

1991

# Catalog for 1991-1992

University of Maine

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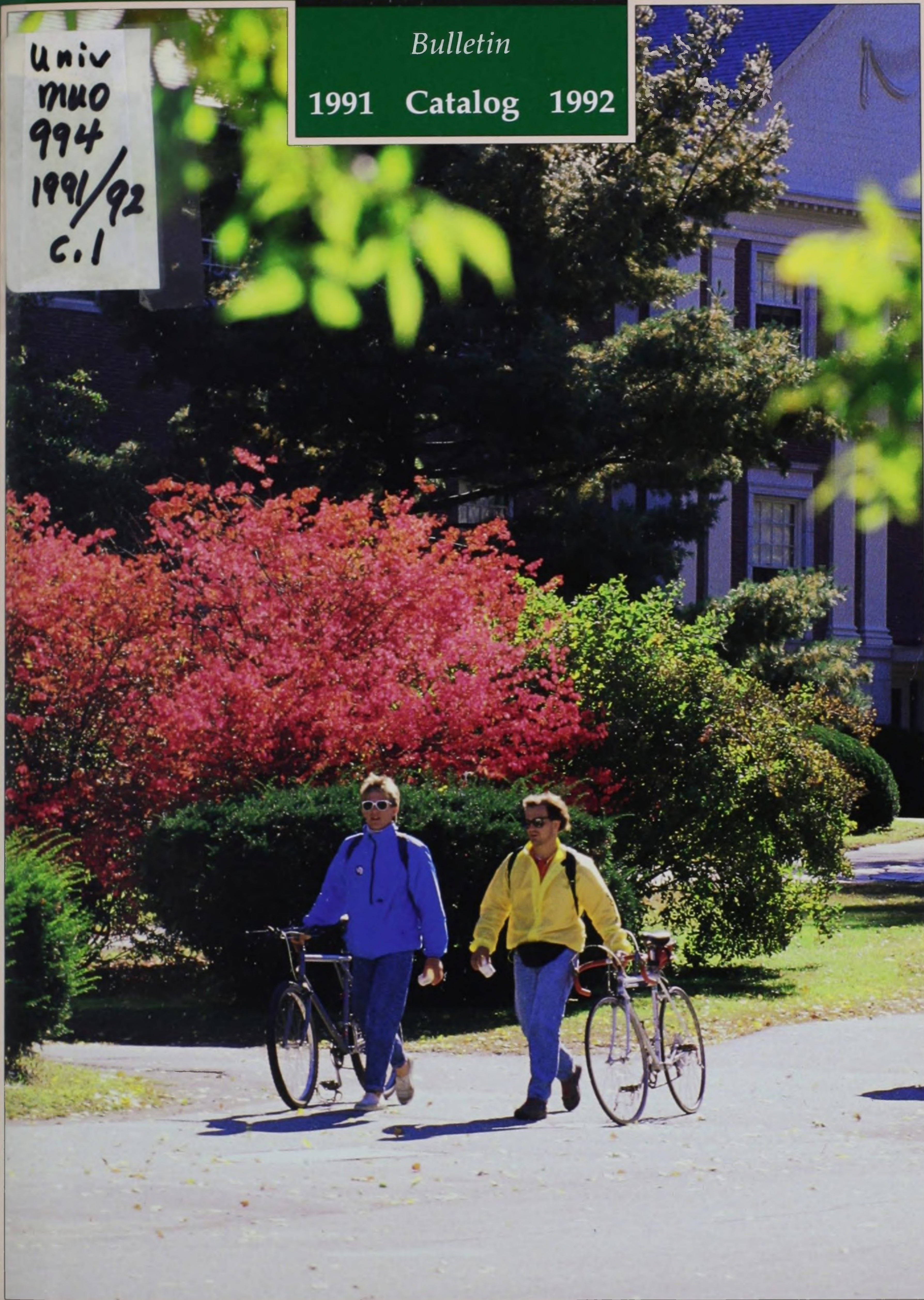


UNIVERSITY OF MAINE

*Bulletin*

1991 Catalog 1992

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# Catalog for 1991–1992

University of Maine



The University of Maine shall not discriminate and shall comply with applicable laws prohibiting discrimination on the grounds of race, color, religion, sex, sexual orientation, national origin or citizenship status, age, handicap, or veteran status in employment, education, and all other areas of the University

The University of Maine does not discriminate on the basis of handicap in admission or access to, or treatment or employment in its programs and activities, in compliance with Section 504 of

the Rehabilitation Act of 1973 and its implementing regulations.

In addition, the University of Maine does not discriminate on the basis of sex in its educational programs or activities, in compliance with Title IX of the Education Amendments of 1972 and its implementing regulations.

Questions and complaints about discrimination in any area of the University or about the application of Section 504 or Title IX should be

directed to Suzanne Estler, Director of Equal Opportunity, 318 Alumni Hall, University of Maine, Orono, ME 04469, (207) 581-1226. Inquiries about both areas may also be referred to the Assistant Secretary for Civil Rights, U.S. Department of Education, Washington, D.C., or to the Director, Office for Civil Rights, U.S. Department of Education, Region I, John W. McCormack Post Office and Courthouse Building, Boston, MA 02109.

University of Maine  
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# Contents

Academic Calendar .....	iv	Technical Division .....	84	College of Social and Behavioral	
Correspondence .....	v	College of Arts and Humanities .....	89	Sciences .....	247
General Information .....	1	School of Performing Arts .....	116	School of Nursing .....	278
Academic Information .....	13	College of Business Administration .....	127	School of Social Work .....	281
Financial Information .....	17	College of Education .....	133	University College .....	283
Admission .....	19	College of Engineering .....	145	Continuing Education Division .....	285
Abbreviations and Symbols .....	25	Aerospace Studies (Air Force		Summer Session .....	285
Interdisciplinary Course		ROTC) .....	147	University-wide Programs .....	311
Concentrations .....	27	Pulp and Paper Technology .....	151	Canadian Studies Program .....	311
Bachelor of Arts Degree: Requirements,		Military Science (Army ROTC) .....	175	University Honors Program .....	313
Rules and Regulations .....	39	Naval Science (Navy ROTC) .....	177	Onward Program .....	315
College of Applied Sciences		School of Engineering		Women's Studies .....	317
and Agriculture .....	45	Technology .....	181	Administration and Faculty .....	319
School of Human Development .....	72	College of Forest Resources .....	189	Index .....	343
College-wide Programs and Minors .....	80	College of Sciences .....	207		

**Information in this Catalog covers the academic year 1991-1992**

The University of Maine reserves the right to revise, amend, or change items set forth in this BULLETIN from time to time. Accordingly, readers of this BULLETIN should inquire as to whether any such revisions, amendments, or changes have been made since the date of publication. The University of Maine reserves the right to cancel course offerings, to set the minimum and maximum sizes of classes, to change designated instructors in courses, and to make decisions affecting the academic standing of anyone participating in a course or program offered by the University of Maine.



# Academic Calendar 1991-1992

## FALL SEMESTER 1991

September 3 ..... Classes begin, 8:00 a.m.  
October 11 ..... Fall break begins, 5:00 p.m.  
October 16 ..... Classes resume, 8:00 a.m.  
November 26 ..... Thanksgiving recess begins, 9:15 p.m.  
December 2 ..... Classes resume, 8:00 a.m.  
December 13 ..... Classes end, 5:00 p.m.  
December 16 ..... Final exams begin, 8:00 a.m.  
December 20 ..... Final exams end, 6:15 p.m.

## SPRING SEMESTER 1992

January 13 ..... Classes begin, 8:00 a.m.  
February 28 ..... Spring recess begins, 5:00 p.m.  
March 16 ..... Classes resume, 8:00 a.m.  
May 1 ..... Classes end, 9:30 p.m.  
May 4 ..... Final exams begin, 8:00 a.m.  
May 8 ..... Final exams end, 12:30 p.m.  
May 9 ..... Commencement, 10:30 a.m.



## Correspondence

Inquiries should be directed as indicated below:

**General administrative matters:** Interim President, John C. Hitt, Alumni Hall

**Admission to the freshman class and to advanced standing:** Director of Admissions, William J. Munsey, Chadbourne Hall

**College of Applied Sciences and Agriculture:** Dean of the College, Wallace C. Dunham, Winslow Hall

**College of Arts and Humanities:** Dean of the College, Leslie A. Flemming, Stevens Hall

**College of Business Administration:** Dean of the College, W. Stanley Devino, South Stevens Hall

**College of Education:** Dean of the College, Robert A. Cobb, Shibles Hall

**College of Engineering and Technology:** Dean of the College, Norman Smith, Barrows Hall

**College of Forest Resources:** Dean of the College, G. Bruce Wiersma, Nutting Hall

**College of Sciences:** Dean of the College, Dagmar Cronn, Aubert Hall

**College of Social and Behavioral Sciences:** Dean of the College, Julia M. Watkins, Stevens Hall

**University College:** Dean of the College, Charles R. McRoy, Acadia Hall

**Graduate School and scholarships available for graduate students:** Dean of the Graduate School, Charles E. Tarr, Winslow Hall

**Continuing educational courses:** Director, Continuing Education Division, Robert C. White, Chadbourne Hall

**Summer Session:** Director, Robert C. White, Chadbourne Hall

**Conferences and Institutes:** Director, Bruce G. Stinson, Chadbourne Hall

**Financial assistance:** Director of Student Aid, Steven Klein, Wingate Hall

**Financial services for students:** Business Manager, Alumni Hall

**Residence Halls:** Director of Residential Life, Scott Anchors, Hilltop

**Off-campus housing:** Associate Dean of Student Services, Maxine Harrow, Memorial Union

**Senior and alumni placement:** Placement Director, Adrian J. Sewall, Chadbourne Hall

**Student Records:** Registrar, John F. Collins, Jr., Wingate Hall

## Accreditation

The University of Maine is accredited by the New England Association of Schools and Colleges, Inc., which accredits schools and colleges

in the six New England states. Accreditation by the Association indicates that the institution has

been carefully evaluated and found to meet standards agreed upon by qualified educators.

## The University of Maine System

The University of Maine System is a statewide system of public institutions of higher education. It is operated by a single Board of Trustees, which is appointed by the Governor. The chief academic and administrative officer for the system is the Chancellor, who is responsible to the Board of Trustees.

The University has campuses in Augusta, Farmington, Fort Kent, Machias, Orono, Presque Isle, and Portland/Gorham (University of Southern Maine). The University of Maine includes the Colleges of Applied Sciences and Agriculture, Arts and Humanities, Business Administration, Education, Engineering and

Technology, Forest Resources, Sciences, Social and Behavioral Sciences, the University College, and the Graduate School.



# General Information

The University of Maine is located about half-way between Kittery, the southernmost town in the state, and Fort Kent on the northern boundary. It is on U.S. Route 2A approximately eight miles from Bangor, the third largest city in Maine. The University campus is a mile from the business section of Orono, an attractive town of about 10,000 people, and borders the Stillwater River, a branch of the Penobscot River.

## History

The University was originally established as the State College of Agriculture and the Mechanic Arts under the provisions of the Morrill Act approved by President Abraham Lincoln in 1862. The next year, the State of Maine accepted the conditions of the act and in 1865 created a corporation to administer the affairs of the college. The original name was changed to the University of Maine in 1897.

The institution opened on September 21, 1868, with 12 students and two faculty members. Dr. Merritt Caldwell Fernald was appointed acting president. By 1871, curricula had been developed in agriculture, civil engineering, mechanical engineering, and electives. From these curricula the Colleges of Agriculture, Technology, and Arts and Sciences gradually developed. Women have been admitted since 1872. The School of Education was established in 1930 and became the College of Education in 1958. The University operated a college of law from 1898 to 1920. After this unit was discontinued in 1920, the University did not offer law courses until 1961 when a School of Law, located in Portland, was added through a merger with Portland University.

Schools of Business Administration, Forestry, Home Economics (now Human Development), and Nursing were established in 1958. The School of Business Administration became the College of Business Administration in 1965. The University of Maine at Bangor became the University's sixth college in 1974. At that time it was renamed Bangor Community College, and in 1985 it received its current name, University College. Schools of Engineering Technology and Performing Arts were established in 1975. The College of Forest Resources was established in 1982.

The Maine Agricultural Experiment Station was established as a division of the University by act of the Legislature of 1887, as a result of the passage by Congress of the Hatch Act. It succeeded the Maine Fertilizer Control and Agriculture Experiment Station, which had been established in 1885.

In 1980, the University of Maine was accorded Sea Grant College status by the Federal Government under provisions of the National Sea Grant College Program Act.

Graduate instruction has been offered by various departments for many years. The first master's degree was conferred in 1881, and the first doctor's degree in 1960. Since 1923, all graduate work has been consolidated in a separate division, the Graduate School.

Beginning in 1895, the Summer Session has usually been held each year. Summer Sessions of varying lengths are designed for teachers, school administrators and for regular college students who desire to accelerate their work.

## Mission

The University of Maine is the land grant university and sea grant college of the State of Maine. The mission of the University of Maine is to provide for the State of Maine a center of academic excellence in which are housed the resources for knowledge creation and dissemination to a statewide audience. Undergraduate and graduate programs through the doctorate are provided in selected academic fields. Basic and applied research appropriate to Maine is an ongoing responsibility, while other creative endeavors, including basic research of national or international significance, are encouraged. Organized programs of public service are provided throughout the state.

## Non-discrimination Policies

The University of Maine is committed to a living, learning and working environment fully inclusive of the diverse populations it serves. Thus, the University shall not discriminate and shall comply with applicable laws prohibiting discrimination on the grounds of race, color, religion, sex, sexual orientation, national origin or citizenship status, age, handicap, or veteran status in employment, education, and all other areas of the University.

Consistent with this policy, the University has a responsibility to: (1) provide a living, learning and working environment free of harassment related to any of the above characteristics and specifically related to sexual harassment, (2) provide reasonable accommodation to assure the fullest possible participation of persons with disabilities in the educational and employment life of the University, (3) assure employment and educational practices free of discrimination, and (4) provide full and impartial investigation of concerns regard-

ing discrimination in these categories in any area of the University.

### *Sexual Harassment Policy*

In accordance with its policy of complying with non-discrimination laws, the University will regard freedom from sexual harassment as a right which will be guaranteed as a matter of policy. Any employee or student will be subject to disciplinary action for violation of this policy.

Sexual advances, requests for sexual favors and other verbal or physical conduct of a sexual nature constitute sexual harassment when:

1. Submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment or education;
2. Submission to or rejection of such conduct by an individual is used as the basis for academic or employment decisions affecting that individual; or
3. Such conduct has the purpose or effect of interfering with an individual's academic or work performance or creating an intimidating, hostile or offensive employment, educational, or living environment.

Consenting relationships may constitute sexual harassment under this policy. When a professional power differential exists between members of the University of Maine and a romantic or sexual relationship develops, there is a potential for abuse of that power, even in relationships of apparent mutual consent. A faculty or staff member should not engage in such relationships. Further, the University prohibits the abuse of power in romantic or sexual relationships.

To ensure that power is not abused and to maintain an environment free of sexual harassment, a faculty or staff member must eliminate any current or potential conflict of interest by removing himself or herself from decisions affecting the other person in the relationship. Decisions affecting the other person include grading, evaluating, supervising, or otherwise influencing that person's education, employment, housing, or participation in athletics or any other University activity.

It is the policy of the University of Maine to ensure fair and impartial investigation that will protect the rights of the person(s) filing sexual harassment complaints, the person complained against and the University as a whole. A separate brochure and information specific to sexual harassment is available through the Office of Equal Opportunity.

Questions, concerns and complaints about discrimination in any area of the University or about the application of laws and regulations related to equal opportunity and affirmative action should be directed to: Office of Equal Op-



portunity, 318 Alumni Hall, University of Maine Orono, Maine 04469; (207) 581-1226.

#### *Nonsexist Language*

The University of Maine, as an equal opportunity educational institution, is committed to both academic freedom and the fair treatment of all individuals. It therefore discourages the

use of sexist language. Language that reinforces sexism can arise from imprecise word choices that may be interpreted as biased, discriminatory, or demeaning even if they are not intended to be. Accordingly, all University communications including classes and communications, whether delivered orally or in writing, shall be free of sexist language.

Each member of the University community is urged to be sensitive to the impact of language and to make a commitment to eliminate sexist language. Guidelines on the use of nonsexist language can be provided by the Women in the Curriculum Program or Public Affairs.

## Undergraduate Degree Programs

### College of Applied Sciences and Agriculture

#### Associate of Science

Animal Medical Technology  
Landscape and Nursery Management  
Merchandising

#### Bachelor of Science

Aquaculture  
Agribusiness and Resource Economics  
Animal and Veterinary Sciences  
Bio-Resource Engineering  
Bio-Resource Engineering Technology  
Child Development/Family Relations  
Food Industry Systems  
Forest Engineering  
Health and Family Life Education  
Human Nutrition and Foods  
Landscape Horticulture  
Merchandising and Consumer Resources  
Natural Resources  
Sustainable Agriculture

### College of Arts and Humanities

#### Bachelor of Arts

Art  
English  
French  
German  
History  
International Affairs \*  
Latin  
Modern Languages  
Music  
Philosophy  
Romance Languages  
Spanish  
Theatre

\* With majors in the following: Anthropology, Economics, Foreign Languages, History, and Political Science.

#### Other

Bachelor of Music in Music Education  
Bachelor of Music in Performance

### College of Business Administration

Bachelor of Science  
Business Administration

### College of Education

#### Bachelor of Science

Art Education  
Elementary Education  
Health, Physical Education and Recreation Education  
Secondary Education

#### Other

Provisional Teaching Certificate: Elementary or Secondary Levels

### College of Engineering

#### Associate of Science

Civil Engineering Technology  
Electrical Engineering Technology  
Mechanical Engineering Technology

#### Bachelor of Science

Chemical Engineering  
Civil Engineering  
Computer Engineering  
Construction Management Technology  
Electrical Engineering  
Electrical Engineering Technology  
Engineering Physics  
Forest Engineering  
Mechanical Engineering  
Mechanical Engineering Technology  
Pulp and Paper Technology

#### Surveying Engineering

Certificate in Five-Year Pulp and Paper Management

### College of Forest Resources

#### Bachelor of Science

Forest Engineering  
Forestry  
Recreation and Park Management  
Wildlife Management  
Wood Technology

### College of Sciences

#### Bachelor of Arts

Biology  
Chemistry  
Clinical Laboratory Sciences  
Computer Science  
Geological Science  
Mathematics  
Physics  
Zoology

#### Bachelor of Science

Biochemistry  
Biology  
Botany  
Chemistry  
Microbiology  
Molecular and Cellular Biology

### College of Social and Behavioral Science

#### Bachelor of Arts

Anthropology  
Broadcasting  
Economics  
International Affairs \*  
Journalism



Political Science  
 Psychology  
 Public Management  
 Social Work  
 Sociology  
 Speech Communication

### Bachelor of Science

Nursing

\* With majors in the following: Anthropology, Economics, Foreign Languages, History, and Political Science.

## University College

Associate of Arts

Liberal Studies

### Associate of Science

Business Management  
 Dental Hygiene  
 Health Information Technology  
 Human Services  
 Legal Technology

### Other

Bachelor of University Studies  
 Certificate in Dental Assisting  
 Certificate in Paralegal Studies

## Academic and Career Exploration Program (ACE)

Designed to help students explore the wealth of academic fields that the University has to offer, the ACE program is appropriate for those in-

dividuals who (1) are uncertain about choice of major or academic program; (2) have such wide range of interests that admission to one of the colleges would be too limited at this point; or (3) want assistance in exploring various academic fields and their relationship to career. Such students can apply for admission to ACE rather than to one of the undergraduate colleges at the University of Maine. The ACE program will help students assess their academic and personal strengths and use those assessments to decide on the most appropriate majors and career paths. Under the guidance of selected faculty advisors and through a series of structured activities and one-credit seminars, students will systematically examine not only possible majors, but also their own learning styles, their values and their long-range goals. Students may continue in this program until they can transfer into a college or academic program that matches their abilities and intellectual and/or career interests. At the time of transfer, they must meet any eligibility standards (e.g., GPA) of the chosen college or major.

## Graduate Degree Programs

### Doctor of Philosophy:

Biochemistry and Molecular Biology  
 Biological Sciences  
 Chemical Engineering  
 Chemistry  
 Civil Engineering  
 Food and Nutrition Sciences  
 Forest Resources  
 Geological Sciences  
 History  
 Individualized  
 Microbiology  
 Oceanography  
 Physics  
 Plant Science  
 Psychology  
 Surveying Engineering  
 Wildlife  
 Zoology

### Doctor of Education

Master of Arts with major in one of the following:

Economics\*  
 Education  
 English\*  
 French  
 History\*  
 Liberal Studies\*  
 Mathematics\*

\*Indicates non-thesis option

Psychology  
 Speech Communication\*  
 Theatre\*

Master of Science with major in one of the following:

Agricultural and Resource Economics  
 Animal Sciences  
 Bio-Resource Engineering  
 Biochemistry  
 Botany and Plant Pathology  
 Chemical Engineering  
 Chemistry  
 Civil Engineering  
 Community Development  
 Computer Science  
 Education  
 Electrical Engineering  
 Entomology  
 Food Science  
 Forestry  
 Geological Sciences  
 Human Development  
 Mechanical Engineering  
 Microbiology  
 Oceanography  
 Physics  
 Plant and Soil Sciences  
 Quaternary Studies  
 Resource Utilization  
 Survey Engineering  
 Wildlife Management  
 Zoology

### Professional Programs

#### Certificate of Advanced Study

Master of Arts in Teaching with major in one of the following:

French  
 German  
 Spanish

#### Master of Business Administration

#### Master of Education

Master of Engineering with a major in one of the following:

Bio-Resource Engineering  
 Civil Engineering  
 Electrical Engineering  
 Engineering Physics  
 Mechanical Engineering.

#### Master of Forestry

#### Master of Music

Master of Professional Studies with major in one of the following:

Agricultural and Resource Economics  
 Animal Sciences  
 Biochemistry



Community Development  
Microbiology  
Public Administration

## Master of Public Administration

## Master of Science in Medical Technology

## Master of Social Work

## Master of Wildlife Conservation

## Accreditation

The University of Maine is accredited by the New England Association of Schools and Colleges. In addition, many of the University of Maine's professional programs and departments are accredited by national professional associations, including:

Accreditation Board for Engineering and Technology  
American Assembly of Collegiate Schools of Business  
American Chemical Society  
American Dental Association Commission on Dental Accreditation  
American Home Economics Association  
American Psychological Association  
American Veterinary Medical Association  
Committee on Allied Health Education and Accreditation in cooperation with the American Medical Record Association  
Council on Social Work Education  
Council for Standards in Human Service Education  
National Association of Schools of Art and Design  
National Association of Schools of Music  
National Association of Schools of Public Affairs and Administration  
National Council for Accreditation of Teacher Education  
Society of American Foresters

## Other Facilities and Services

### The Bureau of Public Administration

The Bureau of Public Administration was established in 1965 by Act of the 102nd Maine Legislature for the purpose of improving the quality of public administration in the State of Maine. As an integral part of the Department of Public Administration the Bureau provides applied research on public policy/program issues, management training and development, and consultation services to assist Maine state and local governments. In addition, the Bureau publishes reports, articles, newsletters and manuals related to the field of public administration as

well as particular issues facing Maine's public administrators.

### The Conferences and Institutes Division

Established in 1973, this office brings together groups of participants and qualified resource people to share information and ideas, develop new skills and insights, and seek solutions to current problems. Each year over 30,000 people participate in more than 300 conferences, meetings, seminars, workshops, short courses, institutes, and symposia. The office is located in Chadbourne Hall.

### The Canadian-American Center

The Canadian-American Center coordinates the broad range of Canadian and cross-border studies at the University of Maine. Located at 154 College Avenue, the Center houses seminar rooms, research space for visiting faculty and administrative offices of the University of Maine's National Resource Center for Canada.

### Computing and Instructional Technology

Computing and Instructional Technology is a service organization designed to assist students, faculty and staff with instruction and presentations. To achieve the end, the department is organized into four service areas. The *Training/Network* area includes management of three general use microcomputer clusters (Stewart Commons, Neville Hall and Folger Library), and consultation to novice microcomputer users at these locations. It also sponsors frequent workshops and provides DOS and MAC software support. Additionally, this area is responsible for local and campus-wide networks. The *Microcomputer Resource Center (MRC)* assists students, faculty and staff with personal purchases of microcomputers, software and accessories. It also repairs microcomputers and printers for University departments. *Audio-Visual Services* provides audio-visual equipment and repairs campus-owned AV equipment. *Television Services* is responsible for on-campus distribution of television including three instructional classrooms, the television studio in Alumni Hall and satellite teleconferences, as well as standard video and audio production.

### The Libraries

The Raymond H. Fogler Library, on the Orono campus, is the largest library in Maine. It contains an excellent collection of general materials to support undergraduate and graduate studies as well as rich and varied research collections including 760,000 volumes, 5,400 periodical subscriptions, more than 1.1 million microforms, and more than 1.5 million U.S. and Canadian federal government publications.

Specialized collections include Maine-related materials, sound recordings and music scores, maps, manuscripts, and educational material for teachers and students. An online catalog provides convenient access to the holdings of a University of Maine System libraries. Student and faculty have access to electronic database for computerized literature searching in the Information Services Department and the Science and Engineering Center. Zenith and APPLE microcomputers are available for use at no charge.

The University College Library, located in Eastport Hall on the Bangor campus, contains books and audiovisual materials supporting the curriculum of the college. The library at the Irvin C. Darling Center in Walpole houses a specialized collection of books, journals, and reprints devoted to Marine Studies.

### The University of Maine Museum of Art

The University of Maine Museum of Art is a vital visual arts institution on the Orono campus. Founded in 1946, the University of Maine Museum of Art is one of the earliest and most distinguished land grant University art collections in the United States. The permanent collection of over 4,500 works includes a wide variety of prints and paintings by such artists as George Inness, Daumier, Picasso, Sims, Piranesi, Kollwitz, Wesselman, and Dine. The Museum's focus is on modern and contemporary nationally and internationally recognized artists.

The Museum mounts approximately six major shows a year. Work is also displayed in Ives Gallery and the Hartgen Gallery in the Memorial Union. In addition to exhibitions work is displayed in residential and in satellite galleries throughout the State of Maine.

The only fine arts institution owned by the people of the State of Maine, the Museum offers its resources in outreach programming, from PEP (Public Exhibition Program) traveling shows and Maine Visual Arts Dialogue, a program designed to unite those involved in the visual arts, to extensive museum education.

### Planetarium and Observatory

The Planetarium and Observatory are operated by the Physics and Astronomy Department for the benefit of students and the general public by a director and a staff of students from all areas of the University. Located on the second floor of Wingate Hall, the Planetarium offers a variety of public star shows throughout the year, free to University students. It is also available for special group showings for departments, clubs and area schools. The Observatory in the dome building next to the Memorial Union contains a vintage Alvan Clark refractor telescope, and everyone is welcome to stop in when staff operators open it on clear nights.

### The Hudson Museum

The Hudson Museum is located in the Maine Center for the Arts on the UM campus. The



museum's collections are largely, but not exclusively, anthropological and function as teaching and research aids for University students and the general public.

The Hudson Museum's permanent collections include one of the finest assemblages of pre-Columbian Mexican and Central American materials in the United States. The collections also include materials from the Native Americans of the Northwest Coast area, Plains and Eastern Indians, Equator, the Arctic, Oceania, Asia and Africa. Visiting exhibits are regularly brought to the museum to supplement the permanent collections. Regular hours are Tuesday-Friday, 9:00 to 4:00; Saturdays, 9:00 to 3:00; and Sundays 11:00 to 3:00. Admission is free for visitors, but donations are encouraged. Groups may expect a modest charge and admission fees for special exhibits. For further information call 581-1901.

### The Northeast Archives of Folklore and Oral History

The Northeast Archives of Folklore and Oral History, a part of the Anthropology Department, is located in the basement of South Stevens Hall. It is a research facility and a repository for tape recordings, transcripts of tapes and related photographs and manuscript material relevant to the folklore and folklife of Maine and the Maritime Provinces of Canada.

### Women in the Curriculum Program

The mission of the Women in the Curriculum Program (WIC) is to improve the quality of education for all students by helping to ensure that the experiences and perspectives of women are part of the University curricula. To this end the WIC office, which reports to the Vice President for Academic Affairs, administers an Interdisciplinary Concentration in Women's Studies and continues a longstanding effort toward curriculum revision, that is the refocusing of the University's courses to represent equally the experiences, contributions, values and perspectives of both sexes.

The WIC office provides small grants for curriculum development and for research projects consistent with WIC goals, is responsible for implementing the University's nonsexist language policy, and shares with the Equal Opportunity office responsibility for efforts supporting women's development.

Additional WIC programs include the weekly presentations in the WIC Lunch Series, the University's annual celebration of Women's History, the Maryann Hartman Awards to Maine women of achievement, guest speakers, and a variety of other projects and events intended to assist the university in providing a full and accurate education for its students.

### Services for Students with Disabilities (Onward Program)

Services for Students with Disabilities facilitates the education of students with disabilities by providing a point of coordination for any special services they may need while attending UM.

Services provided or coordinated through Services for Students with Disabilities include advising, special orientation to campus, readers, recorders, tutors as needed, the ordering of taped texts, classroom relocation, lift keys, priority registration, mediation and advocacy, as well as personal, educational, and vocational counseling.

Services for Students with Disabilities, located in the Onward Building, will be happy to supply further information and answer questions. Students with special needs are urged to contact the Counselor/Coordinator of Services for Students with Disabilities, Onward Building, UM, Orono, ME 04469. Phone (207) 581-2320.

### Office of University Retention Programs

The Office of University Retention Programs, established in 1986, works to help students persist at the University of Maine until their educational goals are reached. It does so by developing programs to help students succeed academically and recommending them for implementation.

Because of its importance to student retention, the quality of the first-year experience at the University receives special emphasis from the Office. Acting as a student advocate, the Office works in conjunction with the colleges to improve services such as academic assistance and advising, which clearly have an impact on student inclination to achieve educational goals.

Additionally, the Office is responsible for listening to student problems, helping students with them and assessing their significance to the ability of students to remain in school. Problem solving focuses on the individual, systemic causes and solutions to the attrition problem which affects a broad range of students.

### Office of Research and Public Service

The Office of Research and Public Service has the responsible planning, coordinating and administering the programs of organized research and public service of the University of Maine. This objective is accomplished through procedures designed to

A. Coordinate the research and public service efforts of the colleges and other units of UM with the goal of developing effective interrelationships between staff functions and projects.

- B. Develop long-range goals and objectives for the research and public service programs of UM and provide faculty and staff members with the opportunity to contribute to planning, establishing and implementing such goals.
- C. Provide increased opportunity for faculty and staff members to participate in programs of research and public service by promoting multidisciplinary and interdisciplinary approaches to solving identified problems. Comprehensive and timely information on grant support is made available on a continuing basis.
- D. Disseminate information resulting from the research and public service programs to the general public, including the private sector.

Following is a list of current organized research and public service units operating at UM.

### The Maine Agricultural Experiment Station

For more than one hundred years, the Maine Agricultural Experiment Station has been undertaking research for Maine and its people. Originally devoted to research for Maine's farm community, the Experiment Station is now Maine's most important center for research in agriculture, forest resources, and rural economic development. The Station maintains its offices and principal research laboratories at Orono. Additional research facilities include Aroostook Farm at Presque Isle, Highmoor Farm in Monmouth, Blueberry Hill Farm in Jonesboro, Witter Animal Science Center at Orono, and the DeMerritt Forest at Orono. More than one hundred scientists participate in research programs designed to apply the techniques of modern science to the needs of Maine. This commitment to relevance is seen in both applied and basic programs in agriculture, forestry, wildlife, human nutrition, food technology, fisheries and aquaculture, community economic development, plant and animal biology, and family living. Two public advisory committees, the University of Maine Agricultural Advisory Committee and the Forest Resources Research Advisory Committee, provide advice in the development and oversight of the research programs.

### Sponsored Programs Division

The Sponsored Programs Division provides support services to faculty and staff seeking extramural funding for research, teaching, or public service projects, and to those who direct extramurally funded projects. On behalf of the University, SPD oversees the submission of proposals and shares with the Principal Investigator or Project Director responsibility for the management of grants, contracts and cooperative agreements.



## Faculty Research Funds Program

The Faculty Research Funds Program is comprised of three yearly grant programs awarded on an competitive basis: the Regular Faculty Research Fund Award supports work which can be completed in one year and provides research support other than faculty salaries, the Summer Faculty Research Fund Award provides \$5,000 awards for faculty summer salaries for work which can be completed in one summer and the Scientific Equipment and Book Fund Award is for the acquisition of equipment or library collections. The purpose of these funds is to stimulate and assist individual members of the faculty to initiate or redirect research or studies of a scholarly nature. Eligibility is limited to tenure-track and full-time nontenure-track faculty with an extended appointment for which research is an expected component. Funds are provided by the Vice President for Research and Public Service, and projects are selected by the Faculty Research Funds Committee. By design, the Committee includes representatives from each of the respective colleges and members are appointed by the Faculty Senate.

## Water Resources Institute Program

This problem-oriented research and public service program is centered on land and water resources; no courses or degree programs are offered. Current focus areas include water and soils management and waste utilization. Specific objectives are to design and manage research projects, to disseminate research results and to foster student training. Funded projects are often interdisciplinary. Seminars and conferences are held in cooperation with other campus units and state agencies. Because it draws on the research and outreach talents of faculty and staff throughout the University, the WRIP Program can be adjusted to meet changing needs.

## The University of Maine Center for Marine Studies

Approved by the Board of Trustees on September 28, 1977, and located on the Orono campus, the primary goal of this unit is to develop an internationally recognized center emphasizing research and graduate studies. The Center provides leadership in the development of quality research programs with emphasis on the Gulf of Maine, its coastal zone, and other related cold water regions. Components of the Center within the University include the Joint Institutional Sea Grant Program, the Ira C. Darling Center at Walpole, the Maine Lobster Institute, the Migratory Fish Research Institute, and the Maine Marine Advisory Program. The Center also provides access to marine research capabilities (including an 80-foot research vessel), located at other institutions in the region.

## The Ira C. Darling Center for Research, Teaching, and Service

The University's marine laboratory, a part of the Center for Marine Studies, is located six miles from the mouth of the Damariscotta River. Regional habitats range from marshes and tidal flats to rocky shores and subtidal rock walls. Deep-sea conditions can be reached 10-20 miles offshore. A flowing seawater facility at the lab supports a wide variety of experiments with living organisms. The Center has 20,000 square feet of laboratory space and a wide variety of sampling and analytic equipment, including a scanning electron microscope, an elemental (CHN) analyzer, gas chromatographs, a scintillation counter, an image analysis system, and an atomic absorption spectrophotometer available for faculty and student marine research. Year-round dormitory space accommodates 12, and summer quarters are available for an additional 20 persons. A steel and concrete pier provides berthing for vessels (one equipped with a hydraulic winch) and a number of outboard motor boats used for inshore and nearshore field work. Through cooperative arrangements with other institutions, faculty and students have access to offshore and open ocean areas. The Center's library contains several thousand volumes, more than 150 scientific journals, and an extensive reprint collection. Laboratory space for students and visiting investigators can be arranged.

## The Sea Grant College Program

Part of the Center for Marine Studies, the Sea Grant College Program provides a focus for the University of Maine and cooperating institutions on important marine issues and the resource potential of the Gulf of Maine and its coastal boundary. Primarily a program of marine research, graduate education, and marine extension education, the program, in partnership with the University of New Hampshire, receives primary funding from the Office of Sea Grant, National Oceanic and Atmospheric Administration. The Marine Advisory Program is a network of organizations working together toward a common goal: to promote the wise use, development and conservation of northern New England's coastal and Marine resources through research-based educational programs. By integrating the talents of educational institutions and government agencies it extends the impact of its programs and responds effectively to the needs of those dependent on Marine resources.

## Institute for Quaternary Studies

The Institute is a global effort by faculty members with Joint Appointments in the departments of Anthropology, Plant Biology and Pathology, History, and Geological Sciences, in the study of the Quaternary Period, a time of numerous glacial/interglacial cycles leading

up to the present. Interdisciplinary projects relate the effects of climate change to the physical, biological, chemical, social, and economic conditions of the present and future.

## Laboratory for Surface Science and Technology

The Laboratory for Surface Science and Technology (LASST) is one of the University's organized research units. LASST coordinates research in a range of fundamental and applied areas relating to the properties of surfaces and interfaces of materials and their application to areas such as microsensors, catalysis, and thin film growth. Extensive laboratory facilities have been set up to support the research needs of LASST's faculty members, other University of Maine faculty, and state and regional industries. LASST provides opportunities for about twenty-five graduate and undergraduate students to acquire training and experience in a high technology program. LASST faculty also offer specialized courses in surface and interface science. Major research areas include surface crystallography, microwave acoustics, surface phase transitions, adsorption and catalysis, analytical methods, adhesion, atomic force microscopy, biosensors, gas sensors and fluid sensors.

## French-Language Center for International Training and Development (Office of International Programs)

The Center offers short-term training and development programs in management, the sciences, and technical subjects to participants who come from the developing francophone nations of Africa and the Caribbean. All such programs are conducted in French.

## The Department of Industrial Cooperation

The University has skills and facilities that are useful to individuals, private industry and government agencies. The Department of Industrial Cooperation was established in 1946 to coordinate the activity in a way that does not compromise the basic commitment of the University to teaching, research and public service. All University costs, including the operation of the Department, are paid by clients using the service.

## University of Maine Cooperative Extension

The University of Maine Cooperative Extension extends the resources of the University to the people of Maine wherever they live, an important responsibility of all land-grant colleges and universities. At work in Orono and in 16 county offices, more than 100 Extension faculty mem-



bers and roughly 15,000 volunteers conduct educational programs to help Maine citizens solve problems at home, at work, on farms, and in communities. In addition, Extension administers the state's 4-H program, which involves more than 24,000 Maine young people in educational club, camp, and in-school activities. All Extension programs are based on research performed at the University of Maine and other land-grant institutions across the nation. Besides county educators and volunteers, Extension personnel include state and area specialists, administrators, professionals, and paraprofessionals. County Extension Associations sponsor Extension programs in each county. Maine's Cooperative Extension is part of a nationwide Extension system, supported by a three-way partnership involving the U.S. Department of Agriculture, the land-grant colleges and universities, and county governments.

### Center for Innovation and Entrepreneurship

The Center for Innovation and Entrepreneurship serves as an extension link for relating the technical needs of Maine manufacturing firms to the resources of the University of Maine. Technical needs are identified by plant visits, meetings, surveys and various other communication tools. Responses to these needs are then made through such technology transfer mechanisms as noncredit education programs, technical problem solving, consulting, new product development, surveys, referrals and in-plant projects.

### The Bureau of Labor Education

Established in 1966, the University of Maine's Bureau of Labor Education provides specialized educational opportunities and conducts practical research for Maine workers and their organizations. Program offerings and activities focus on leadership development, labor law, occupational health and safety, economics and union administration. Through these activities, Maine workers are provided with information and knowledge necessary for making informed decisions regarding changing economic, political and social conditions.

### The Pulp and Paper Foundation

Supported by private funding from 146 companies located in 25 states as well as several hundred individual donations, the foundation encourages a strong teaching and research program in Chemical Engineering, with a significant undergraduate scholarship program available to qualified students throughout the College of Engineering, School of Engineering Technology and the College of Forest Resources.

### Office of International Programs

The Office of International Programs (OIP) has programmatic responsibility for coordinating UM international program activities, making policy recommendations and establishing protocol and procedures for new programs and initiatives, developing strategies, and maintaining liaison with external public and private institutions, organizations and agencies. The director of OIP also oversees and manages activities related to the Title XII and to research and program development activities, particularly in developing countries.

### Katahdin Area Health Education Center

The unit provides Continuing Education Division programs to health professionals, assists medical and nursing students at various universities to participate in clinical rotations with rural physicians and hospitals, develops educational programs for rural areas, and recruits minority students into the program.

### The Lobster Institute

A program of research and education conducted in cooperation with the lobster industry, the Institute generates information about the Maine lobster which is used to help conserve and enhance the resource and ensure the continuance of the lobster industry in Maine and adjacent areas. The Institute works with representatives of the industry to identify practical problems and generate their solutions.

### Maine Council on Economic Education

A cooperative effort of the University of Maine and more than 100 business and labor groups combined with the University's College of Education, the Council offers statewide programs of teacher training in economics, hosts workshops, and integrates economic education into school curricula.

### National Center for Geographic Information and Analysis

This research center was established to study methods of collecting, storing, analyzing, using and presenting geographic information in a computer-based world, and to promote an understanding of the impact of this new technology on science, society and industry. The Center studies spatial concepts necessary to advance research in such areas as artificial intelligence, computer graphics, computer science, ecology, engineering, geography, mathematics as well as many others. The NCGIA is the only such center in the U.S. and is operated by a consortium of the University of California at Santa Barbara, the State University of New York at Buffalo and the University of Maine.

### Margaret Chase Smith Center for Public Policy

The Margaret Chase Smith Center for Public Policy was created in 1989 to improve the capacity of the University to address important public problems and issues. The Center produces and broadly disseminates policy studies which are relevant, timely and responsive. The primary audience for projects of the Center is the State of Maine, including its citizens, officials in the legislative and executive branches and affected interests from educational, business and technological sectors. The Center is an interdisciplinary unit, with working relationships with a broad range of faculty and other units at the University of Maine.

### Maine Inventors Network

The Maine Inventors Network is a collaboration between the University of Maine and the University of Southern Maine that provides comprehensive services to guide new products from invention to marketplace, from concept to commercialization.

The Maine Inventors Network serves as a public service, catalyst, referral office and source of information for the inventor and entrepreneur. Utilizing University of Maine resources, assistance is provided in the areas of invention evaluation, technical needs, protection, manufacturing and commercialization. Further referrals are provided in marketing, finance and business planning in conjunction with the Small Business Development Center at the University of Southern Maine.

The goal of the Maine Inventors Network is to encourage and stimulate new business startups and add-on products for existing Maine manufacturers, while providing a much needed public service to the residents of Maine.

### Office of Research

This office has broad responsibilities for fostering and encouraging research throughout the campus. It provides administration oversight for the organized research units, the research risk committees (i.e., human subjects, animal welfare and biosafety), and the Faculty Research Funds Program. It is also responsible for developing policies for research and related activities and for allocating university cost-sharing funds for extramural activities.

### Division of Student Affairs

#### Center for Student Services

Center staff members work closely with individual students and student groups to help them solve personal, social, and academic problems. Staff members also act as a resource to Student Government and other student organizations, assist students in the development and



evaluation of student life policies, and serve as student advocates to speed up the administrative problem-solving process. The office addresses specific student needs through the following sub units:: Center for Multicultural Affairs, Commuter/Non-Traditional Student Services, International Student Program, Judicial Affairs Office, Memorial Union Program, Student Activities and Organizations, and Substance Abuse Services.

## Counseling Center

The Counseling Center's mission is to provide services and programs which promote the personal development and psychological well-being of students, and to encourage a University atmosphere which is conducive to growth and which maximizes students' educational attainments.

The Center staff, consisting of doctoral level counselors, psychologists and a psychiatric consultant, provides a full range of counseling and mental health services to help students in areas such as educational functioning and decision making, career selection, personal and emotional development, relationship difficulties, psychological disorders and emotional crises. These services are provided through individual and group counseling/therapy, educational/occupational library resources, interest, ability and personality testing, psychological and psychiatric evaluation, crisis intervention and preventive and developmental programming. In addition to these services, Counseling Center staff also provide consultation and educational programming to the campus community.

All full-time students on the Orono campus are eligible for the services of the center free of charge. Referral services are provided to persons who are not eligible to be seen at the Counseling Center.

Counseling Center offices are located on the Gannett side of Cutler Health Center.

## Career Center

The Career Center provides counseling and assistance to students who are involved in career planning and/or seeking employment for all undergraduate and graduate students and alumni.

Staff members provide individual counseling to help students explore career options, set career goals, and devise strategies for reaching these goals. SIGI PLUS, a computer guidance system, is also used to assist students with career decisions. Counselors are actively involved in outreach programming in residence halls, classes and organizations on campus. A Self-Help Career Lab including extensive written and audio-visual materials on careers, employers, and graduate schools, is located in the office.

Special programs designed to help students make connections with employers are sponsored on an on-going basis. Examples of such

programs include the Maine Mentor Program, the Graduate School Fair, Career Awareness Week, and the Maine Recruiting Consortium.

Employers from regional and national firms conduct interviews on campus for graduating seniors. In addition, the Center collects and publishes information regarding job openings for graduates. Students are also encouraged to develop their own personalized job search and assistance is provided through individual counseling and group workshops such as "Resume Writing," "Interviewing Techniques," "Job Search Strategies." For further information contact the Career Center, Chadbourne Hall, University of Maine, Orono, Maine 04469. (207) 581-1359.

## Office of Student Aid

The Office of Student Aid administers a variety of programs to help students finance their education when their own families' resources are inadequate. To enable the University to make a proper judgment as to the amount and kind of assistance a student needs, the Financial Aid Form (FAF) should be filed with the College Scholarship Service. The FAF is available at high schools and the UM Office of Student Aid. Applications must be filed each year, whether or not the student has filed previously. Priority funding will be given to applications received by the College Scholarship Service (CSS) by March 1. Applications received after this date will be considered only after on-time applicants are processed *and* if funds are available.

*Note:* All aid applicants are considered without regard to age, sex, race, ethnic origin or physical ability except in those cases where the aid is intended to rectify prior or existing imbalance in minority or other group participation in the educational process.

Some of the financial aid programs are listed below:

*Supplemental Educational Opportunity Grants.* These grants are made available from federal funds to students who meet certain need standards. This source of aid is not repaid.

*Pell Grant Program.* Federal grants applied for directly to the U.S. Department of Education are available to students during their undergraduate years. The Financial Aid Form used for University application is also used for the Pell Grant. This type of aid is not repaid. All Pell Grant recipients must certify compliance with the Anti-Drug Abuse Act.

*University Scholarship.* This is gift aid, based primarily on need. Academic achievement or special donor requirements may be additional criteria.

*University Grants.* This is gift aid offered through state appropriations to the University. This grant is awarded on the basis of financial need and *does not* require repayment.

*Perkins Loans.* Amounts awarded are based on student need. No interest is charged to students until repayment begins. Ordinarily a re-

payment period of 10 years is permitted at an interest charge of five percent of the unpaid balance. Repayment begins 9 months after graduation, (6 months for students who borrowed prior to July 1, 1987). Grace periods of three years on payment of principal or interest are allowed for military service, Peace Corps service and VISTA service. No payments are required as long as the student remains at least a half-time student in a degree program at either the graduate or undergraduate level. Cancellation of the loan amount, plus interest, is granted for those who become full-time teachers in elementary or secondary education in "deprived" areas and to teachers of the handicapped. Allowances are also made for teachers in Head Start programs and special circumstances for people in military service. Loans are awarded on an academic-year basis only and must be reapplied for each year. They are not automatically renewed.

*Stafford Student Loan.* Stafford Loans are available through banks, credit unions and savings and loan associations to students with demonstrated financial need. Undergraduate student may borrow up to \$2,625 annually through the sophomore year and up to \$4,000 a year after you obtain junior status. Your actual eligibility will probably be less than the maximum if you are receiving other financial aid.

Stafford Loans carry an interest rate of 8% for the first four years of repayment and 10% a year thereafter. You must begin to repay your Stafford Loan whenever you are not enrolled at least half time in a degree program for six months or more. *Note:* Stafford Loans require a separate application available from your lender. You should apply for this loan after you have received your financial aid award letter.

First time Stafford Loan borrowers at this University must attend an entrance interview/loan counseling session before the loan check can be released.

*College Work-Study Program* (summer and academic year). With the assistance of federal funds, the University is able to provide many employment opportunities either on-campus or in various not-for-profit off-campus agencies. Location of employment is limited to within the State of Maine. Many jobs provide work experience directly related to the student's educational objective while providing regular income for educational expenses. Students generally are limited to part-time work during the summer or other school vacations. Eligibility is based on financial need.

*Regular Student Employment.* Information for on-campus employment opportunity is available at the Office of Student Aid and through individual UM departments.

## Satisfactory Academic Progress for Federal Student Aid Recipients

All student aid recipients must meet the University's policy of Satisfactory Academic Progress to receive federal, state, and University aid. Stu-



dent's progress is measured by their grade point average (GPA) and the number of credits completed. Students also have a maximum time-frame in which to complete their academic program. The time-frame varies depending on the program of study. A student must meet both the minimum GPA requirement and have completed the required credit hours within established times to remain eligible. A brochure, *Academic Requirements for Students Receiving Federal Student Assistance*, outlines the policy in detail. The brochure is available from the Office of Student Aid on the diversity of ethnic identity, race, language, gender and sexual orientation of among our students, faculty, staff and nearby communities.

### International Student Program

The International Student Program Office (ISPO) helps international students achieve their educational objectives by assisting in their successful adjustment to a new culture and educational system and increasing their awareness of the many resources available to them. The ISPO offers assistance with immigration matters, academic concerns, personal issues and social problems. The ISPO also provides intercultural opportunities such as GAB, Culturefest and International Week. This office is responsible for issuance of the U.S. Immigration I-20 or IAP-66 forms necessary for the international student to obtain a student visa from the U.S. consulate in their native country. All international students, including those with "F" student or "J" exchange student status, must report to the International Student Program Office as soon as convenient after arrival on campus.

### Center for Multicultural Affairs

The mission of the Center for Multicultural Affairs is to provide support services and programs to the University of Maine minority populations which include the Federal and Board of Trustees designated minority populations and to provide multicultural programming for the University community. The Center will assist the minority populations to achieve their academic, career and personal objectives. The Center will advocate on minorities' behalf and assist the campus-wide planning efforts to promote a cultural diversity that validates and reflects, affectively and cognitively, multiculturalism at the University of Maine. This multicultural fact must be affirmed through knowledge and actualization of the socio-cultural ecology, and ethnic identities which are characterized by race, language, spirituality, gender, and sexual orientation among all: students, faculty, staff and Maine communities. The Center for Multicultural Affairs offices include:

#### I. Indian Student Programs

The Indian Programs provides academic and career counseling for students. Supportive serv-

ices often start before the regular college school year. The office works in close cooperation with the University of Maine Onward Program. Thus, the office assures American Indian students that remedial courses in reading, study skills, math, sciences, and English are available. This service encourages Indian students who might not have otherwise attended college to enroll at the University of Maine.

#### II. Minority Students Services

During the past few years, services and activities for minority students at the University of Maine have increased dramatically. The development of a minority support network is in its final stages. This network will provide minority students with academic testing, tutoring, counseling, and financial aid.

#### III. Multicultural Programs

Multicultural programming activity has included programs which have ranged from establishing and advising minority students organizations to assisting campus-wide planning efforts to promote awareness of the multicultural presence on campus.

#### IV. The Franco-American Centre

The Franco-American Centre is an advocate of the Franco-American Fact at the University of Maine and the region. This office stimulates the development of academic and program offerings relevant to the history and life experience of this ethnic group in Maine and New England. In addition, the Centre provides bilingual and bicultural models of delivery of service; work experience for University students; maintains a readily available library of materials and information and has established a network of resources in Maine and North America to assist students, faculty, administrators and agencies with their research and programming needs.

Contact Theodore Mitchell, Director and Associate Dean, Memorial Union. (207) 581-1417.

### Student Health Service

The Student Health Service provides health care to University of Maine students who have paid the comprehensive fee. Outpatient services include appointments with physicians and nurses. Laboratory studies, x-rays, physical therapy, and pharmacy are available at the Cutler Health Center. Health education is an integral part of the Student Health Service and programs are provided.

Practitioner services provided at the Cutler Health Center are covered by the Comprehensive Fee. There is a reasonable charge for medications obtained at the pharmacy and for laboratory tests and x-ray studies. Students are responsible for the cost of care provided off-campus. The University sponsors a Health Insurance Policy.

### Religious Affairs

Fourteen religious groups provide opportunities for religious programming, worship, study,

conversation, and witness: Hillel Foundation (Jewish), Maine Christian Association (Protestant), St. George's Greek Orthodox Church (Greek Orthodox), Our Lady of Wisdom Parish/Newman Center (Roman Catholic), U.M. Student Fellowship (Pentecostal), United Methodist Church (Methodist), Redeemer Lutheran Church (Lutheran), Orono Friends (Quaker), Church of Universal Fellowship (varying Denominations) and the Canterbury Club (Episcopal). The chaplains are available for counseling or instruction. The InterVarsity Christian Fellowship, Campus Crusade for Christ, Bahai Club and UM Muslim Student Group, four approved student organizations, meet weekly in the Memorial Union.

Questions concerning the above may be directed to the Office of the Dean of Student Activities, the Memorial Union.

The churches and synagogues of Orono, Old Town, and Bangor always welcome the attendance of University students. The Drummond Chapel, a small meditation room open to the University community, is located in the Memorial Union.

The Office of the Dean of Student Activities, Memorial Union, serves as a resource in the areas of religious affairs.

## Student Life

### Student Government

The University of Maine Student Government is the largest organization of its kind in the State of Maine. It is funded and controlled by students with the sole purpose of benefiting students through educational, cultural and social programs, events, and activities.

The Student Government is involved in literally hundreds of University policies and programs, from sponsoring food baskets for the hungry at Thanksgiving to working out a reasonable alcohol policy with various University officials.

The activities of student government are directed by an elected president and vice-president who appoint and coordinate a diverse administrative staff including four governing boards, many committees, and other divisions representing the needs of students and promoting student rights.

The Student Government receives monies from the Student Activity Fee. The Student Government Executive Budgetary Committee, as an advisory body, assists in budget matters and in disbursing funds to groups and organizations requesting assistance.

The General Student Senate (GSS) is the legislative unit of the Student Government and is under the leadership of the vice-president. The GSS has final approval over all Student Government matters. It is composed of 35 to 55 members, each elected by a specific constituency for a one-year term. The GSS deals with budget matters, Student Government Policy,



recommendations to the University, and any matters affecting the students of UM.

The six boards that help make up the Student Government are the Guest Lecture Series, Off-Campus Board, Residents on Campus, Inter-Fraternity Council, Panhellenic Council and Student Legal Services. All Board chairpersons hold seats in the Cabinet of the Student Government which is chaired by the President of Student Government. All Student Government committee memberships and meetings are open to all students. **Graduate Students have their own student government which is described in the Graduate School Catalog.**

#### *Guest Lecture Series (GLS)*

The mandate of the GLS is to promote a well rounded education by presenting lectures on diverse topics and subjects to the University community. GLS sponsors six to eight lectures each year and is also responsible for assisting various campus organizations and departments in presenting speakers of special interest through co-funding and other support.

#### *Off-Campus Board*

The Off-Campus Board was created to serve the needs and interests of the undergraduate student housed off-campus. This goal is accomplished by providing functions such as frequent meetings, spaghetti dinners, concerts, a food co-op, a monthly newspaper, working on Landlord/Tenant relations and other social events.

#### *Residents on Campus (ROC)*

As the student governing body of the 18 residence halls and the three area Boards at U.M., the ROC's purpose is to coordinate and assist in the implementation of programs, policies and activities directly involving on-campus students.

#### *Inter-Fraternity Council (IFC)*

The 12 fraternities at the University are represented by the Inter-Fraternity Council. Membership consists of two members from each fraternity, the president and one other member. The officers of IFC are elected in the Fall by the entire fraternity system. The Council sponsors programs for the fraternity system of educational and social natures and assists in the development of policies of the University system that affect fraternities. The Inter-Fraternity Council and Panhellenic Council (see below) are funded through Student Government and provide services for students and the community, including marathons, blood drives and big brother/big sister programs. Greek Week, a competitive intramural schedule and many social events highlight Greek life on campus.

#### *Panhellenic Council (PANHEL)*

The Panhellenic Council is the representative council for sorority women on campus. PANHEL coordinates activities for 7 sororities and cosponsors events with IFC, such as Winter Carnival and Greek Week. PANHEL is also involved in fund raising for charity. The election of officers is held in the Fall of each year.

#### *Student Legal Services*

Student Legal Services provides free legal advice to undergraduate students on such issues as landlord-tenant relationships, divorce, small claims, personal injury, auto accidents, problems with the University, and many others. Full court representation is also available. The office is staffed by one attorney, two full-time paralegals and student paralegals.

Any University undergraduate student who has paid an activity fee to the Student Government at the University of Maine shall be entitled to utilize the facilities of the Student Legal Services.

### Residency Requirement for First Year Students

The University of Maine believes that living in campus residence halls is an educational opportunity that all first year students should experience. Campus residence halls provide students the opportunity to become part of a community and participate in a variety of educational experiences. To facilitate this experience, living in a residence hall is a requirement for all first year students who are under the age of 20, who do not live in the immediate area and who do not have exceptional circumstances which would prevent them from living on campus. For additional information on this policy, please contact the Department of Residential Life at (207) 581-4584.

### Public Affairs

The Public Affairs office serves as the University of Maine's official link with the media and is responsible for the production of the University of Maine's major publications (including graphic design), photography and broadcast-related needs. The staff disseminates news releases, story leads, photos and print and broadcast material to the local, state, national and international media, and responds to requests for information from newspapers, magazines, radio and television stations, and the general public. In addition, the staff is involved in organizing press conferences, and generating and assisting in publicity for University of Maine events and activities. Public Affairs is responsible for University of Maine general information materials, directories, catalogs, bulletins, weekly Maine Perspective, and other publications. Public Affairs also assists University of Maine departments and offices in their individual media counseling, and with publications, broadcasting (radio and television), photography, and graphic design. The Speakers Bureau, experts referral service and campus tours are also administered through Public Affairs.

### Office of Equal Opportunity

The Office of Equal Opportunity serves UM students, faculty, staff, applicants and users of uni-

versity services. The Office is responsible for investigating complaints of discrimination and/or harassment based on race, color, religion, sex, sexual orientation, national origin or citizenship status, age, handicap, or veterans status; ensuring accessibility to all programs for persons with disabilities; monitoring and promoting compliance with EEO/AA laws and regulations; providing consultation and educational presentations for classroom lectures as well as seminars and workshops on issues related to equal opportunity/affirmative action and/or sexual harassment; providing advocacy and support for the creation and maintenance of an environment which promotes diversity.

The Director of the Office of Equal Opportunity is responsible to the students and employees of the University for resolving discrimination and harassment complaints. The Director will talk with you informally or formally about your concerns. Please feel free to contact the Office of Equal Opportunity, 318 Alumni Hall, University of Maine 04469: (207) 581-1226.

### Maine Center for the Arts

The Maine Center for the Arts, dedicated in September of 1986, is the cultural focus of the University of Maine and the surrounding region. The Center consists of the 1,629-seat Hutchins Concert Hall, the Hudson Museum, the Palmer Gallery, and the Bodwell Dining Area.

The Center presents a wide assortment of more than forty live performances during the academic year, as well as a summer series consisting of twelve to fifteen events. A full spectrum of performances is offered, ranging from classical music to bluegrass, from avant-garde dance to Broadway musicals, jazz to folk and ethnic music, comedy to family entertainment, and much more. In addition to the regular season of events, the Concert Hall is also available for rent by major promoters who have brought still other types of performers to the University of Maine Campus.

Past performances have featured Isaac Stern and Yo Yo Ma, Arlo Guthrie, Jean Redpath, the Royal Winnipeg Ballet, the Peking Acrobats, Marcel Marceau, Leontyne Price, Rudolf Nureyev, Johnny Winter, Greg Allman, the Modern Jazz Quartet, Peter, Paul and Mary, Dana Carvey, Dennis Miller, Kris Kristofferson, Lee Greenwood, and many others.

Students are encouraged to experience a wide variety of performances to enhance their overall education at the University of Maine. The Comprehensive Fee makes it possible for UM students to attend some performances at no cost, and substantial discounts are often offered to UM students.

In addition, students can benefit from Master Classes which are often offered in conjunction with performances by visiting world-class artists in many disciplines.

Tickets for all events are available at the Box Office, located in the lobby of the Maine Center



for the Arts. The Box Office is open weekdays from 9:00 a.m. to 4:00 p.m. and for one and one-half hours before every performance. The phone number for ticket orders is (207) 581-1755.

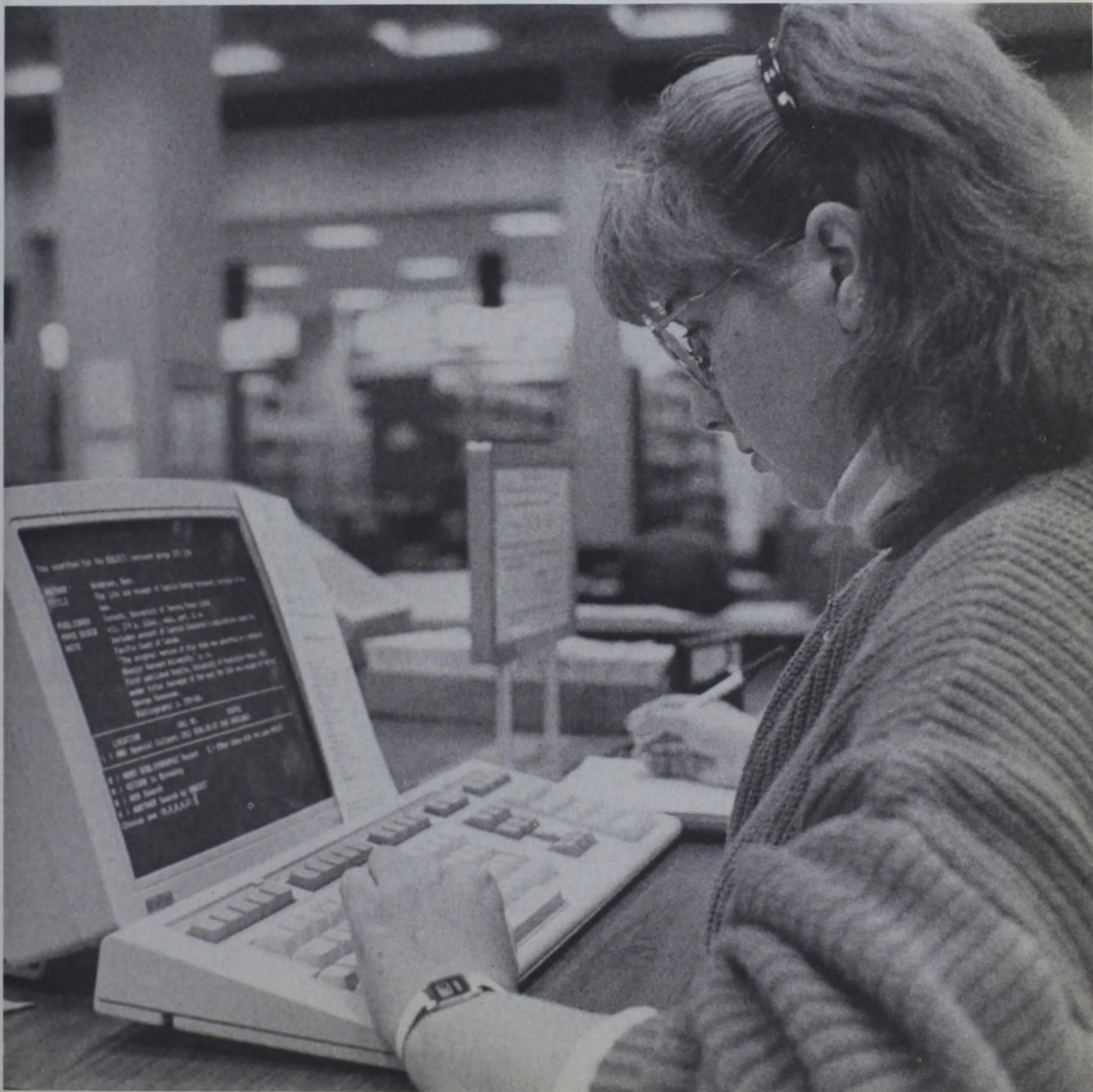
### Computing and Data Processing Services

CAPS provides support for the instructional, research and administrative computing needs of the University community. The staff of the

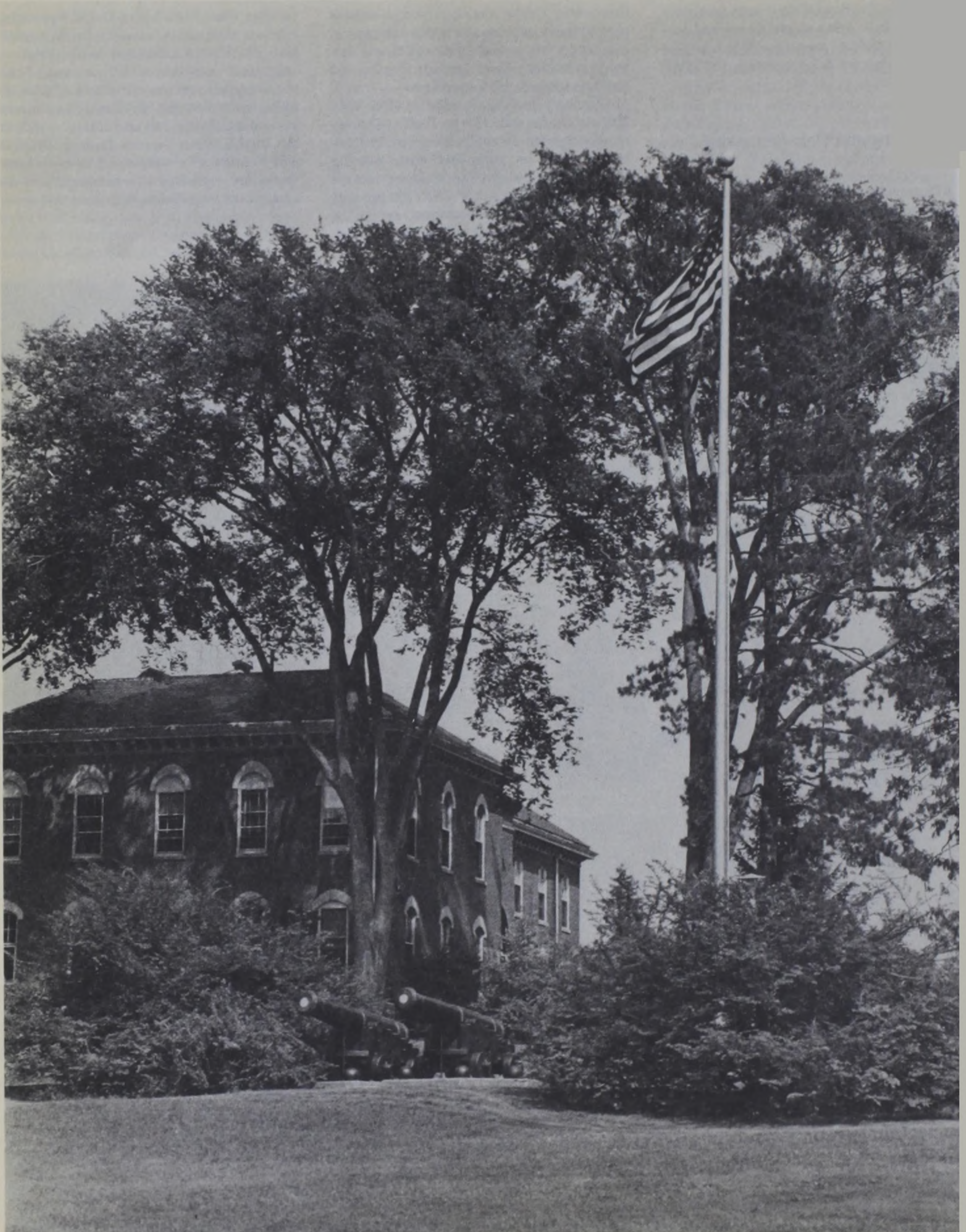
Computing Center develops and maintains programming systems and applied programs, conducts short courses and workshops, and works with individual students, faculty and staff on computer related problems.

University facilities include an IBM 3090-200J mainframe with a Vector Facility. The current configuration includes more than 1500 telecommunications ports and more than 10 billion bytes of disk storage. Six tape drives are available, supporting 6250/1600/800 bpi tape densities. The base operating system is VM/XA. CMS provides interactive and batch

facilities while DOS/VSE with CICS provides transaction processing as well as batch capabilities. The 3090 is connected to the Ethernet "backbone" network on campus and to the state-wide network supported by CAPS. In addition to the 3090, the backbone links computers in departments, labs and offices, as well as the URSUS library system. Through BITNET and the Internet the campus and state-wide networks are connected to educational and research institutions throughout the world.









# Academic Information

## Questions on Policy

Policies set forth in this publication provide specific guidance for students at the University of Maine. It is the responsibility of each student to be familiar with policies which govern their courses of study. Questions concerning material in the catalog should be directed to the student's academic advisor or to the dean of the appropriate college.

## Responsibilities

It is the student's responsibility to fulfill all academic requirements required to achieve his or her selected educational objective. It is the responsibility of the faculty and staff to advise and assist the student in this effort.

## Immunization Law

The State of Maine requires all students born after 1956 to furnish proof of immunization against measles, rubella, tetanus, and diphtheria. Proof of immunization must be on file at Cutler Health Center prior to registration. Students should forward proof of immunization to Cutler Health Center as soon as possible after notification of admission.

## Registration

Undergraduates at the University of Maine will register in accordance with the following procedures:

### First-Year Students

All first-year students are required to attend both orientation sessions held during the summer and in the fall immediately prior to the start of classes. The dates of these sessions are furnished to new students and their parents.

Registration for the fall semester occurs during the summer orientation period in consultation with representatives from the faculty.

### Upperclass students

Upperclass students who transfer to the University of Maine will contact the dean of their college after admission to register for the upcoming semester.

All currently active students who plan to return to UM will meet with their advisor.

Academic advisors are assigned to all students to assist in planning their educational pro-

grams, to ensure they are meeting graduation requirements, to provide counsel and guidance in academic work, and to advise with study or classwork problems. Each student is, however, ultimately responsible for satisfying degree requirements.

## Course Numbering System

Courses numbered 0-99: Associate degree, vocational courses or other courses not normally transferable toward a baccalaureate degree.

Courses numbered 100-299: Associate and/or lower level baccalaureate degree.

Courses numbered 300-399: (junior/senior) baccalaureate degree courses

Courses numbered 400-499: Upper level baccalaureate courses; with appropriate qualification and permission, may be taken for graduate credit.

Courses numbered 500-599: Graduate level courses; with appropriate qualification and permission, may be taken for undergraduate credit.

Courses numbered 600-699: Graduate level courses.

## Grading System

Letter grades on a scale of A to E are given by faculty at the University. Faculty may grant plus and minus grades. These letter grades carry the following numerical values:

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

Passing undergraduate grades: A, Excellent; B, Good; C, Satisfactory; D, Low-level passing, below the average required for graduation; P, Passed for degree credit, only on a Pass/Fail basis.

Failing grades: E, Failed. F, Failed a pass/fail course (Does not count in grade point average.) L, Stopped attending, (calculates as "E" on transcript.)

Progress grade: R, final grade deferred (thesis).

Non-credit grades: W, dropped without penalty.

Incomplete Grades: An Incomplete grade must be made up within the time limit specified in writing by the faculty member. The work must be done and the grade filed by the tenth week of the next full semester. In all cases incompletes must be resolved within one year at the end of the semester in which the course was

taken or the grade will automatically become an "E". Under specific circumstances a student may graduate with an incomplete on the transcript.

Degree hours are the sum of the course credit hours of courses which may be counted toward a degree, provided a passing grade has been received.

Accumulative average is quality points divided by total attempted hours, carried to two decimal points. Quality points are the number of credit hours taken multiplied by the numerical value of the letter grade. The total hours are the sum of the course credit hours from all courses attempted except those taken on a Pass-Fail basis.

Pass-Fail registrations do not affect the grade point average.

Grade reports are sent in the student's name to an address designated by the student. (Campus addresses are not normally considered valid grading addresses.) A student's academic performance is considered confidential information and written permission of the student is normally required to fulfill inquiries by persons outside the administrative or academic community of the University of Maine.

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 semester final grade report should contact the instructor without delay. Records are considered to be correct if a student does not report errors to the Registrar's Office within six months of the completion of a course.

## Dean's List Requirements

- 12 or more hours exclusive of pass-fail and no incompletes.
- Minimum of 3.0 semester average in all colleges except:
 

Academic and Career Exploration	3.20
Applied Science and Agriculture	3.20
Technical Division of Applied Science and Agriculture	3.20
Arts and Humanities	3.30
Sciences	3.30
Social and Behavioral Sciences	3.30
University College	3.25

## Academic Requirements

Students must meet the specific academic requirements as shown in the University catalog in effect at the time of their initial matriculation. If a student is absent from the University for two or more years, the academic requirements



shown in the catalog in effect at the time of re-matriculation will normally apply.

## Academic Probation, Suspension, Dismissal

The Committee on Academic Standing meets to determine which students are not making satisfactory progress. Those students not meeting academic requirements are placed on probation, or suspended, or dismissed.

### Academic Probation

Academic Probation signifies unsatisfactory performance that does not warrant suspension or dismissal but does indicate that the student's academic future is in question.

Academic probation is determined generally by the following scale:

Total Hours	Minimum Accumulative Average*
0-30	1.7
31-60	1.8
61-90	1.9
91 and above	2.0

### Remedial Probation

Associate degree students may be placed on Remedial Probation. While in this status, they must pursue a directed program of remedial courses. No degree credit will be granted for this work.

### Academic Suspension

Academic Suspension indicates that a student is separated from the University for one semester with return guaranteed upon application for readmission.

Suspension is the usual academic action when a student's performance in a single semester is poor (usually under 1.0) or when required courses have been failed with an otherwise satisfactory record.

### Academic Dismissal

Academic Dismissal indicates that a student is separated from the University for a minimum of one semester. Return is not guaranteed; a student must file an application for readmission. Students dismissed twice from the University are not ordinarily allowed to return.

Dismissal is the usual action when a student fails to make normal progress toward gradua-

tion. Situations that lead to academic dismissal are:

1. Failure to maintain an accumulative grade-point average at a level necessary to make acceptable progress towards the accumulative grade-point average required by the college for graduation.
2. First-year students who receive a GPA below 1.0; (1.3 for University College)
3. Students on probation who fail to improve in the subsequent semester, or
4. Upperclass students readmitted following suspension or dismissal who show no improvement.

### Provisional Dismissal

First-year students and first semester Transfer Students who are experiencing academic difficulties may be placed in a Provisional Dismissal Status. This status requires the student to discuss his or her academic record with the Dean of the College to determine whether the student will continue in classes during the following semester.

### Forgiveness Policy

Associate Deans may re-evaluate the first semester transcript of students placed on Provisional Dismissal even though the student is allowed to continue without a break in enrollment. Normally such re-evaluation will be done at the end of the second semester, and will be reserved for students whose GPA for that semester is 2.0 or above.

### During Suspension or Dismissal

Students under dismissal or suspension may not register for a course or courses in any division of the University for credit. They may, with the approval of the dean of the college from which they have been dismissed or suspended and the Vice President for Academic Affairs, take a course or courses on a non-credit basis for remedial purposes. Students under dismissal or suspension who register for a course or courses at other institutions should be aware that credit so obtained will not ordinarily be accepted by the University of Maine if and when the student is readmitted.

### Appeal Policy

If a student wishes to appeal a decision of the Committee on Academic Standing, he or she may appeal to a Subcommittee comprised of the dean of the student's college (or designated representative) and the Vice President for Academic Affairs (or designated representative). If the decision of these two individuals is unsatisfactory to the student, he/she may make a final appeal to the Committee on Academic Standing as a whole. The decision of the Committee as a whole will be final.

## Graduation

Each college sets its own graduation requirements in terms of grades or grade points. Candidates for associate and baccalaureate degrees must: (a) receive passing grades in all courses required by the major department, (b) accumulate the number of degree hours specified by the college in which the student is registered, and (c) achieve an accumulative average of not less than 2.0.

To be considered for graduation, a student must complete an Application for Degree or Certificate form during the final semester and pay a commencement fee. These forms are available in the Registrar's Office. If application is made, but no degree is conferred, another application must be submitted prior to the next commencement and another commencement fee paid. A minimum residence of one year is required for the attainment of any bachelor's degree. This regulation refers to the senior year. Two exceptions to this regulation were approved by the Trustees in 1978: 1. Exceptions may be made for students who have already completed three or more years at the University of Maine who may be given permission by their academic dean, when there is sufficient and valid reason, to complete the senior year elsewhere under the general supervision of their dean's office. 2. 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 may qualify for the appropriate bachelor's degree at the University of Maine upon receipt of the professional degree, provided that their collegiate dean at the University of Maine approves. This policy is retroactive. Inquiries about degrees awarded under this exception should be addressed to the Registrar.

Baccalaureate Degrees with distinction are conferred at commencement for the following attainments in rank: Seniors having an average grade of 3.50 or above will be graduated with Highest Distinction, 3.25 to 3.49 with High Distinction and 3.00 to 3.24 with Distinction if they meet the criteria listed below.

These criteria state that the average grade is based on the students work on the Orono campus and must include 60 hours or 50% of the total degree hours required in the student's program of study, whichever is greater. A minimum of at least 15 credit hours by the senior year must be taken at the University of Maine for the attainment of any associate degree.

Degrees with Honors, with High Honors, or with Highest Honors are awarded to seniors who successfully complete the Honors Program.

From the graduating seniors in December and May, the two highest ranking baccalaureate degree candidates are designated class valedictorian (highest) and salutatorian (next highest). For May graduates, this rank is based upon the first seven semesters of full-time attendance, al-

\*Most associate degree programs require 1.8, 1.9 and 2.0 at the end of the first, second, and third semesters respectively. In individual situations, the dean of a college may place a student on probation for unsatisfactory performance even though his/her accumulative average exceeds the above listed minimums.



of which must have been in resident instruction at the University of Maine. Full-time means 12 hours, exclusive of Pass-Fail or Incompletes.

Students who have declared a double major or a double major across-college lines must satisfy the requirements for each major prior to the award of the appropriate degree.

Students who have taken sufficient courses outside of their primary major to qualify for a second degree must have at least 150 degree hours prior to the award of the second degree if they are in one of the colleges that require 120 hours for graduation. Students in colleges which require more than 120 hours for graduation must have 30 hours beyond their normal degree requirements to be awarded a double degree.

### Outside Clinical Work

Many divisions of study at the University, at both the undergraduate and graduate level, re-

quire as a condition of graduation the completion of one or more training programs or courses in an outside clinical or professional setting, such as a hospital, clinic, professional office, or public classroom. These outside institutions, offices and schools which provide the environmental opportunities to our students sometimes impose additional requirements upon our students as conditions of participation in their programs. Such requirements might include evidence of a recent medical examination, evidence of health, auto or other insurance, a written agreement to personally accept and abide by the rules and regulations of the that institution, the execution of an indemnity agreement or release relative to personal liability of liability to others and similar requirements pertinent to the particular study program. The University assumes there will be assent and compliance to such requirements, rules and regulations by each student upon his or her enrollment in those courses involving outside clinical study.

### Veteran's Benefits

Contact the Office of Veteran's Affairs, Wingate Hall, (207) 581-1316, for:

- A. Counseling Veterans regarding Educational Benefits.
- B. Processing applications for Veterans Educational Benefits.
- C. Maintaining a file of each Veteran receiving Benefits.
- D. Certification of student drawing Benefits.
- E. Providing assistance in solving problems related to educational assistance.
- F. Making special arrangements related to Veterans Educational Benefits.
- G. Directing Veterans to various other agencies to help solve problems not related to Educational Benefits.









# Financial Information

## General Information

The University expects the student to be financially responsible. All accounts are carried in the name of the student. Bills and statements are mailed to the student, not the parent. All charges are payable in full no later than the first day of class for each semester. After that, a \$25.00 late fee is assessed. After the fourth week of classes students with accounts that have not been paid or deferred to financial aid will have their class registrations for the semester cancelled. Financially delinquent students will not be allowed to register for courses and academic records will be withheld until all financial obligations to the University have been satisfied.

The financial requirements of the University, changing costs, state and legislative action and other matters may require an adjustment of these charges and expenses. The University reserves the right to make such adjustments to the estimated charges and expenses as may from time to time be necessary in the opinion of the Board of Trustees up to the date of final registration for a given academic term. The applicant acknowledges this reservation and agrees to the financial terms and conditions of the University by the submission of an application or by registration.

## Invoices and Statements

Semester bills are mailed to the student's home address approximately 45 days before the start of a semester. Charges are calculated using pre-registrations, room sign-up information, and data supplied by the Admissions Office.

## Schedule of Charges

### Application Fee

A nonrefundable application fee of \$15.00 must accompany each application.

### Matriculation Fee

A one-time fee of \$20.00 is required of each student who elects to pursue a degree program.

### New Student Fee

All new students (first year and transfers) are charged a one-time New Student Fee of \$50.00. Students who reside in a residence hall during the New Student Orientation program are billed accordingly for those services.

## Tuition

*Undergraduate and Associate Maine Residents*  
\$69.00 per credit hour.

*Non-Residents*  
\$195.00 per credit hour.

Non-Resident students enrolled under the New England Board of Higher Education Exchange Program are billed at 50 percent above the Maine Resident rate.

## Room and Board

### REGULAR RESIDENCE HALL (Double Occupancy)

	Board***	Room	Yearly
19 meal plan	2045	2196	4241
14 plus meal plan*	2045	2196	4241
10 plus meal plan*	2045	2196	4241

### ESTABROOKE HALL\*\*

(Graduate/Undergraduate students 21 and older)

Estabrooke meal plan	1617	2252	3869
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### YORK VILLAGE

meal plan optional	0	2196	2196
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### COMMUTER MEAL PLAN

All plans listed above

### 5 MEAL PLAN

792

### MAINECARD\*\*\*

any amount in \$25.00 increments

## Mandatory Fees

A mandatory student activity fee of \$20.00 per semester, a communication fee of \$8.00 per semester and a recreation fee of \$8.00 per semester are charged to all students enrolled for six or more credit hours.

A mandatory comprehensive fee of \$138.00 per semester is charged to all students enrolled for 12 or more credit hours. Students enrolled for at least 6 credit hours but less than 12 credit hours will be assessed a comprehensive fee of \$69.00. Students enrolled for less than 6 credit hours will not be assessed the comprehensive fee.

\* A portion of plan included in MAINECARD.

\*\* Estabrooke room charges higher due to extended occupancy.

\*\*\* For regular meal plans, unused meals cannot be carried over to the next semester. All MAINECARD balances are rolled forward to the next semester, but are not refunded upon graduation or leaving the University.

## Yearbook (Optional)

Students electing to purchase a yearbook will be billed for the yearbook on the Fall semester invoice.

## Insurance Fee

A student health insurance plan is an excellent way for students to safeguard against medical expenses. All enrolled students are eligible to participate. The charge for this insurance coverage is \$390.00 per year.

## Student Health Fee

The student health fee provides outpatient services at the Cutler Health Center including physician, nurse and physical therapy visits as well as on-premises lab testing and X-rays. Students who are enrolled for 12 (twelve) or more credit hours receive this coverage as part of their comprehensive fee.

Students enrolled for 6 through 11 credit hours have the option of selecting the health care coverage, at no additional cost, as part of their comprehensive fee.

Students enrolled for 1 through 5 credit hours may, for a \$69.00 part-time fee, voluntarily subscribe to the health care program.

## Late Fee

A \$25.00 late fee will be assessed to students who register for class and/or pay their bills after the first day of class. To avoid being charged the late fee, students who have not received a bill should contact the Business Office before the start of classes for an estimation of charges.

## Books and Supplies

The cost of books and supplies depends on the courses in which a student is enrolled. Books and supplies are not billed on the semester invoice. They must be paid to the University Bookstore at the time of purchase. Average semester expenses total \$200.00.

## Course Fees

Course fees are charged in several courses. The amounts are listed in the Schedule of Classes. Course fees for courses dropped after the second week of classes are not retracted.

## Acceptance Deposits

Students accepted to the University of Maine for the fall semester will be required to submit a \$150.00 non-refundable acceptance deposit by the Candidates Reply Date of May 1. Students



accepted after May 1 will be required to submit the non-refundable confirmation deposit within two weeks of notification. The acceptance deposit is credited to the student's account in the University Business Office.

Students accepted to the University of Maine for the spring semester will be required to submit a \$150.00 non-refundable deposit by January 1.

## Withdrawal From The University

Students who are considering withdrawal from the University should report to the Center for Student Services, Memorial Union for information about the correct procedure. Returning students electing to live in residence halls for the next academic year must sign up and pay a \$75.00 room deposit during the latter part of the Spring Semester. The deposit is credited to the Fall Semester bill. If the room reservation is cancelled on or before June 1, the deposit is refundable. The room deposit is forfeited if the cancellation is received later than May 1.

## Refunds

Students leaving the University before the end of a semester may be eligible for a refund.

### A. Tuition

Tuition will be refunded according to the scale and provisions set forth below for students withdrawing during the first four (4) weeks of a term.

1. Scale: The period of attendance is counted for the first day of classes and includes weekends and holidays. The refund will be calculated as of the date the student notifies the Registrar of withdrawal.

1st week	100%
2nd week	75%
3rd week	50%
4th week	25%

No refund is made after the 4th week.

2. Provisions:

- (1) In no case will tuition be reduced or refunded because of voluntary absence from classes
- (2) Tuition adjustments attributable to involuntary absence, e.g., extended illness will be processed on a case by case basis.

### B. Fees

University fees are not refundable.

### C. Room and Board

Room and board refunds are made in accordance with the Residence and Dining annual contract. The annual contracts must be signed by each student living in a residence

hall. No refund will be made for withdrawals occurring less than 14 days prior to the end of a semester.

## Add-Drop Refund Policy

Students will be given financial credit for courses which are dropped during the Add-Drop period only (the first two weeks of classes). No financial adjustments will be made to students' accounts for courses dropped after this period.

## Installment Plan

For parents and students who find it more convenient to make monthly payments, the University of Maine offers a monthly payment plan administered by Academic Management Services, 50 Vision Boulevard, East Providence, R. I. 02914. This plan enables the student or parents to pay all or a portion of their annual charges in equal installments. The fee for this option is \$45.00 per year. An application for the installment plan may be obtained from the Business Office, Alumni Hall.

## Rules Governing Residency

### Original Classification

A student is classified as a resident or a non-resident for tuition purposes at the time of admission to the University. The decision, made by the Director of Admissions, is based upon information furnished by the student's application and any other relevant information. No student once having registered as an out-of-state student is eligible for resident classification in the University, or in any college thereof, unless he or she has been a bona fide domiciliary of the state for at least a year immediately prior to registration for the term for which resident status is claimed. This requirement does not prejudice the right of a student admitted on a non-resident basis to be placed thereafter on a resident basis provided he or she has acquired a bona fide domicile of a year's duration within the state.

### Change of Classification

For University purposes, a student does not acquire a domicile in Maine until he or she has been here for at least one year primarily as a permanent resident and not merely as a student. If the student is enrolled for a full academic program, as defined by the University, it will be presumed that the student is in Maine for educational purposes and the burden will be on the student to prove otherwise. In general, members of the Armed Forces and their dependents

are normally granted in-state tuition rates during the period when they are on active duty within the State of Maine.

Subject to the provisions of the preceding paragraph, the domicile of an unmarried minor follows that of the parents or legally appointed guardian. The bona fide year round domicile of the father, if living, otherwise that of the mother, is the domicile of such a minor, but if the father and the mother have separate places of residence, the minor takes the domicile of the parent with whom he or she lives or to whom he or she has been assigned by court order. If neither of the parents are living, the unmarried minor takes the domicile of his or her legally appointed guardian.

Subject to the provisions of the first paragraph, an adult student, defined for the purposes of these rules is one who is either married or 18 years of age or older, will be classified as a resident of Maine if he or she has completed 12 consecutive months of domicile in Maine immediately preceding registration for the term for which residents status is claimed.

Subject to the provisions of the first paragraph, if a non-resident student marries a Maine resident and asserts a domicile in Maine, the student shall be deemed to have a residence in Maine.

### Appeal Procedure

To change resident status, the following procedures are to be followed:

Submit a "Request for change of residence status" form to the Director of Business Services. If the decision of the Director of Business Services is considered incorrect, the student may appeal the decision in the following order:

1. Vice President for Administration
2. Treasurer of the University Chancellor's Office, whose decision shall be considered final.

In the event that the Director of Business Services possesses facts or information indicating a change of status from resident to non-resident, the student shall be informed in writing of the change in status and will be given an opportunity to present facts in opposition to the change. The student may appeal the decision as set forth in the preceding paragraph.

No application will be considered for change after September 1 for the fall semester, after January 1 for the spring semester, and after May 1 for the summer session.

All changes approved during a semester will be effective for the beginning of the next semester; none are retroactive.

In all cases the University reserves the right to make the final decision as to the resident status for tuition purposes.



# Admission

## Admissions Staff

Director: William J. Munsey

Associate Directors: Albert F. Hackett, Thomas M. Jenkins

Assistant Directors: Holly L. Chase, Kimberly Johnston, Alan D. Whittemore

## Enrollment Management Staff

Assistant Vice President for Enrollment Management: Joyce D. Henckler, Director of Marketing Media: Pamela Dumas Serfes, Staff Assistant: Janet Boucouvalas

The University invites applications from prospective degree candidates without regard to race, color, creed, sex, national origin, handicap or age. The University seeks candidates whose academic credentials, scholastic achievement and motivation indicate promise of success in the University environment.

All correspondence concerning undergraduate admission should be addressed to the Admissions Office, Chadbourne Hall, University of Maine, Orono, ME 04469.

Candidates for admission to the Graduate School should contact the Dean of the Graduate School, 2 Winslow Hall, University of Maine, Orono, ME 04469.

To arrange a campus visit, interview or tour, contact the Admissions Office at (207) 581-1561.

The University of Maine belongs to the National Association of College Admission Counselors, and as such subscribes to the Statement of Principles of Good Practice. Accredited by the New England Association of Schools and Colleges, the University maintains standards of academic excellence and encourages the efforts of secondary schools and colleges to maintain or achieve regional accreditation to provide a measure of academic standards for the admission of degree candidates.

The approval of candidates for admission to University degree programs is on a selective basis.

The recommended date to apply for the fall semester is February 1. The recommended date to apply for the spring semester is November 1. The date to apply for fall semester Early Action is November 30. Deadline dates for the application and supporting academic documents are recommended as a guide to students who also seek University housing and consideration for financial aid.

The Admissions Office reviews and notifies on-time prospective candidates of admission decisions between January and mid-April for fall semester enrollment.

First-year students with outstanding academic credentials who would like to receive early action in January are encouraged to apply by November 30. Students considered for early action must rank in the top ten to fifteen percent of their class and have combined SAT scores of 1050 or higher, or an ACT composite score of 25 or higher.

Candidates notified between February and mid-April are encouraged to apply between December and mid-January and by the recommended date of February 1.

Academic performance in the senior year as evidenced by mid-year grades is an important consideration when reviewing many student credentials. Students for whom mid-year grades are necessary to complete the review of the admissions application, will be notified between February and mid-April, once the office has received mid-year grades and completed the evaluation of the application and supporting academic credentials.

Candidates approved for admission prior to the completion of the academic year are accepted contingent upon successful completion of all academic work and the receipt of a final transcript of grades. The University reserves the right to terminate the acceptance of a degree candidate if the applicant fails to achieve academic success in course work, or the capacity of the University to provide academic and student support services for the student has been reached.

## International Candidates

Prospective students who are non-immigrants are invited to apply for admission as first year or transfer degree candidates. Candidates are required to submit the completed International Admissions Application and an application fee of U.S. \$20.00 payable by an international bank draft or money order. Please submit official or certified photocopies of all educational documents; the results of the Test of English as a Foreign Language (TOEFL), if English is not the candidate's native tongue, and/or results of the Michigan Placement Exam. The completed Financial Documentation form and certified documentation of adequate finances are required before an admissions decision is rendered. Candidates must submit the application, application fee and all required documents by March 1. Any financial documents not in English *must be accompanied by certified English translations*. Educational records must include subjects studied by year, the number of weekly lecture and laboratory hours in each subject, grades, marks or percentages earned in year-

end examinations, as well as copies of diplomas, titles, degrees, and certificates, final documentation must certify that the candidate has adequate funds for study at the University; the documentation must be officially certified or notarized and be less than one year old. International students are required to have medical insurance coverage under the University of Maine Student Health Insurance Program or equivalent provided by a sponsoring agency.

International candidates should contact the Admissions Office for the International Application packet and assistance with the admissions process. The University is authorized under federal law to enroll non-immigrant alien students.

## Permanent Resident Candidates:

Candidates who are permanent residents of the United States, as evidenced by the resident alien card issued by the United States Immigration and Naturalization Service, must submit a photocopy of *both sides* of their permanent resident card at the time of application. This is required to document the candidate's status with the I.N.S.

## Scholastic Aptitude Test (SAT)

The University of Maine College Board Code is 3916. Candidates for admission are required to submit test results of the Scholastic Aptitude Test (SAT). The ACT examination will be accepted in lieu of the SAT. Candidates for admission to associate degree programs in University College are advised to review the admission and testing requirements of University College programs found in a later section of this catalog.

High school seniors, and recent high school graduate candidates applying for admission must submit SAT or ACT Test results no later than February 1. Test scores submitted after February 1 may delay the reviewing and notification process for prospective students.

Arrangements to take the College Board SAT should be made with the local high school guidance office. Registration must be completed at least six weeks before the test date.

The College Board will administer tests on each of the following dates during 1991-92.

Saturday, October 12, 1991\*

Saturday, November 2, 1991

Saturday, December 7, 1991

Saturday, January 25, 1992

Saturday, April 4, 1992 (SAT only)

\*SAT only in California, Florida, Georgia, Hawaii, Illinois, No. Carolina, Pennsylvania, So. Carolina and Texas.



Saturday, May 2, 1992

Saturday, June 6, 1992

Please forward official test results from the Education Testing Service.

## Test of English as a Foreign Language (T.O.E.F.L.)

Candidates whose native language is not English are required to document their proficiency in English by submitting test results from the International Test of English as a Foreign Language (T.O.E.F.L.). Permanent residents of the United States (as evidenced by the resident alien card) may be evaluated on a case by case basis depending upon the number of years they have lived in the United States and their fluency in the English language. Candidates who have attended high schools or colleges in the United States may be evaluated based on their academic performance and the length of time they have attended school or college in the United States. In all instances the T.O.E.F.L. is preferred and may be required of any candidate.

## Achievement Tests

College Board Achievement Tests are not required of candidates applying to the University. The Departments of English and Mathematics administer on-campus placement examinations for the purpose of appropriate registration in introductory level courses. The Department of Foreign Languages and Classics offers the Foreign Language Placement Examination for purposes of both placement and credit. Placement testing is available during New Student Orientation and at the beginning of each academic semester.

## Advanced Standing

### Advanced Placement

The University recognizes advanced academic work completed in secondary schools by means of Advanced Placement Tests. Candidates interested in advanced placement and credit must take one or more of the Advanced Placement Tests administered by The College Board. Credit is granted for scores of 3, 4, and 5.

### CLEP (College Level Examination Program)

CLEP is a national program of credit-by-examination that offers, primarily to the older adult student, the opportunity to obtain academic recognition for college level achievement. Information on the policy of granting credit for CLEP examinations is available from the Admissions Office, the Continuing Education Division and the Office of Testing and Research.

### Credit by Examination (Academic Departments)

Students who show evidence of advanced knowledge may be exempt from certain courses and requirements if they pass examinations

developed by the academic department. A student who successfully passes such an examination earns course credit as well as exemption from the course. Whether or not students may challenge by exam any particular course or courses is the decision of the unit (department, school, or college) which has immediate academic authority for the course or courses. Students interested in credit by examination should contact the department chair or unit head for further information and fee structure.

### Mathematics Placement Examination

Any student planning to register in mathematics courses MAT 111, MAT 112, MAT 113, MAT 122, MAT 123, MAT 126 or MAT 142A is required to take and successfully pass the mathematics qualifying examination administered by the Department of Mathematics. Examinations are administered during New Student Orientation or during the first week of classes.

## Academic Credit for Prior Learning

Undergraduate credit for prior learning in any academic discipline may be awarded only by recommendation of regular faculty in that discipline.

Credit may be awarded for demonstrated learning related to specific courses or knowledge and skills incorporating a broad spectrum within a discipline. The academic teaching unit in the related discipline will be the final arbiter for the granting of prior learning credit.

Prior learning credit may be awarded for up to a maximum of 24 semester credit hours in any four year undergraduate degree program and up to a maximum of 12 semester credit hours in a two year undergraduate program. Colleges may elect to establish a lower limit. Nothing in this policy shall apply to transfer of credit from other accredited post-secondary institutions. Three methods of learning assessment that may be used: 1) Written "challenge" examinations; 2) National standard course equivalency recommendations such as the American Council on Education (ACE), National Guide, and 3) Evaluation of portfolio documentation.

For information, contact Continuing Education Division and Summer Session, (207) 581-3143. (This policy may not apply in all Colleges.)

## Early Admission (Junior Year)

The Admissions Office may consider for early admission high school candidates who have not completed the requirements for the high school diploma. Upon the recommendation of the high school principal and guidance counselor, the University will consider candidates who have demonstrated outstanding academic achievement and whose motivation and maturity reflect

a strong desire to pursue a University degree program. Candidates must have completed a minimum three years of college preparatory subjects in high school and submit test results of the Scholastic Aptitude Test or the ACT examination. Candidates are requested to arrange an on campus interview and will also be required to have the support and endorsement of their parents or legal guardian.

## Deferred Admission

It is the policy of the University of Maine to permit approved degree candidates to defer University enrollment for up to one year. The intent of this deferred degree status is to allow students the opportunity to seek employment as a means of saving funds for college or the opportunity to travel and take a "break" from academic study. Deferred admission is not approved for candidates who seek to enroll at any other college, University, or postgraduate year of secondary school study. Candidates approved for deferred admission will be required to submit a non-refundable deposit of \$150 which will be held on account by the University Business Office. Candidates requesting deferred enrollment status must make their request in writing to the Admissions Office prior to August 1 for fall semester enrollment and prior to January 1 for spring semester enrollment.

## Deferred Admission (Active Military Duty)

Candidates approved for admission to the University of Maine who enter active military duty for a period of time which exceeds one year may request deferred enrollment. Requests for military deferred enrollment will be considered on an individual basis. Request must be received by August 1, for candidates who applied for the fall semester and by January 1 for the spring semester.

## Admission to Continuing Education Courses

The University of Maine offers a variety of academic programs through the Continuing Education Division. Categories of enrollment in Continuing Education include:

1. Degree Students: Candidates for admission to degree status through the Continuing Education Division must meet all entrance requirements for either undergraduate or graduate degree enrollment. Applications must be filed with the undergraduate Admissions Office or the Graduate School.
2. Non-degree Students: Students interested in taking CED courses for personal or professional enrichment are advised to contact



the CED office in Chadbourne Hall for class schedules and registration information.

3. Bachelor of University Studies: The Continuing Education Division offers, through University College, the Bachelor of University Studies degree. Course offerings are through the CED department. Interested candidates should contact the CED Office for more detailed information regarding entrance requirements.

Information and registration materials may be obtained by writing the Director, Continuing Education, Chadbourne Hall, University of Maine, Orono, ME 04469.

## Readmission

Former University of Maine degree candidates planning to return to the campus to resume undergraduate work must contact the Academic Dean of the undergraduate college in which the candidate plans to seek enrollment. Candidates will be notified by the Dean's office of the readmission decision.

## Transfer Candidates

Each academic year the University of Maine enrolls transfer candidates who have successfully completed academic work at colleges and universities from throughout the United States and abroad. Transfer candidates must be in good standing both academically and in terms of student behavior to be considered for transfer admission. Students who have financial indebtedness (unpaid bills) at any other post secondary institutions at the time of application, and thus are unable to secure official transcripts of prior work will not be considered for transfer admission until such time as an official transcript or transcripts have been received in the Admissions Office. Official transcripts are records mailed directly to the Admissions Office from previous schools or colleges attended.

The admission of transfer students to the University of Maine is determined by the availability of openings in undergraduate degree programs and the competitive academic credentials submitted by candidates.

Candidates applying for transfer consideration are required to have a minimum 2.0 grade point average (on a 4.0 scale). It should be noted that meeting the minimum grade point average does not guarantee transfer acceptance to the University of Maine.

Candidates who desire to transfer to the University of Maine from another college or university of recognized standing, are encouraged to file application with the Admissions Office by November 1 for spring semester and March 1 for fall semester. Applications received after the recommended deadline dates are reviewed based on the available openings within academic colleges and the capability of university departments to complete work with required

documents in a timely manner. Applications must include a statement of the names and addresses of all schools and colleges previously attended. Transfer candidates who have successfully completed a minimum of one year of transferable college course work commensurate with the intended academic field of study at the University, are not required to take the SAT test, if the examination was not previously completed by the candidate. If completed, the SAT or ACT scores should be included on the high school transcript.

Applicants must arrange for official college transcripts to be forwarded from previously attended colleges and universities to the Director of Admissions, University of Maine, Orono, ME 04469. Student copies of academic transcripts are not accepted as official documents.

The following statement was approved by the University of Maine System Board of Trustees on March 25, 1985. The statement serves as current University policy throughout the University of Maine System.

"A student who has been suspended for either academic or disciplinary reasons by one campus of the University of Maine shall not be admitted as a matriculated student by the same or another campus for the next academic semester nor thereafter until the conditions established for termination of that suspension have been met; a student who has been dismissed for either academic or disciplinary reasons by one campus of the University of Maine shall not be admitted as a matriculated student by the same or another campus for the next academic semester not thereafter until the conditions of the following sentences are satisfied.

A student who has been dismissed or suspended, seeking admission after dismissal or an exception to this policy, shall file a written petition with, and shall interview with the Director of Admission or a designee after filing an application for admission with the Admissions Office. In the petition and interview the student shall present clear and convincing reasons to justify admission as a matriculating student to the campus that satisfactorily negate the likelihood of any repetition of the conduct or conditions which led to such dismissal or suspension.

## Transfer Credit Evaluation

The evaluation of prior academic work is completed through the academic dean's office of the candidate's undergraduate college after candidates have been approved for admission to the University. Evaluations are normally completed during the spring and summer months once the final transcript has been received. Transcript evaluation for candidates entering the spring semester (January) may be delayed pending the receipt of final records.

Trustee policy is to provide the maximum opportunity for transfer within the University of Maine System. When a student is accepted for transfer within the University of Maine, all

undergraduate degree credits obtained at any unit of the system will be transferrable to any other unit, but will not be automatically applied to the specific academic degree program to which the student has entered. Each student will be expected to meet the established requirements of the academic program into which transfer is effected, and appropriate application of that credit is the responsibility of the particular academic unit. To determine which courses are transferrable for degree program credit, students should consult with the academic dean's office or their academic advisor prior to registration.

## Enrollment of Non-Degree Students

Students who wish to enroll in University courses as a non-degree student are required to register through the Continuing Education/Summer Session Office for both day and evening classes. Registration for classes is completed on a space available basis. Interested students are advised to check with the Continuing Education Office or the academic college or department to determine if any academic prerequisites are required for course enrollment. Students enrolled in a non-degree status are not eligible to receive financial assistance to meet financial obligations.

## New England Regional Student Program

New England's public state universities and colleges are working cooperatively to increase the number and variety of educational opportunities for college-bound students. Under this cooperative program, qualified New England residents are given preferred admission to New England state universities and colleges in specific academic programs not available in their home states. Students accepted in these programs are also granted the benefit of tuition reduction which is lower than that charged out-of-state students. This plan makes available to the residents of the region a wider variety of academic programs without additional funds to duplicate specialized staff and expensive facilities in each state.

Each New England public institution of higher education involved in the regional student program has designated which of its academic majors are to be offered on a regional basis and maintain control over their own courses and programs.

Undergraduate programs begin during the student's first year of enrollment at the University. Enrolled students who change their major and thus become eligible for the regional major must notify the Registrar's Office at the University. Tuition reduction under the regional program takes effect the semester following notification.



Information may be obtained from any local high school guidance office in New England or from the New England Board of Higher Education, 45 Temple Place, Boston, MA 02111.

## Acceptance Deposit

Students accepted to the University of Maine for the fall semester will be requested to submit a \$150.00 non-refundable acceptance deposit by the Candidates Reply Date of May 1. Deposits received prior to May 1 are considered non-refundable deposits. Students accepted after May 1 will be requested to submit the non-refundable confirmation deposit within two weeks of notification. The acceptance deposit is credited to the student's account in the University Business Office.

Students accepted to the University of Maine for the spring semester will be requested to submit a \$150.00 non-refundable deposit by January 1. Deposits received prior to January 1 are considered non-refundable.

## Financial Aid and Scholarships

All applicants for financial aid are required to file the Financial Aid Form (FAF) with the College Scholarship Service annually and send the appropriate tax information to the Office of Student Aid. The FAF application is available in each local high school guidance office in the late fall. Requests for financial assistance will be reviewed by the Office of Student Aid after candidates have been approved for admission to

the University. The on-time application deadline to file for aid consideration is March 1.

Mailing of the FAF to the College Scholarship Service by mid February is recommended to meet the March 1 deadline. University based financial aid funds are awarded for the academic year (September to May) and, as such, candidates applying for January admission who do not file the FAF by March 1 of the previous spring may be restricted to the PELL Grant and the Stafford Loan (GSL) if financial qualifications have been met.

The University holds membership in the College Scholarship Service (CSS) of the College Board. Participants in CSS subscribe to the principle that the amount of financial aid granted should be based upon financial need. The College Scholarship Service assists colleges and universities and other agencies in determining the family financial contribution to meet college expenses.

Information and FAF forms are available at the Office of Student Aid for upperclass students.

Further information may be found in this catalog in the section entitled "Office of Student Aid."

## Academic Entrance Requirements

Academic course requirements for admission to the University are established by each undergraduate college. The academic courses shown for each college on the accompanying chart represent the years of high school study required for admission to the University. Students are ex-

pected to complete a college preparatory curriculum which brings to the University classroom developed skills in writing, reading comprehension, reasoning, mathematics, the natural sciences, history and social sciences, foreign languages and the fine arts.

Candidates out of high school who did not complete requirements for the high school diploma must present evidence of successful passage of the General Equivalency Diploma (GED) as approved by the Department of Education.

In effect for the Fall of 1994, a phase-in will occur for students applying to the College of Education. Students must fill the following entrance requirements:

English	4 years
Social Studies	2 years
Mathematics	3 years
Lab Science	2 years
Foreign Language	2 years
Health/Physical Education	1 year
Academic Electives (Different Subjects)	4 Units

## Music Audition (School of Performing Arts)

Candidates seeking admission to music degree programs will be contacted by the Music Department regarding the required music audition.

Non-music majors interested in music organizations are encouraged to contact the Music Department for information concerning participation in chorus, band, orchestra, and other music programs.





**SUBJECT AREA REQUIREMENTS (IN YEARS) FOR ALL BACCALAUREATE (4-YEAR) DEGREE PROGRAMS**

	English	Alg. I	Mathematics Geom.	Alg. II	Trig.	Foreign Language	Lab Science	History/ Social Studies	Recommended
Academic & Career Exploration	4	1	1	1	—	—	1	1	Computer science, 1 year Fine Arts, 1 year Foreign Language, 2 years Electives, 4 subjects
<b>COLLEGE OF:</b>									
Applied Sciences & Agriculture	4	1	1	1	1/2*	—	2 (Chemistry or Physics)	1	Computer science, 1 year Fine arts, 1 year Electives, 5 subjects
School of Human Development	4	1	1	1	—	—	1 (Health/Family Life Ed. & Human Nutr. & Food require Chemistry)	1	
Arts & Humanities	4	1	1	1	—	2	1	1	Computer science, 1 year Fine arts, 1 year Electives, 4 subjects
Business Administration	4	1	1 (Math must be taken senior year.)	1	—	2	1	1	Computer science, 1 year Fine arts, 1 year
Education	4	Three years from one area and two years from one area: Foreign Language, Math, and Lab Science.						1	Computer science, 1 year Fine arts, 1 year Foreign language, 2 years Mathematics, 3 years Lab science, 2 years
Engineering	4	1	1	1	1/2	—	2 (Chemistry & Physics)	1	Computer science, 1 year Fine arts, 1 year Foreign language, 2 years Mathematics (senior year)
School of Engineering Technology	4	1	1	1	1/2	—	1 (Physics)	1	Computer science, 1 year Fine arts, 1 year Foreign language, 2 years Chemistry, 1 year
Forest Resources	4	1	1 (*Forest Engineering applicants only)	1	1/2*	—	2 (Biology & Chemistry or Physics)	1	Computer science, 1 year Fine arts, 1 year Trigonometry, 1/2 year
Sciences: B.A.	4	1	1	1	—	2	1	1	Computer science, 1 year Fine arts, 1 year Mathematics (senior year) Lab science, 1 year
B.S.	4	1	1	1	—	—	2 (1 year Chemistry or Physics required)	1	Computer science, 1 year Fine arts, 1 year Foreign language, 2 years Mathematics (senior year)
Social & Behavioral Sciences	4	1	1	1	—	2	1	1	Computer science, 1 year Fine arts, 1 year Electives, 4 subjects
School of Nursing	4	1	1	1	—	—	2 (Biology & Chemistry)	1	Computer science, 1 year Fine arts, 1 year Electives, 4 subjects

**SUBJECT AREA REQUIREMENTS (YEARS) FOR ALL ASSOCIATE (2-YEAR) DEGREE PROGRAMS**

Technical Division, Applied Sciences & Agriculture	4	Two years of math (One must be Algebra)				—	1* (Chemistry recommended for Animal Medical Tech. applicants)	1	
University College	4	Refer to specific program as requirements vary among academic depts.						1	

Please note: In the case of a two-year foreign language requirement, applicants must take two years of the same language.







# Abbreviations and Symbols

ACE	Academic and Career Explorations	EDS	Education - Research	MEE	Mechanical Engineering
AED	Art Education	EDU	Education - Research	MET	Mechanical Engineering Technology
AER	Aerospace Studies	EDV	Education - Vocational and Driver Education	MIS	Military Science
ANT	Anthropology	EDW	Education - Workshop	MOY	Modern Society
ARE	Agribusiness and Resource Economics	EET	Electrical Engineering Technology	MUE	Music - Education
ARH	Art History	ELE	Electrical Engineering	MUH	Music - History
ARS	ARTS-Religious Studies (SM)	EMA	Education - Mathematics	MUL	Music - Literature
ART	Art	EML	Education - Middle Level	MUO	Music - Organizations
ASA	Applied Science and Agriculture	ENG	English	MUP	Music - Performance
AST	Astronomy	ENT	Entomology	MUS	Music
AVA	Animal, Veterinary and Aquatic Sciences	ERL	Education - Reading/Language Arts	MUY	Music - Theory
BCH	Biochemistry	ESC	Education - Science	NAV	Naval Science
BIO	Biology	ESS	Education - Social Studies	NFS	Nutrition and Food Science
BRE	Bio-Resource Engineering	FMT	Forest Management Technology	NRC	Natural Resources
BUA	Business Administration	FOE	Forest Engineering	NUR	Nursing
BUS	Business Management	FOL	Foreign Languages	OCE	Oceanography
CAN	Canadian/American Studies	FOR	Forest Resources	ONE	Onward - English
CEC	Education - Counseling	FOS	Food Science	ONI	Onward - Independent
CEN	Computer Engineering	FRE	French	ONM	Onward - Mathematics
CET	Civil Engineering Technology	FTY	Forestry	ONO	Onward - Orientation
CHE	Chemical Engineering	GEE	General Engineering	ONR	Onward - Reading
CHF	Child Development and Family Relations	GEO	Geography	ONS	Onward - Science
CHY	Chemistry	GER	German	PAA	Public Administration
CIE	Civil Engineering	GES	Geological Sciences	PBP	Plant Biology and Pathology
CLA	Classics	GET	General Engineering Two-Year	PHI	Philosophy
CLD	Merchandising and Consumer Resources	GRE	Greek	PHY	Physics
COS	Computer Science	GRR	Graduate Readings	POS	Political Science
DAN	Dance	HEC	Home Economics	PPA	Pulp and Paper
DEA	Dental Assisting	HED	Education - Higher Education	PSE	Plant, Soil and Environmental Sciences
DEH	Dental Hygiene	HIT	Health Information Technology	PSY	Psychology
DRA	Drama	HNF	Human Nutrition and Foods	QUS	Quaternary Studies
DSE	Developmental Studies/English	HOM	Consumer Studies, Housing and Management	RPM	Recreation and Park Management
DSI	Developmental Studies/Individual	HON	Honors	RUS	Russian
DSM	Developmental Studies/Mathematics	HPR	Health, Physical Education and Recreation	SAG	Sustainable Agriculture
DSR	Developmental Studies/Reading	HRA	Hotel, Restaurant and Tourism Administration	SCI	Science
DSS	Developmental Studies/Study Skills	HRM	Hotel, Restaurant and Tourism Management	SCS	Sciences
EAD	Education-Administration	HTY	History	SED	Education - Special Education
EAE	Education-Adult Continuing Education	HUD	Human Development	SOC	Sociology
EAS	Earth Sciences	HUM	Humanities	SPA	Spanish
EBI	Education - Bilingual Education	HUS	Human Services	SPC	Speech Communication
ECE	Early Childhood Development	IEI	Intensive English Institute	SPE	Speech
ECO	Economics	IND	Independent Studies	SPS	Special Seminars
ECY	Ecology	INM	Education - Media	SSC	Social Science
EDA	Education-Measurement and Evaluation	INT	Interdepartmental Listings	STT	Education - Student Teaching
EDB	Education-Appraisal and Basic Professional Courses	ITA	Italian	SVE	Surveying Engineering
EDC	Education-Curriculum	JMC	Journalism and Mass Communication	SWK	Social Work
EDF	Education-Curriculum	LAT	Latin	THE	Theatre
EDG	Education - General	LET	Legal Technology	TSO	Technology and Society Project
EDH	Education-History and Philosophy	LIB	Liberal Studies	WLM	Wildlife Management
EDL	Education-History and Philosophy	LNM	Landscape and Nursery Management	WRE	Writing Experience
EDM	Education-History and Philosophy	MAT	Mathematics	WRI	Writing Intensive
		MCB	Microbiology	WST	Women's Studies
				WTY	Wood Technology
				ZOL	Zoology



## Interdepartmental Listings

Departments listing the course are shown in parentheses.

- INT 110 Modern Economic Problems (ARE, ECO)  
 INT 211 Machine Tool Laboratory II and Welding (BRE, MET)  
 INT 219 Introduction to Ecology (PBP, ZOL)  
 INT 224 Sociology of Rural Life (ARE, SOC)  
 INT 230 Waste Management (ARE, CIE)  
 INT 233 Introduction to Engineering (CHE)  
 INT 250 Forum on Food (HUD)  
 INT 256 Forest Production (ENT, FTY, PBP)  
 INT 290 Nuclear War (PHI, PHY, ZOL)  
 INT 319 General Ecology (PBP, ZOL)  
 INT 323 Introduction To Conservation Biology (BIO, NRC, PBP, PSE, WLM, ZOL)  
 INT 324 Contemporary Rural Problems (ARE, SOC)  
 INT 329 The Individual and the Community (ARE, SOC)  
 INT 360 Economics and Biology of Marine Fisheries Management (ECO, ZOL)  
 INT 375 Field Studies in Ecology (FOR, OCE, PBP, WLM, ZOL)  
 INT 385 Computer Hardware Theory (ELE)
- INT 398 Undergraduate Research Participation (CHE, CHY, ELE)  
 INT 410 Introduction to the Study of Linguistics (ANT, ENG, FOL)  
 INT 414 Women in Society (ANT)  
 INT 420 Ecology Laboratory and Field Course (ZOL)  
 INT 444 Integrated Farming Systems (ARE, PSE)  
 INT 450 Agricultural Pest Ecology (ENT, PBP, PSE)  
 INT 454 Optical Communications (ELE, PHY)  
 INT 458 Culture and Economic Change (ANT, ECO)  
 INT 476 School and Society Study Tour (HUD)  
 INT 480 Sociolinguistics (ANT, SOC, SPC)  
 INT 482 Pesticides and the Environment (ENT, FOS, PSE)  
 INT 485 Human Factors Engineering (MEE, PSY)  
 INT 494 Field Experience (PAA, POS)  
 INT 500 Seminar in Quaternary Studies (ANT, GES, PBP, PSE)  
 INT 501 Discourse Analysis (ANT, PSY, SPC)  
 INT 510 Marine Invertebrate Zoology (OCE)  
 INT 514 Microeconomics Theory (ARE, ECO)
- INT 525 Tropical Deforestation Seminar (FMT, FOE, FTY, ZOL)  
 INT 528 Rural Health Care Delivery I (NUR, PSY, SPC, SWK)  
 INT 529 Rural Health Care Delivery II (NUR, PSY, SPC, SWK)  
 INT 530 Econometrics (ARE, ECO)  
 INT 537 The Evolution and Development of Canadian Government and Politics (HTY)  
 INT 539 Ice Ages and Humankind (ANT, PBP, QUS)  
 INT 545 Late Quaternary Paleoecology (PBP)  
 INT 552 Behavior Genetics (PSY, ZOL)  
 INT 555 Pest-Plant Interactions (ENT, PBP)  
 INT 563 Marine Benthic Ecology (OCE, PBP, ZOL)  
 INT 640 Seminar in Ecology (PBP, WLM, ZOL)
- INT 120A Basic and Pathogenic Microbiology (AVA, BMMB)  
 INT 135A Business Data Analysis (BUS, LIB)  
 INT 151A Essays on Human Ecology (BIO, ENG)  
 INT 168A Business Data Processing-COBOL (BUS, LIB)





# Interdisciplinary Course Concentrations (ICC'S)

The purpose of the Interdisciplinary Course Concentration is to provide students with the opportunity to integrate substantive material and understandings across several formal disciplines, thus to broaden their perceptions in a systematic and controlled fashion. Like the major, the concentration is directed toward a special learning goal rather than to a special category of student. All students who are in good standing are invited to declare an interdisciplinary course concentration (i.e., fully matriculated students neither on probation or any other form of limited academic acceptance). To receive interdisciplinary credit a student must earn at least a 2.0 ("C") in each course in a given concentration. Successful completion of an ICC is noted on the student's transcript.

Students intending to declare an Interdisciplinary Course Concentration should do so during the second semester of their sophomore year. In some cases it may be desirable to declare a concentration earlier, and permission may be granted to declare a concentration later in a student's undergraduate career. A form for declaring an ICC may be obtained from the Dean of the Student's College.

## Canadian Studies

### Faculty:

- Prof. Peter Morici, Coordinator, Economics, Canada House  
 Prof. Robert Babcock, History, 200 Stevens Hall  
 Assoc. Prof. John Battick, History, 130 Stevens Hall  
 Assoc. Prof. Cathleen Bauschatz, Foreign Languages, 252 Little Hall  
 Assoc. Prof. Robson Bonnicksen, Anthropology, 459 College Avenue  
 Prof. Harold Borns, Geology, 304A Boardman Hall  
 Asst. Prof. Kent Carter, Business Administration, S. Stevens  
 Asst. Prof. Howard Cody, Political Science, 31 N. Stevens  
 Prof. Edward Collins, Political Science, 27 N. Stevens Hall  
 Assoc. Prof. David Decker, Art, 111 Carnegie Hall  
 Prof. Stewart Doty, History, 145 Stevens Hall  
 Prof. Alaric Faulkner, Anthropology, 44 S. Stevens Hall  
 Assoc. Prof. Jacques Ferland, History, 275C Stevens Hall  
 Asst. Prof. Robert B. Forster, Forest Resources, Nutting Hall  
 Assoc. Prof. James Gallagher, Sociology, 201 Fernald Hall  
 Lecturer James Herlan, Foreign Languages, Little Hall

- Asst. Prof. Stephen Hornsby, Anthropology, Canada House  
 Prof. Edward Ives, Anthropology, 42 S. Stevens Hall  
 Prof. Alan Kezis, Agricultural and Resource Economics, 206 Winslow Hall  
 Assoc. Prof. Victor A. Konrad, Anthropology, Canada House  
 Assoc. Prof. Kenneth Norris, English, 304 Neville Hall  
 Assoc. Prof. Michael Palmer, Political Science, 31 N. Stevens Hall  
 Assoc. Prof. Raymond Pelletier, Foreign Languages, 266 Little Hall  
 Prof. Robert Rioux, Foreign Languages, 214 Little Hall  
 Prof. David Sanger, Anthropology, 26 S. Stevens Hall  
 Assoc. Prof. Kathryn Slott, Foreign Languages, 278 Little Hall  
 Prof. David Smith, History, 150 Stevens Hall  
 Prof. Emerita Alice Stewart, History, Canada House  
 Prof. James Wilson, Agricultural and Resource Economics, Winslow Hall  
 Prof. Bernard Yvon, Education, 317 Shibles Hall

### Rationale and Requirements

The Canadian Studies Program at UM offers a greater number and wider range of courses in this area than any other University in the United States. Canadian Studies provides a valuable area of study for (1) students entering fields of education, business, and government where knowledge of Canada is increasingly important; (2) those specializing in international relations; and (3) undergraduates wishing to pursue graduate work either in a Canadian field or in an area with a Canadian component.

For an undergraduate program of study, students may obtain either a concentration or minor in Canadian Studies. In most colleges, a concentration in Canadian Studies requires 18 credit hours or 6 courses. The courses must include CAN 101: Introduction to Canadian Studies, two core courses and three related courses which can be selected from either Canadian Core courses or Canadian Related courses. Courses taken at a Canadian University through the Canada Year Program administered by the Canadian-American Center can also be included in the Concentration.

CAN 501: The making of the Canadian Identity is available to senior undergraduate students who have completed their senior/concentration in Canadian Studies and/or are considering graduate work on Canada. Students who are qualified or are considering graduate study on Canada should contact the center regarding this course and the M.A. and Ph.D. programs at the University of Maine.

For twenty years the Center has sent students in the Canada Year Program to Canadian Universities. University of Maine students have studied in Newfoundland (Memorial University), Prince Edward Island (University of Prince Edward Island), Nova Scotia (Dalhousie University, Acadia University), New Brunswick (University of New Brunswick, Mount Allison University), Québec (Université Laval, McGill University, Université de Sherbrooke, Concordia University, Université du Québec à Chicoutimi), Ontario (University of Toronto, York University, Carleton University, University of Guelph), Alberta (University of Calgary) and British Columbia (University of British Columbia, Simon Fraser University, University of Victoria).

Although participation in Canadian Studies is not a prerequisite to the Canada Year program, applications from students in Canadian Studies will be given preference by the selection committee. Study in Canada allows a student to strengthen his or her major by adding courses not offered at Orono and to live in an area with a different culture or language.

Courses with a 400 number are for selected undergraduate and graduate students.

### Canadian Core Courses

- CAN 101 Introduction to Canadian Studies  
 CAN 401 Readings in Canadian Studies  
 CAN 501 The Making of the Canadian Identity  
 ARH 162 Modern Architecture and Design  
 ARH 168 Canadian Art  
 ARH 361 Topics in Art History  
 ANT 422 Folklore of Maine and the Maritime Provinces  
 ANT 457 North American French Cultures and Societies  
 ANT 460 Peoples and Cultures of the Circumpolar Area  
 ANT 472 North American Prehistory  
 ANT 490 Topics in Anthropology: a. French Canadian Immigration b. The Arts of Native Canada  
 ECO 439 International Trade and Commercial Policy  
 ECO 440 Canadian Economics: Issues and Policies  
 ECO 445 Regional Economics  
 ENG 236 Canadian Literature  
 ENG 436 Topics in Canadian Literature  
 FRE 254 Popular Culture in French Canada  
 FRE 256 French Canadian Civilization  
 FRE 297 French May Term in Quebec City



- FRE 442 French Language of North America  
 FRE 452 The Novel of Quebec  
 FRE 456 Seminar in Quebec Studies  
 FRE 550 Seminar in French Canadian Literature and Language  
 FRE 552 Films, Video Drama, and Literature in French Canada  
 GEO 214 Geography of Canada and the United States  
 GEO 301 Historical Geography of North America  
 GEO 302 Geographical Perspectives on Atlantic Canada  
 GEO 350 The Geography of Canada  
 HTY 111 Canada: From Cartier to Trudeau  
 HTY 199 Problems in History  
 HTY 272 The Industrial Worker in America  
 HTY 458 History of French Canada and Franco-Americans  
 HTY 459 Colonial Canada  
 HTY 460 Modern Canada  
 HTY 482 Canada and the American Economy  
 HTY 499 Contemporary Problems in History  
 HTY 521 Canada and the United States, 1783 to the Present  
 HTY 522 Canadian Economic History  
 HTY 550 Readings in Bibliography and Criticism in Canadian History  
 HTY 599 Special Topics in History  
 POS 243 Canadian Government and Politics  
 POS 456 Canadian Political Parties  
 POS 496 International Affairs Internship  
 POS 531 Topics in Comparative Politics  
 POS 537 Evaluation and Development of Canadian Government and Politics  
 POS 587 Problems in International Law (Canada)  
 SOC 431 Canadian Society

#### Canadian Related Courses

- ANT 221 Introduction to Folklore  
 ANT 425 Oral History and Folklore  
 ANT 451 North American Indian Ethnology  
 ANT 473 Historic Archaeology  
 ANT 474 Analysis of Historic Artifacts  
 ANT 570 Seminar in Northeastern North American Prehistory  
 ANT 573 Advanced Methods in Historic Archaeology  
 BUA 328 Canadian/U.S. Business: A Comparison  
 BUA 345 International Management  
 BUA 376 International Marketing  
 ECO 439 International Trade and Commercial Policy  
 ECO 445 Regional Economics  
 FOL 490 Topics in Foreign Languages: Bilingualism and Biculturalism  
 FRE 440 Franco-American Civilization  
 GEO 215 Cultural Geography

- GES 324 Geology of North America  
 GES 543 Quaternary History of Northeastern North America  
 HTY 199 Problems in History  
 INT 539 Ice Ages and Humankind  
 JMC 214 The Foreign Media  
 OCE 270 Oceanography Today  
 OCE 370 Introduction to Oceanography  
 POS 387 International Law  
 SOC 442 Population and Society

For complete details about the Canadian Studies concentration, contact the Canadian-American Center, Canada House, 154 College Avenue.

#### Classical Studies

##### Faculty

- Assoc. Prof. Kristina M. Passman, Coordinator, Foreign Language and Classics, 254 Little, (2080)  
 Asst. Prof. Karen-Edis Barzman, Art, 151 Carnegie (3252)  
 Assoc. Prof. Jay Bregmen, History, 200A Stevens (7808)  
 Asst. Prof. Sarah A. Halford, Philosophy, The Maples (3865)  
 Assoc. Prof. Michael Howard, Philosophy, The Maples (3864)  
 Assoc. Prof. Michael Palmer, Political Science, 31 N. Stevens (1879)  
 Prof. J. Norman Wilkinson, Theatre, 209 E. Annex (2405)  
 Assoc. Prof. John R. Wilson, English, 205 Neville Hall

##### Rationale

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 C.E., 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 course concentration is particularly useful to the student with interests in ancient history, in philosophy, art history, anthropology, literature, and political science. It will also prove useful to the student preparing for a career in law.

##### Requirements:

A minimum of 18 credits or 6 courses. The student who elects this concentration 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 101, Classical Civilization, and the remaining three courses in one of two areas listed below. The list below is flexible: new courses, special seminars, pertinent readings in upper level Honors courses, and independent study may be approved for Classical Studies.

#### Course Offerings

##### Art History:

- ARH 155 Art History I  
 ARH 251 Classical Art  
 ARH 361 Topics in Art History: Greek Art

##### Classics:

- CLA 101 Greek Literature in English Translation  
 CLA 102 Latin Literature in English Translation

##### Foreign Languages: English

- ENG 300 The Bible as Literature  
 FOL 231 Western Tradition in Literature: Homer through Renaissance

##### Greek

- GRE 101 Elementary Greek I  
 GRE 102 Elementary Greek II  
 GRE 203 Readings in Greek Literature I  
 GRE 204 Readings in Greek Literature II

##### History:

- HTY 201 Classical Civilization  
 HTY 401 History of Greece  
 HTY 402 Roman History  
 HTY 433 Greek and Roman Mythology  
 HTY 434 Greek and Roman Heritage in America

##### Latin:

- LAT 203 Readings in Latin Literature I  
 LAT 204 Readings in Latin Literature II  
 Upper level Latin as offered

##### Philosophy:

- PHI 203 Ancient Greek Religion  
 PHI 210 History of Ancient Philosophy  
 PHI 282 The New Testament and Early Christianity

##### Political Science:

- POS 212 Introduction to Political Theory  
 POS 389 Classical Political Thought

##### Theatre

- THE 112 Masterpieces of World Drama I

#### Developmental Disabilities

##### Faculty

- Assoc. Prof. Barbara Csavinszky, Human Development, Coordinator, 32 Merrill Hall  
 Assoc. Prof. Dana Birnbaum, Child Development, 33 Merrill Hall



Asst. Prof. Nancy Brawner-Jones, Special Education, 145 Shibles Hall  
 Assoc. Prof. Phyllis Brazee, Education, 205 Shibles Hall  
 Assoc. Prof. Stephen Butterfield, Physical Education, 103 Lengyel  
 Assoc. Prof. Richard Cook, Nutrition, 25 Merrill Hall  
 Asst. Prof. Elizabeth DePoy, Social Work, Annex C  
 Prof. William Dopheide, Comm. Disorders, 208 E. Annex  
 Assoc. Prof. Elaine Gershman, Psychology, Little Hall  
 Assoc. Prof. Katheryn Gaianguet, Sociology, 201B Fernald Hall  
 Prof. Walter Harris, Education, 151 Shibles Hall  
 Assoc. Prof. Donald Hayes, Psychology, 301 Little Hall  
 Asst. Prof. Laurie E. Hicks, Art, 157 Carnegie Hall  
 Prof. Michael Lewis, Art, 104 Carnegie Hall  
 Prof. Shirley Oliver, Child Development, 12 Merrill Hall  
 Assoc. Prof. Steven Ott, Public Administration, 9 N. Stevens Hall  
 Asst. Prof. Jill Perrone, Nursing, 160 College Ave.  
 Prof. John Pettit, Communication Disorders, Conley Speech and Hearing Center  
 Prof. Marisue Pickering, Communication Disorders, 209 Alumni Hall  
 Assoc. Prof. David Samuelian, Human Services, 107 Caribou Hall, UC  
 Assoc. Prof. Gary Schilmoeller, Child Development, 37 Merrill Hall  
 Assoc. Prof. Pamela Schutz, Education, 301 Shibles  
 Assoc. Prof. Frank Setter, Human Services, 101 Caribou Hall, UC  
 Assoc. Prof. William Whitaker, Social Work, Annex C  
 Assoc. Prof. Lucille Zeph, Special Education, 305 Shibles Hall

#### The University Affiliated Program

The University Affiliated Program (UAP) provides students with an opportunity to learn about developmental disabilities within an interdisciplinary academic concentration. Students declare this concentration in addition to their major field of study. The components of the program are: A common core of courses which includes one course in normal child behavior, a course in exceptionality and two or more courses elected from a list of approved courses offered by participating colleges, plus a series of seminars on disabilities and a practicum experience with Behavioral and Developmental Pediatrics at Eastern Maine Medical Center or with one of the UAP cooperating agencies. Through these experiences, students develop an appreciation of the many factors effecting development. They develop special skills and learn how their own specialty can operate with other disciplines to provide the most beneficial program for an individual with developmental disabilities.

The developmental disabilities course concentration is open to selected undergraduate students in the following departments and areas:

Art Education/Art Child Development/  
 Family Relations Elementary Education Health  
 and Family Life Education Health, Physical Education  
 and Recreation Human Nutrition and  
 Foods Human Services Nursing Psychology Social  
 Work Sociology

To apply for admission, consult with one of the above faculty from your department, and complete the declaration Form.

#### Course Offerings

A. PREREQUISITES: Choose at least one normal child behavior course (Three credits).

CHF 201 Introduction to Child Development 3  
 PSY 323 Psychology of Childhood 3

B. CORE: Choose at least one course (Three credits).

SED 402 Mainstreaming Exceptional Students 3  
 OR  
 SED 400 Survey of Exceptionality 3  
 PSY 428 Psychology of the Exceptional Child 3

C. ELECTIVES: Choose at least two electives for six credits. These must be outside the student's major.

AED 171 The Teaching of Art 3  
 CHF 352 Strategies for Family Intervention 3  
 CHF 433 Adolescence 3  
 CHF 434 Adult Development and Aging 3  
 HNF 101 Introduction to Food and Nutrition 3  
 HNF 301 Life Cycle Nutrition 3  
 HPR 270 Motor Development and Learning 3  
 HPR 367 Mainstreaming in Physical Education/Recreation 3  
 HPR 380 Health, Physical Education and Recreation Programs in the Elementary School 3  
 PSY 308 Theories of Personality 3  
 PSY 312 Abnormal Psychology 3  
 PSY 324 Psychology of Adolescence 3  
 SED 401 Introduction to Education of Severely Handicapped 3  
 SOC 318 Sociology of the Family 3  
 SOC 319 Domestic Violence and Social Structure 3  
 SPC 130 Introduction to Communication Disorders 3  
 SPC 454 Communication Development in Children 3  
 SPC 480 Language and Speech Development 3  
 SPC 388 Hearing Impairment 3  
 SWK 320 Introduction to Social Work and Social Welfare 3  
 SWK 440 Social Welfare Policy and Issues 3  
 SWK 368 Psychosocial Aspects of

Disability (C.E.D. Only) 3

D. SEMINAR: Must select Level I Seminar in the U.A.P. Lecture-Discussion series, one credit. Level II Seminar, one credit optional.

E. PRACTICUM: Choose three to six credit hours of work. Must include one credit of seminar.

The experience in the University Affiliated Program (UAP) may be taken under a field experience or special problems designation depending upon the specific discipline and will include at least one lecture/ discussion seminar in developmental disabilities.

F. TRANSCRIPTS: Satisfactory completion of the concentration will result in the concentration specifically being indicated on a student's transcript.

#### Environmental Issues and Ecological Studies

##### Faculty

Prof. Melvin Gershman, Microbiology and Animal, Veterinary and Aquatic Sciences, Coordinator, 302 Hitchner Hall  
 Assoc. Prof. Christopher Cronan, Botany, 202 Deering Hall  
 Prof. Ronald Davis, Botany, 217 Deering Hall  
 Prof. John Dearborn, Zoology, 321 Murray Hall  
 Prof. Malvern Gilmartin, Zoology, 306 Murray Hall  
 Assoc. Prof. William Glanz, Zoology, 311 Murray Hall  
 Prof. Rollin Glenn, Plant, Soil and Environmental Sciences, 115 Deering Hall  
 Prof. Bradford Hall, Geological Sciences, 110 Boardman Hall  
 Assoc. Prof. Malcolm Hunter, Wildlife, 226 Nutting Hall  
 Assoc. Prof. George Jacobson, Jr., Botany, 18 Deering Hall  
 Prof. Peter Kleban, Physics, 222 Bennett Hall  
 Prof. Irving Kornfield, Zoology, 215 Murray Hall  
 Assoc. Prof. Bernard McAlice, Botany and Oceanography, 9 Deering Hall  
 Asst. Prof. Christopher Murdock, 201a Nutting Hall  
 Prof. Stephen Reiling, Agricultural Economics, 207 Winslow Hall  
 Assoc. Prof. Chet Rock, Civil Engineering, 457 Aubert Hall  
 Assoc. Prof. Paul Roscoe, Anthropology, 40 S. Stevens Hall  
 Assoc. Prof. Edward Schriver, History, 115 Stevens Hall  
 Prof. Malcolm Shick, Zoology, 211 Murray Hall  
 Prof. William TeBrake, History, 275B Stevens Hall  
 Asst. Prof. Warren Tomkiewicz, Education, 212 Shibles Hall  
 Prof. Robert Vadas, Botany and Oceanography, 209 Deering Hall

##### Rationale

To cope with an increasing number of actual and potential environmental problems requires



a well-informed citizenry. Environmental concerns are considered in a number of courses offered by the University. Some relate to social issues and some accentuate Ecology and Biology and involve various natural sciences.

As an introduction to the Environment and Ecology Concentration, all students are required to take AVA 250 (Our Environment) and ARE 371 (Introduction to Natural Resource Economics and Policy) or INT 219 (Introduction to Ecology). Science majors may substitute INT 319 (General Ecology) for INT 219. In addition, students will choose four courses from the list below for a minimum of 18 credit hours. It is recommended that the selection of offerings be made in consultation with the coordinator of the concentration and the student's major advisor.

### Course Offerings

#### Anthropology:

- ANT 464 Cultural Ecology Biology:  
 BIO 468 Limnology Civil Engineering:  
 CIE 331 Fundamentals of Environmental Engineering Education:  
 ESC 444 Basic Field Ecology Forestry:  
 FTY 349 Principles of Forest Management Geological Sciences:  
 GES 101-102 Aspects of the Natural Environment History:  
 HTY 217 Environmental History of Europe  
 HTY 277 History of the Treatment of the American Environment

#### Interdepartmental Listings:

- INT 290 Nuclear War Microbiology:  
 MCB 400 Our Microbial World Oceanography:  
 OCE 501 Biological Oceanography

#### Plant, Soil, and Environmental Sciences

- PSE 144 Soil and Water Conservation Wildlife:  
 WLM 320 Introduction to Wildlife Conservation

#### Zoology:

- ZOL 213 Introduction to Marine Science  
 ZOL 301 Natural History of the Maine Coast  
 ZOL 524 Population Biology  
 ZOL 525 Community Ecology  
 ZOL 585 Physiological Ecology  
 ZOL 586 Physiological Ecology Laboratory

### Franco-American Studies

#### Faculty

- Assoc. Prof. Raymond Pelletier, Foreign Languages, Coordinator, 266 Little Hall  
 Prof. Jacob Bennett, English, 313 Neville Hall  
 Prof. Stewart Doty, History, 170 Stevens Hall  
 Assoc. Prof. James Gallagher, Sociology, 201 Fernald Hall  
 Lecturer James Herlan, Foreign Languages, Little Hall  
 Assoc. Prof. Victor Konrad, Anthropology, Canada House  
 Dir. Yvon Labbe, Franco-American Affairs, 126 College Avenue  
 Professor Bernard Yvon, Education, 317 Shibles

### Rationale

The last two decades have witnessed the emergence on campuses throughout the nation of academic programs that document the contribution of America's ethnic communities to the creation of a multicultural society. In New England, and particularly in Maine where citizens of French-Canadian and Acadian descent number approximately 35 percent of the population, Franco-Americans provide a unique example of a cultural group that has been dedicated to keeping its language and culture alive for the past one hundred years. As such, Franco-Americans provide an essential key to understanding the region's cultural identity and diversity and a strong link to developing political and economic ties with French-speaking Canadians.

A program of Franco-American studies relates to North American history, to sociological, anthropological, linguistic, literary, and educational issues and is designed to integrate theories and methodologies from each of these disciplines. The initial focus of this course concentration is on the people of French-Canadian and Acadian ancestry in New England. As the student progresses through the concentration, options become available to relate cultural, linguistic, historical, and social characteristics, and educational policies to the mother country or to place them in the context of American society. All aspects of the rich past of Franco-American culture, ranging from the study of language and lifeways to the examination and analysis of contemporary issues, are aimed at creating a greater understanding and appreciation of the state and the region.

The participating faculty members in this course cluster are committed to the idea that a society can best be approached on its own terms and through an interdisciplinary curriculum. They are also committed to achieving a better understanding of America's multicultural society.

### Course Offerings

In order to qualify for a course concentration in Franco-American studies, a student must develop competency in the following areas:

#### A. Franco-American Culture and History

All students must earn six credits chosen from among the following courses:

- ANT 457 North American French Cultures and Societies  
 FRE 440 Franco-American Civilization  
 FRE 442 French Language of North America  
 HTY 458 History of French Canada and Franco-Americans

#### B. French Language

Students are required to complete the FRE 203/204 sequence or the FRE 205/206 sequence for Franco-Americans fluent in French or to demonstrate comparable proficiency by examination. All students are strongly encouraged to go beyond this minimum level of proficiency by participating

in the variety of courses and programs offered by the Department of Foreign Languages.

#### C. Franco-American Culture as it Relates to a Broader Range of Academic Disciplines

Students are required to take 12 semester hours outside their major from any of three of the following clusters, with no fewer than two courses chosen from each cluster. (For example, a history major will probably take at least two courses in the history cluster, but in order to satisfy the requirements for this concentration he or she must also select two courses from the French cluster and two courses from the Society and Culture clusters.)

#### Education

- EBI 380 Methods and Materials for Bilingual Instruction  
 EBI 390 Introduction to Bilingual Education  
 EBI 560 Advanced Studies in Bilingual Education

#### Folklore

- ANT 422 Folklore of Maine and the Maritime Provinces  
 ANT 423 Folksong  
 ANT 424 Narrative  
 ANT 425 Oral History and Folklore: Fieldwork

#### French

- FRE 256 French Canadian Civilization  
 FRE 452 The Novel of Quebec  
 FRE 456 Seminar in Quebec Studies

#### Geography

- GEO 210 Geography of Maine  
 GEO 215 Cultural Geography  
 GEO 301 Historical Geography of North America

#### History

- HTY 459 Colonial Canada  
 HTY 460 Modern Canada

#### Language

- INT 410 Introduction to the Study of Linguistics  
 INT 480 Sociolinguistics  
 ANT 481 Language and Culture

#### Society and Culture

- SOC 338 Race and Culture Conflict  
 ANT 439 Psychological Anthropology  
 ANT 468 Social Anthropology of Complex Societies

### Geography

#### Faculty

- Asst. Prof. Stephen Hornsby, Anthropology Coordinator, Canada House  
 Professor Marshall Ashley, Forestry, 208 Nutting Hall  
 Professor Richard Blanke, History, 115C Stevens Hall  
 Assoc. Prof. Robson Bonnichsen, Anthropology 495 College Ave.  
 Professor Melvin Gershman, Animal, Veterinary and Aquatic Sciences, Microbiology 302 Hitchner Hall



Assoc. Prof. Victor Konrad, Anthropology,  
Canada House

Prof. Irving Kornfield, Zoology, 215 Murray  
Hall

Prof. Stephen Reiling, Agricultural and Re-  
source Economics, 207 Winslow Hall

Assoc. Prof. Edward Schriver, History, 115A  
Stevens Hall

Prof. Thomas Taylor, Public Administration, 39  
N. Stevens Hall

Prof. William TeBrake, History, 275B Stevens  
Hall

Assoc. Prof. David Tyler, Civil Engineering, 120  
Boardman Hall

Professor Claude Westfall, Engineering Tech-  
nology, 202 E. Annex

(The above list represents faculty currently  
teaching courses included in the Geography  
Course Cluster. Changes occur from semester to  
semester and year to year.)

### Rationale

Geography is an established discipline at most American universities. The last 30 years have seen considerable growth of geography departments as the discipline moved from a focus on regional studies to the development of spatial and locational theory. The discipline, however, remains 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, human-environment relationships, and pre-history. Geography courses and degrees appeal to undergraduates seeking a general yet practical University education. Geography graduates 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.

Although the University of Maine does not offer either the B.A. or B.S. degree in geography, a considerable number of geography and geography-related courses are taught on a regular basis. The Geography Course Cluster provides students interested in the field the opportunity to combine, with their major, a general or focused set of courses (minimum, 18 credit hours) in human geography. Students interested only in aspects of physical geography are urged to consider courses in geology and the Environmental Issues and Ecological Studies cluster.

GEO 201, Introduction to Human Geography, or GEO 210, Geography of Maine, should be taken by the interested student in the first or second year. The student is also urged to discuss and plan course selection with the Coordinator, Assistant Professor Stephen Hornsby (Anthropology-Geography).

### Course Offerings

A. Core Curriculum. Three to six credit hours

#### 1. Prerequisite

GEO 201 Introduction to Human Geography

GEO 210 Geography of Maine

GEO 215 Cultural Geography

2. Students are urged to select one of the following courses:

GEE 116 Cartographics

SVE 111 Plane Surveying

FOE 206 Photogrammetry and Remote Sensing

ANT 497 Departmental Projects (Field Experience in Geography - May term)

B. Elective Courses. Twelve to 15 credit hours, with no more than three credit hours below the graduate level.

Although it is possible to take a wide range of elective courses, 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.

#### 1. Urban and Regional Planning

Careers in public administration, marketing, resource management and numerous other areas demand an understanding of human spatial and locational relationships, and an ability to predict how humans organize space. This knowledge is of particular importance in planning the growth of cities and their surrounding regions. The student interested in urban and regional planning should select from the following list of courses:

GEO 210 Geography of Maine

GEO 214 Geography of Canada and the United States

GEO 350 The Geography of Canada

ECO 444 Urban Economics

ECO 445 Regional Economics

POS 233 Urban Politics

ARE 474 Land Use Planning

PAA 580 City and Regional Planning

#### 2. 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

ANT 475 Paleoenvironmental Archeology

HTY 277 History of the Treatment of the American Environment

GEO 210 Geography of Maine

GEO 214 Geography of Canada and the United States

GEO 215 Cultural Geography

GEO 301 Historical Geography of North America

GEO 302 Geographical Perspectives on Atlantic Canada

GEO 350 The Geography of Canada

Students may also include up to six credit hours of regional anthropology (ANT 422, ANT 441, ANT 442, ANT 451, ANT 453, ANT 454, ANT 460, ANT 471, ANT 472) and regional history (HTY 301, HTY 402, HTY 409, HTY 422, HTY 423, HTY 424, HTY 425, HTY 426, HTY 435, HTY 436, HTY 337, HTY 441, HTY 447, HTY 448, HTY 455, HTY 456)

#### 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:

GEO 214 Geography of Canada and the United States

GEO 215 Cultural Geography

INT 219 Introduction to Ecology

AVA 250 Our Environment

PSE 144 Soil and Water Conservation

BIO 260 Interaction Between Humans and Their Environment

ANT 475 Paleoenvironmental Archaeology

HTY 217 Environmental History of Europe

HTY 277 History of the Treatment of the American Environment

INT 319 General Ecology

ARE 371 Introduction to Natural Resource Economics and Policy

ARE 474 Land Use Planning

PSE 428 Landscape Design Problems

FTY 457 Forest Watershed Management

INT 500 Seminar on Quarternary Studies

RPM 554 Forest Recreation Planning

ARE 572 Agricultural Trade and Economic Growth

#### 4. Rural Resource Management

In Maine, the wise management of rural lands with forests, agriculture, and recreation resources is of considerable value and increasing importance. Many new and interesting careers will be found in this area. For students interested in this field, a diverse knowledge of rural Maine's lands and occupants is essential. A selection of the following courses can provide such a background.

GEO 210 Geography of Maine

GEO 214 Geography of Canada and the United States

GEO 215 Cultural Geography

INT 224 Sociology of Rural Life

PSE 144 Soil and Water Conservation

ARE 371 Introduction to Natural Resource Economics and Policy

INT 324 Contemporary Rural Problems

INT 329 The Individual and the Community

ARE 471 Resource Economics

ARE 474 Land Use Planning

ARE 486 Government Policies Affecting Rural America



RPM 554 Forest Recreation Planning  
ARE 572 Agricultural Trade and Economic Growth

#### 5. Locational Analysis of Economic Activities

One of the primary concerns of geography is that of predicting and explaining the location of economic activities. Factories, stores, warehouses, and other facilities, and the communication and transportation links between them, are not haphazardly placed on the landscape. There are definite reasons why these facilities are where they are, and a knowledge of these reasons is of considerable importance in such matters as industrial expansion, selecting the location of a new store, and planning a transportation system for a town. The following selection of courses address this area of concern.

GEO 210 Geography of Maine  
GEO 214 Geography of Canada and the United States  
GEO 215 Cultural Geography  
GEO 350 Geography of Canada  
ECO 444 Urban Economics  
ECO 445 Regional Economics  
ARE 371 Introduction to Natural Resource Economics and Policy  
ARE 471 Resource Economics  
ARE 474 Land Use Planning

#### 6. Geopolitics

The partitioning of land, zoning, the distribution of electoral districts, and the division of the earth's surface into national, regional, and municipal territories all have political significance. The student of politics has much to gain from a clearer understanding of political geography. The following courses are useful in this regard.

GEO 210 Geography of Maine  
GEO 214 Geography of Canada and the United States  
GEO 215 Cultural Geography  
GEO 350 Geography of Canada  
POS 223 Political Geography  
POS 233 Urban Politics  
ARE 474 Land Use Planning  
ARE 486 Government Policies Affecting Rural America  
PAA 580 City and Regional Planning

#### 7. Spatial Organization of Society

Human occupancy of the land and the distribution of human groups are highly organized. For example, specific social class groups in the city reside in particular neighborhoods and maintain barriers and distance between themselves and other groups. The spatial organization of society is treated in the following courses:

GEO 210 Geography of Maine  
GEO 214 Geography of Canada and the United States  
GEO 215 Cultural Geography  
GEO 302 Geographical Perspectives on Atlantic Canada  
GEO 350 Geography of Canada  
INT 224 Sociology of Rural Life

SOC 442 Population and Society  
INT 324 Contemporary Rural Problems  
INT 329 The Individual and the Community

### Latin American Studies

#### Faculty

Prof. James Acheson, Anthropology, Coordinator, 40B S. Stevens Hall  
Professor Melvin Burke, Economics, 220 Stevens Hall  
Assoc. Prof. Eugene DelVeccio, Foreign Languages, 250 Little Hall  
Assoc. Prof. Laura Luszczynska, Foreign Languages, 216 Little Hall  
Assoc. Prof. Kathleen N. March, Foreign Languages, 276 Little Hall  
Assoc. Prof. James Troiano, Foreign Languages, 274 Little Hall

#### Rationale

The Latin American course cluster offers a series of courses in foreign languages, anthropology, history and economics concerning Latin America designed to broaden the student's undergraduate education and increase his or her job opportunities.

Although North Americans and Latin Americans share the "New World," they have little understanding of each other. North Americans have reacted to Latin America either by ignoring it, or through the most unfortunate stereotypes.

Latin America cannot be ignored much longer. The area is rich in natural resources (most of the oil used in New England comes from Venezuela). It also presents a huge market for U.S.-made goods. The area currently is undergoing rapid and sometimes violent social change, as witnessed by the ongoing events in Central America. Spanish speakers recently have become the largest immigrant group in the United States; and Cuba's Castro is an acknowledged leader of all the countries in the "Third World."

The size and diversity of Latin America make it difficult to comprehend. Brazil alone is larger than the continental United States. Latin American communities range from sparkling modern cities like Caracas and Rio de Janeiro to thousands of rural, traditional hamlets in the Amazon Basin and Central America. Although Spanish and Portuguese are the predominant languages, there are hundreds of different Indian societies, totaling millions of people which have maintained their traditional languages and cultures.

Measured by North American standards, Latin America appears eccentric, inconsistent, and full of surprises. Measured by its own standards, it is orderly, consistent, and comprehensible.

The Latin American Course Cluster combines training in languages, literature, and social sciences to allow students to begin to deal with this very different and increasingly important part of the world. The faculty involved in

this course cluster have spent substantial time in Latin America. Several are natives of Latin American countries.

#### Course Offerings

A minimum of 18 hours are required for the Latin American Course Cluster.

##### A. Language Competence.

The student must demonstrate proficiency in Spanish at the intermediate level. Proficiency may be demonstrated either by examination or by completing SPA 203/204 with a mark of "B" or higher. Students will not be admitted to the program until they have completed SPA 101/102. Course work in intermediate Spanish (SPA 203/204) will be counted toward the Course Cluster, however. (In the near future students may be able to fulfill the language requirement in Portuguese).

##### B. Social Sciences and Literature.

In addition, the student is required to take at least one course in three of the following four areas:

###### History

HTY 447 Latin America: Under the Conquerors  
HTY 448 Latin America: Reform and Revolution  
HTY 452 Topics in Latin American History

###### Anthropology

ANT 453 Peoples and Cultures of Mesoamerica  
ANT 467 Peasant Studies

###### Economics

ECO 438 Economic Development  
ECO 436 Marxian Economics

###### Literature

SPA 307 Readings in Peninsular Literature  
SPA 308 Readings in Spanish American Literature. Another more advanced course in Latin American literature may fulfill this requirement (SPA 408, SPA 409, SPA 410)

Additional courses in Spanish, Portuguese, Latin American Literature, History, and Anthropology are recommended.

### Legal Studies

#### Faculty

Prof. Erling Skorpen, Philosophy, Coordinator, 5 The Maples  
Assoc. Prof. Steven Barkan, Sociology, 201A Fernald Hall  
Assoc. Prof. R. Brucher, English, 415 Neville Hall  
Professor Edward Collins, Political Science, 15 N. Stevens Hall  
Assoc. Prof. Edward Laverty, Public Administration, 200 Alumni Hall  
Assoc. Prof. Harlan J. Onsrud, Surveying Engineering, 117A Boardman Hall  
Professor Jefferson White, Philosophy, 11 The Maples



**Rationale**

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. This interdisciplinary course concentration 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.

**Course Offerings**

The Legal Studies Curriculum is divided into two clusters as follows:

- A. Courses "About" Law (three to be selected for nine credits)
- ENG 229 Topics in Literature (Law)  
 PHI 244 Philosophy of Law I  
 PHI 245 Philosophy of Law II  
 POS 382 Introduction to Law  
 SOC 314 Law and Society  
 SVE 321 Cadastral Systems
- B. Courses "In" Law (two to be selected for six credits)
- HTY 499 Contemporary Problems in History  
 COS 492 Computer Related Law  
 JMC 370 Telecommunication Law and Policy  
 JMC 375 Mass Media Law and Ethics  
 PAA 405 Administrative Law  
 POS 383 Constitutional Law  
 POS 384 Constitutional Law: Civil Liberties  
 PAA 410 Local Government Law  
 POS 387 International Law  
 SOC 345 Women, Crime and Criminal Justice  
 SVE 221 Legal Aspects of Land Surveying  
 SVE 522 Environmental Law and Resource Regulation

**Linguistics****Faculty**

Assoc. Prof. Henry Munson, Anthropology, Coordinator, 36B S. Stevens Hall  
 Assoc. Prof. Paul Bauschatz, English, 304 Neville Hall  
 Professor Jacob Bennett, English, 313 Neville Hall  
 Prof. Catherine J. Garvey, Psychology, 286 Little Hall  
 Coop. Assoc. Prof. Sharon Jackiw, Foreign Languages, 24 Coburn Hall  
 Asst. Prof. Mark Kuhn, Speech Communication, 325 Stevens Hall  
 Asst. Prof. Rex Pyles, Foreign Languages, 270 Little Hall  
 Prof. Robert Rioux, Foreign Languages, 214 Little Hall  
 Professor Jefferson White, Philosophy, The Maples

**Rationale**

Linguistics is the field of study concerned with language, both as a general human faculty and as manifested in particular languages. The discipline includes such topics as: the acquisition of language, its sounds, meaning, structure, social and cultural aspects, families and dialects, and change.

The linguistics program entails a minimum of 15 credit hours, as follows:

**A. Core**

At least one course must be completed in each of the following categories for a minimum total of nine credit hours.

**1. Introduction**

INT 410 Introduction to the Study of Linguistics

**2. Language Structure**

FOL 453 Phonology  
 ENG 477 Modern Grammars

**3. Language in Context**

INT 480 Sociolinguistics  
 ANT 481 Language and Culture  
 SPC 480 Language and Speech Development  
 INT 501 Discourse Analysis

**B. Electives**

Students may select courses from among the following which, when added to those in the core, will complete the total of 15 credit hours.

ENG 476 History of the English Language  
 ENG 579 The Theory of Composition (also listed as SPC 579)  
 GER 403 History of the German Language  
 FRE 420 French Phonetics  
 FRE 442 French Language of North America  
 FRE 499 Applied French Linguistics  
 FRE 500 History of the French Language  
 FRE 520 French Linguistics  
 COS 220 Introduction to Computer Science I  
 COS 221 Introduction to Computer Science II  
 COS 301 Programming Languages  
 COS 470 Introduction to Artificial Intelligence  
 MAT 241 Mathematical Logic  
 PHI 260 Philosophy of Language  
 PHI 250 Logic I  
 PHI 363 Theory of Knowledge  
 PSY 522 Social Development in Children  
 SPC 356 Speech Play and Performance  
 SPC 454 Communication Development in Children  
 SPC 405 Women and Communication  
 SPC 483 Anatomy and Physiology of the Speech Mechanism  
 SPC 484 Introduction to Speech Science  
 SPC 585 Children's Language Disorders

The enumeration here is not definitive; new courses, projects, special seminars, or pertinent reading in upper honors courses may be approved for this program.

Note: The three areas for B.A. distribution requirements are represented among the courses

listed for this concentration. Working towards a concentration in linguistics is, therefore, compatible with satisfying distribution requirements for the B.A. degree.

Although one may fulfill the minimum requirements by taking five courses from Category A and none from Category B, it is expected that students will choose one or more of the elective courses.

**Marine Resources****Faculty**

Professor Robert Bayer, Animal, Veterinary and Aquatic Sciences, Coordinator, Hitchner Hall

The Interdisciplinary Course Concentration in Marine Resources consists of an introductory "core" amounting to eight credit hours, plus an additional 10 or more credit hours of advanced courses, chosen to include at least TWO courses selected from ONE of two areas of specialization, as listed below, or other courses approved by the coordinator.

**Course Offerings**

(Course prerequisites are given in parentheses.)

**MARINE RESOURCES CORE:**

AVA 220 Topics in Marine Resources	2
OCE 370 Introduction to Oceanography (Permission)	3
ARE 471 Resource Economics (ECO 110)	3
OR	
INT 360 Economics and the Biology of Marine Fisheries Management (ECO 420, ZOL 204 or permission)	3

**MARINE RESOURCE UTILIZATION:**

INT 319 General Ecology (1 year of college chemistry and 1 year of college biological science)	
ARE 371 Introduction to Natural Resource Economics and Policy	
ARE 577 Economics of Public Choice (ECO 420)	3
MCB 515 Marine Bacteriology (General Chem., Gen. Micro.)	3
MCB 520 Fish Diseases (MCB 300, 301 or permission)	4
AVA 212 Maine Mariculture (permission)*	3
ZOL 470 Fishery Biology (ZOL 329, INT 319 or WLM 200)	3
AVA 211 Aquaculture	3
AVA 409 Shellfisheries Biology (ZOL 443, or permission)	3
ZOL 573 Fisheries Science (ZOL 470 and 471 or permission)	2
BOT 473 Biology of Algae (BIO 100, BOT 203)	4
BOT 474 Aquatic Flowering Plants (BOT 464 or permission)	2
BOT 475 Algal Growth and Seaweed Mariculture (BIO 100, 1 yr Biology and 1 yr Chemistry)	3

\*Offered during the summer session only.



BOT 503 Natural History and Ecology of Marine Algae (INT 319 or Bot 473 or equivalent)	4
<b>MARINE TECHNOLOGY:</b>	
BRE 469 Agricultural Process Engineering (MEE 230, 360, or CIE 350)	3
BRE 550 Simulation of Biological and Physical Systems (MAT 126, Fortran)	3
CIE 458 Coastal Engineering (CIE 350)	3
CIE 558 Advanced Coastal Engineering (CIE 458, MAT 258, MAT 259)	3
CIE 559 Numerical Modeling of Lake and Estuarine Processes (MAT 259)	3

In addition to the courses listed, Co-op Education and special problems (available in each department) may be included in the 10-credit hours of courses required beyond the core. However, inclusion of these courses requires the advance written approval of the Coordinator of the Concentration in Marine Resources.

## Marxist/Socialist Studies

### Faculty

Prof. Douglas Allen, Philosophy, Coordinator, The Maples
Prof. Robert Babcock, History, 200B Stevens Hall
Assoc. Prof. Steven Barkan, Sociology, 201 Fernald Hall
Prof. Richard Blanke, History, 115C Stevens Hall
Assoc. Prof. Robert A. Brinkley, English, 209 Neville
Professor Melvin Burke, Economics, 220 Stevens Hall
Asst. Prof. Valerie Carter, Sociology, 201 Fernald Hall
Prof. Josephine Donovan, English, 305 Neville Hall
Asst. Prof. Jacques Ferland, History, 275C Stevens Hall
Assoc. Prof. Alexander Grab, History, 265A Stevens Hall
Professor Burton Hatlen, English, 309 Neville Hall
Assoc. Prof. Michael Howard, Philosophy, The Maples
Assoc. Prof. Richard Judd, History, 1656 Stevens Hall
Asst. Prof. Ngo Vinh Long, History, 200C Stevens Hall
Prof. Mark A. Lutz, Economics, 250 Stevens Hall
Professor Kyriacos Markides, Sociology, 210 Fernald Hall
Assoc. Prof. Virginia Nees-Hatlen, English, 311 Neville Hall
Assoc. Prof. Paula Petrik, History, Stevens Hall
Asst. Prof. Robert Prasch, Economics, 270A Stevens Hall
Assoc. Prof. Jana Sawicki, Philosophy, The Maples
Professor Howard Schonberger, History, 265C Stevens Hall

Prof. Charles Scontras, Modern Society, 213 East Annex  
 Assoc. Prof. James Warhola, Political Science, 23 North Stevens

### Rationale

The Marxist/Socialist Course Cluster encourages students to look at the world from a Marxist/Socialist perspective. Many departments offer approaches which 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 challenges such assumptions and judgments and such a world outlook.

As an approach to history and society, Marxism places primacy on the mode of production and the division of labor and sees class struggle as the primary force of historical development. Such an alternative Marxist/Socialist perspective allows students to take seriously such concepts as imperialism, analyzed as an outgrowth of capitalism on a global scale. Such an alternative perspective will examine various analyses of the state and will allow students to approach the state not as some "neutral" entity but as the result of class conflict and as basically reflecting the class interests of those who hold power in any society.

Finally, Marxism is an invitation to examine basic concepts of rationality and objectivity in a different light. Marxism rejects the claim by other approaches to be "value-free" and "neutral." The Marxist/Socialist alternative will maintain the unity of theory and practice and the position that all approaches, either explicitly or implicitly, reflect value assumptions and judgments and a specific world outlook.

### Course Offerings

The organizers of the Marxist/Socialist Course Cluster recognize that there are many courses offered at the University which allow a student to gain insight into various dimensions of Marxism, socialism, and anti-imperialism, and which are not presented from a Marxist or Socialist perspective.

The "core courses" approach their subject matter from a Marxist/Socialist perspective. The "elective courses" either do not deal primarily with Marxism, socialism, and anti-imperialism or they treat the theory or practice of Marxism/Socialism as an object of study but not necessarily from a Marxist/Socialist perspective.

All students who elect the Marxist/Socialist Course Cluster 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.

### Core Courses:

#### Economics

ECO 431 Contemporary Alternatives in Political Economy  
 ECO 436 Marxian Economics  
 ECO 438 Economic Development

#### English

ENG 470 Topics in Literary Theory and Criticism

#### History

HTY 467-468 20th Century U.S. History  
 HTY 473-474 American Diplomatic History

#### Philosophy

PHI 106 Social Issues in Recent Religious and Philosophical Thought  
 PHI 342 Marxist Philosophy I: The Philosophy of Karl Marx  
 PHI 343 Marxist Philosophy II: Twentieth Century Marxist Philosophy

#### Sociology

SOC 343 Sociology of Work and Labor

### Elective Courses:

#### Economics

ECO 435 History of Economic Thought  
 ECO 437 Comparative Economic Systems

#### English

ENG 429 Topics in Literature: Race, Class, and Gender in 20th Century American Literature  
 ENG 453 The Works of Shakespeare  
 ENG 456 The English Romantics  
 ENG 481 Topics in Women's Literature

#### History

HTY 272 The Industrial Worker in America  
 HTY 407 The Age of Revolution, 1789-1860  
 HTY 409 Twentieth Century Europe, 1919 to Present  
 HTY 424 History of Russia II  
 HTY 441 History of Modern China  
 HTY 482 Canada and the American Economy  
 HTY 499 Contemporary Problems in History (The U.S. and Vietnam)

#### Modern Society

MOY 102 Modern Society

#### Philosophy

PHI 439 Feminist Theory  
 PHI 341 History of Western Social and Political Philosophy II  
 PHI 465 Topics in Philosophy: Freedom, Equality and Community  
 PHI 465 Topics in Philosophy: Democracy, State and Society

#### Political Science

POS 336 The Communist Government of the Soviet Union  
 POS 478 Foreign Policy of the Soviet Union

#### Sociology

SOC 101 Introduction to Sociology  
 SOC 202 Social Problems  
 SOC 313 Deviant Behavior



SOC 314 Law and Society  
 SOC 460 Major Ideas in Sociology

## Medieval Studies

### Faculty

Asst. Prof. Linne R. Mooney, English, Coordinator, 217 Neville Hall  
 Asst. Prof. Karen-Edis Barzman, Art History, 151 Carnegie Hall  
 Assoc. Prof. Cathleen Bauschatz, Foreign Languages, 252 Little Hall  
 Assoc. Prof. Paul Bauschatz, English, 403 Neville Hall  
 Prof. Jacob Bennett, English, 313 Neville Hall  
 Assoc. Prof. Jay Bregman, History, 200A Stevens Hall  
 Assoc. Prof. Evelyn Newlyn, English and Women's Studies, 125 Shibles Hall  
 Assoc. Prof. Kristina Passman, Classics, 254 Little Hall  
 Prof. Robert Rioux, Foreign Languages, 214 Little Hall  
 Asst. Prof. Theresa Sears, Foreign Languages, 258 Little Hall  
 Prof. William Tebrake, History, 275B Stevens Hall

### Rationale

Among historic periods, the Middle Ages seem to offer the greatest contrast to our present age. This contrast may broaden our sense of the human condition and clarify the nature of our experience. The Middle Ages also constitute the earliest phase of our modern civilization in terms of language and art, historic awareness, religion, philosophy, and politics. By examining the Middle Ages from various humanistic points of view, we should develop a sense of both the variety and coherence of this period, and through this experience a fuller understanding of our own times.

### Course Offerings

The Medieval Studies concentration consists of a minimum of fifteen credit hours or five courses. The student who elects this concentration normally begins with an introduction to the Middle Ages by taking HTY 105 or HTY 202, only one of which may be included in the concentration. Thereafter, the student takes one other course in the History area, such as HTY 403 or HTY 404, and the remaining three courses in two or three of the other areas below in which medieval courses are offered. The enumeration of courses here is not definitive; new courses, special seminars, pertinent reading in upper honors courses, and independent studies may be approved for the concentration. Students are encouraged to explore as many different approaches to the Middle Ages as possible.

### Art History

ARH 257 Northern Renaissance Art

### English

ENG 231 (FOL 231) Western Tradition in Literature: Homer through the Renaissance

ENG 251 English Literature Survey: Beginnings Through Neoclassicism  
 ENG 451 Chaucer and Medieval Literature  
 ENG 476 History of the English Language  
 ENG 551 Medieval English Literature

### Foreign Languages and Classics

FRE 404 Medieval and Renaissance French Literature  
 FRE 504 Seminar in Medieval and Renaissance Literature  
 LAT 482 Medieval Latin  
 SPA 425 Medieval Spanish Literature

### History

HTY 105 History of European Civilization I  
 HTY 202 Medieval Civilization  
 HTY 402 Roman History  
 HTY 403 Early Middle Ages  
 HTY 404 Late Middle Ages  
 HTY 427 European Intellectual History I

### Philosophy

PHI 311 Medieval Philosophy  
 PHI 382 Religion of The New Testament and Early Christianity

## Peace Studies Program

### Faculty

Prof. James Acheson (Chairperson), Anthropology  
 Assoc. Prof. Tina Baker, English  
 Assist. Prof. Bahman Bakhtiari, Political Science  
 Assoc. Prof. Steve Barkan (Chairperson), Sociology  
 Assoc. Prof. John Battick, History  
 Asst. Prof. David Batuski, Physics  
 Prof. Richard Blanke, History  
 Prof. Melvin Burke, Economics  
 Assist. Prof. Valerie Carter, Sociology  
 Prof. Steve Cohn, Sociology  
 Assist. Prof. Tim Cole, Political Science  
 Prof. Ed Collins, Political Science  
 Assoc. Prof. Richard Cook, Human Development  
 Assoc. Prof. George Criner, Agricultural and Resource Economics  
 Prof. Johannes Delphendahl, Agricultural and Resource Economics  
 Prof. Stewart Doty, History  
 Assoc. Prof. Sandra Gardner, Sociology  
 Prof. Melvin Gershman, Microbiology and Animal, Veterinary and Aquatic Sciences  
 Prof. Carol Gilmore, Management  
 Prof. Rollin Glenn, Plant, Soil and Environmental Sciences  
 Assoc. Prof. Alex Grab, History  
 Assoc. Prof. Kathryn (Grzelkowski) Gaianquest, Sociology  
 Assist. Prof. Sarah Halford, Philosophy  
 Prof. Ken Hayes, Political Science  
 Assoc. Prof. Diana Hulse-Killacky, Education  
 Prof. Malcolm Hunter, Wildlife Resources  
 Assoc. Prof. Naomi Jacobs, English  
 Assist. Prof. Susan Laird, Education  
 Assist. Prof. Matthew Liebman, Sustainable Agriculture

Prof. Mark Lutz, Economics  
 Prof. Ray McKerrow, Speech Communication  
 Assoc. Prof. Robert Milardo, Human Development  
 Assoc. Prof. Henry Munson, Anthropology  
 Assist. Prof. Christopher Murdoch, Forest Resources  
 Prof. Kyriacos Markides, Sociology  
 Prof. Stephen Marks, Sociology  
 Prof. Ruth Nadelhaft, English  
 Assoc. Prof. William J. Phillips, English  
 Assoc. Prof. Paul Roscoe, Anthropology  
 Assoc. Prof. Steve Sader, Forest Resources  
 Prof. Erling Skorpen, Philosophy  
 Prof. David Smith (Bird & Bird Professor), American History and Agricultural History  
 Prof. William Stone, Psychology  
 Assoc. Prof. James Warhola, Political Science  
 Assoc. Prof. William Whitaker, Social Work

### Rationale:

The Peace Studies Program at the University of Maine focuses on research and study about basic issues confronting humankind as it moves toward the twenty-first century. It deals with the problem of violence defined in psychological, economic, political and ecological terms. It seeks to understand violence and its causes, to explore short- and long-term strategies for eliminating the causes of violence and to develop skills for peaceful resolution of conflict. By encouraging individuals to act on their understanding of the causes of violence, it seeks the creation of a more peaceful society and world.

The program takes an interdisciplinary, global and international approach to: threats of force and use of force in international relations, including arms control and external involvement in civil wars; international law and organization; human rights, defined in the broadest sense; oppression of and discrimination against social groups based upon gender, race, class, religion, and nationality; political oppression in general and economic exploitation of developing countries; and the deterioration of the world environment.

The Peace Studies Program infuses concerns for peace into the campus and U.M. System community and joins with the people of Maine in sharing information and skills in the pursuit of peace.

### Requirements

The Peace Studies concentration consists of a minimum of 18 credits or 6 courses. Credit must come from at least 3 different departments, and 2 or more courses must be among those designated "core" courses.

Introductory courses provide a basic understanding of the causes and consequences of conflict and violence. Electives seek to expand awareness of the global community from an interdisciplinary perspective, by focusing on various crucial issues facing humanity. Core courses are those that make the meaning, cri-



teria or conditions of peace the central theme. The senior project is designed to give practical experience or encourage research in an area related to peace or conflict resolution.

#### Peace Studies Program Courses

To obtain a Peace Studies concentration 18 credits are required: 3 credits in an "Introduction to Peace Studies" course, 6 credits (or more) in "Core" courses, 3 credits in a senior project, 6 credits in any other courses listed.

#### INTRODUCTORY COURSES:

For information on Introductory courses, please contact the Peace Studies Office.

#### ELECTIVE COURSES

##### Agricultural and Resource Economics

ARE 281 World Food Demand, Population and World Food Supply

NRC 100 Introduction to Natural Resources

##### Animal, Veterinary and Aquatic Sciences

AVA 250 Our Environment

##### Anthropology

ANT 215 Social Anthropology

ANT 453 Peoples and Cultures of Mesoamerica

ANT 454 Cultures and Societies of the Middle East

ANT 461 Islamic Fundamentalism

ANT 465 Political Anthropology

ANT 467 Peasant Societies

ANT 470 Religion and Politics

##### Business Administration

BUA 331 Labor Management Relations

BUA 631 Collective Bargaining

##### Education

EDG 498 Problems in Education

##### English

ENG 185A\* Introduction to Mythology

HUM 201A\* Literature and the Exploration of Human Values

ENG 255A\* Women in Literature

ENG 429 Topics in Literature: Utopian Literature

##### Forestry

FTY 349 Principles of Forest Management

FTY 430 Urban Forest Management

##### History

HTY 215/216 World in the Twentieth Century

HTY 280 Naval History

HTY 409 Twentieth Century Europe

HTY 446 History of Modern Middle East

HTY 467 Early Twentieth Century America

##### Honors

HON 302 Hunger in the U.S. and the World

HON 450 Culture and Identity

##### Interdisciplinary

INT 230 Waste Management

INT 290 Nuclear War

INT 525 Tropical Deforestation (Grad. Course)

##### Philosophy

PHI 230 Ethics

PHI 385 Recent Religious Thought

##### Plant, Soil and Environmental Sciences

PSE 105 Principles and Practices of Sustainable Agriculture

PSE 144 Soil and Water Conservation

PSE 146 Land Use Planning - Soil Aspects

##### Political Science

POS 121/122 Current World Problems

POS 223 Political Geography

POS 241 Politics in Contemporary Societies

POS 335 Democratic Governments of Europe

POS 336 Communist Governments of the Soviet Union

POS 358 Public Opinion

POS 373 International Relations

POS 374 U.S. Foreign Policy

POS 467 African Politics

POS 477 Politics of the Middle east

##### Psychology

PSY 339 Political Psychology

##### Sociology

SOC 202 Social Problems

SOC 319 Domestic Violence and Social Structure

SOC 329 Sociology of Sex Roles

SOC 330 Perspectives on Women

SOC 338 Race and Culture Conflict

SOC 347 Wealth, Power and Prestige

SOC 460 Major Ideas in Sociology

SOC 482 Sociology of Religion

##### Speech Communication

SPC 347 Argument and Critical Thinking

SPC 403 Persuasion and Social Influence

##### Wildlife Management

WLM 480 International Conservation

##### Zoology

ZOL 465 Evolution

#### Core Courses

##### Counseling Education

CEC 552 Effective Group Work in the Helping Professions

##### Economics

ECO 430 Humanistic Economics

ECO 436 Marxian Economics

ECO 437 Comparative Economic Systems

ECO 438 Economic Development

##### Political Science

POS 387 International Law

POS 388 World Order Through International Organization and Law

POS 475 National Security Analysis

POS 573 Problems in International Politics

##### Sociology

SOC 308 Problems of Violence and Terrorism

SOC 314 Law and Society

SOC 465 Evolution, Revolution and the Future

##### Social Work

SWK 375 Hunger As an Issue in Social Welfare

#### Senior Project

The 3-credit senior project should be a collaborative effort between the student, the Peace Studies director and the student's major department.

#### Public Relations

##### Faculty

Inst. Sheila Pechinski, Business Administration, Coordinator, 216 East Annex

Assoc. Prof. Warren Burns, Speech Communication, 340 Stevens Hall

Assoc. Prof. Arthur Guesman, Journalism, 107 Lord Hall

Assoc. Prof. Naomi Jacobs, English, 215 Neville Hall

##### Rationale

Through the Interdisciplinary Course Clusters program, UM students can build a concentration in Public Relations.

As public and private organizations have grown larger and more complex, the need to communicate with clients, constituents, and the general public has become more crucial. All organizations try to present themselves favorably to others, and most need to solicit acceptance of their ideas, services, and products. Some public relations concepts call simply for the presentation of a favorable image of the organization. Others actively attempt to shape public opinion in order to further the programs, ideals, and other interests of the organization. Individuals, staffs, and even entire departments now specialize in public relations, and a body of knowledge and skills have grown around the total concept.

The Public Relations Course Cluster provides students with a basic program for entering the broad field of public relations. Courses included in the program outlined below should help the student develop and apply communication skills. The cluster requires a minimum of 15 credits, distributed as follows:

#### Course Offerings

##### A. Core

At least three graded courses must be completed in this category, one from each sub-category. Pass-fail grading is not acceptable, nor are grades below C-. (Course prerequisites are given in parentheses.)

1. Speech Communication in Public Relations  
SPC 257 Business and Professional Communication (Junior or Senior standing 3 hours of SPC courses or permission)  
SPC 267 Public Relations: Oral Communication Strategies (Junior or Senior

\*Two-year courses do not count toward degree credit for students in a four-year degree program, but can be part of the Peace Studies concentration.



standing. 3 hours of SPC courses or permission)

2. Journalism in Public Relations  
JMC 237 Reporting and Newswriting (ENG 101)  
JMC 250 Introduction to Advertising
3. English in Public Relations  
ENG 317 Technical Writing (ENG 101)  
ENG 417 Advanced Technical Writing (6 credits in writing, including ENG317 and permission)

#### Electives

To go beyond the 15-credit minimum, students may choose courses from this category. The list is not definitive; new courses, seminars, field experiences, and other projects may be approved for the program.

- BUA 325 Principles of Management and Organization (6 credits in ECO and Junior standing)
- BUA 330 Personnel Management and Industrial Relations (6 credits in ECO, PSY 100 and Junior standing)
- BUA 326 Dynamics of Organization and Behavior (BUA 325)
- BUA 372 Advertising (BUA 370)(May not be combined with JMC 250)
- ENG 301 Advanced Composition (ENG 212 or permission)
- ENG 496 English Apprenticeship (Field Experience; 24 credits in ENG including JMC 332 Public Affairs Reporting (JMC 238) JMC 355 Advertising Copywriting and Layout (JMC 250)
- JMC 489 Seminar - Media Ethics and Issues (Senior JMC majors, or permission)
- PAA 200 Public Management (PAA 100 or POS 100)
- POS 358 Public Opinion (POS 100, Junior standing)
- SPC 277 Interviewing (Junior or Senior standing. 3 hours of SPC courses or permission)
- SPC 496 Field Experience in Speech Communication (speech communication majors only, with 2.5 in SPC, and 9 credits above 100 level in Speech Communication, and permission of committee)

#### SPC 470 Communication in Organizations (Junior or Senior standing)

Although students may fulfill the minimum requirements by taking five courses from Category A and none from Category B, they are expected to choose one or more of the electives. Students may take one course only from *within their major*.

### Religious Studies

#### Faculty

- Assoc. Prof. Jay Bregman, History, Coordinator, 115B Stevens Hall
- Prof. Douglas Allen, Philosophy, The Maples
- Asst. Prof. Sarah A. Halford, Philosophy, The Maples
- Prof. Burton N. Hatlen, English, 309 Neville Hall
- Prof. Kyriacos Markides, Sociology, 210 Fernald Hall
- Assoc. Prof. Henry Munson, Anthropology, S. Stevens Hall
- Assoc. Prof. John R. Wilson, English, 205 Neville Hall

#### Rationale

Traditionally, questions about the ultimate meaning of human existence have been posed in the form of religion. Courses included in the religious studies cluster 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 cluster should develop an awareness of the broad range of religious phenomena and an ability to analyze and elucidate the significance of such phenomena. All students who elect this cluster should begin by taking PHI 105, Introduction to Religious Studies. Thereafter the student should take at least four courses from one of the following subclusters: i.e., four courses from "A," or four courses from "B," or four courses from "C," or four courses from "D." These courses should be taken from at least three different disciplines.

#### Course Offerings

- A. Religion in the Development of Western Civilization  
PHI 108 Ways of Understanding the Bible  
PHI 282 Religion of the New Testament and Early Christianity  
HTY 403/404 The Middle Ages  
HTY 405 The Renaissance and Reformation  
HTY 427/428 European Intellectual History  
HTY 499 Contemporary Problems in History (Greek & Roman Religion & Mythology)  
ENG 241 American Literature Survey: Beginnings Through Romanticism  
ENG 457 Nineteenth Century Fiction, Poetry and Essay
- B. Theoretical Perspectives on Religion  
PHI 381 The Nature of Religious Experience  
PHI 465 Advanced Topics in Philosophy  
PHI 490 Topics in Religious Studies  
ENG 429 Topics in Literature: The Traditional Theory of Literature  
SOC 482 Sociology of Religion
- C. Religion in the Non-Western World  
PHI 286 Religions and Philosophies of the East: Hinduism  
PHI 287 Religions and Philosophies of the East: Buddhism  
HTY 435/436 History of China  
HTY 437 History of Modern Japan  
ANT 441 People and Cultures of the Pacific Islands  
ANT 451 North American Indian Ethnology  
ANT 453 Peoples and Cultures of Mesoamerica  
ANT 454 Cultures and Societies of the Middle East  
ANT 460 Peoples and Cultures of the Circumpolar Area  
ANT 461 Islamic Fundamentalism
- D. Religion in the Contemporary World  
PHI 106 Social Issues in Recent Religious and Philosophical Thought  
PHI 385 Recent Religious Thought  
ENG 429 Topics in Literature: Tolkien and Modern Fantasy







# Bachelor of Arts Degree: Requirements, Rules and Regulations, and Special Programs

## Requirements for the B.A. Degree

### Entrance Requirements

Information on requirements for admission to the University, as well as specific academic preparation necessary for entrance into a B.A. degree program, is given in full in the Admission section of this catalogue. All deficiencies in entrance requirements must be made up before registering for the junior year.

NOTE: For admission to a B.A. degree program, two years of the same high school foreign language is required. Students who have not fulfilled this entrance requirement must take two semesters (six hours) of a foreign language here for no credit.

### Academic Advising

The University of Maine is committed to fostering and maintaining a positive relationship between students and their academic advisors. All first year students will have the opportunity to participate in academic orientation programs conducted in the summer and just prior to the fall semester. These orientations are intended to provide students with knowledge and skills of use in making a successful academic adjustment to college life.

Upon the completion of 53 degree hours (usually during the student's fourth semester), students declare a major; the faculty in the department in which the major is located become responsible for approving course registration during the final two years of academic study.

Special advising options are available, as follows:

A. Pre-Law Advising. A comprehensive advising service is available for students interested in attending law school upon graduation from the University. Recognizing that there is no set pattern of undergraduate courses required by law schools, students will be encouraged to give attention to the "Statement on Prelegal Education" of the Association of American Law Schools, which emphasizes the development of basic skills and insights involving education for "comprehension and expression in words, critical understanding of the human institutions and values with which the law deals, and creative power in thinking." Students will be aided in the selection of courses, furnished information on careers in law, the re-

quirements of different law schools, the nature of the Law School Admission Test, when to take it and how to interpret results, and advised of the range of schools to which their records and scores might indicate successful application. Catalogues of a large number of law schools are available. A Pre-Law Society of students meets many times during the year. For further information contact the department of Political Science, North Stevens Hall.

B. Premedical, Predental and other Health Professions Advising. Students interested in medical and dental schools, as well as any other health professions schools, should register in their first year with the Health Professions Committee, 330 Aubert Hall. This committee provides liaison between the University and medically-related professional schools and works closely with students during the application process. Specific information on premedical, predental, and preoptometry curricula is provided elsewhere in this catalog (refer to index).

### Bachelor of Arts Degree Requirements

The B.A. degree requirements are designed to ensure that by the end of a student's college career she or he will have been exposed not only to the required courses for the major, but also to a broad range of subjects.

A. College Composition. During the first two years, students must demonstrate satisfactory completion of ENG 101, College Composition, with a grade of "C" or above. This may be done in a variety of ways, depending upon the results of a one-hour placement examination which is administered to *all* incoming first year students during New Student Orientation.

1. Students whose test results indicate readiness for ENG 101 should register for a division of ENG 101 in the appropriate semester, and will receive credit for the College Composition requirement when they have fulfilled course objectives with a grade of "C" or above;
2. Students who score exceptionally well on the placement examination may receive credit by examination for the College Composition requirement and will be so informed by their academic advisors at registration. The credit hours thus earned count towards the 120 credit hours re-

quired for graduation;

3. Students whose examinations indicate that they do not meet minimum entrance standards for ENG 101 will be required to enroll in (and pass) ENG 001 as a prerequisite to ENG 101. The credit hours earned in ENG 001 *do not count* towards the 120 credit hours required for graduation.

Additional writing requirements are discussed in the section on distribution requirements which follows.

B. Distribution Requirements. Students must distribute some of their course work among each of three areas, as follows:

<b>Area I</b>	
Social Sciences	12
<b>Area II</b>	
Arts (visual and performing) and Humanities	15
<b>Area III</b>	
Natural Sciences and Mathematics	11
	<hr/>
	38
ENG 101 College Composition	3
	<hr/>
	41

In addition, the following requirements must be met:

1. *Area II (Arts (visual and performing) and Humanities):* At least three, but not more than six credit hours of the fifteen required in Area II must be taken from the list of courses meeting area requirements in the Visual and Performing Arts. At least nine, but not more than twelve credit hours of the fifteen must be taken from the list of courses meeting requirements in the Humanities.
2. *Area III (Natural Sciences and Mathematics):* Of the eleven credit hours required in Area III, at least one course must include an associated laboratory. Additionally, a two-semester sequence in a single discipline must be taken from an approved list (e.g., GES 101, 102).
3. *Upper Level Credits:* A minimum of six credit hours in Area I (Social Sciences) and a minimum of six credit hours in Area II (Arts and Humanities) *must* be taken in upper level courses. Upper level courses are designated as such in each area's listing of courses.

Many individual courses are designated as fulfilling a requirement in one of the three



areas indicated above. Students are advised to meet their distribution requirements by taking courses *outside* their own major and as widely distributed as possible throughout the three areas. A complete listing of courses by area requirement is available in each Dean's Office.

- C. *Credits Outside the Major*: Of the 120 credit hours required for graduation, 72 credit hours are required *outside* the major. If a particular major requires courses in another discipline, either within the same department or in another department, those credit hours may still count towards the 72 hours.
- D. *Writing Skills*: In addition to ENG 101, each student is required to take two writing courses, one specified as a "writing experience" course and the other as a "writing intensive" course. Courses which meet these requirements are indicated as such in each area's list of courses. The requirement may be fulfilled with courses from any of the three areas. During the junior year, all B.A. degree students will have to demonstrate writing proficiency in their major.
- E. *Foreign and International Perspectives*: Each student must take at least one, three-credit course which places its primary emphasis on a foreign and/or international perspective, as designated in each area's list of courses. Note: A course designated as "Writing Experience" or "Writing Intensive" may at the same time satisfy credit hour requirements in one of the three general areas, credit hour requirements for a major, and Foreign and/or International Perspectives course requirements. Likewise, a course emphasizing a foreign or international perspective may at the same time satisfy credit hour requirements in one of the three general areas, credit requirements for a major, and Writing-Experience or Writing- Intensive course requirements.

## Requirements in Fulfillment of the Major

On the completion of 53 degree hours, students, in conference with their advisor and with the approval of their dean, select their major subject. The department in which the major subject falls becomes for administrative purposes the student's major department. The major curriculum is the nucleus of related courses selected by the student as representing her or his chief field of interest or major subject. The minimum number of credit hours acceptable for a major, as well as specific course requirements for a given major, are set by the department in which the major resides.

## Foreign Language Requirements

Most departments that offer the B.A. degree have special language requirements or recom-

mendations for B.A. degree students, as follows:

NOTE: Intermediate level proficiency means the equivalent of two semesters of an intermediate level language course; e.g. SPA 203, 204.

ANTHROPOLOGY: Intermediate language proficiency strongly recommended; ART: Intermediate level French or German is required for students who major in art history;

CHEMISTRY: One year of either French, German, or Russian;

COMPUTER SCIENCE: The intermediate level of a foreign language is strongly recommended; ENGLISH: Proficiency at the intermediate level;

GEOLOGY: Students contemplating graduate work are strongly encouraged to take either French, German, or Russian;

HISTORY: Students majoring in History are required to demonstrate intermediate level proficiency in a foreign language through course work or examination;

JOURNALISM AND MASS COMMUNICATION: Proficiency at the intermediate level;

MATHEMATICS: The intermediate level of a foreign language is strongly recommended;

MUSIC: One year of a foreign language which can be either the continuation of the language taken in high school or a new language;

PHILOSOPHY: One year of a foreign language is recommended for the B.A. degree, two years for those going on to graduate study;

PHYSICS: One year of a foreign language is recommended for the B.A. degree, two years for those contemplating graduate study;

POLITICAL SCIENCE: At least one year of a modern foreign language beyond the intermediate level for students majoring in international affairs;

SOCIOLOGY: Recommended if considering graduate study;

SOCIAL WORK: Recommended if considering graduate study;

SPEECH COMMUNICATION: A foreign language course may be elected by the student to meet one of the department's outside requirements;

ZOOLOGY: Proficiency at the intermediate level.

In addition, students may elect to fulfill one or more of the B.A. distribution requirements with a foreign language chosen from an approved list.

Students who have presented two years of a high school foreign language for admission will *not* receive credit for an *elementary* course in that particular language unless *five* years have passed between high school graduation and *admission* to a college or University. It is recommended that these students take:

1. An intermediate or advanced course in the high school language (credits earned in those courses count towards the advanced course credits in the humanities category),

OR

2. An elementary course in a new language (credits earned here count towards the introductory course credits in the humanities category).

Any language course (except for elementary courses in the student's high school foreign language) can, of course, be taken for credit as an elective. Credits are awarded on a semester basis.

Finding the appropriate level at which to take a language course is essential for success. During New Student Orientation, the Foreign Language Placement Examination will be given to all incoming first year students for purposes of both placement and credit.

Credit by examination can be achieved as follows:

1. If the score on the Foreign Language Placement Examination is sufficiently high (see following table), the student will receive three hours of degree credit equivalent to the first semester of the intermediate course.
2. As an incentive to continue language study, a student is eligible to receive an additional three credit hours equivalent to the second semester of the intermediate course by skipping an intermediate course and passing with a grade of "B" or better two semesters of language study beyond the intermediate level. For example, a student who scores 580 on the French examination would receive three credits equivalent to French 203. The student would then have the choice of taking French 204, or skipping French 204 and taking FRE 205 and FRE 209 or 210, or an advanced course. A student who completes, for example, a three-hour French course above the intermediate level with a "B" grade or better will receive an additional three credit hours equivalent to French 204. **STUDENTS TAKING FRENCH 203 OR 204 FOR CREDIT CANNOT RECEIVE CREDIT FOR THESE COURSES BY EXAMINATION.**
3. The student who scores extremely high will receive six hours of credit equivalent to the intermediate course. It is recommended that these students continue to take advanced courses in the language for which they have demonstrated considerable proficiency.

Exam	Score Range	
	3 Hrs. Credit	6 Hrs. Credit
French	53-62	63 and above
German	48-60	61 and above
Spanish	50-59	60 and above

The Foreign Languages and Classics Department accepts Advanced Placement Examinations in Foreign Languages and Literature for degree credit. Scores of four and five on either examination will receive six credits; scores of three will receive three credits.

Students who did not have two years of the same language in high school are admitted to a B.A. degree program on a "CONDITIONAL" status. They are required to take two semesters (six hours) of the same foreign language



without degree credit to remove this "CONDITIONAL" status. Students are expected to make up this deficiency during their first year at the University of Maine.

### Graduation Requirements

In order to graduate, students must be in good academic standing, i.e., not on an academic action; and must have no outstanding deficiencies (check student handbook for specific details). In addition, the following requirements must be satisfied:

- 1. Minimum completion of 120 degree hours, with an accumulative grade point average of 2.0 ("C" average) in the major and overall. (NOTE: in computing averages, each hour of "A" is multiplied by 4, "B" by 3, "C" by 2, "D" by 1, and "E" by 0)
- 2. Seventy-two hours of course work outside the major field
- 3. Satisfactory work in written English, as demonstrated by proficiency examination
- 4. Satisfactory completion of all distribution requirements
- 5. Satisfactory completion of writing experience, writing intensive, and foreign/international perspectives course requirements.
- 6. Satisfactory completion of requirements for the major.

### Rules Pertaining to Credit for the B.A. Degree

The following is a listing of rules and regulations which pertain to the granting of credit towards the required 120 hours for the B.A. degree (this is *not* meant to be an all-inclusive list).

#### Away Status

Students wishing to register for "Away" status must be in good academic standing and must obtain *prior approval* from their academic advisor and dean (approval and registration forms are available in their Dean's Office). Course equivalencies should be determined *prior* to registration. For further details, check the Student Handbook.

Before students pursue Summer Session courses in *any* institution (including UM), they must be in good academic standing and secure the approval of their dean and the chairperson of the student's major department *if they expect degree credit for such work*. A prior approval form is available in their Dean's Office.

#### Military Science

B.A. degree students do not receive degree credit for military science courses (Air Force, Army, or Navy ROTC) until they are in their junior and/or senior year. A maximum of 10 hours of advanced level military science

courses may count towards the 120 degree hour requirement.

#### Pass/Fail

Students who have achieved sophomore standing and who have an accumulative grade point average of 2.0 or better are eligible to take one course a semester on a "Pass/Fail" basis. However, courses which are required for the B.A. degree and courses taken in one's major field or closely related fields may not be taken on a "Pass/Fail" basis. A grade of "D" or better is graded as a "Pass." Although "Pass" grades are not used in computing grade point averages, the credit thus earned is counted for degree credit. The "Pass/Fail" option may be added, deleted, or changed from one course to another only during the first two weeks of the Add-Drop period.

#### Physical Education

Students may earn up to two credits in Physical Education (HPR) *skills* courses applicable towards the 120 total needed for graduation. Physical Education is *not* required for graduation. NOTE: All Physical Education courses are designated as HPR (Health, Physical Education, and Recreation).

#### Problems Courses

Field experience, practica, and independent study (readings, etc.) are normally taken in the student's major. Problem courses, practica, and independent study courses *outside* the student's major, and especially outside the student's college, require special prior permission from the academic advisor and dean. A maximum of 12 credit hours in practica or field experience may be counted towards the 120-hour degree requirement.

#### Transfer Credit

All students who transfer to the University of Maine from another institution must earn a minimum of 30 hours of "Orono" courses to qualify for the B.A. degree. Degree credit will normally be allowed for courses in which grades of "C" or above have been received. Evaluation of such courses for approval of degree credit and possible equivalency rests with the Dean of the student's college.

A number of agreements have been formalized with other institutions for the acceptance of transfer degree credit. Some of these are: College of the Atlantic; University College; Canadian universities; University of Salzburg; Denmark International Studies, University of Copenhagen, and miscellaneous other overseas institutions. Specific details are available through the Registrar's Office or the Office of the Dean, of the student's college.

## Degree Options

In addition to traditional programs leading to a single four-year degree in a specified subject area, a variety of options exist.

### Double Major

Double majors are permitted between most disciplines at the University of Maine. The requirements for meeting the double major state that a student must meet all requirements of two separate and distinct disciplines. Students also may obtain a double major or double degrees *across* colleges by satisfying the requirements for both colleges and majors. Students intending to become candidates for double majors or degrees across colleges must declare their intent to the deans of both colleges no later than the beginning of their junior year.

### Interdisciplinary Course Concentrations (ICC'S)

The purpose of the Interdisciplinary Course Concentration is to provide students with the opportunity to integrate substantive material and understandings across several formal disciplines, thus to broaden their perceptions in a systematic and controlled fashion. Like the major, the concentration is directed toward a special learning goal rather than to a special category of student. All students who are in good standing are invited to declare an interdisciplinary course concentration (i.e., fully matriculated students neither on probation or any other form of limited academic acceptance). To receive interdisciplinary credit a student must earn at least a 2.0 ("C") in each course in a given concentration. Successful completion of an ICC is noted on the student's transcript.

Students intending to declare an Interdisciplinary Course Concentration should do so during the second semester of their sophomore year. In some cases it may be desirable to declare a concentration earlier, and permission may be granted to declare a concentration later in a student's undergraduate career. A form for declaring an ICC may be obtained from the Office of the Dean of the student's College.

The following is a list of the Interdisciplinary Course Concentrations available along with the Faculty Coordinator for the concentration.

- Canadian Studies*, Asst. Prof. Stephen Hornsby, Canada House
- Classical Studies*, Assoc. Prof. Kristina Passman, Little Hall
- Developmental Disabilities*, Prof. Barbara Czavinszky, Merrill Hall
- Environmental Issues and Ecological Studies*, Prof. Melvin Gershman, Hitchner Hall
- Franco-American Studies*, Assoc. Prof. Raymond Pelletier, Little Hall
- Geography*, Asst. Prof. Stephen Hornsby, Canada House



*Latin American Studies*, Prof. James Acheson, S. Stevens Hall

*Legal Studies*, Prof. Erling Skorpen, The Maples  
*Linguistics*, Assoc. Prof. Henry Munson, S. Stevens Hall

*Marine Resources*, Prof. Robert Bayer, Hitchner Hall

*Marxist-Socialist Studies*, Prof. Douglas Allen, The Maples

*Medieval Studies*, Asst. Prof. Linne Mooney, Neville Hall

*Peace Studies*, Director of the Peace Studies Program, The Maples

*Public Relations*, Assoc. Prof. Warren Burns, Stevens Hall

*Religious Studies*, Assoc. Prof. Jay Bregman, Stevens Hall

*Women's Studies*, Director, Alumni Hall

For descriptions of each of the above programs, including participating faculty, program descriptions and course selections, refer to the index.

## International Affairs

A student may major in International Affairs in anthropology, economics, foreign languages, history, or political science. For complete information, refer to "International Affairs" in the index.

## Clinical Laboratory Sciences

The B.A. in Clinical Laboratory Sciences is offered by the faculty of the Department of Zoology. Students may major in Medical Technology or Cytotechnology. Admission is not automatic and depends upon academic performance and aptitude for the field. Medical Technology/Cytotechnology students are on campus for three years, and spend their senior year in a twelve-month practicum. Upon completion of the practicum, students are eligible to take the certifying examination administered by the American Society of Clinical Pathology.

For further information, see the description of Clinical Laboratory Sciences under the College of Sciences.

## Provisional Certificates for Teachers

Certification for elementary or secondary school teaching may be earned by students registered in a B.A. degree program. Twenty-four hours of basic work (EDB 202, EDB 221, EDB 204, SED 402, one methods course, a practicum experience, one curriculum course, a student teaching seminar, and student teaching) meets the professional subject requirements for the General Secondary Provisional Certificate, which must be renewed after two years. One full semester of student teaching is required for certification.

In addition to the 24 hours in professional courses, completion of a 36-hour concentration in one academic subject commonly taught in secondary schools is required.

Students who wish to pursue certification for elementary school teaching should take (EDB 202, EDB 221, EDB 204, SED 402, five methods courses, a practicum experience, a student teaching seminar and student teaching.

All students must have an overall grade point average of at least 2.5 to enter student teaching.

Students planning on teacher certification should ascertain in advance whether their planned area of academic concentration is acceptable. *Because students must meet both the State and College of Education requirements, it is recommended that students wishing to become certified should contact the College of Education early in their academic career.* Information may be obtained in the dean's office in the College of Education.

## Premedical, Predental, and Preoptometry Studies

Medical, dental, and optometry colleges in general desire students who are not only well prepared in the sciences and mathematics but who also are broadly educated. To the first point, they require certain courses in biology, chemistry, mathematics, and physics; to the second, they recommend a liberal background in the humanities and the social sciences. In order to meet the minimum requirements of most medical, dental, and optometry schools, students choosing to obtain a B.A. degree should plan, with the aid of their advisors, to include the following specific courses within the framework of their major program, all to be completed before the senior year:

CHY 111/112 General Chemistry OR	8
CHY 113/114 Chemical Principles	8
CHY 251/252 Organic Chemistry Lecture	6
CHY 253/254 Organic Chemistry Laboratory	4
Two Sem. English Composition or Literature	6
PHY 111/112 General Physics OR	8
PHY 121/122 Physics for Engineers and Physical Scientists	8
BIO 100 Basic Biology	4
AND	
ZOL 204 Animal Biology	4

Most medical, dental, and optometry schools will accept advanced placement in lieu of one or more of these subjects.

Chemistry and Biology should be taken in the first year.

Many medical, dental, and optometry schools require or recommend certain additional courses. Among those most commonly listed are the following:

Calculus  
Psychology  
Microbiology  
Physiology  
Principles of Genetics

Quantitative Analysis  
Comparative Anatomy  
Biochemistry  
Physical Chemistry  
Computer Science.

Although most premedical, predental, and preoptometry students major in a science, they may major in any of the non-science departments according to their interests. The student would be well advised, however, to take a program during the first two years that will allow the greatest possible freedom of choice in later selecting an undergraduate major. The first year specimen curricula given for majors in chemistry, physics, or zoology will leave many options open. Those who major in a non-science department and meet only the minimum science and mathematics requirements should achieve superior grades in order to demonstrate their proficiency in these critical subjects. Students interested in medical, dental, and optometry schools should register at the beginning of their first year with the Health Professions Committee (330 Aubert Hall). This committee provides liaison between the University and medical, dental, and optometry professional schools and works closely with students during the application process. Applicants should take the appropriate admissions test during the spring semester of their junior year.

Students should be familiar with the admission policies of professional schools to which they plan to apply. They also must meet the requirements of the undergraduate college and department in which they plan to major.

## Special/Support Programs

In addition to the various degree options listed above, several support programs have been developed to provide additional assistance and flexibility to B.A. degree students in designing their academic curriculum and augmenting their horizons.

## Honors Program

First Year students of marked academic ability are invited to apply for admission to the University Honors Program. The work of the first and second years, under the direction of staff drawn from all colleges of the University, provides the stimulus and guidance which should enable a superior student to begin building a balanced view of the liberal arts and sciences and to lay the foundation for the more specialized work which is to come. The Honors Program reaches its peak in a project which is written during the senior year and treats of some special area within the student's major field. Students may be admitted at any stage of the Honors Program up to the opening of the junior year. HON 101, 102, 201, 202, and 301 are taken in common with students of all colleges within the University. These courses, plus HON 498 and 499, constitute the core of the Honors Program. Formal rec-



ognition is conferred following a successful completion of the Honors Program, in the form of graduation honors of three grades: honors, high honors, highest honors.

The Honors Committee of each college consists of faculty currently teaching in the program, as well as departmental representatives selected by the Chairs and ratified by the Dean. The principal duties of this committee are to serve on Senior Thesis Examinations and to serve as a liaison between departments and the Honors Program. Each college has its own Honors Secretary.

## Cooperative Education

Cooperative Education/Field Experience at the University of Maine includes many forms of experiential learning opportunities that relate to the student's academic objectives and supplement classroom theory. Cooperative Education provides a year or more of practical work experience integrated with eight semesters of classroom courses. The work can be alternated with class work on a part-time basis or full-time during the school term. Field experience is a general term applied to many types of experiential learning.

All work-learning experiences are eligible for credit under the specific requirements of each academic department. To receive credit, a student must register for the course prior to completing the experience and it must relate to the student's academic major. Most departments require junior to senior standing for the awarding of credit. The Cooperative Education Office is located in Wingate Hall, Orono, 581-1344.

## Study Away

Students who are in good academic standing are encouraged to consider study away. A variety of opportunities are available for spending a year, a semester, or shorter periods (e.g. a summer) studying in a foreign country. Study away is especially popular as a junior-year option, but programs exist which are appropriate to other levels. Programs are available in a wide variety of English-speaking and non-English speaking countries, including Canada, France, Austria, Germany, Brazil, Spain, Australia, and the British Isles.

In the case of study away programs sponsored by the University of Maine, students will

register for the appropriate UM course. Academic credit for such courses will be awarded in the same manner as for any other UM course. In cases where the student registers for study in another institution (e.g. a foreign university or a study abroad program offered by another accredited American university) the student should register for "Away Status". In these cases, credit will be transferred from the host institution according to policies set by the dean and the chair of the student's major department; such transferred credit is not normally included in calculating a student's grade point average.

Students who are interested in study away options should contact their academic advisor or, for Study Abroad and National Student Exchange, contact the Study Abroad/National Student Exchange Office, Roger Clapp Greenhouse. It is necessary to discuss plans for foreign study with the student's advisor and with the dean's office, to insure that the intended study will be appropriate to the student's overall academic program.

## National Student Exchange

The National Student Exchange (NSE) program offers students an opportunity to study in about 100 universities throughout the United States and its territories for a semester or academic year. The program provides an opportunity for students to experience a different academic environment while maintaining progress towards academic goals, expanding academic options, clarifying personal and professional goals, and seeing and experiencing the United States with its diversity of cultures,

Students whose goals are consistent with the purposes of the NSE program are encouraged to explore this option. Applicants must be full-time students, of at least second-year standing, and maintain a minimum 2.5 GPA. For information and applications contact the Study Abroad/National Student Exchange Office, Roger Clapp Greenhouse.

## University Affiliated Program (UAP)

A University Affiliated Program with the Department of Pediatrics at Eastern Maine Medical Center and several colleges at the University

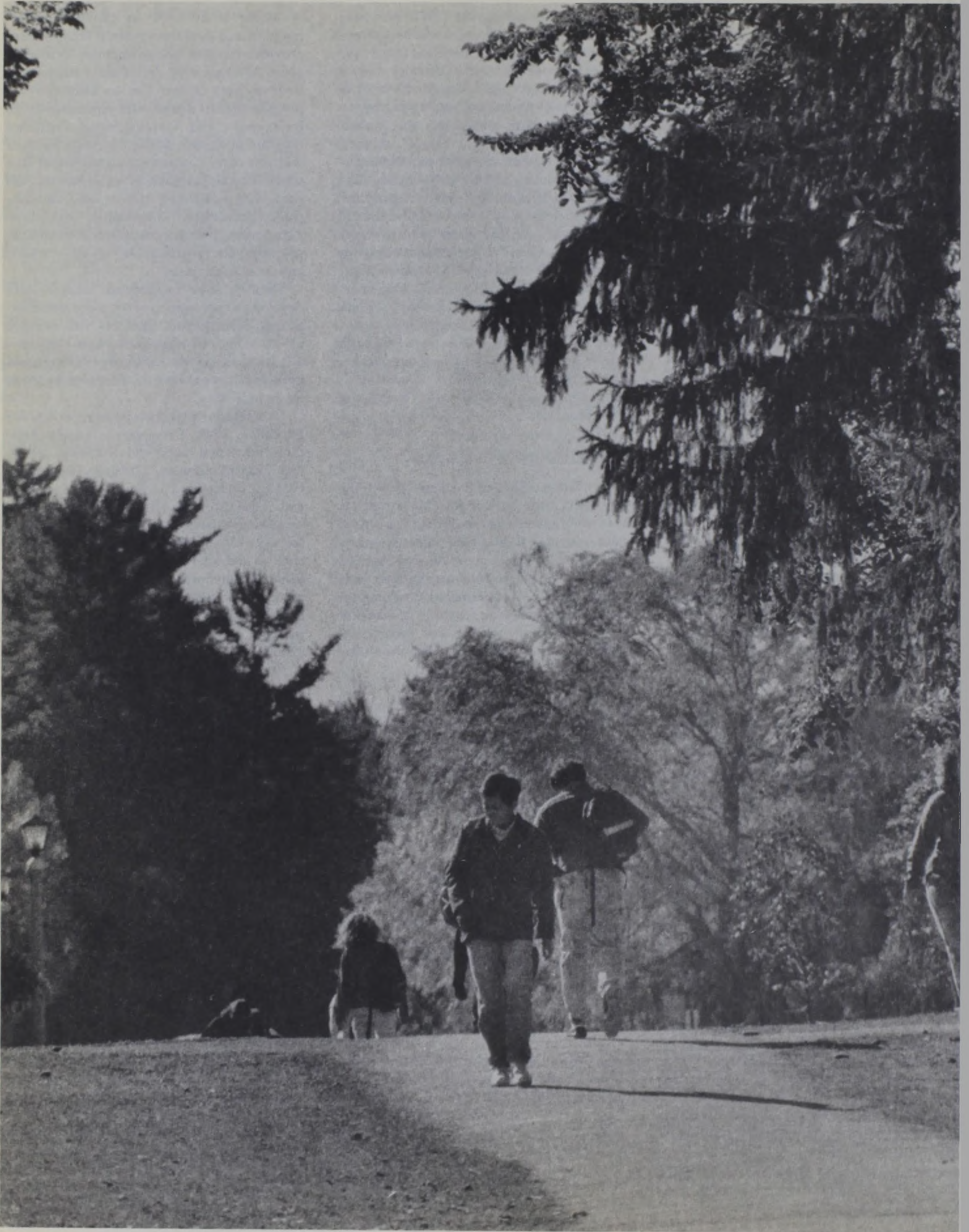
of Maine is available to qualified undergraduate and graduate students. This program provides students with an opportunity to learn about developmental disabilities within an interdisciplinary context. The key features of the program are: (1) a practicum experience in the Behavioral Child Developmental Pediatrics Program at Eastern Maine Medical Center or with one of the cooperating agencies, and (2) a series of seminars given by professionals who work with disabilities, such as: child development specialists, educational specialists, nutritionists, pediatricians, physical therapists, psychologists, psychiatrists, social workers, and speech therapists.

Through these experiences, students will develop an appreciation of the many factors affecting development. Students will develop special skills, but will also see how their own specialty can cooperate with other disciplines to provide the most beneficial treatment program for an individual.

Undergraduate students majoring in Art/Art Education, Child Development/Family Relations, Education, Food and Nutrition, Health and Human Services, Nursing, Psychology, Physical Education and Recreation, Sociology, and Social Work are eligible. Students will be selected after having satisfactorily completed a sequence of basic courses in Developmental Disabilities and after having met specific department requirements for the UAP. Undergraduates participate in a practicum and in an interdisciplinary seminar series (see Interdisciplinary Concentration in Developmental Disabilities).

Graduate students in Child Development, Human Nutrition, Psychology, Special Education, and Speech Communication are eligible. Each graduate student will participate in an individually designed practicum specific to his or her discipline. Students will be selected on the basis of interest and background. In conjunction with the practicum, students will participate in an interdisciplinary seminar series.







# College of Applied Sciences and Agriculture

Wallace C. Dunham, *Dean*

The College of Applied Sciences and Agriculture specializes in programs in three fundamental areas:

Human Development  
Economic Development of Natural Resources  
Agricultural and Aquatic Biology

Within these areas degree programs are offered at all academic levels. Two-year programs leading to the Associate of Science degree in selected areas are offered through the Technical Division. Baccalaureate (4-year) programs leading to the Bachelor of Science degree are offered through the School of Human Development and six academic departments (Agricultural and Resource Economics; Bio-Resource Engineering; Animal, Veterinary and Aquatic Sciences; Entomology; Food Science and Plant, Soil and Environmental Sciences). Advanced degrees (Master of Science and Doctor of Philosophy) also are offered in a wide variety of disciplines.

The undergraduate programs of the college are designed to develop proficiency in a specific discipline or profession, and to provide broad experience in the social sciences and the humanities. The overall goal is to help students prepare for rewarding careers while at the same time providing access to courses which will broaden perspective and enhance the quality of life by developing an appreciation for the arts and humanities.

Students in all programs of study within the college enjoy the benefits of an advising program designed with their needs and interests foremost in mind. During the first year students meet weekly in small seminar classes with their academic advisor. Once the choice of a major is formalized (usually at the beginning of the sophomore year) a faculty member is assigned to serve as academic advisor for each student. This person, whose professional training complements the student's academic interests, helps with course selection and provides advice concerning career development. Throughout the undergraduate years, the capabilities, aspirations, and goals of the student are the primary concerns governing the advising process.

Students may select a degree program upon entering the college. However, many delay a formal choice of major until the sophomore year. In addition to the major, students in the College of Applied Sciences and Agriculture have the option of selecting one of more than 20 minor areas of concentration. These optional minors range from such technical disciplines as chemistry, to humanities and social sciences. Choice of a minor enables students to strength-

en their preparation in the major by selecting supporting courses from a related discipline, to prepare themselves in an alternative discipline, or to focus those credits they are required to earn in the humanities and social sciences.

## Baccalaureate Degree Programs

In the following list, baccalaureate degree (all are bachelor of science) programs of the college are grouped into broad disciplinary areas. Programs marked by an asterisk (\*) are offered cooperatively by two or more academic departments. The parentheses enclose the name of the academic unit responsible for administration of each program.

### Programs in Human Development

Human Nutrition and Foods (School of Human Development)  
Child Development/Family Relations (School of Human Development)  
Health and Family Life Education (School of Human Development)

### Programs in the Economic Development of Natural Resources

Agribusiness Administration (Department of Agricultural and Resource Economics and College of Business Administration)  
Agribusiness and Resource Economics (Department of Agricultural and Resource Economics)  
Bio-Resource Engineering (Department of Bio-Resource Engineering)  
Bio-Resource Engineering Technology (Department of Bio-Resource Engineering)  
Food Industry Systems (\* with concentrations in Food Science, Food Production and Processing Technology and Food Industry Management)  
Landscape Horticulture (Department of Plant, Soil and Environmental Sciences)  
Merchandising and Consumer Resources (School of Human Development)  
Natural Resources (\*) with concentrations in natural history and ecology, marine resources and sciences, soil and water conservation, resource and environmental economics, land use planning, earth sciences, environmental history and social science perspectives, government and public policy, environmental entomology, waste management and individualized concentration.  
Sustainable Agriculture (\*) with concentrations in sustainable agriculture, animal and veterinary science, agribusiness and resource eco-

nomics, plant protection, plant science and soil science.

### Programs in Agricultural and Aquatic Biology

Animal and Veterinary Sciences  
(Department of Animal, Veterinary and Aquatic Sciences)  
Pre-Veterinary (Department of Animal, Veterinary and Aquatic Sciences)  
Aquaculture (Department of Animal, Veterinary and Aquatic Sciences)

### Pre-Veterinary and Other Pre-Professional Programs

Pre-veterinary students in the college normally major in the pre-veterinary concentration of the program in animal and veterinary sciences. Four of the faculty in Animal, Veterinary and Aquatic Sciences are veterinarians, assuring students of knowledgeable advisors. Besides preparing students academically for application to a college of veterinary medicine, the program also allows valuable experience in working with large and small domestic animals. This type of experience can be helpful in gaining admission to a veterinary college.

Students interested in pursuing a career as a registered dietician are advised to major in Human Nutrition and Foods at the undergraduate level. This program, which is approved by the American Dietetic Association, provides the background needed to pursue graduate studies in nutrition or to apply for admission to a certified internship program in dietetics.

All students contemplating careers in the health professions are aided and advised by the University Health Professions Committee. The primary purpose of this committee and the programs it sponsors is to assist students in applying to professional schools. Among its many activities, the committee brings to campus deans and other administrators of medical and veterinary schools. These visits provide students first-hand information regarding the selection process followed by professional schools.

### Associate Degree Programs

Through its Technical Division, the college offers associate degree programs in the following technical areas:

Animal Medical Technology (Animal, Veterinary and Aquatic Sciences)  
Merchandising (School of Human Development)



Landscape and Nursery Management (Plant, Soil and Environmental Sciences)

## Admission Requirements

### Baccalaureate Programs

Students interested in the bachelor of science degree must submit scores on the College Entrance Examination Board Scholastic Aptitude Test (S.A.T.) with their application.

High school course requirements for admission to various professional areas of study are:

#### A. Applied Sciences

English	4 units
Algebra I and II	2 units
Plane Geometry	1 unit
Trigonometry (or its equivalent)	1/2 unit
(Bio-Resource Engineering and Bio-Resource Engineering Technology only)	
Science	2 units
(chemistry or physics preferred)	
History/Social Science	1 unit
Academic Electives	5 1/2-6 units

#### B. School of Human Development

English	4 units
Algebra I & II	2 units
Plane Geometry	1 unit
Science*	1 unit
(chemistry recommended)	
History/Social Science	1 unit
Academic Electives	7 units

### Associate Programs

Students entering two-year, associate of science programs must have graduated from high

\*Chemistry required for majors in Human Nutrition and Foods, and Health and Family Life Education.

school or have received a GED certificate, must have completed the C.E.E.B. Scholastic Aptitude Tests, and must possess a strong desire for a specific technical program. Two units of mathematics, one of which must be algebra, are required. Students who contemplate continuation in a regular four-year baccalaureate degree curriculum must first complete the two-year associate degree program at a grade point average of 2.5 or higher, and must satisfy entrance requirements to the desired baccalaureate degree program.

### Transfer Admission

Admission of transfer students is made by the University Admissions Office. Evaluation of records for transfer credits is made by the associate dean of the college with the aid of the appropriate school director or department chairperson. In general, degree credit is given for equivalent course work passed at a satisfactory level.

## Graduation Requirements

### Bachelor of Science Degree Candidates

Completion of course work required in the various programs of the College of Applied Sciences and Agriculture leads to a degree of bachelor of science. All students are required to complete a minimum of 120 degree hours. Bio-Resource Engineering requires 130 credit hours.

In addition, each student must achieve an accumulative grade point average of 2.0 for all courses designated as "major" courses and an accumulative grade point average of 2.0 over all courses taken. The requirements for some programs may be higher for grades in "major" courses.

In addition to individual program requirements, all degree candidates must complete the following minimum degree requirements:

Communications	6
Writing course*	(3)
Speaking course**	(3)
Humanities and Social Sciences	18

Courses in the humanities and social sciences must be chosen to introduce students to literature, the arts, history, and current social issues. Academic advisors will assist with course selection.

TOTAL HOURS 24

Physical education is not a requirement, but students may count up to two credits of physical education as electives.

### Associate of Science Degree Candidates

For the degree of associate of science, students must complete satisfactorily a prescribed technical curriculum with a minimum of 60 credit hours earned at an accumulative grade point average of at least 2.0.

\*Students selected for First Year Student Honors are excused; students may receive degree credit through Advanced Placement. All others ordinarily will take ENG 101, College Composition, with possible substitution of ENG 212, Intermediate Composition, and ENG 317, Advanced Professional Exposition, or JMC 231, Reporting and Newswriting.

\*\*Students ordinarily will take SPC 103, Fundamentals of Public Communication. Possible substitutes, with permission of the associate dean, are SPC 245, Small Group Communication, SPC 247, Argumentation and Public Advocacy, or SPC 106, Oral Communication of Literature.



## Agricultural and Resource Economics

Professor Kezis (Chairperson)

Professors Delphendahl, Dunham, Ploch, Reiling, Watkins, Wilson

Associate Professors Boyle, Criner, Johnston, Leiby, Marra, White

Assistant Professors Cheng, Deller

### Bachelor of Science in Agribusiness and Resource Economics

The Bachelor of Science in Agribusiness and Resource Economics is offered by the faculty of the Department of Agricultural and Resource Economics.

Three areas of concentration are available, Agribusiness Economics, Resource Economics, and Agribusiness Administration. Agribusiness Administration is a 5 year program jointly offered with the College of Business Administration. It is a unique opportunity to earn both a bachelor's degree in Agribusiness and Resource Economics and a Master's of Business Administration. The department's programs are designed to develop abilities to handle managerial responsibilities and make economic decisions in the food, fiber and other resource based sectors of the economy. The program provides a broad education in agricultural business, economics, resource economics, and community economic development.

Areas of instruction include the business and economic aspects of production, with emphasis on the economic use and management of capital, labor, and land resources; the business aspects of marketing, with emphasis on pricing, financing, merchandising, and consumption; and the economics related to development of area resources. Also stressed are the social and human factors associated with food production, processing, distribution, consumption, and community development. In addition, training is complemented by a comprehensive, integrated program of courses in the sciences, other social sciences, communications, arts, and humanities.

Employment opportunities exist in marketing, service, research, and management positions, with food, agricultural, and other such businesses as manufacturing and processing firms, wholesale and retail distribution firms, insurance and credit agencies, cooperatives, and feed, fertilizer, and other input supply companies. Those in the resource economics concentration find employment with conservation groups and state or federal agencies concerned with natural resource development or preservation, as well as with private sector firms which develop resource inventories and impact statements. Graduates also are frequently employed by federal and state governments, and by colleges and universities.

### Curriculum in Agribusiness and Resource Economics

#### Agribusiness Concentration

##### Basic Sciences

BIO 100 Basic Biology 4

Electives\* 7

TOTAL HOURS 11

##### Communications

ENG 101 College Composition 3

SPC 103 Fundamentals of Public

Communication 3

TOTAL HOURS 6

##### Humanities and Social Sciences

ENG 317 Advanced Professional

Exposition 3

ARE 422 Rural Economic

Development 3

Electives\*\* 12

TOTAL HOURS 18

##### Mathematics and Statistics

MAT 114/115 Mathematics for

Business and Economics I/II 6

OR

MAT 126 Analytic Geometry and

Calculus (4)

MAT 215 Introduction to Statistics

for Business and Economics 3

OR

ECO 485 Introduction to Economic

Statistics and Econometrics (3)

COS 100 Introduction to Personal

Computers 3

TOTAL HOURS 12(10)

##### Applied Sciences and Agriculture

INT 219 Introduction to Ecology 3

Electives\*\*\* 6

TOTAL HOURS 9

##### Economics

ECO 120 Principles of

Microeconomics 3

ECO 121 Principles of

Macroeconomics 3

ECO 421 Intermediate

Macroeconomics 3

OR

ECO 453 Money and Banking (3)

ECO 420 Intermediate

Microeconomics 3

TOTAL HOURS 12

#### Agribusiness

BUA 201 Principles of Accounting I 3

BUA 202 Principles of Accounting II 3

ARE 371 Introduction to Natural  
Resource Economics and Policy 3

ARE 453 Farm Management 3

ARE 454 Introduction to  
Production Economics 3

ARE 458 Principles of Resource  
Business Management 3

ARE 459 Resource Based Business  
Finance 3

ARE 465 Food and Fiber Marketing 3

ARE 468 Price Analysis and  
Forecasting 3

ARE 471 Resource Economics 3

OR

ARE 473 Land Economics (3)

ARE 486 Government Policies  
Affecting Rural America 3

ARE 489 Seminar 2

Electives (any ARE courses) 9

TOTAL HOURS 44

Free Electives\*\*\*\* 7(9)

ASA 117 Issues and Opportunities 1

MINIMUM HOURS REQUIRED FOR  
GRADUATION: 120

#### Agribusiness Administration

This is an academically challenging program that is recommended only for the most capable students. It is administered jointly by the Department of Agricultural and Resource Economics in the College of Applied Sciences and Agriculture and by the College of Business Administration.

Students interested in the program apply for Admission to Agribusiness and Resource Eco-

\*Choose from the following fields: botany, microbiology, biochemistry, chemistry, geology, mathematics, physics, zoology.

\*\*Choose from the following fields: agricultural and resource economics, anthropology, art, economics, education, English, history, journalism, language, literature, modern society, music, philosophy, political science, psychology, sociology, speech.

\*\*\*Any courses in the College of Applied Sciences and Agriculture except those with the designations ARE, CLD, CHF and HEC.

\*\*\*\*Course offerings from the College of Business Administration are recommended for those interested in agribusiness. All students are encouraged to select additional courses from the Departments of Animal, Veterinary and Aquatic Science and Plant, Soil and Environmental Science.



nomics in the College of Applied Sciences and Agriculture.

Continuance in the concentration requires, at least, a 2.5 cumulative average.

Students who successfully complete the 4-year undergraduate portion of the program will receive the B.S. in Agribusiness and Resource Economics, and will be eligible to apply to the Graduate School to enter the Master's Program in Business Administration.

Completion of the 4-year program *DOES NOT* guarantee admission to the M.B.A. program. Admission requirements for the M.B.A. include a good undergraduate grade point average, plus a minimum score of at least 475 on the Graduate Management Admission Test (GMAT). The following formula can be used as a guide to determine eligibility:

((Undergraduate cumulative G.P.A.) x 200) + GMAT score = 1075 or more.

Upon successful completion of the fifth year of the program, students will receive the M.B.A. degree.

Agribusiness Administration majors complete the same basic requirements as Agribusiness majors but take five additional business courses in place of electives. The five courses are listed below:

- BUA 220 The Legal Environment of Business
- BUA 325 Principles of Management and Organization
- BUA 335 Business Information Systems
- BUA 350 Business Finance
- BUA 370 Marketing

**Resource Economics Concentration**

*Basic Sciences*

BIO 100 Basic Biology	4
Electives*	7
<b>TOTAL HOURS</b>	<b>11</b>

*Communications*

ENG 101 College Composition	3
SPC 103 Fundamentals of Public Communication	3
<b>TOTAL HOURS</b>	<b>6</b>

*Humanities and Social Studies*

ENG 317 Advanced Professional Exposition	3
Electives**	12
<b>TOTAL HOURS</b>	<b>15</b>

*Mathematics and Statistics*

MAT 114/115 Mathematics for Business and Economics I/II	6
OR	
MAT 126 Analytic Geometry and Calculus	(4)
MAT 215 Introduction to Statistics for Business and Economics	3
OR	
ECO 485 Introduction to Economic Statistics and Econometrics	(3)
COS 100 Introduction to Personal Computers	3
<b>TOTAL HOURS</b>	<b>12(10)</b>

*Applied Sciences and Agriculture*

INT 219 Introduction to Ecology	3
Electives***	9
<b>TOTAL HOURS</b>	<b>12</b>

*Economics*

ECO 120 Principles of Microeconomics	3
ECO 121 Principles of Macroeconomics	3
ECO 421 Intermediate Macroeconomics	3
OR	
ECO 453 Money and Banking	3
ECO 420 Intermediate Microeconomics	3
<b>TOTAL HOURS</b>	<b>12</b>

*Agricultural and Resource Economics*

BUA 201 Introduction to Accounting I	3
BUA 202 Introduction to Accounting II	3
ARE 371 Introduction to Natural Resource Economics and Policy	3
ARE 454 Introduction to Production Economics	3
ARE 422 Rural Economic Development	3
ARE 471 Resource Economics	3
ARE 473 Land Economics	3
ARE 486 Government Policies Affecting Rural America	3
ARE 489 Seminar	2
Electives in ARE or Economics****	9
<b>TOTAL HOURS</b>	<b>35</b>
Free Electives*****	16(18)
ASA 117 Issues and Opportunities	1

**MINIMUM HOURS REQUIRED FOR GRADUATION: 120**

\*Choose from the following fields: botany, microbiology, biochemistry, chemistry, geology, mathematics, physics, zoology.

\*\*Choose from the following fields: agricultural and resource economics, anthropology, art, economics, education, English, history, journalism, language, literature, modern society, music, philosophy, political science, psychology, sociology, speech.

\*\*\*Choose from PSE 140 Soils Science, PSE 150 Forest Soil Science, FOE 206 Photogrammetry and Remote Sensing, BRE 235 Soil and Water Control, PSE 100 Crop Science, FTY 444 Forest Economics, FTY 446 Forest Policy and Planning, or other ASA courses excluding ARE.

\*\*\*\*Choose from ECO 471 Public Finance and Fiscal Policy, ECO 472 State and Local Government Finance, ECO 445 Regional Economics, ECO 444 Urban Economics, ARE 468 Price Analysis and Forecasting, ARE 474 Land Use Planning, or other appropriate ARE or economics courses.

\*\*\*\*\*Recommended electives include PAA 220 Introduction to Public Policy, PAA 200 Introduction to Public Management and Bureaucracy, SVE 111 Plane Surveying, SVE 221 Legal Aspects of Land Surveying, GEE 116 Cartographics, CIE 331 Fundamentals of Environmental Engineering, PSE 442 Soil Taxonomy, PSE 444 Soil Morphology and Soil Mapping, BIO 468 Limnology, or other electives listed under LSA and ARE above that are not used as electives in those areas.

**Courses in Agricultural and Resource Economics**

**ARE 123 Micro-Computer Applications for Agriculture**

An introduction to computers and computer applications for personal and agri-business productivity. Focus on the use of word processor, spread sheet and data base management applications software for the micro-computer environment. Limited coverage of main-frame computer use, personal computer selection, programming and programming languages are included. Emphasis on hands-on exposure to the materials. **Cr 3.**

**ARE 138 Agribusiness Accounting I**

Includes preparation of financial statements, mechanics of accounting cycle, and asset valuation and analysis. Lec 2, Lab 2. **Cr 3.**

**ARE 139 Agribusiness Accounting II**

Includes analysis and interpretation of liabilities and stockholders equity, concept of present values, preparation of statement of changes in financial position and consolidated financial statements, analysis of financial statements, and accounting for inflation. Prerequisites: ARE 138. Lec 2, Lab 2. **Cr 3.**

**ARE 148 Principles of Agricultural Economics**

Economic principles applied to the business firm. Production, marketing, use of human and natural resources, governmental policy and international trade. Rec 3. **Cr 3.**

**ARE 281 World Food Demand, Population and World Food Supply**

Provides perspectives on the world food problem, the supply and demand for food, world population distribution and the unequal resource base of regions. Alternative policy measures to solve the food problem will be discussed. Prerequisites: ARE 148, ECO 110 or ECO 120. **Cr 3.**

**ARE 371 Introduction to Natural Resource Economics and Policy**

Economic aspects of natural resource management and policy will be presented. Both consumptive and nonconsumptive uses of natural resources will be discussed along with the socially optimal use of renewable and nonrenewable resources. Contemporary environmental problems and policies will also be presented. Prerequisites: ECO 120 or ARE 148. **Cr 3.**

**ARE 396 Field Experience in Agriculture and Resource Economics**

An approved progra 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. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). **Cr 1-16.**

**ARE 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. Prerequisites: ECO 110 or ECO 120, or permission of instructor. Cr 3.

#### ARE 453 Farm Management

Study of the concepts and tools of farm management in today's economic environment, including types of farm business organizations, farm planning concepts and techniques, tax management, risk management, and farm growth, liquidation and transfer. Prerequisite: ECO 110 or ARE 148. Cr 3.

#### ARE 454 Introduction to Production Economics

Application of economic relationships; principles and problems of resource allocation at the farm level. Prerequisite: ECO 110 or ARE 148. Rec 3. Cr 3.

#### ARE 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. Cr 3.

#### ARE 459 Resource Based Business Finance

Designed to assist the student to develop skills necessary to deal with financial aspects of resource based businesses. Topics to be included are financial statement spreading and analysis, analyzing cash flow, business plan development, negotiation and entrepreneurship. Rec 3. Cr 3.

#### ARE 462 Recreation and Park Management

Fundamental management considerations related to the administration of recreation and park programs. Rec 3. Cr 3.

#### ARE 465 Food and Fiber Marketing

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. Prerequisite: ECO 110 or permission of instructor. Rec 3. Cr 3.

#### ARE 468 Price Analysis and Forecasting

Analysis and measurement of factors affecting supply, demand, and elasticity, their relation to the level and changes of market prices, and use of quantitative techniques in forecasting. Prerequisite: ECO 420, MAT 215 or permission of instructor. Rec 3. Cr 3.

#### ARE 471 Resource Economics

Study of the principal economic and institutional factors affecting the use of land and resources including supply, demand and future requirements; economics of resource allocation, functioning of the market, benefit cost analysis, planning for more efficient use of resources. Prerequisite: ECO 110. Rec 3. Cr 3.

#### ARE 473 Land Economics

Principle economic and institutional factors affecting land use. Emphasis on land rent, economics of land conservation, public measure for directing land use and taxation of landed property. Prerequisite: ARE 148 or ECO 110 or permission. Rec 3. Cr 3.

#### ARE 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. Prerequisite: ARE 473 or permission. Cr 3.

#### ARE 486 Government Policies Affecting Rural America

Analysis of policies and programs affecting rural America, agriculture, and the food industry. Prerequisite: ECO 110 or ARE 148 or permission. Rec 3. Cr 3.

#### ARE 489 Seminar

Discussion of current economic and social problems. Prerequisite: seniors and graduate students. Rec 2. Cr 2.

#### ARE 497 Independent Studies

Analysis of current problems in agricultural and resource economics, rural sociology, and community development. Prerequisite: permission of instructor. May be repeated for additional credit. Cr 1-3.

#### ARE 511 Advanced Applications of Agricultural Economic Theory

Economic principles applicable to agricultural and resource problems and their use in policy evaluation. Comparative statics used to illustrate the application of consumer demand theory, the theory of the firm, production economics, market structure, and welfare economics. Prerequisite: ECO 420. Cr 3.

#### ARE 517 Research Methods in Agricultural and Resource Economics

A study of the nature of economic and social analysis including the scientific method and the formulation and testing of hypotheses. Introduces economic research quantitative techniques, including matrix algebra and with computer applications. Prerequisite: MAT 232. Cr 3.

#### ARE 518 Mathematical Optimization Techniques

Provides a working knowledge of mathematical optimization techniques and their application to relevant economic problems. Cr 3.

#### ARE 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.

#### ARE 528 Community Development Applications

Introduces skills and strategies needed by community development practitioners including

community development process, group process, social and behavioral change and manpower retraining. Selected presentations by practicing professionals in the field. Prerequisite: ARE 527. Cr 3.

#### ARE 554 Production Economics

The principles of optimum resource allocation applied to the agri-business firm including advanced techniques for attaining optimum resource allocation. Cr 3.

#### ARE 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 agri-business sector of the U.S. economy. Prerequisite: ARE 465, ECO 420. Cr 3.

#### ARE 571 Advanced Resource Economics

Analysis of economic theory as it relates to the development and management of exhaustable and renewable natural resources. Examines the unique characteristics of resource markets, the determination of optimal pricing and use, resource policy, and management issues. Prerequisite: ARE 511. Cr 3.

#### ARE 572 Agricultural Trade and Economic Growth

Theories and applications of international and interregional agricultural trade and economic growth. Prerequisite: ECO 420. Cr 3.

#### ARE 577 Economics of Public Choice

Analysis of economic systems as mechanisms for collective action. Emphasis on the role of property rights in natural resource utilization. Focus on the market system, reasons for market failure in resource allocation and income distribution, and analysis of extra-market and non-market alternatives for collective action. Prerequisite: ECO 420. Cr 3.

#### ARE 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.

#### ARE 597 Independent Studies

Analysis of current problems in agricultural and resource economics, rural sociology, and community development. May be repeated for a total of six credits. Cr 1-3.

#### Interdisciplinary Courses

##### INT 110 (ARE, ECO) Modern Economic Problems

An introduction to the operation of modern economic systems. Topics might 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. Cr 3.



**INT 224 (ARE, SOC) Sociology of Rural Life**  
Analysis of the significance of rural society in American culture. Considers the impact of forces of change including population movement and the significance of changes in the social systems of community, family, religion, education, and stratification. Rec 3. Cr 3.

**INT 230 (ARE, CIE, TSO) Waste Management**

The study of the history and current problems of society's municipal solid waste. Waste generation, recycling and disposal will be covered for both Maine and the nation. Social, economic and engineering aspects will be examined. Cr 3.

**INT 324 (ARE, SOC) Contemporary Rural Problems**

A problem-oriented, class participation course focusing on the trends in contemporary rural

society. Rural population displacement and mobility, poverty, industrialization; consequent changes in occupational compositions, and related changes. Prerequisite: INT 224 or equivalent. Rec 3. Cr 3.

**INT 329 (ARE, SOC) The Individual and the Community**

Analysis of the structure and functioning of the community. Emphasis on ways in which individuals and groups are affected by community dynamics. Students participate in a community project. Prerequisite: INT 224 or permission. Rec 3. Cr 3.

**INT 444 (ARE, PSE) Integrated Farming Systems**

Designed to be a capstone to the Sustainable Agriculture Program, this course requires students, in conjunction with faculty, to integrate their knowledge of the physical, economic, so-

cial and philosophical aspects of sustainable agricultural production. Prerequisites: PSE 100, PSE 140, ARE 148, and ARE 453 or equivalents. Lec 3, Lab 1. Cr 4.

**INT 514 (ARE, ECO) Microeconomic Theory**  
An examination of modern economic analysis with regard to the consumer, the firm and market structures. Prerequisite: permission. Cr 3.

**INT 530 (ARE, ECO) 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 multiequation models and forecasting. Prerequisite: ECO 485 or permission. Cr 3.





## Animal, Veterinary and Aquatic Sciences

Associate Professor Hawes (Chairperson)

Professors Bayer, Gershman, Gibbs, Hidu

Associate Professors Barton, Congleton, Corey, Harris, Kling, Stokes, Stimpson

Assistant Professor Wallace

Associate Extension Instructors Anderson, El-Begearmi, Opitz, Walker

Assistant Extension Instructor Hought

Cooperating Professors Dow, Fakelman

Faculty Associates Andrews, Birmingham, Browne, Chapman, Cunliffe-Beamer, L. Davis, P. Davis,

Feher, Gauger, Griffin, Havey, Ingraham, Meiczinger, Porter, Rogers, Ruksznis Sherman, Staples

Stiles, Thompson, Trickey, Waite, Wall, Whittaker

### Bachelor of Science in Animal and Veterinary Sciences (Pre-veterinary)

The Bachelor of Science in Animal and Veterinary Sciences is offered by the faculty of the Department of Animal, Veterinary and Aquatic Sciences.

The animal sciences curriculum is designed to provide a broad biological training as well as a thorough understanding of the anatomy, breeding, diseases, genetics, management, nutrition, and physiology of large animals, avian species and laboratory animals.

Because a basic knowledge in animal sciences is fundamental to successful work in many job situations, the curriculum offers a wide choice of electives so students may adapt their courses of study to meet special professional interests or needs. Through the proper use of options, students can prepare for admission to graduate school or veterinary college, to teach sciences in secondary schools, to pursue technical sales and service work in the animal and poultry industries, for careers as laboratory animal technicians, or to develop such animal production enterprises as dairy, poultry, or livestock farms.

Courses in animal health are offered to support the curriculum in the department and the curriculum in wildlife management. They also serve as elective opportunities for students in other agricultural and life sciences, and in other colleges. This department also administers the Pre-Veterinary Science Program and provides an opportunity for students to be certified to teach high school biology and agriculture. (See Agriculture and Natural Resource Education.)

Superior students should consider continuing their studies at the graduate level. The Department of Animal, Veterinary and Aquatic Sciences offers the master of science degree in animal science for a program of study in animal nutrition, pathology, physiology, management, or breeding, as well as a master in Marine Bio-Resources. The doctor of philosophy degree may be earned in the nutritional sciences, biological sciences program or Marine Bio-Resources.

### Course and Credit Requirements

TOTAL CREDIT HOURS: 120

Animal Science Courses	34-35
General Science Courses	29
Liberal Arts Courses	27
General Electives (Including ASA 117: Issues)	28-29 (1)

#### Animal Science Courses

AVA 145 Animal Science	4
AVA 200 Careers in Animal Science	1
AVA 260 Animal Genetics and Breeding	3
AVA 351 Animal Science Technology	2
AVA 401 Senior Paper in Animal Science	1-2
AVA 402 Senior Paper in Animal Science	1
AVA 437 Animal Diseases	3
AVA 455 Animal Nutrition	3
AVA 461 Animal Breeding	3
AVA 462 Feeds and Feeding Animals	2
AVA 480 Physiology of Reproduction	4
PLUS ** Credits from AVA 463, AVA 464, AVA 465, AVA 466, AVA 467	2
AVA 346 Dairy Cattle Technology	3
OR	
AVA 348 Livestock Management	3
PLUS ONE OF THE FOLLOWING:	
AVA 211 Aquaculture	3
AVA 285 Applied Avian Biology	3
AVA 349 Laboratory Animal Technology	4
<b>TOTAL HOURS</b>	<b>34-35</b>

#### General Science Courses

BIO 100 Basic Biology	4
ZOL 204 Animal Biology	4
CHY 111 / 112 General Chemistry I and II	8
OR	
BCH 207 Fundamentals of Chemistry	4
AND	
BCH 208 Elementary Physiological Chemistry	4
AVA 236 Physiology of Domestic Animals	4

MAT 122 Algebra and Trigonometry, Pre-Calculus OR (MAT 126, 232)	4 or 3
COS 100 Introduction to Personal Computers	3
OR (COS 210, 215)	
FOS 301 Food Processing Industry: Principles and Problems	3
<b>TOTAL HOURS</b>	<b>29</b>

#### Communications

ENG 101 College Composition	3
ENG 317 Technical Writing (ENG 212, 317, JMC 231)	3
SPC 103 Fundamentals of Public Communication	3
OR (SPC 106, 245, 247, 257)	
<b>TOTAL HOURS</b>	<b>9</b>

#### Humanities/Social Sciences

INT 110 Modern Economic Problems	3
Plus 15 additional credits	
<b>TOTAL HOURS</b>	<b>18</b>

#### Graduate School or Pre-veterinary Concentration

Courses recommended:	
BCH 322 Biochemistry	3
CHY 251 Organic Chemistry I	3
CHY 253 Organic Chemistry Laboratory I	2
CHY 252 Organic Chemistry II	3
CHY 254 Organic Chemistry Laboratory II	2
MAT 151 Calculus for the Life Science I	4
MCB 300 General Microbiology	3
MCB 305 General Microbiology Lab	2
PHY 111 General Physics I	4
PHY 112 General Physics II	4
ZOL 333 Comparative Anatomy	4
ZOL 336 Developmental Biology	4

\*Students are required to take two production courses; one must be either Dairy Cattle Technology (AVA 346) or Livestock Management (AVA 348)



**Education Minor**

Students have the opportunity to schedule courses in the College of Education which fulfill the requirements for certification to teach in primary and secondary schools (including biology and agriculture). See Agricultural and Natural Resource Education in index.

**Courses in Animal, Veterinary and Aquatic Sciences****AVA 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. Prerequisites: First-year students and Sophomore standing or by permission. Lec 3, Lab 2. Cr 3.

**AVA 200 Careers in Animal Science**

A required course in the spring semester of the sophomore year involving student presentation of at least one topic to a class of peers. Cr 1.

**AVA 211 Aquaculture**

The history and current status of world sea farming with emphasis on mollusks and the developing Maine situation. Cr 3.

**AVA 212 Maine Mariculture**

The history, current advances and status of world commercial fishing techniques of a variety of marine animals, especially mollusks and finfish. Laboratories in aquaculture methods and field trips to commercial aquaculture sites in Maine. Prerequisite: Permission of instructor. Cr 3.

**AVA 220 Topics in 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. Lec 2. Cr 2.

**AVA 222 Companion Animals**

The course will address the problems and some social implications encountered in raising pets—the dog, cat and horse in particular. Cr 2.

**AVA 236 Physiology of Domestic Animals**

Principles of physiological processes of domestic animals and how they effect growth, lactation and reproduction. Prerequisite: ZOL 204 or equivalent. Lec 4. Cr 4.

**AVA 249 Laboratory Animal Technology**

The principles and practices associated with research animal care in clinics, hospitals and laboratories. Topics will include animal models for human diseases and maintenance of germ-free animals; animal housing facilities; mating systems and record keeping; animal welfare issues and characteristics of various species. Prerequisite: AVA 145. Lec 3, Lab 3. Cr 4.

**AVA 250 Our Environment**

A basic, interdisciplinary introduction to the effect of our biological and physical environment on life and humankind. Students investigate

one environmental problem of their choice, including possible solutions, and produce a detailed paper. Open to students in all colleges. Offered as an eight-week block course. Cr 3.

**AVA 260 Animal Genetics and Breeding**

The principles of genetics. The transmission and expression of hereditary factors in animals. Prerequisite: BIO 100. Lec 3. Cr 3.

**AVA 285 Applied Avian Biology**

A study of domesticated birds emphasizing the principles of genetics, nutrition, reproduction and health. Chickens, turkeys, waterfowl, game birds and cage birds are covered with focus on the optimum care and management of these species through increased knowledge of their basic biology. Field trips will be arranged depending on student interests. Prerequisites: BIO 100 and ZOL 204 or permission. Lec 3. Cr 3.

**AVA 299 Animal Welfare and Rights**

Explores and considers the evolution of our relationship with and to animals, and the philosophical, social, economic, scientific, moral and ethical implication that follow. Cr 3.

**AVA 335 Zoonoses (Diseases Acquired From Animals).**

The etiology, infectious sources, mode of transmission, portal of entry, diagnosis, treatment, prevention, and control of pathogenic organisms transmissible to man from lower animals. Prerequisite: BIO 100 or permission. Lec 3. Cr 3.

**AVA 346 Dairy Cattle Technology**

The application of breeding, feeding, housing, selection, care, records, breed association programs and recent research findings to herd management. Prerequisite: AVA 145, AVA 480, AVA 260, AVA 455. Cr 3.

**AVA 347 Equine Science**

Principles of equine science, including breeds, breeding, conformation, nutrition, management, unsoundness, health program, selection, housing, and training. Lec 3. Cr 3.

**AVA 348 Livestock Management**

The selection, breeding, feeding, care and management of beef cattle, sheep, and swine. Prerequisite: AVA 145. Lec 3. Cr 3.

**AVA 350 Equine Behavior and Training**

The physiological development, control and education of the horse stressing biting, longeing, collection and schooling for saddle and driving. Prerequisite: AVA 347. Lec 2, Lab 2. Cr 3.

**AVA 351 Animal Science Techniques**

Direct application of current techniques used in the management of dairy and beef cattle, sheep and swine. Included are restraint, dehorning, castration, docking, milking, shearing and health management and computer applications in the animal sciences. Prerequisite: AVA 346 or AVA 348. Lec 1, Lab 3. Cr 2.

**AVA 352 Sheep Production**

The application of the principles of genetics, breeding, nutrition and management to sheep (lamb and wool) production in the Northeast.

Laboratory devoted to practical experiences techniques of sheep management from lamb to marketing. Prerequisite: AVA 145 or permission. Lec 1, Lab 2. Cr 3.

**AVA 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) anatomy, (2) behavior, (3) breeding, (4) disease, (5) management, (6) nutrition, (7) physiology. Not more than five credit hours will be permitted toward graduation. Prerequisite: AVA 145 or permission. Cr 3.

**AVA 396 Field Experience in Animal, Veterinary and Aquatic Sciences**

An approved program of work experience which contributes to the academic major in which academic credit is given. Students may work part time or full time for a semester in a job related to their professional career goal. Prerequisite: Permission. (Pass/Fail Grade Only). Cr 1-3.

**AVA 401 Senior Paper in Animal Science**

An original investigation of a problem in the animal sciences, under the guidance of a faculty member. Students are required to submit a draft report describing their research. Prerequisite: AVA 200, ENG 317 or equivalent and senior standing. Cr 1-3.

**AVA 402 Senior Paper in Animal Science**

The student will prepare a final copy of the work done in AVA 401 and present an oral report to faculty and students. Prerequisites: AVA 401 and SPC 103 or equivalents and senior standing. Lec 1. Cr 3.

**AVA 409 Shellfisheries Biology**

The biology, ecology and management of commercial marine shellfish, especially mollusk with emphasis on species commercially important to Maine's natural fisheries and those having a high potential in mariculture. Includes lab demonstrations. Lec 3. Cr 3.

**AVA 437 Animal Diseases**

Introduction to the study of disease in animals including the courses, pathology and control diseases of domestic animals. Prerequisite: AVA 236 or ZOL 377 or permission. Lec 3. Cr 3.

**AVA 444 Diseases and Parasites of Wildlife**

Studies on diseases of North American wildlife emphasizing preventative and control measures with practice in diagnostic techniques. Wildlife majors. Lec 2, Lab 2. Cr 3.

**AVA 445 Sustainable Animal Production Systems**

A study of various animal (monogastric/ruminant/aquatic) production systems in relation to sustainable agriculture with emphasis on integration into overall farm management schemes and evaluation on the basis of animal productivity, farm profitability and environmental impact. Prerequisites: AVA 145, PSE 100, PSE 101. Lec 3. Cr 3.



**AVA 455 Animal Nutrition**

Principles of nutrition, methods of experimentation and discussion of nutritional balances. Prerequisite: ZOL 204, BCH 207, BCH 208 or equivalent. Cr 3.

**AVA 461 Animal Breeding**

Covers the inheritance of the commercially valuable characteristics or 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. Prerequisite: AVA 260 and MAT 122 or MAT 126 or MAT 232 and ARE 123 or COS 210, COS 215. Lec 2, Lab 2. Cr 3.

**AVA 462 Feeds and Feeding Animals**

Nutrient requirements of animals and general principles of ration balancing. Nutritive value and characteristics of common feedstuffs. Prerequisite: AVA 455. Cr 2.

**AVA 463 Feeding Companion Animals**

Nutritional requirements and adequate diets for horses, cats, and dogs will be the principle area of study. Prerequisites: (previously or concurrently) AVA 455, AVA 462. Cr 1.

**AVA 464 Feeding Swine and Poultry**

Formulation of specific rations for swine and poultry. Prerequisites: (previously or concurrently) AVA 455, AVA 462. Cr 1.

**AVA 465 Feeding Beef and Sheep**

Formulation of specific rations for beef and sheep. Prerequisites: (previously or concurrently) AVA 455, AVA 462. Cr 1.

**AVA 466 Feeding Dairy Cattle**

Balancing rations using a variety of feedstuffs for the lactating dairy cow. Prerequisites: (previously or concurrently) AVA 455, AVA 462. Cr 1.

**AVA 467 Feeding Fish**

Formulation of high protein rations necessary for growth in fish species. Prerequisites: (previously or concurrently) AVA 455, AVA 462. Cr 2.

**AVA 480 Physiology of Reproduction**

Comparative development and functions of the reproductive process in domestic animals. Prerequisite: ZOL 377 or AVA 236. Lec 3. Cr 3.

**AVA 501 Monogastric Nutrition and Physiology**

Structure of the monogastric gastrointestinal tract and its functions will be discussed with emphasis on details of digestive absorption and secretion of digestive glands, as well as the utilization of energy, proteins, fats, carbohydrates, vitamins and minerals. Prerequisites: AVA 236, AVA 256, AVA 455, BCH 322 or equivalent courses. Lec 3. Cr 3.

**AVA 502 Ruminant Nutrition and Physiology**

Explores ruminant metabolism, especially rumen function, factors which modify it, and the effects on the flow of nutrients to the host animal. Covers anatomical and physiological development of the rumen, as well as factors affecting digestion and microbial metabolism in the context of a dynamic system. Prerequisites: AVA 236, AVA 455, BCH 322 or permission. Lec 3. Cr 3.

**AVA 503 Advanced Animal Pathology**

General and systemic animal pathology viewed as physiological and morphological dysfunctions. Emphasis on the basic principles of the disease process with reference to a variety of different types of etiological agents. Prerequisites: AVA 236, AVA 437, AVA 455, BCH 322 or equivalents. Lec 3. Cr 3.

**AVA 504 Research Methods in Ruminant Nutrition**

A multi-disciplinary introduction to some laboratory and animal techniques used in nutritional research. Prerequisites: AVA 455 or HNF 410, CHY 240 or permission. Lec 2, Lab 6. Cr 3.

**AVA 505 Nutritional Energetics**

Discusses and evaluates the factors which influence partition of dietary energy in all species, with particular emphasis on dietary com-

position and nutritional adequacy as they influence energy metabolism, and on the development of systems for rationing based on energetics. Prerequisites: AVA 455, BCH 451 or permission. Lec 3. Cr 3.

**AVA 506 Vitamins**

Advanced study of the fundamental role of vitamins and minerals in nutrition, including their chemical properties, absorption, metabolism, storage, excretion and deficiency symptoms. A critical study of the biochemical basis of vitamin function and their interrelationships with other substances. Prerequisites: AVA 455 or HNF 410, BCH 322 or permission. Lec 2. Cr 3.

**AVA 507 Nutritional-Environmental Interactions**

Effects of the physical environment on the nutrition, metabolism and performance of animals. Implications for their feeding and management. Prerequisites: AVA 455 or HNF 410, PHY 106 or permission. Lec 3. Cr 3.

**AVA 508 Minerals**

A discussion of the inorganic elements (essential and nonessential), and their metabolism including the absorption, biochemical function, excretion, storage, and deficiency and toxicity symptoms associated with each. Emphasis on the interaction of minerals with other inorganic and organic substances. Prerequisite: AVA 455 or HNF 410, BCH 322 or permission. Lec 3. Cr 3.

**AVA 561 Simulation Using a Structured Language**

Studies the applicability of simulation techniques to research problems, the components of a dynamic model including programming in a C simulator with a spatial component, and analysis of the output. Prerequisite: One programming course and permission. Cr 3.

**AVA 590 Special Topics in Animal Science**

Anatomy, breeding, diseases, management, nutrition, physiology as related to poultry, dairy, or marine animals. Prerequisite: permission. Cr Ar.



## Bio-Resource Engineering

Professor Riley (Chairperson)

Professors Rowe, Smith

Associate Professors Christensen, Hedstrom, Huff, Hunter, Soule

Assistant Professor McBurnie

The Bachelor of Science in Bio-Resource Engineering is offered by the faculty of the Department of Bio-Resource Engineering.

The bio-resource engineering curriculum combines study in engineering and mathematics, the biological sciences, and the physical sciences to provide a unique background for solving engineering problems associated with agriculture, aquaculture, food and fibre processing.

The basic curriculum is strengthened by elective options, or students may specialize in one of three areas according to their interests and needs. Areas of concentration are: (1) agricultural engineering; (2) aquacultural engineering, and (3) food engineering. Electives in engineering and the life sciences aid in providing a broad base of knowledge for engineering practice.

Employment opportunities for bio-resource engineers are as diverse as the food and fiber industries themselves. Graduates in Bio-Resource Engineering may be employed as design engineers by machinery and aquacultural systems manufacturers; and by governmental entities; as sales engineers by machinery, food, or chemical companies; as research engineers by industry, government, or state experiment stations, or in teaching or extension positions by universities. Some work as consulting engineers. A number of opportunities for foreign service are available.

The curriculum in Bio-Resource Engineering is a joint responsibility of the College of Engineering and the College of Applied Sciences and Agriculture and is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

This degree requires satisfactory completion of at least 130 degree hours at an accumulative grade point average of not less than 2.0 in a course of study which conforms to the curriculum at right.

### Concentrations

#### Agricultural Engineering

PSE 140 Soil Science 3

MEE 380 Design I 3

BRE 466 Irrigation & Containment with one of the following: 3

BUA 220 The Legal Environment of Business 3

INT 110 Modern Economics 3

Problems 3

### Specimen Curriculum

First Year	
Fall Semester	Spring Semester
BRE 220 Introduction to Bio-Resource Engineering 3	BRE 255 Materials in Bio-Resource Engineering 3
BIO 100 Basic Biology 4	BRE 257 Computer Applications in Bio-Resource Engineering 3
ASA 117 Issues & Opportunities 1	MAT 127 Analytic Geometry and Calculus II 4
MAT 126 Analytical Geometry and Calculus 4	PHY 121 Physics for Engineering and Physical Scientists I 4
CHY 113 Chemical Principles I 4	BRE 268 Computer Aided Drafting and Design 3
<b>TOTAL HOURS</b> 16	<b>TOTAL HOURS</b> 17
Second Year	
Fall Semester	Spring Semester
BRE 281 Surveying 1	BRE 282 Introduction to Bio-Resource Engineering Research 2
ENG 101 College Composition 3	MEE 230 Thermodynamics 3
MEE 150 Applied Mechanics: Statics 3	MEE 270 Applied Mechanics: Dynamics 3
MAT 228 Analytical Geometry and Calculus 4	MAT 259 Differential Equations 4
PHY 122 Physics for Engineers & Physical Scientists II 4	SPC 103 Fundamentals of Public Communications 3
<b>TOTAL HOURS</b> 15	<b>TOTAL HOURS</b> 15
Third Year	
Fall Semester	Spring Semester
MEE 360 Fluid Mechanics 3	MEE 251 Strength of Materials 3
BRE 465* Soil and Water Resources Engineering 3	ELE 215 Electrical Circuits 3
BRE 469* Process Engineering 3	BRE 491 Design Project I 1
ENG 317 Technical Writing 3	BRE 460* Power and Machinery 3
Electives 6	Electives 6
<b>TOTAL HOURS</b> 18	<b>TOTAL HOURS</b> 16
Fourth Year	
Fall Semester	Spring Semester
BRE 492 Design Project II 2	BRE 493 Design Project II 1
BRE 480 Senior Seminar 1	BRE 463* Structures and Environmental Design 3
BRE 462* Power Transmission and Control 3	Electives 12
BRE 464* Instrumentation and Control Systems 3	<b>TOTAL HOURS</b> 16
Electives 8	
<b>TOTAL HOURS</b> 17	

**TOTAL REQUIREMENT FOR GRADUATION 130 CREDIT HOURS**

\* These courses are taught on an alternate year schedule so may be taken in either the 3rd or 4th years. Electives: 12 Credit hours must be Humanities or Social Sciences courses. 20 Credit hours must be from Concentration recommendations - see text.



and a minimum of 8 credits from the following list:

PLSE 100 Plant Science	4
PLSE 101 Crop Systems	4
MEE 381 Design II	3
MEE 455 Advanced Strength of Materials	3
BRE 452 Fluid Power and Robotics	3
MEE 435 Internal Combustion Engines	3
MEE 471 Mechanical Vibrations	3

#### Aquacultural Engineering

AVA 211 Aquaculture	3
AVA 220 Topics in Marine Resources	2
DCE 370 Introduction to Oceanography	3

with one of the following:

BUA 220 The Legal Environment of Business	3
INT 110 Modern Economic Problems	3

and minimum of 9 credits from the following list:

BRE 466 Irrigation and Water Supply Design	3
AVA 212 Maine Mariculture	3
AVA 409 Shell Fisheries Biology	3
CIE 458 Coastal Engineering	3
ZOL 472 Aquatic Food Webs	3
ZOL 213 Introduction to Marine Science	3

#### Food Engineering

CHE 350 Automatic Control	3
FOS 301 Introduction to Food Science	3

FOS 502 Food Processing I	4
FOS 503 Food Processing II	4

with one of the following:

BUA 220 The Legal Environment of Business	3
INT 110 Modern Economic Problems	3

and a minimum of 3 credits from the following list:

ARE 365 Food & Fiber Marketing	3
MCB 300 General Microbiology	3
MEE 231 Thermodynamics II	3
MEE 386 Refrigeration and Air Conditioning Systems Design	3
MEE 432 Heat Transfer	3

Students under the Regional Program transferring to the University of Maine after the sophomore year from the Universities of Massachusetts, New Hampshire, Rhode Island or Vermont should check the bulletins of those institutions for curricula for the first two years in Bio-Resource Engineering.

#### Graduate Work in Bio-Resource Engineering

The degrees of Master of Science (Bio-Resource Engineering) and Master of Engineering (Bio-Resource Engineering) are offered with options

for specialization in soil and water engineering, farm structures, agricultural power and machinery, electric power and processing, and fisheries and aquaculture.

Several research assistantships are available each year. Incumbents devote half time to research on approved projects of the Maine Agricultural Experiment Station.

### Bachelor of Science in Forest Engineering

The bachelor of science degree in forest engineering is a program administered by the College of Forest Resources and the Bio-Resource Engineering Department. It is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, and by the Society of American Foresters. The program offers a unique opportunity to prepare for a diversity of challenging careers that direct engineering principles toward the needs of the forest environment. (See Index.)

#### Courses in Bio-Resource Engineering

##### BRE 220 Introduction to Bio-Resource Engineering

Basic concepts of the engineering and organization of bio-resource production systems with particular emphasis on forestry, agriculture and aquaculture. Lec 2, Lab 2. Cr 3.

##### BRE 229 Basic Shop Techniques

A course in selection, care and use of tools, woodworking techniques, metalworking and welding. Lec 1, Lab 3. Cr 2.

##### BRE 230 Park Service and Maintenance

Basic introduction to the specialized services and maintenance of parks and recreation areas, including construction, systems operations, equipment use and repair, and materials applications. Lec 2, Lab 2. Cr 3.

##### BRE 231 Processing Machinery

Introduction to machinery used in processing food and fiber. Study of mechanisms and components with emphasis on commercial applications. Topics include power transmission, materials handling, safety, and properties of bulk materials related to transport. Prerequisite: MAT 122. Lec 2, Lab 2. Cr 3.

##### BRE 232 Buildings and Environment

A consideration of environmental control including methods and materials of construction, functional requirements and system economics of production, processing and storage buildings. Prerequisite: MAT 122. Lec 2, Lab 2. Cr 3.

##### BRE 233 Fluid Power Technology

Examines basic fluid power systems, component installation and function analysis, basic system design, troubleshooting and testing techniques.

Prerequisite: PHY 111, PHY 112 or permission. Lec 2, Lab 3. Cr 3.

##### BRE 235 Water Supply & Waste Management

The study of hydrologic processes and development of water supply systems, water quality and quantity analyses, and reservoir development. Design of pumping plants, wells, water delivery systems, and waste disposal systems is covered; environmental and energy concerns are reviewed, with emphasis on selection of components and management strategies. Lec 2, Lab 3. Cr 3.

##### BRE 236 Farm and Forest Power

Principles of construction, operation, and maintenance of internal combustion engines, tractors, and related equipment. Selection, application, and management of power equipment in farm and forestry activities. Prerequisite: MAT 122. Lec 2, Lab 2. Cr 3.

##### BRE 237 Automation and Process Control

An introduction to measurement theory, process monitoring, data acquisition, applied control theory and robotics with emphasis on applications in processing and manufacturing. Prerequisite: MAT246A and PHY 112. Lec 2, Lab 2. Cr 3.

##### BRE 238 Electrification

Fundamentals of electric circuits including basic wiring techniques and planning of wiring systems, and selection, use, and care of electric devices and controls used in agriculture and forestry. Emphasis on practical application. Prerequisite: PHY 112 or equivalent. Lec 2, Lab 2. Cr 3.

##### BRE 239 Processing Technology

A study of the sizing and selection of equipment and systems for the food and fiber processing industry. Introduces pumps, fans and their systems in relation to the basics of fluid mechanics, aid ventilating and drying systems in relation to the psychometric properties of air vapor mixtures. Considers the principles of materials handling and handling systems. Introduces the theory and application of refrigeration and air conditioning. Prerequisites: MAT 122 & PHY 111, PHY 112. Lec 2, Lab 2. Cr 3.

##### BRE 241 Energy and Society

Basic concepts of energy and power including energy sources and their limitations, demands for energy, forms in which we use it, and reasons for shortages. Examines energy conversion, storage, and transport, and their effects on environment, as well as energy conservation and future use. Lec 2, Lab 2. Cr 3.

##### BRE 242 Metals and Society

A study of metals technology in society, past and present, including the scope of our metallic resources, mining and concentration methods, extraction, refining, and fabrication. Covers recycling and environmental effects properties of metal, alloying and heat treating, and welding as a fabrication method. Electric arc and gas welding instruction is provided. Lec 2, Lab 2. Cr 3.



**BRE 248 Engineering For A Sustainable Agriculture**

Study of the applications of engineering technology to sustainable agriculture. Emphasis will be on the use of energy, internal combustion engine power, mechanized implements, buildings, and soil and water resources with attention given to reducing inputs, maximizing returns, and providing for low environmental impact. Prerequisites: PHY 111 or equivalent, PSE 100. Lec 3. Cr 3.

**BRE 255 Materials in Bio-Resource Engineering**

Introduction to physical and mechanical properties of structural and biological material useful in agricultural and forest engineering design and application. Prerequisite: PHY 121 or permission of instructor. Lec 2, Lab 2. Cr 3.

**BRE 257 Computer Applications in Bio-Resource Engineering**

An introductory programming course using the FORTRAN language. Program exercises are selected to illustrate numerical techniques important in engineering and are done on either the mainframe or microcomputer. Introduces use of microcomputers, data files, graphic input and output devices, editors, wordprocessors and spreadsheets. Prerequisite: MAT 126. Lec 2, Rec 2. Cr 3.

**BRE 268 Computer Aided Drafting and Design**

An introductory computer aided drafting course using the VERSACAD two and three dimensional software package on microcomputers. Drawings produced are plotted on either ink pen plotter or line printer. Additional topics include: Computer Aided Design and Computer Aided Manufacturing in industry, microcomputer use, graphic input and output devices. Prerequisite: GEE 101. Lec 1, Rec 1, Lab 3. Cr 3.

**BRE 281 Elementary Plane Surveying**

Designed to help the student understand the concepts and develop the skills necessary for basic surveying. Lec 1. Cr 1.

**BRE 282 Introduction to Bio-Resource Engineering Research**

Introduces engineering experimentation involving biological material. Primarily for sophomores majoring in bio-resource engineering. Lec 1, Lab 2. Cr 2.

**BRE 298 Special Topics in Bio-Resource Engineering**

Studies are offered in hydraulic power systems, surveying techniques and advanced welding and design. Also available as a five week block course. Transcript will show area of study. Cr Ar.

**BRE 343 Energy-Efficient Housing**

An examination of mankind's efforts to develop shelter, covering determination of a family's housing needs, selection and utilization of a home site, selection of materials, structural design of framing components, heating systems,

insulation, water systems, electrical systems, and estimations of construction costs. Lec 3. (C.E.D. only). Cr 3.

**BRE 380 Senior Seminar**

Problems associated with professionalism and the first employment of the young agricultural engineer. Lec 1. Cr 1.

**BRE 396 Field Experience in Bio-Resource 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. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

**BRE 452 Fluid Power and Robotics**

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. Introduces robotics, robot kinematics, coordinate frame transformations, path description and planning. Laboratory work includes design and test of fluid power systems including computer control and programming the motion of a jointed manipulator. Prerequisite: Dynamics, Fluid Mechanics, Differential Equations and Circuit Theory, Junior Standing or permission. Rec 2, Lab 3. Cr 3.

**BRE 460 Power and Machinery**

A design course for engineering majors covering design considerations of heat engines; power requirements and capacities of machinery; interactions between power units, implements and the ground. Prerequisite: MEE 230. Lec 2, Lab 3. Cr 3.

**BRE 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. Prerequisites: MEE 251 and MEE 360 (or CIE 350). Lec 2, Lab 3. Cr 3.

**BRE 463 Structures and Environmental Design**

Fundamentals of heat transfer, psychrometrics, ventilation, animal energetics, waste handling, atmospheric properties required for storage of biological products. Basic structural design of buildings. Applications to the design of animal and plant production and product storage structures. Prerequisite: MEE 251. Lec 2, Lab 3. Cr 3.

**BRE 464 Instrumentation and Control Systems**

Analysis of dynamic measurement and control systems, involving temperature, force, content, strain, and fluid flow measurements in physical and biological systems. Prerequisite: PHY 122 and MAT 228 or permission. Lec 2, Lab 2. Cr 3.

**BRE 465 Soil and Water Resources Engineering**

Engineering analysis for and design of systems for maintaining environmental water quality and soil productivity in agricultural and forested watersheds. Includes nutrient cycling and natural systems for water pollution control, soil waterplant relationships and engineering design of soil/water management systems. Prerequisite: CIE 350 or MEE 360. Lec 2, Lab 3. Cr 3.

**BRE 466 Irrigation and Water Supply Design**

Examines the environmental factors influencing plant growth with an emphasis on water, soil water retention and movement, irrigation system design and management, analysis and design of surface water and groundwater supply systems, environmental impacts of agricultural water management. Prerequisite: BRE 465 or permission of instructor. Lec 2, Lab 2. Cr 3.

**BRE 469 Process Engineering**

Analysis and design of unit operations such as size reduction, separation, heating, drying, refrigeration, and their applications to agricultural processing. Prerequisite: MEE 230 and MEE 360 or CIE 350 (may be taken concurrently). Lec 2, Lab 2. Cr 3.

**BRE 491 Design Project I**

The first of a three-course sequence which gives a supervised design experience to upperclass BRE and FOE majors, including lectures on design procedures and topics. The student will be required to choose a design project and project advisor during the semester. Lec 1. Cr 3.

**BRE 492 Design Project II**

The second of a three-course sequence which gives a supervised design experience to upperclass BRE and FOE majors. Taught as a tutorial. Each student will carry out a design project in his or her field of interest. Lab 6. Cr 3.

**BRE 493 Design Project III**

The third of a three-course sequence which gives a supervised design experience to upperclass BRE and FOE majors. The student is required to prepare a written report suitable for submission to the ASAE engineering design competition and to deliver a one hour seminar on the project. Rec 1. Cr 3.

**BRE 497 Special Problems in Bio-Resource Engineering**

Independent study. Cr Ar.

**BRE 550 Simulation of Biological and Physical Systems**

An introduction to modeling and simulating real life, time dependent, continuous systems. Examples from physiology, economics, water management, plant growth, population dynamics, and other fields are simulated on the digital computer using Fortran and 360/CSM. Prerequisite: MAT 126 or equivalent, elementary Fortran. Lec 3. Cr 3.



## Bachelor of Science in Bio-Resource Engineering Technology

The Bachelor of Science in Bio-Resource Engineering Technology is offered by the faculty of the Department of Bio-Resource Engineering.

The curriculum provides training in specific aspects of engineering technology together with instruction in business, economics, computing and accounting. It is designed to prepare graduates for jobs in the application of equipment, systems and technologies to the production, processing, shipping, storage and handling of food and fiber products from agriculture, forestry, fisheries and aquaculture.

Graduates will find employment as managers or maintenance supervisors of production and processing facilities, technical representatives for machinery and equipment companies, and support, testing or installation personnel for manufacturers, material suppliers, processors, contractors and primary producers.

This degree requires satisfactory completion of at least 124 degree hours at an accumulative grade point average of not less than 2.0 in a course of study which conforms to the following curriculum.

Graduates of the associate degree programs in the College of Engineering who are qualified for transfer into baccalaureate programs may transfer up to 60 credits for courses in which they have received a grade of "C" or better. Two additional years will be required to complete the degree of Bachelor of Science in Bio-Resource Engineering Technology.



### Curriculum for B.S. Degree in Bio-Resource Engineering Technology

First Year			
Fall Semester		Spring Semester	
BRE 268 Computer Aided Drafting and Design	3	BRE 229 Basic Shop Techniques	2
ENG 101 English Composition	3	COS 100 Introduction to Personal Computers	3
ASA 117 Issues and Opportunities	1	MAT 164A Analytical Geometry and Introductory Calculus	3
INT 110 Modern Economic Problems	3	SPC 103 Fundamentals of Public Communications	3
MAT 142A Algebra & Trigonometry	3	PHY 112 General Physics II	4
PHY 111 General Physics I	4	OR	
OR		PHY 108 Basic Physics	4
PHY 107 Basic Physics	4	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>17</b>		
Second Year			
Fall Semester		Spring Semester	
BRE 220 Introduction to Bio-Resource Engineering	3	EET 210 Circuits, Machines, and Electronics	4
ARE 138 Agribusiness Accounting I	3	ENG 317 Technical Writing	3
BCH 207 Fundamentals of Chemistry	4	MET 150 Statics	3
MAT 246A Introductory Calculus	4	Humanities Electives	3
<b>TOTAL HOURS</b>	<b>14</b>	Technical Electives	3
		<b>TOTAL HOURS</b>	<b>16</b>
Third Year			
Fall Semester		Spring Semester	
BRE 235* Water Supply and Waste Management	3	BRE 236* Power	3
BRE 281 Elementary Plane Surveying	1	BRE 237* Automation and Process Control	3
MET 233 Thermodynamics	3	BRE 238* Electrification	3
MET 219 Strength of Materials	3	MET 355 Materials	3
Humanities Elective	3	Technical Elective	3
Technical Elective	3	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>16</b>		
Fourth Year			
Fall Semester		Spring Semester	
BRE 231* Processing Machinery	3	BRE 232* Buildings and Environment	3
BRE 233 Fluid Power Technology	3	BRE 239* Processing Technology	3
BRE 380 Senior Seminar	1	Humanities Elective	3
BUA 220 The Legal Environment of Business	3	Technical Elective	3
Technical Elective	3	Technical Elective	3
Technical Elective	3	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>16</b>		

**TOTAL CREDIT FOR GRADUATION: 124**

\* These courses are taught alternate years so may be taken in either the third or fourth years.



## Entomology

Professors Forsythe (Chairperson)

Professors Dimond, K.E. Gibbs, Osgood, Storch

Associate Professor Alford

Assistant Professors Drummond, Groden

Cooperating Professors Bentley, A. Bushway, R. Bushway

Cooperating Educator Dill

Faculty Associates Jennings, Mairs

Emeritus Professor Simpson

Entomology is the study of insects, which are the most abundant animals on earth, both in number of individuals and in number of known species. Besides being fascinating organisms from a biological point of view, they are extremely useful test animals for studying basic biological phenomena. Of major importance is the fact that insects can create major problems for humans. They can transmit serious diseases, consume our crops and other plants, feed on livestock and wreck havoc with our homes and other possessions. Directly, or indirectly, insects have an impact on every man, woman and child in the world.

Students who wish to pursue studies in Entomology have various options available to them at the University of Maine. One option is to enter the B.S. degree program in Natural Resources and major in the concentration of Environmental Entomology, which is a broad-based program of study. A second option, which includes Entomology as a major component, is to concentrate studies in Plant Protection within the B.S. degree program of Sustainable Agriculture. A third option is to obtain a B.S. in Natural Resources, Sustainable Agriculture, or Biology and enter the M.S. degree program in Entomology. For most people engaged in the profession of Entomology, graduate training is necessary.

### Courses in Entomology

#### ENT 220 Insects, Science and Society

Designed to acquaint the non-biology major with human dependence on and interactions with insects and their close relatives. Insect structure, biology, effects on human health and food supplies, and control strategies are discussed. Offered without lab. Lec 3. Cr 3.

#### ENT 305 Problems in Entomology

Open to juniors and seniors in any college who have special interest and qualifications in entomology. Cr Ar.

#### ENT 326 Introductory Entomology

Fundamental principles of insect life and the relation of insects to plants, animals, and human. Laboratory includes a study of structure, and systematics. An insect collection is required. Prerequisite: BIO 100. Lec 2, Lab 4. Cr 4.

#### ENT 328 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. Prerequisite: BIO 100. Lec 2, Rec 1, Lab 2. Cr 4.

#### ENT 449 Insect Pest Management

Examines the basic principles involved to reduce populations of pest insects. Biological, chemical, and other population suppression methods based on ecological considerations and systems management. Laboratory includes independent study, demonstrations, and selected readings of special topics. Prerequisite: ENT 326, INT 256 or ENT 328. Lec 2, Lab 2. Cr 3.

#### ENT 460 Insect Biology and Taxonomy

Introduction to the orders and families of insects: their characteristics, evolution and biology. Laboratory emphasis is on identification of lower orders and Coleoptera. Prerequisite: ENT 326, INT 256 or ENT 328 Lec 2, Lab 2. Cr 3.

#### ENT 461 Insect Biology, Taxonomy and Systematics

Characteristics and biology of Lepidoptera, Diptera, and Hymenoptera and the principles of modern systematics. Laboratory deals exclusively with the identification of native and exotic specimens within those three orders. Prerequisite: ENT 326, INT 256 or ENT 328. Lec 2, Lab 2. Cr 3.

#### ENT 505 Problems in Entomology Cr Ar.

#### ENT 511 Insect Ecology

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

#### ENT 530 Aquatic Entomology

Aquatic stages of freshwater insects including distribution, biology, ecology and adaptation. Emphasis on insect roles as food sources for fish and waterfowl and indicators of water quality. Prerequisite: introductory entomology course or permission. Lec 2. Cr 2.

#### ENT 531 Aquatic Entomology, Laboratory

Emphasizes identification and sampling methods. Field trips and collection required. Prerequisite: introductory entomology course or permission. Lab 4. Cr 2.

#### ENT 561 Seminar and Entomological Literature

Required for first year graduate students. The use of library indexes in manuscript preparation for scientific publication and methods of preparing materials for the presentation of biological data. Students conduct a review of entomological literature on assigned topics and present findings. Cr 2.

#### ENT 562 Seminar

Students conduct a review of entomological literature on assigned topics and present their findings. Subject area of seminar varies each semester. Course can be repeated for credit. Cr 1.

#### ENT 570 Morphology, Physiology and Behavior of Insects I

Investigates the fundamental principles of insect systems in terms of structure and function. Includes laboratory exercises. Prerequisite: ENT 326 or ENT 328 or permission. Cr 1-3.

#### ENT 571 Morphology, Physiology and Behavior of Insects II

Investigates the fundamental principles of insect systems in terms of behavior patterns and physiological processes for the survival of individuals and populations. Includes laboratory exercises. Prerequisite: ENT 570 or permission. Cr 1-3.

### Interdisciplinary Courses

#### INT 256 (ENT, FTY, PBP) Forest Protection

Principles of forest protection involving disease insects and fire with emphasis on understanding the identification, ecology, and control of tree pests. Prerequisites: Plant Biology Elective, BOT 233 or BOT 464. Lec 3, Lab 1. Cr 4.

#### INT 450 (ENT, PBP, PSE) Agricultural Pest Ecology

An examination of the intrinsic and extrinsic principles of weed, plant disease, and insect pest interrelationships. Emphasis on integrated pest management strategies and crop ecosystems.



tem models. Prerequisites: An introductory course in two of the three pest sciences-PSE 403, BOT 457, or ENT 326, ENT 328, INT 256 or permission. Lec 3. Cr 3.

**INT 482 (ENT, FOS, 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. Prerequisites: One semester of biology and one semester of chemistry; juniors and above. Lec 3. Cr 3.

**INT 555 (ENT, PBP) Pest-Plant Interactions**  
Physiological and genetic systems involved in pathogenesis, insect feeding, and host plant resistance, including plant breeding practices and

strategies for disease and insect control. Prerequisite: genetics and biochemistry or permission. Cr 3.





## Food Science

Professor A. Bushway (Chairperson)  
Professors R. Bushway, Slabyj  
Assistant Professor Schroeder, Camire

The Department of Food Science participates in the interdisciplinary program leading to a Bachelor of Science in Food Industry Systems.

This program consists of three concentrations (1. Food Science; 2. Food Industry Management; 3. Food Processing and Processing Technology), all of which require students to take courses offered by the Department of Food Science.

The Food Science concentration meets the Institute of Food Technologists guidelines for a B.S. degree in Food Science which allows students to apply for national scholarships funded by multinational food companies.

The Department of Food Science offers the Master of Science degree in Food Science while a Doctor of Philosophy may be earned in Food and Nutritional Sciences.

### Courses in Food Science

#### FOS 203 Science of Food

Separates food facts from fantasies through examination of the physical and chemical properties and nutritional content of food, as well as the process from harvest to consumption. Emphasis on food safety, food additives and new technologies. Lec 3. Credit not given for food science majors. **Cr 3.**

#### FOS 298 Independent Studies

Independent studies in restricted areas of food science: (1) special topics, (2) food chemistry, (3) food spoilage and fermentation, (4) food processing, (5) quality evaluation (6) food biochemistry. Prerequisite: Permission of department. **Cr Ar.**

#### FOS 301 Introduction to Food Science

Examines the scope of the food manufacturing industry, processing principles and practices. Current issues include food safety, food additives, new processing technologies and federal and state regulations are discussed. Lec 3. **Cr 3.**

#### FOS 350 Food Process Sanitation

Significance of sanitation in present day food processing plants. Implementation and maintenance of proper sanitation practices. Micro-

bial growth, food-borne diseases and pest control. Food laws and regulations. Lec 3. **Cr 3.**

#### FOS 396 Field Experience in Food Science

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. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). **Cr 1-16.**

#### FOS 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. Prerequisites: MCB 300 and MCB 301. Lec 3, Lab 4. **Cr 4.**

#### FOS 489 Senior Project in Food Science

A laboratory research project will be conducted under the supervision of a faculty member. Written reports and an oral presentation of results are required. Prerequisite: senior standing. **Cr 2.**

#### FOS 502 Food Processing I

Thermal processing, freezing, dehydration, and curing and smoking as applied to food production. Examines the effect of processing on quality as measured by chemical, microbiological, physical and sensory methods. Prerequisite: permission of instructor. **Cr 4.**

#### FOS 503 Food Processing II

Pasteurization, refrigeration, freeze drying, extrusion technology, chemical preservation and irradiation in the food industry. Examines the effect of processing on quality as measured by chemical, microbiological, physical and sensory methods. Prerequisite: permission of instructor. **Cr 4.**

#### FOS 513 Microbiology of Food Fermentations

Introduction to fermentation technology as it applies to foods. Microbiology and biochemistry of food fermentations and applications of biotechnology to this field. Topics include: dairy, meat and vegetable fermentations, indigenous fermentations. Prerequisites: FOS 438, BCH 451 or permission. **Cr 3.**

**FOS 571 Food Science Graduate Seminar**  
Review of literature, presentation of techniques, procedures and results in food science research. **Cr 1.**

#### FOS 581 Problems in Food Science

Special topics - Opportunity is provided to pursue an individualized topic in the food science area. **Cr Ar.**

#### FOS 582 Food Chemistry

Chemical changes that occur in food during processing and storage and the use of modern analytical instrumentation (GC and HPLC) to detect these changes. **Cr 4.**

#### FOS 583 Microbial Ecology of Foods

Control of microorganisms in food by temperature, UV light, ionizing radiation, water activity, pH, redox potential, organic acids, curries, salts, antibiotics, gases and packaging and processing equipment by sanitation. Instruments used for rapid estimation of bacterial concentration and application of commercial testing kits. Prerequisite: MCB 300, MCB 301 and permission. **Cr 4.**

#### FOS 585 Sensory Evaluation of Foods

Methods and techniques including experimental design and statistical analysis. Prerequisite: MAT 232 or permission. **Cr 4.**

#### FOS 586 Food Biochemistry

A study of biochemical changes that occur in food during processing and storage. **Cr 4.**

#### FOS 587 Food Analysis

Methods used to analyze food including nutrient composition and natural toxicants. Use of modern analytical instrumentation (GC and HPLC) is stressed. **Cr 4.**

### Interdisciplinary Course

#### INT 482 (ENT, FOS, PSE) Pesticides and the Environment

Study of the properties of pesticides and their fate in the environment. Includes application of technology, governmental regulations, and environmental concerns. Prerequisites: One semester of biology and one semester of chemistry for juniors and above. Lec 3. **Cr 3.**



## Plant, Soil, and Environmental Sciences

Professor Fernandez (Chairperson)

Professors Glenn, Smagula

Associate Professors Goltz, Langille, Mitchell, Reeves, Stack, Zibilske

Assistant Professors Cappiello, Erich, Liebman, Ohno, Porter, Schupp, Wiedenhoef

Senior Soil Scientist Rourke

Faculty Associates Clapham, Honeycutt, Kalloch, LaFlamme, Litton, Merrick, Rustad

### Bachelor of Science in Landscape Horticulture

The Bachelor of Science in Landscape Horticulture is offered by the faculty of the department of Plant, Soil, and Environmental Sciences. In this program, students with a natural curiosity and enthusiasm for plant science have the opportunity to study landscape design and maintenance, greenhouse/nursery operations, and herbaceous/woody plant material. In addition, students take courses in basic sciences, communications, business management, and liberal arts. Landscape horticulture graduates have the opportunity to select from a wide range of job opportunities. Examples of recent job openings are landscape consultant, landscape designer, public garden administrator, grounds superintendent, golf course superintendent, garden center manager, nursery foreman and landscape gardener. A number of graduates now own businesses within the landscape horticulture industry. Employment opportunities are available both in and outside the state of Maine.

Positions in teaching, research, and extension may require training beyond the B.S. degree. The program provides a background that will allow students to pursue graduate programs in landscape architecture, ornamental horticulture, floriculture and horticultural therapy. For information call (207) 581-2918 OR (207) 581-2938.

### Curriculum in Landscape Horticulture

#### Landscape Horticulture Professional Courses

PSE 110 Horticulture	3
PSE 120 Herbaceous Landscape Plants	3
PSE 124 Greenhouse Management	4
PSE 126 Agrostology	3
PSE 127 Landscape Construction	3
PSE 140/141 Soil Science/Laboratory	4
PSE 221 Woody Landscape Plants I	3
PSE 222 Woody Landscape Plants II	3
PSE 223 Nursery/Garden Center Operations	3
PSE 225 Landscape Graphic Communication	3
PSE 328 Landscape Design	3
PSE 370 Senior Seminar in PSE	2

PSE 410 Plant Propagation	3
PSE 425 Landscape Management	3
PSE 428 Landscape Design Problems	3
PSE 440 Soil Chemistry and Plant Nutrition	4
<b>TOTAL HOURS</b>	<b>50</b>

#### Basic Sciences

BIO 100 Basic Biology	4
CHY 111/112 General Chemistry OR	8
BCH 207/208 Fundamentals of Chemistry	8
COS 100 Introduction to Personal Computers	3
MAT 122 Algebra and Trigonometry, Pre-Calculus	4
<b>TOTAL HOURS</b>	<b>19</b>

#### Professional Supporting Courses

BOT 201/202 Plant Biology	4
BOT 452/453 Plant Physiology	4
BOT 457 Plant Pathology	4
BOT 464 Taxonomy of Vascular Plants	4
ENT 328 Introductory Applied Entomology	4
<b>TOTAL HOURS</b>	<b>20</b>

#### Communications

ENG 101 College Composition	3
ENG Literature Course*	3
ENG 317 Advanced Professional Exposition	3
SPC 103 Fundamentals of Public Communication	3
<b>TOTAL HOURS</b>	<b>12</b>

#### Humanities and Social Sciences

Minimum Hours	15
(Free Electives) Minimum Hours	6
ASA 117 Issues and Opportunities	1
<b>TOTAL HOURS</b>	<b>22</b>

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

#### Supporting Electives

BRE 268 Computer Aided Drafting and Design	3
ARE 138 Agribusiness Accounting	3

\*Recommended choices: ENG 120, 121, 122, 123, 235.

ARE 454 Introduction to Production Economics	3
ART 101 Drawing I	3
ART 111 Basic 2-D Design	3
ART 121 Basic 3-D Design	3
BOT 203 The Plant Kingdom	4
BOT 435 Plant Anatomy	4
ENT 449 Economic Entomology	3
INT 110 Modern Economic Problems	3
INT 482 Pesticides and the Environment	3
PSE 144 Soil and Water Conservation	3
PSE 146 Land Use Planning--Soil Aspects	2
PSE 248 Soil Organic Matter and Fertility	4
PSE 397 Problems in Plant, Soil and Environmental Sciences	Ar
PSE 429 Park Planning and Design	3

### Courses in Plant, Soil and Environmental Sciences

#### PSE 100 Plant Science

Response of agricultural crops to environmental factors such as moisture, temperature, light and soil fertility. Effects of weeds, diseases and insect pests on plant growth are also discussed. Prerequisite: BIO 100 or permission. 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. Prerequisite: PSE 100 or permission. Rec 4. **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. Rec 3. **Cr 3.**

#### PSE 110 Horticulture

General horticultural principles and practices as related to fruits, vegetables and ornamentals.



Emphasis on biological, environmental and cultural aspects of horticulture. Rec 3. Cr 3.

#### **PSE 120 Herbaceous Landscape Plants**

The principles and practices of growing and using herbaceous plants in the landscape. Emphasis on identification, selection, landscape use and plant culture. Rec 2, Lab 2. Cr 3.

#### **PSE 124 Greenhouse Management**

Management of greenhouse facilities and production of floricultural crops. Emphasis on structures, management, crop production and marketing. Rec 3, Lab 2. Cr 4.

#### **PSE 126 Agrostology**

The identification, establishment, fertilization, mowing, pest control, and soil requirements of grasses suitable for use on lawns, golf courses, athletic areas, cemeteries, parks and low maintenance areas. Rec 3. Cr 3.

#### **PSE 127 Landscape Construction**

An introduction to the functional and aesthetic properties of construction materials. Construction methods used in common landscape construction practice. Covers grading, drainage, retaining walls, tree wells, stairs, terraces, decks, visual screens, fences, paving materials and site structures. Prerequisite: PSE 110. Studio 2, Rec 2. Cr 3.

#### **PSE 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. Prerequisites: Permission. Lab 2. (Pass/Fail Grade Only). Cr 1.

#### **PSE 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. Prerequisite: Permission. Lab 2. (Pass/Fail Grade Only). Cr 1.

#### **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. Prerequisite: CHY 111 or BCH 207. Rec 3. Cr 3.

#### **PSE 141 Soil Science Lab**

A series of practical laboratory exercises providing hands-on experience with soil measurements and information use. Cr 1.

#### **PSE 143 Tropical Agriculture**

Considers the characteristics and problems of the soils, plants, and animals of the tropics. Explores programs and methods for stimulating their potential productivity. Rec 3. Cr 3.

#### **PSE 144 Soil and Water Conservation**

Management of soil and water resources in accordance with multiple use concepts, problems of erosion and water pollution. Rec 2. Cr 2.

#### **PSE 146 Land Use Planning-Soil Aspects**

A consideration of basic soil characteristics and properties as they influence land use and aid local and regional planning. Rec 2. Cr 2.

#### **PSE 150 Forest Soil Science**

Fundamentals of soil science including development, properties, and management of soils and the interrelationships of soils to forest growth. Prerequisite: CHY 111. Rec 2, Lab 2. Cr 3.

#### **PSE 160 Environmental Issues: The Atmosphere**

An exploration of the science and societal impact of topics involving the atmosphere and all inhabitants of earth. Rec 3. Cr 3.

#### **PSE 221 Woody Landscape Plants I**

The study of woody plants suitable for landscape use in New England. Emphasis on plant identification and general characteristics. Prerequisite: PSE 110, equivalent or permission. Lec, Lab 2. Cr 3.

#### **PSE 222 Woody Landscape Plants II**

A study of the aesthetic qualities, culture and maintenance requirements of woody landscape plants through field trips and extensive hands-on lab sessions. Prerequisite: PSE 110, equivalent or permission. Lec 2, Lab 2. Cr 3.

#### **PSE 223 Nursery/Garden Center Operations**

The principles and practices of plant propagation, production, marketing and sales as seen from the landscape horticulture industry perspective. Emphasis on production systems and nursery/garden center business management. Prerequisites: PSE 110, equivalent or permission; PSE 140. Lec 2, Lab 2. Cr 3.

#### **PSE 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. Prerequisite: PSE 110, equivalent or permission. Studio 6. Cr 3.

#### **PSE 248 Soil Organic Matter and Fertility**

Fundamental aspects of soil organic matter management. Principles of plant residue decomposition and the environmental and agricultural implications of human intervention in this process. Prerequisites: CHY 111, CHY 112; PSE 140. Lec 3, Lab 1. Cr 4.

#### **PSE 328 Landscape Design**

The principles of landscape design as applied to design analysis, circulation, land forms, construction, planting design, specifications, estimating and presentation. Also considers the application of design. The aesthetic, functional and horticultural principles of the composition of the planted landscape and the development of landscape plans. Prerequisite: PSE 120, PSE 221, PSE 222 and PSE 225. Lec 2, Lab 2. Cr 3.

#### **PSE 370 Senior Seminar in Plant, Soil, and Environmental Sciences**

Review of literature, problems, and research related to plants, soils and the environment. Rec 1. Cr 1.

#### **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. Prerequisite: junior standing and permission (Pass/Fail Grade Only). Cr 1-16.

#### **PSE 397 Problems in Plant, Soil, and Environmental Sciences**

Opportunity is provided for specialization in specific areas of plant, soil and environmental sciences. Prerequisite: permission. Cr A.

#### **PSE 401 Advanced Crop Management**

Production practices for specific agricultural crops important to Maine. Students may register for one or more of the following sections: (001) Fruits. Scientific principles and practice used in the production of fruit crops. The culture of fruits adapted to the Northeast with emphasis on apples and blueberries. (002) Vegetables. The characteristics and culture of important vegetable crops. Considers their adaptation to local soil and climatic conditions. (003) Forages. The practices important in grazing management, and cultivation of forage grasses, legumes, and silage corn. Covers the principles of forage preservation. (004) Potato Production practices of potatoes for tablestock processing and seed. Prerequisite: PSE 100 or PSE 101 or permission. Cr 3.

#### **PSE 403 Principles of Weed Control**

Principles and practices of controlling weeds in agricultural crops and in non-crop areas. Emphasis on chemical methods. Covers herbicide functions, equipment and recommendation for use. Prerequisites: BIO 100 and PSE 100 or permission of instructor. Rec 3. Cr 3.

#### **PSE 410 Plant Propagation**

Principles and methods involved in the propagation of herbaceous and woody plants by seed, division, layering, cutting, budding, grafting and tissue culture. Prerequisites: BOT 453 and BOT 452 or permission. Rec 2, Lab 2. Cr 3.

#### **PSE 425 Landscape Management**

The principles and practices of operating a landscape maintenance landscape contractor business. Includes setting up a new business, site analysis, labor analyses, bidding and estimating, development of maintenance plans and contracts, and customer/employee relations. The student will integrate previous experience and instruction in plant materials, landscape design, soil management and general horticultural principles. Prerequisite: Senior standing in LHC or permission. Lec 2, Lab 2. Cr 3.



**PSE 428 Landscape Design Problems**

Theory and practice of landscape design as are applied to common environmental problems. Emphasis is on exposure and awareness in the area of landscape design. Prerequisites: PSE 120, PSE 221, PSE 222, PSE 225 and PSE 328. Rec 2, Lab 2. Cr 3.

**PSE 429 Park Planning and Design**

Basic planning and design principles of space, scale and circulation applied to recreation areas and park facilities with special emphasis on visitor use. Prerequisite: PSE 221, PSE 222 or BOT 233. Rec 2, Lab 2. Cr 3.

**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. Major emphasis on agronomic systems; depending on student interest discussion may include horticultural crops and forest ecosystems. Prerequisite: PSE 140 or PSE 150 and CHY 112 or CHY 114 or BCH 207. Lec 3, Lab 3. Cr 4.

**PSE 442 Soil Taxonomy**

Taxonomy and classification of soils. Prerequisites: PSE 140 or PSE 150 and GES 101, GES 541; junior, senior or graduate standing. Rec 2, Lab 3. Cr 3.

**PSE 444 Soil Morphology and Soil Mapping**

Soil profile description and soil map construction taught in an intensive 3 week course. Prerequisites: PSE 140 or PSE 150, PSE 442. Lab 6. Cr 3.

**PSE 445 Agricultural Ecology**

An examination of inter-related biological, technological and socio-economic factors affecting agricultural production and sustainability in developed and developing countries. Extensive reading, oral presentations, and a written project are required. Prerequisites: PSE 105 or permission. Cr 3.

**PSE 448 Soil Microbiology**

Soil-inhabiting microorganisms and the important processes they mediate including organic matter decomposition, transformations and cycling of nitrogen, sulfur, phosphorus and other elements. Prerequisite: BCH 221 or permission. Rec 3, Lab 2. Cr 4.

**PSE 451 Physics of the Plant Environment**

An intensive study of the above and below ground physical environment of local plants and animals. Prerequisites: PHY 111 and PHY 112, MAT 151 or permission. Rec 4. Cr 4.

**PSE 477 Advanced Studies in Crop Science I (Study Area)**

Comprehensive study of basic practices in production of agricultural crops. Discussion of selected readings. Register for one or more of optional areas, including (1) apple production, (2) forage management, (3) potato production, (4) sustainable agriculture. Prerequisite: PSE 100 or PSE 101 or permission. Cr 3.

**PSE 479 Crop Physiology**

Bridges the gap between ecology and process physiology. Focus on the integration of various processes to produce the response shown by whole plants when grown as a community. Prerequisites: PSE 100, BOT 452 or permission. Rec 3, Lab 1. Cr 4.

**PSE 501 Plant Growth Regulators**

Concepts and techniques of plant growth and development with emphasis on phytohormones and synthetic growth substances in relation to economic plants. Prerequisite: BOT 452. Rec 2, Lab 2. Cr 3.

**PSE 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. Prerequisites: BOT 452 and BOT 453 or permission. Rec 2, Lab 2. Cr 3.

**PSE 509 Experimental Design**

Principles of research in biological sciences, design of experiments, statistical analysis and interpretation of data. Rec 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. Prerequisite: INT 419 or permission. Cr 3.

**PSE 546 Chemistry of Soils**

Covers composition and chemical transformation in soils, soil-solution equilibria considerations, soil profile development, and ion-exchange phenomena in soils. Prerequisites: PSE 140 or PSE 150 and CHY 240 or permission. Rec 2, Lab 4. Cr 4.

**PSE 548 Rhizosphere Microbiology**

A study of microbial activities, excluding pathogenesis, in the plant root environment. Prerequisite: PSE 448 or permission. Rec 3, Lab 3. Cr 4.

**PSE 551 Environmental Biology Measurement Methods**

Research techniques and methods to determine the local physical environment of plants and animals. Prerequisites: PHY 111 and PHY 112, MAT 152 or permission. Lec 2, Lab 2. Cr 3.

**PSE 570 Graduate Seminar in Plant, Soil, and Environmental Sciences**

Student presentations of literature reviews, research, methodology and research progress before a critical audience of peers and faculty. Cr 1.

**PSE 597 Special Topics in Plant, Soil, and Environmental Sciences**

Advanced study of plant and soil related topics. Prerequisite: permission. Cr Ar.

**Interdisciplinary Courses****INT 323 (BIO, NRC, PBP, PSE, WLM, ZOL)****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 socio-economic and political matrix in which conservation problems must be solved. Prerequisite: BIO 100. Cr 3.

**INT 444 (ARE, PSE) Integrated Farming Systems**

Designed to be a capstone to the Sustainable Agriculture Program, this course requires students, in conjunction with faculty, to integrate their knowledge of the physical, economic, social and philosophical aspects of sustainable agricultural production. Prerequisites: PSE 100, PSE 140, ARE 148, and ARE 453 or equivalents. Lec 3, Lab 1. Cr 4.

**INT 450 (ENT, PBP, PSE) Agricultural Pest Ecology**

An examination of the intrinsic and extrinsic principles of weed, plant disease, and insect pest interrelationships. Emphasis on integrated pest management strategies and crop ecosystem models. Prerequisites: An introductory course in two of the three pest sciences-PSE 403, BOT 457, or ENT 326, ENT 328, INT 256 or permission. Lec 3. Cr 3.

**INT 482 (ENT, FOS, 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. Prerequisites: One semester of biology and one semester of chemistry; juniors and above. Lec 3. Cr 3.



## Interdisciplinary Programs of Study

### Bachelor of Science in Aquaculture

The Bachelor of Science in Aquaculture is an interdisciplinary program offered cooperatively by the faculties in the departments of Bio-Resource Engineering, Animal, Veterinary and Aquatic Sciences, and Agricultural and Resource Economics.

The Aquacultural program is designed for students interested in the culture and production of marine animals as commercial food products. It is based on the understanding that the principles of production for commercial livestock and poultry are equally applicable to the controlled production of marine animals. The program of study offers 3 areas of emphasis.

Aquaculture is a growing industry worldwide. In 1985 over 10% of the world's total fish and shellfish landings were from culture production. By the year 2000, aquaculture is expected to be responsible for 25% of total production. Success in aquaculture demands scientific knowledge of economic, biological and environmental characteristics of the Maine coast. This program offers three main emphasis areas; Aquaculture Technology, Aquaculture Science, and Aquaculture Business Management and Marketing. Students will receive a well-rounded education in mathematics, physical and biological sciences, economics and business as well as humanities and social sciences.

Graduates will be prepared for technical and supervising positions in the growing aquaculture industry and will also be prepared to pursue advanced degrees in related fields, particularly the pending graduate program in Marine Bio-Resources at Orono.

#### Concentrations

##### Aquaculture Technology

Students will receive their course concentration in the Department of Bio-Resource Engineering. Courses such as Introduction to Engineering Design, Processing Technology, Materials in Bio-Resource Engineering, Buildings and Environment and Aquaculture Engineering Technology will be taken.

##### Aquaculture Science

Courses with a biological emphasis are included in this concentration. Fish Health, Aquaculture, Shellfisheries Biology, Animal Nutrition, Invertebrate Biology and Animal Genetics are a sample of courses to be taken.

##### Aquaculture Business Management and Marketing

This concentration provides a background in applied economics and business. Accounting, Resource Business Management, Resource Based Business Finance and Natural Resource

Economics and Policy are a sample of courses to be taken.

#### Curriculum in Aquaculture

ASA 117 Issues and Opportunities 1

##### Foundations Courses

AVA 220 Introduction to Marine Resources 2  
Total Hours 2

##### Communications

ENG 101 College Composition 3  
SPC 103 Public Speaking 3  
ENG 317 Technical Writing 3  
Total Hours 9

##### Humanities and Social Science

INT 110 Modern Economic Problems 3  
OR  
ARE 148 Principles of Agricultural Economics 3  
Humanities and Social Science Electives\* 15

##### Quantitative and Computer Skills

MAT 114 Mathematics for Business and Economics II 3  
OR  
MAT 151 Calculus for Life Sciences I 4  
OR  
MAT 164A Analytical Geometry and Introductory Calculus 3  
MAT 215 Introduction to Statistics for Business and Economics 3  
OR  
MAT 232 Principles of Statistical Inference 3  
COS 100 Introduction to Personal Computers 3  
Total Hours 9-10

##### Aquaculture Core Courses

AVA 211 Aquaculture 3  
BIO 100 Basic Biology 4  
OCE 370 Introduction to Oceanography 3  
MCB 300 General Microbiology 3  
BRE 220 Introduction to Bio-Resource Engineering 3  
BRE 235 Water Supply and Waste Management 3  
ARE 454 Production Economics 3  
Total Hours 22

\*Electives should be chosen to address the following areas: Diversity, Western cultural tradition and social context and institutions. At least one three-hour elective must be taken in each area. One three-credit elective must be taken above the introductory level and one three-credit elective must be a literature course.

Students will complete one of the following concentrations:

##### Aquaculture Technology

BCH 207 Fundamentals of Chemistry 4  
BRE 231 Processing Machinery 3  
BRE 232 Buildings and Environment 3  
BRE 236 Farm and Forest Power 3  
BRE 238 Electrification 3  
BRE 239 Processing Technology 3  
BRE 249 Aquacultural Systems Design 3  
BRE 255 Materials of Bio-Resource Engineering 3  
BRE 268 Computer Aided Drafting and Design 3  
BRE 298 Special Topics in Bio-Resource Engineering 3  
BRE 380 Senior Seminar 1  
PHY 111/112 General Physics 8  
Total Hours 40

##### Aquaculture Science

AVA 200 Sophomore Seminar 1  
AVA 260 Animal Genetics 3  
AVA 368 Independent Study - Shellfish 2  
AVA 368 Independent Study - Finfish 2  
AVA 401 Senior Paper in Animal Science I 1-2  
AVA 402 Senior Paper in Animal Science II 1  
AVA 409 Shellfisheries Biology 3  
AVA 420 Fish Health Management 3  
AVA 462 Applied Animal Feeding 2  
AVA 467 Feeding Fish 2  
BCH 207 Fundamentals of Chemistry 4  
BCH 208 Elementary Physiological Chemistry 4  
FOS 301 Food Processing 3  
MCB 305 General Microbiology Lab 2  
ZOL 204 Animal Biology 4  
ZOL 353 Invertebrate Biology 4  
Total Hours 41-42

##### Aquaculture Business Management and Marketing

ARE 371 Introduction to Natural Resource Economics and Policy 3  
ARE 458 Agribusiness Management 3  
ARE 459 Agribusiness Finance 3  
ARE 465 Food and Fiber Marketing 3  
ARE 489 Senior Seminar 2  
BCH 207 Fundamentals of Chemistry 4  
BRE 239 Processing Technology 3  
BUA 201 Principles of Accounting I 3  
BUA 202 Principles of Accounting II 3  
FOS 301 Food Processing 3



PHY 103/104 Descriptive Physics	4
BUA and ARE Electives (to be chosen with advisor)	6
Total Hours	40
Free Electives	10-19

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

## Bachelor of Science in Food Industry Systems

The Bachelor of Science in Food Industry Systems is an interdisciplinary program offered cooperatively by the faculties in the departments of Agricultural and Resource Economics, Bio-Resource Engineering and Food Science. Contact Person: Assistant Professor Craig J. Schroeder; 101 Holmes Hall, Orono, Maine 04469. (207) 581-1621.

The program is designed to enable students to prepare for professional careers in the rapidly growing food industry or to pursue graduate training.

The B.S. in Food Industry Systems is designed to provide students with the ability to solve problems related to evaluation, engineering, preservation, safety and packaging of foods during handling, storage, processing, marketing, distribution and preparation for consumption.

The Food Industry Systems curriculum provides a strong educational background in the application of the basic sciences (chemistry, physics, biochemistry, microbiology) to food systems. The combination of engineering, food science and agribusiness with the biological and physical sciences prepares the student to effectively handle problems concerned with food safety, process engineering and technology, new product development and business management and marketing. In addition to specialized courses, the curriculum also places emphasis on helping students develop excellent communication skills.

The curriculum is composed of three concentrations, with 120 credit hours required for graduation. The concentrations (1. Food Science; 2. Food Industry Management; 3. Food Production and Processing Technology) are designed so the Food Industry Systems graduates will be well educated in the physical and biological sciences and will possess the quantitative and communication skills necessary for a successful career in the food industry. The program is also designed to allow students ample flexibility to pursue individual interests in preparing for careers or postgraduate study.

Graduates with a B.S. in Food Industry Systems find employment in the food industry in entry level technical (food process engineering, product development, business management and marketing) or supervisory (quality control

manager, processing control manager, distribution manger) positions. Government employment is available with the United States Department of Agriculture.

### Curriculum in Food Industry Systems

#### Core courses:

##### Sciences:

BIO 100 Basic Biology	4
CHY 111/112 General Chemistry	8
BRE 257 Computer Applications in Bio-Resource Engineering	3
BRE 239 Processing Technology	3
FOS 301 Introduction Food Science	3
FOS 502/503 Food Processing I & II	8
FOS 489 Senior Project in Food Science	1 OR
BRE 480 Senior Seminar	1
Total Hours	30

##### Applied Economics:

ARE 454 Introduction Production Economics	3
INT 110 Modern Economic Problems	3
Total Hours	6

##### Communications:

ENG 101 College Composition	3
ENG 317 Advanced Professional Exposition	3
SPC 103 Fundamentals of Public Communication	3
Total Hours	9

##### Humanities and Social Sciences:

Total Hours	18
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##### Orientation Course:

ASA 117 Issues & Opportunities	1
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##### Quantitative:

MAT 122 Algebra and Trigonometry, Pre-Calculus	4
MAT 123 Enriched Calculus and Analytic Geometry I	4
MAT 232 Principles of Statistical Inference	4
Total Hours	11

### THREE CONCENTRATIONS: Minimum of 38 Hours Required

#### Food Science

MCB 300 General Microbiology	4
BCH 221/322 Organic Chemistry/Biochemistry	8
OR	
CHY 251-253/252-254 Organic Chemistry & Laboratory	10
PHY 111 General Physics	4

#### Food Production and Processing Technology

MAT 264A Introductory Calculus	3
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PHY 111/112 General Physics	8
BRE 220 Introduction to Bio-Resource Engineering	3
BRE 268 Computer Aided Design	3
BRE 255 Materials in Bio-Resource Engineering	3
BRE 231 Processing Machinery	3
MET 233 Thermodynamics	3
BRE 232 Structures & Environment	3
BRE 233 Fluid Power	3
EET 210 Strengths & Statics	3
BRE 235 Water & Waste	3
BRE 237 Automation and Process Control	3
BRE 238 Electrification	3
<i>Food Industry Management</i>	
BUS 201/202 Accounting	6
ARE 458 Principles of Agribusiness Management	3
ARE 465 Food & Fiber Marketing	3
ARE 459 Agricultural Business Finance	3
Business and Applied Economics Electives	18
<i>Professional Electives (7-25 credits)</i>	
BCH 221 Organic Chemistry	4
BCH 322 Biochemistry	4
FOS 438 Food Microbiology	4
FOS 298-1 Special Topics	3
FOS 298-5 Food Quality Evaluation	3
FOS 298-6 Food Biochemistry	
FOS 396 Field Experience in Food Science	1-16
FOS 513 Microbiology of Food Fermentations	3
FOS 581 Special Topics	3
INT 482 Pesticides and the Environment	3
HNF 170 Fundamentals of Nutrition	3
BCH 451 Principles of Biochemistry	4
FOS 582 Food Chemistry	3
FOS 585 Sensory Evaluation of Foods	3
FOS 587 Food Analysis	4
HNF 101 Introduction to Food and Nutrition	3
ZOL 204 Animal Biology	4
BRE 220 Introduction to Bio-Resource Engineering	3
BRE 268 Computer Aided Design	3
BRE 231 Processing Machinery	3
BRE 232 Structures & Environment	3
BRE 235 Water & Waste	3
BRE 238 Electrification	3
BRE 396 Field Experience in Bio-Resource Engineering	1-16
Other courses as approved by advisor	

MINIMUM HOURS REQUIRED FOR GRADUATION: 120



## Bachelor of Science in Natural Resources

The Bachelor of Science in Natural Resources is an interdisciplinary program offered cooperatively by the faculties of the Departments of Agricultural and Resource Economics, Plant Biology and Pathology, Entomology, Plant, Soil and Environmental Sciences, Animal, Veterinary and Aquatic Sciences, Wildlife, and Forest Biology; Mark Anderson, Coordinator. Students majoring in the program are taught and advised by faculty from several academic departments. The program is designed for students who wish to pursue a professional career in natural resource conservation, management, administration, planning, or research. The degree can also be used in preparation for postgraduate study in several disciplines related to natural resources.

The B.S. in Natural Resources is designed to acquaint students with the scope and characteristics of our renewable natural resources, and to introduce the scientific and economic principles that govern their use and conservation.

The Natural Resources curriculum is composed of seven requirement areas, amounting to 105 credit hours (depending upon selections), plus 15 hours reserved for unstructured electives. The requirement areas are as follows: I. Natural Resources Core Courses; II. Biological and Ecological Science Courses; III. Physical and Chemical Science Courses; IV. Quantitative Skills Courses; V. Communication Skills Courses; VI. Humanities and Social Science Courses; VII. Natural Resources Concentration; VIII. Free Electives.

The requirements are designed so that Natural Resource graduates will be well grounded in both the natural and social sciences, and will possess the skills necessary for a successful career. However, the program is also designed to allow students ample flexibility to pursue individual interests in preparing for careers or postgraduate study.

The Natural Resources concentrations allow a student to pursue a particular aspect of natural resources in depth with an eye toward future employment or postgraduate study. Students should decide on their area of concentration early in their programs so that course choices in the first and sophomore years will include the prerequisites for courses in their chosen concentration. Concentrations currently offered are as follows:

1. Natural History and Ecology
2. Marine Resources and Sciences
3. Soil and Water Conservation
4. Resource and Environmental Economics
5. Land Use Planning
6. Earth Sciences
7. Environmental History and Social Science Perspectives
8. Government and Public Policy
9. Environmental Entomology

10. Waste Management
11. Individualized Concentration

### Area I. The Natural Resources Core (26 credits)

ASA 117 Issues and Opportunities	1
NRC 100 Introduction to Natural Resources	3
INT 110 Modern Economic Problems	3
POS 100 American Government	3
GES 101 Aspects of the Natural Environment I	4
PSE 140 Soil Science	4
BIO 203 Field Natural History of Maine	3
NRC 200 Sophomore Seminar in Natural Resources	1
NRC 300 Junior Seminar in Natural Resources	1
NRC 400 Senior Paper in Natural Resources	2
NRC 489 Critical Issues in Natural Resource Policy	2

### Area II. Biological and Ecological Sciences (14 credits)

All students in the Natural Resources program are required to complete a core of courses amounting to 14 credits in the biological and ecological sciences. Seven of these credits are determined, and seven more are to be selected from the approved list of courses. Advisors may authorize course substitutions in special circumstances.

BIO 100 Basic Biology	4
INT 319 General Ecology	3
Plus at least 7 chosen from the following list of 200-level and above courses.	
BIO 468 Limnology	3
BIO 470 Wetland and Aquatic Biology	4
BOT 201/202 Plant Biology/Laboratory	4
BOT 203 Plant Kingdom	4
BOT 233 Dendrology	4
BOT 458 Bryology	3
BOT 464 Taxonomy of Vascular Plants	4
BOT 473 Biology of Algae	4
ENT 326 Introductory Entomology	4
INT 256 Forest Protection	3
INT 375 Field Studies in Ecology	Arr.
INT 482 Pesticides in the Environment	3
ZOL 204 Animal Biology	4
ZOL 301 Natural History of the Maine Coast	2
ZOL 329/331 Vertebrate Biology I/Laboratory	4
ZOL 330/332 Vertebrate Biology II/Laboratory	4

ZOL 354/355 Biology of Behavior/Laboratory
ZOL 353 Invertebrate Zoology
ZOL 465 Evolution
ZOL 472 Aquatic Food Webs
WLM 201 Ecology Laboratory
WLM 320 Introduction to Wildlife Conservation

### Area III. Physical and Chemical Sciences (8 credits)

CHY 111/112 General Chemistry I/II
OR
CHY 113/114 Chemical Principles I/II
OR
BCH 207/208 Fundamentals of Chemistry/Elementary Physiological Chemistry
OR
PHY 111/112 General Physics I/II

### Area IV. Quantitative and Computer Skills (10 credits)

MAT 122 Algebra and Trigonometry (or other course in nonstatistical math at the level of MAT 122 or above)
FTY 204 Statistics
COS 100 Introduction to Personal Computers

### Area V. Communication Skills (12 credits)

ENG 101 College Composition
ENG 317 Technical Writing
SPC 103 Fundamentals of Public Communication
SPC 347 Argument and Critical Thinking
OR
SPC 403 Persuasion and Social Influence

### Area VI. Humanities and Social Sciences (18 credits)

All Students graduating from the college must earn at least 18 credits in the humanities and social science. The courses, which are selected in consultation with an advisor, must be chosen to meet the following objectives:

Each student takes an eighteen-credit thematic minor in the broadly defined area of Human Values and Social Context. Courses to fulfill this requirement must address the following three areas: diversity, Western cultural tradition, and social context and institutions.

Three of these credits must be above the introductory level, no more than three credits may be in the major, and one of the courses in the thematic minor must be a literature course.



**Area VII. The Natural Resources****Concentrations****18 credits)**

Each student is required to complete at least one natural resource concentration. Each concentration consists of 18 credits, at least 12 of which must be at the 300 level or above. Appropriate course choices must be made in the other requirement areas to satisfy the prerequisites or the chosen concentration.

Ten or more courses are listed under each of the following concentrations. Students are required to build their concentrations largely from the courses on these lists. However, with the approval of the advisor, certain courses not on a list may also be used. For seniors, certain graduate courses may be used in the concentration with approval of the student's advisor. Courses followed by an asterisk are required for the concentration.

*Concentration 1. Natural History and Ecology*

It is recommended that MAT 151 or MAT 126 be taken to meet the non-statistical math component of the Area IV (quantitative and computer skills) requirement.

BIO 470 Wetland and Aquatic Biology	3
BIO 468 Limnology	3
ENT 326 Introduction to Entomology	3
BOT 201/202* Plant Biology/Laboratory	4
BOT 233 Dendrology	3
OCE 370 Introduction to Oceanography	3
WLM 320 Introduction to Wildlife Conservation	2
WLM 420 Forest Wildlife Management	1
ZOL 204* Animal Biology	4
ZOL 401 Natural History of the Maine Coast	2

*Concentration 2. Marine Resources and Sciences*

Students electing this concentration should take MAT 126 or MAT 151 to meet the non-statistical math component of the Area IV (quantitative and computer skills) requirement.

AVA 211 Aquaculture	3
AVA 212 Maine Mariculture	3
AVA 220 Topics in Marine Resources	2
AVA 409 Shellfisheries Biology	3
BOT 473 Biology of Algae	4
BOT 475 Algae Growth and Seaweed Mariculture	3
GES 102 Aspects of Natural Environment II	4
OCE 370 Introduction to Oceanography	3
ZOL 204* Animal Biology	4
ZOL 213 An Introduction to Marine Science	3
ZOL 353 Invertebrate Zoology	4
ZOL 470/471 Fishery Biology/Laboratory	4
ZOL 472 Aquatic Food Webs	2

*Concentration 3. Soil and Water Conservation*

Students electing this concentration should take ZOL 204 and BOT 203 as part of their Area II (biological and ecological sciences) requirement, CHY 113/114 for their Area III (physical and chemical sciences) requirement, and MAT 126 for the nonstatistical math component of the Area IV (quantitative and computer skills) requirement.

BIO 468 Limnology	3
BIO 470 Wetland and Aquatic Biology	4
CIE 331 Fundamentals of Environmental Engineering	3
FTY 357 Forest Watershed Management	3
PSE 100 Plant Science	3
PSE 144 Soil and Water Conservation	2
PSE 146 Land Use Planning - Soil Aspects	2
PSE 440 Soil Chemistry and Plant Nutrition	4
PSE 442* Soil Taxonomy	3
PSE 444* Soil Morphology and Soil Mapping	3
PSE 451 Physics of the Plant Environment	4

*Concentration 4. Resource and Environmental Economics*

ARE 371* Introduction to Natural Resource Economics and Policy	3
ARE 471* Resource Economics	3
ARE 473 Land Economics	3
ARE 474 Land Use Planning	3
ECO 121 Principles of Macroeconomics	3
ECO 420* Intermediate Microeconomics	3
ECO 471 Public Finance and Fiscal Policy	3
FTY 444 Forest Economics	3
HTY 277 History of Treatment of the American Environment	3
INT 360 Economics and Biology if Marine Fisheries Management	3
PAA 200 Public Management	3
PAA 220 Introduction to Public Policy	3

*Concentration 5. Land Use Planning*

ARE 371 Natural Resource Policy and Economics	3
ARE 473 Land Economics	3
ARE 474* Land Use Planning	3
ECO 444 Urban Economics	3
ECO 471 Public Finance and Fiscal Policy	3
ECO 420 Intermediate Microeconomics	3
HTY 277 History of Treatment of the American Environment	3
PAA 370 Urban Policy and Management	3
POS 233 Urban Politics	3
PSE 144 Soil and Water Conservation	2

PSE 146 Land Use Planning - Soil Aspects	2
PSE 444 Soil Morphology and Soil Mapping	3
FTY 208 Forest Surveying and Mapping	3
FOE 206 Photogrammetry and Remote Sensing	3
FTY 349 Principles of Forest Management	3
FTY 480 Applied Geographic Information Systems	3

*Concentration 6. Earth Sciences*

Students electing this concentration are encouraged to take CHY 111/112 for their Area III (physical and chemical sciences) requirements, and MAT 126 and MAT 232 for the mathematics component of the Area IV (quantitative and computer skills) requirement.

GES 102 Aspects of the Natural Environment II	4
GES 109 Geology of Maine	3
GES 311 Mineralogy	4
GES 312 Introduction to Petrology	4
GES 315 Principles of Stratigraphy	4
GES 324 Geology of North America	3
OCE 370 Introduction to Oceanography	3
PSE 440 Soil Chemistry and Plant Nutrition	3
PSE 442 Soil Taxonomy	3
PSE 444 Soil Morphology and Soil Mapping	3
PSE 441 Physics of the Plant Environment	4

*Concentration 7. Environmental History and Social Science Perspectives*

ANT 215 Social Anthropology	3
ANT 464 Cultural Ecology	3
GEO 215 Cultural Geography	3
GEO 301 Historical Geography of North America	3
SOC 101* Introduction to Sociology	3
SOC 202 Social Problems	3
SOC 312 Political Sociology	3
SOC 465 Evolution, Revolution, and the Future	3
HTY 277 History of the Treatment of the American Environment	3
PHI 352 Philosophy of Natural Science	3

*Concentration 8. Government and Public Policy*

ARE 371 Natural Resource Policy and Economics	3
HTY 419 Science and Society until 1800	3
HTY 420 Science and Society since 1800	3
ARE 486 Government Policies Affecting Rural America	3
ARE 473 Land Economics	3
ARE 474 Land Use Planning	3
ECO 471 Public Finance and Fiscal Policy	3
FTY 349 Principles of Forest Management	3



HTY 277 History of Treatment of the American Environment	3
PAA 100 Foundations in Public Administration	3
PAA 200 Public Management	3
PAA 220* Introduction to Public Policy	3
POS 361 American Legislative Process	
POS 362 Maine Government and Politics	3
POS 361 The American Legislative Process	3
PSY 239 Political Psychology	3
WLM 320 Introduction to Wildlife Conservation	2

#### Concentration 9. Environmental Entomology

Students electing this concentration must take BCH 207/208 as their physical and chemical sciences requirement. It is recommended that MAT 151 or MAT 126 be taken to meet the non-statistical math component of the quantitative and computer skills requirement.

BOT 201/202* Plant Biology/Laboratory	4
BOT 233 Dendrology	4
BOT 445 Plant Genetics	3
BOT 464 Taxonomy of Vascular Plants	4
ENT 326* Introductory Entomology	4
ENT 449 Insect Pest Management	3
ENT 460* Insect Biology and Taxonomy	3
ENT 461* Insect Biology, Taxonomy, and Systematics	3
ZOL 204* Animal Biology	4
ZOL 353 Invertebrate Zoology	4
ZOL 462 Principles of Genetics	3
INT 482 Pesticides in the Environment	3
BIO 468 Limnology	4

#### Concentration 10. Waste Management

INT 230 Waste Management	3
CIE 331* Fundamentals of Environmental Engineering	3
BRE 235* Water Supply and Waste Management	3
ARE 371 Introduction to Natural Resource Economics and Policy	3
PSE 248 Soil Organic Matter and Fertility	4
PSE 440 Soil Chemistry and Plant Nutrition	4
PSE 448 Soil Microbiology	4
PSE 451 Physics of the Plant Environment	4
CIE 433 Environmental Engineering Chemistry	3
SVE 522 Environmental Law and Resource Regulation	3
BRE 231 Processing Machinery	3
BRE 232 Buildings and Environment	3
BRE 281 Elementary of Plane Surveying	1

#### Concentration 11. Individualized Concentration

In some cases the standard concentration may not meet adequately the interests or career aspirations of students in this program. Under certain conditions, such students may develop and pursue an individualized concentration of study.

Individualized concentrations obviously must deal with some aspect of natural resources, as is broadly reflected in the degree program at this time. Individualized concentrations may not be developed for areas where degrees are already being offered at the University of Maine. So, for example, while "wildlife" is clearly a natural resource, this would not be an appropriate organizing concept for an individualized concentration since a degree in wildlife may be obtained from another unit of the University of Maine. Individualized concentrations, as all concentrations in the program do, require at least 18 credit hours of study 12 of which must be 300 or 400 level courses.

A student wishing to pursue an individualized concentration should do so in conjunction with an advisor associated with the program. The student should prepare a brief proposal for the concentration, including a narrative explaining the organizing concept of the concentration (essentially a justification), a proposed name of the concentration, and a list of the course that would be taken to complete the concentration. The proposal will need to be approved by the advisor, program coordinator, and Associate Dean for Resident Instruction.

#### Unstructured Electives (15 to 19 credits)

An unstructured elective is any course for which the University awards academic credit. Students may use these credits to increase their professional job prospects by taking additional courses in their area of concentration or by completing course work in a second area of concentration. Some natural resource students may elect courses in foreign languages to broaden opportunities for employment or for study in other countries. Other students may wish to broaden their knowledge in the arts and humanities. Natural resource courses not previously listed that may be of interest to natural resource majors are:

BRE 241 Energy and Society	3
BIO 260 Interactions Between Humans and Their Environment	3
ENT 220 Insects, Science and Society	3
FTY 444 Forestry Economics	3
FTY 446 Forest Policy and Planning	3
GES 224 Geology of the National Parks	3
GEO 201 Introduction to Human Geography	3
GEO 210 Geography of Maine	3
GEO 214 Geography of Canada and the United States	3
GEO 215 Cultural Geography	3
GEO 350 The Geography of Canada	3
BOT 251 Plants and Society	3

INT 380 Pesticides and the Environment	3
OCE 270 Oceanography Today	3
WLM 210 Development of Wildlife Conservation	2
PSE 160 Environmental Issues: The Atmosphere	3

#### Courses in Natural Resources

**NRC 100 Introduction to Natural Resources**  
Introduces resource issues. Provides initial framework for problem analysis, management consideration, and policy development in natural resources. **Cr 3.**

**NRC 200 Sophomore Seminar in Natural Resources**  
Discussion of current issues in natural resource utilization, management, and policy, including outside speakers from various professions concerned with natural resources. **Cr 1.**

**NRC 300 Junior Seminar in Natural Resources**  
Examines issues in natural resources from the perspective of particular agencies and legislative bodies involved with utilization, management and conservation. Focus on presentations by outside speakers representing these agencies. **Cr 1.**

**NRC 396 Field Experience in Natural Resources**  
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. Prerequisite: Junior standing and permission. (Pass/Fail Grade Only). **Cr 1-16.**

**NRC 397 Topics in Natural Resources 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. Transcript will show topic of study. Prerequisite: Natural Resources major or permission of instructor. **Cr 3.**

**NRC 400 Senior Paper in Natural Resources**  
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 natural resources. Prerequisite: natural resource seniors. **Cr 1-3.**

**NRC 489 Critical Issues in Natural Resource 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. Prerequisite: Natural resource seniors. Cr 2.

**Interdisciplinary Course**

**INT 323 (BIO, NRC, PBP, PSE, WLM, ZOL)**

**Introduction to Conservation Biology**

Maintaining the diversity of life forms in the face of environmental degradation involves the study of population ecology, population genet-

ics, and ecosystem ecology plus the socio-economic and political matrix in which conservation problems must be solved. Prerequisite: BIO 100. Cr 3.





## Bachelor of Science in Sustainable Agriculture

Professor Matt Liebman, Coordinator

The Bachelor of Science in Sustainable Agriculture is an interdisciplinary program offered cooperatively by the faculties of the Departments of Agricultural and Resource Economics; Animal, Veterinary and Aquatic Sciences; Bio-Resource Engineering; Entomology; Plant Biology and Pathology; and Plant, Soil, and Environmental Sciences. The program is designed for students interested in work as technical assistants and researchers within the public and private sectors; as policy analysts; or as farmers with sound training in natural resource management and economics. The B.S. degree in Sustainable Agriculture can also be used as preparation for postgraduate study in a variety of disciplines.

The Sustainable Agriculture program stresses how to increase farm profits by decreasing the costs of crop and livestock production; how to build soil tilth and fertility through rotations, multiple cropping and nutrient recycling; how to protect water quality and human health by decreasing the need to use synthetic agrichemicals; how to manage crop pests and livestock diseases with integrated, ecologically sound strategies; how to create a strong, diversified agriculture that can be sustained through years of fluctuating crop prices and weather.

The Sustainable Agriculture curriculum is composed of a core curriculum, concentration requirements and free electives. Students can choose among the following concentrations: Sustainable Agriculture (General); Agricultural and Resource Economics; Animal, Veterinary and Aquatic Science; Plant Protection; Plant Science; and Soil Science. The B.S. in Sustainable Agriculture requires satisfactory completion of at least 120 degree hours at a cumulative grade point average of not less than 2.0 with credits apportioned in the following manner:

Core Curriculum	77-84
Concentration Requirements	17-36
Free Electives	0-23
Total Hours Required to Graduate	120

### Curriculum in Sustainable Agriculture

#### Core Curriculum

##### Basic Sciences and Mathematics

Computer Science	3
BIO 100 Basic Biology	3
Choose 1:	
BCH 207/208 Fundamentals of Chemistry	8
CHY 111/112 General Chemistry I/II	8
CHY 113/114 Chemical Principles I/II	8

Choose 1:	
BIO 451 Biometry	3
FTY 204 Statistical Inference in Forest Resources	3
MAT 232 Principles of Statistical Inference	3
Choose 1:	
MAT 114 Mathematics for Business and Economics II	3
MAT 126 Analytic Geometry and Calculus	4
MAT 151 Calculus for the Life Sciences I	4
TOTAL HOURS	21-22

#### Communications

ENG 101 College Composition	3
ENG 317 Technical Writing	3
SPC 103 Fundamentals of Public Communication	3
TOTAL HOURS	9

#### Sustainable Agriculture: Overview

PSE 105 Principles and Practices of Sustainable Agriculture	3
PSE 445 Agricultural Ecology	3
TOTAL HOURS	6

#### Pest Ecology and Management

Choose 1 or both:	
INT 482 Pesticides and the Environment	3
INT 450 Agricultural Pest Ecology	3
TOTAL HOURS	3-6

#### Plant, Soil, and Environmental Sciences

PSE 140 Soil Science	4
PSE 100 Plant Science	4
PSE 101 Cropping Systems	4
TOTAL HOURS	12

#### Animal, Veterinary, and Aquatic Sciences

AVA 145 Animal Science	4
TOTAL HOURS	4

#### Agricultural and Resource Economics

Choose 1:	
INT 110 Modern Economic Problems	3
ECO 120/121 Principles of Microeconomics and Macroeconomics	6
Choose 1:	
ARE 371 Introduction to Natural Resource Economics and Policy	3
ARE 422 Community Development	3
ARE 454 Production Economics	3
ARE 458 Agribusiness Management	3
ARE 459 Agribusiness Finance	3
ARE 465 Food and Fiber Marketing	3
ARE 471 Resource Economics	3

Other Approved Course	3
TOTAL HOURS	6-9

<i>Bio-Resource Engineering</i>	
BRE 248 Engineering for a Sustainable Agriculture	3
TOTAL HOURS	3

<i>Humanities and Social Sciences</i>	
Electives	12
TOTAL HOURS	12
ASA 117 Issues and Opportunities	1

TOTAL CREDIT CORE CURRICULUM	77-84
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CONCENTRATION INCLUDING ELECTIVES	36-43
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MINIMUM HOURS REQUIRED FOR GRADUATION: 120

The Sustainable Agriculture concentrations identify for the student a course of study in general sustainable agriculture or in more specific concentrations. Students should select their concentration early in their program so that prerequisites can be completed in the first and sophomore years. The concentrations offered are as follows:

#### Concentration 1. Sustainable Agriculture

Note: Students electing this concentration must take both INT 450 and INT 482	
AVA 445 Sustainable Animal Production Systems	3
BOT 457 Plant Pathology	4
ENT 328 Introductory Applied Entomology	3
PSE 248 Soil Organic Matter and Fertility	4
3 Credits of Ecology	3
CONCENTRATION TOTAL	17

#### Concentration 2. Agricultural and Resource Economics

ARE 138/139 Agribusiness Accounting I/II	6
ARE 371 Introduction to Natural Resource Economics Policy	3
ARE 454 Introduction to Production Economics	3
ARE 458 Principles of Management in Agribusiness	3
ARE 459 Agricultural Business Finance	3
ARE 465 Food and Fiber Marketing Business and Economics Electives	9
CONCENTRATION TOTAL	30



*Concentration 3. Animal, Veterinary, and Aquatic Sciences*

AVA 236 Physiology of Domestic Animals	3
AVA 260 Animal Genetics and Breeding	3
AVA 351 Animal Science Techniques	2
AVA 445 Sustainable Animal Production Systems	3
AVA 455 Animal Nutrition	3
AVA 462 Applied Animal Feeding	2
ZOL 204 Animal Biology	4
Choose 2:	
AVA 464 Feeding Swine and Poultry	1
AVA 465 Feeding Beef and Sheep	1
AVA 466 Feeding Dairy Cattle	1
AVA 467 Feeding Fish	2
Choose 1:	
AVA 346 Dairy Cattle Technology	3
AVA 348 Livestock Management	3
Choose 1:	
AVA 461 Animal Breeding	3
AVA 480 Physiology of Reproduction	3
<b>CONCENTRATION TOTAL</b>	<b>34-35</b>

*Concentration 4. Plant Protection*

Note: Students electing this concentration must take BCH 207/208 and both INT 450 and INT 482 for their pest ecology and management requirement.

BOT 201/202 Plant Biology/Lab	4
BOT 457 Plant Pathology	4
ENT 328 Introductory Applied Entomology	4

INT 319 General Ecology	3
ZOL 204 Animal Biology	4
Choose 1:	
BOT 445 Plant Genetics	3
ZOL 462 Principles of Genetics	3
Choose 1:	
BOT 452 Plant Physiology	3
BOT 464 Taxonomy of Vascular Plants	4
BOT 530 Biology of the Fungi	3
ENT 449 Insect Pest Management	3
ENT 460 Insect Biology and Taxonomy	3
ENT 461 Insect Biology, Taxonomy and Systematics	3
ENT 511 Insect Ecology	3
INT 555 Pest-Plant Interactions	3
PHY 103/104 Descriptive Physics/Lab	4
Other Approved Course	
<b>CONCENTRATION TOTAL</b>	<b>34-36</b>

*Concentration 5. Plant Science*

NOTE: Students electing this concentration must take both INT 450 and INT 482.

AVA 445 Sustainable Animal Production Systems	3
BOT 452/453 Plant Physiology/Lab	4
BOT 457 Plant Pathology	4
ENT 328 Introductory Applied Entomology	3
PHY 111/112 General Physics I/II	8
PSE 248 Soil Organic Matter and Fertility	4

PSE 479 Crop Physiology	4
Choose 1:	
BOT 435 Plant Anatomy	4
BOT 445 Plant Genetics	3
BOT 464 Taxonomy of Vascular Plants	4
PSE 410 Plant Propagation	3
PSE 451 Physics of the Plant Environment	4
ZOL 462 Principles of Genetics	3
<b>CONCENTRATION TOTAL</b>	<b>33-34</b>

*Concentration 6. Soil Science*

AVA 445 Sustainable Animal Production Systems	3
BOT 457 Plant Pathology	4
ENT 328 Introductory Applied Entomology	3
PHY 111/112 General Physics I and II	8
PSE 146 Land Use Planning - Soil Aspects	2
PSE 248 Soil Organic Matter and Fertility	4
PSE 440 Soil Chemistry and Plant Nutrition	4
PSE 442 Soil Taxonomy	3
Choose 1:	
GES 541 Glacial Geology	3
PSE 444 Soil Morphology and Soil Mapping	3
PSE 448 Soil Microbiology	4
PSE 451 Physics of the Plant Environment	4
<b>CONCENTRATION TOTAL</b>	<b>33-34</b>





## School of Human Development

Associate Professor Cook (Director)

Professor Oliver;

Associate Professors Baranowski, Birnbaum, Csavinszky, Hyatt, Milardo, Schilmoeller, Schomaker

Assistant Professors Caron, Klimis-Tavantzis, Webber, White

Lecturer Soule

Human Development encompasses physical, social, economic, and aesthetic aspects of living in complex, technologically changing societies. Knowledge coordinated from many fields of learning is applied to the process of decision-making that affects interpersonal and family relationships, the home environment, management of resources, nutrition, food, clothing, design, and human growth and development. Emphasis is placed upon improving the quality of life for families and individuals by helping them develop competencies for effective living.

The undergraduate curriculum has as its objectives specialized preparation for a variety of professional careers, general education for personal and family living, and courses for the enrichment of students from all disciplines.

A student's program, leading to the bachelor of science degree, includes courses in the arts and humanities, social and behavioral sciences, laboratory sciences, and specialized subjects from the School of Human Development in the areas of child development/family relations, human nutrition and foods, merchandising and consumer resources, and health and family life education.

Programs of study may be developed for students from other countries or for those wishing to return to higher education to complete or update their professional positions. Students may prepare for graduate study leading to research, college teaching, and other specialized professional positions.

The dietetics curriculum meets the Standards of Education of the American Dietetic Association and prepares students for internships and AP-4 programs. The Early Childhood Environments curriculum meets eligibility requirements of the National Council for the Accreditation of Teacher Education (NCATE). Education curricula meet State of Maine certification requirements for specialized fields.

A minimum of 120 degree hours and an accumulative grade point average of 2.0 in major coursework and overall program are required for graduation. In addition, students majoring in Child Development and Family Relations must maintain an accumulative average of 2.5 overall and a 2.75 in major courses to be eligible for student teaching.

### Degree Requirements

All students are required to take the following 35 hours:

#### **Communications: 6 hours**

Three hours in oral communications and three hours in written communications.

#### **Laboratory Sciences: 8 hours**

To be selected from biochemistry, biology, botany, geology, chemistry, entomology, physics and astronomy, microbiology, or zoology. Biochemistry is required for human nutrition and foods, and health and family life majors. Gen-

eral chemistry and organic chemistry are required for human nutrition and foods majors.

#### **Mathematics: 6 hours**

Specific course requirements determined by degree concentration.

#### **Social Sciences: 12 hours**

PSY 100 is required; others may be selected from anthropology, sociology, psychology, economics, history, political science, and modern society. Economics is required for merchandising and consumer resource majors. Sociology, and economics are required of human nutrition and foods majors. Introductory courses are not to exceed nine hours.

#### **Humanities: 9 hours**

Art, design appreciation, foreign language, history, honors, music, philosophy, English, other than the basic communications course, performing arts, and selected anthropology courses. Two fields must be represented in these nine hours, and at least one course must be in literature.

#### **Requirements**

Pre-professional sequences and electives complete the required 120 hours. In addition, those who enter the program in the first semester of their first year must complete the first-year seminar, ASA 117, for one credit to be counted toward the required 120 hours.

## Bachelor of Science in Child Development/Family Relations

This program provides training for professional work with children and families in schools, industry, government, and private service agencies. Students with the bachelor of science degree are employed in such diverse settings as day care centers, hospitals, community recreation centers, social service agencies, senior citizen centers, nursery schools, television stations, and public schools. With additional training, careers are open in the areas of family counseling, college teaching, parent education, administration, research, and social work.

Students interested in working with individuals and families may select from two con-

centrations: Early Childhood Environments or Individual and Family Studies.

The Early Childhood Environments concentration prepares students to work with the younger child in a variety of settings. Graduates may work as professionals in infant care, day-care, nursery schools, recreational programs, counseling and mental health centers, clinics, and children's respite care. In addition, students in this concentration who wish to teach kindergarten and/or first, second or third grade may apply for certification in elementary education with an emphasis on nursery-kindergarten through third grade. The certification process is

governed by the Maine State Department of Educational and Cultural Services, Augusta, Maine.

The Individual and Family Studies concentration allows students to specialize in different aspects of the field of human development and family studies. This concentration permits students flexibility in the design of their programs of study. For instance, students may elect to buttress their program with advanced classes in adult development and family development in order to prepare for careers in a variety of areas such as family planning, employee assistance programs, or gerontology. At present, although



Many students majoring in Child Development and Family Relations specialize in early childhood, nearly half of our graduates work in agencies and businesses servicing adults and families.

Students also may participate in the University Affiliated Program (UAP) in the Department of Pediatrics at Eastern Maine Medical Center. An Interdisciplinary Concentration in Developmental Disabilities is required. (See JAP and Interdisciplinary Concentrations in Index.)

CHF 200 and CHF 201 are required in both concentrations and each course must be passed with a grade of "C" or better. Students earning less than a "C" in either of these courses must re-take that course before taking upper level courses for which these are prerequisites.

Students intending to transfer to the Child Development/Family Relations major from a baccalaureate - degree program should have a GPA of 2.5. Students from an associate - degree program should have a GPA of 2.8.

Students electing the Early Childhood Environments concentration must take the following courses:

*Early Childhood Environments*

<8 Eligibility

CHF 201 Introduction to Child Development 3

CHF 200 Family Interaction 3  
 CHF 203 Practicum in Early Childhood Programs 3  
 CHF 331 Cognitive Development CHF 321/322 Curriculum for Young Children I/II 6  
 CHF 420 Creativity and Young Children 4  
 CHF 421 Student Teaching in Early Childhood\* 6  
 CHF 422 Field Placement in Early Childhood Environments\* 6  
 CHF 423 Professional Seminar for Early Childhood Specialists 1  
 HNF 101 Introduction to Food and Nutrition 3  
 EDB 202 The American School 3  
 EDB 204 The Teaching Process 3  
 ERL 313 Teaching of Reading in the Elementary School 3  
 ERL 318 Teaching Language Arts in the Elementary School 3  
 EDG 400 Field Observation 1

\*Student teaching for the early childhood environments option will be contingent upon demonstrated competence in the prerequisite courses. All students applying for permission to student teach must have a TB test prior to placement.

SED 402 Mainstreaming Exceptional Students 3  
 Mathematics 6  
**TOTAL HOURS 60**

Plus a subject concentration of 24 credits. However, if the subject concentration is in child development, only nine additional credit hours are needed because 15 credits in child development are already counted.

*Individual and Family Studies*

The following courses are required:

CHF 200 Family Interaction 3  
 CHF 201 Introduction to Child Development 3  
 Child Development/Family Relations Electives 27  
 Mathematics 6  
**TOTAL HOURS 39**

Students are not restricted in their choice of electives to complete the 120 hours needed for graduation, but rather should consult with their advisor to select courses which best suit their professional goals. (Note: 48 credits of CHE/ECE courses are the maximum that will count toward the 120 credits needed to graduate).





## Bachelor of Science in Merchandising and Consumer Resources

The Merchandising and Consumer Resources program of study is designed to improve the quality of living of individuals and families through the integration of the physical, biological, and social sciences, and the arts and humanities. Students receive a broad general education and a strong foundation for a variety of professional careers in business, education, and service fields. The curriculum allows flexibility for choosing a specialty of particular interest through selection of appropriate major courses supplemented by related fields of study. Graduates with the bachelor of science degree are employed in such diverse positions as managers of apparel and textile businesses, fashion consultants, entrepreneurs of home-based and fashion related businesses, department store management and executive training program participants, consumer representatives for banks, utilities, food and appliance businesses, and educators in the public and private sector including schools, government agencies, and extension.

### Curriculum in Merchandising and Consumer Resources

*Major Core*

MCR 222 Apparel Analysis and Construction 3

MCR 225 Consumer Textiles	3
MCR 231 Design Appreciation	3
MCR 233 Applied Design	3
MCR 428 Seminar: Dress and Adornment	3
MCR 435 Fashion Marketing and Merchandising	3
MCR 270 Introduction to Home Economics	1
MCR 381 Family Resource Management	3
MCR 487 The Consumer in the Present Economy	3
MCR 488 Explorations in Current Consumer Issues	3
<b>TOTAL HOURS</b>	<b>28</b>
<b>Career Core</b>	
MCR 424 Creative Clothing Construction	3
MCR 429 Fashion Entrepreneurship	1-3
HUD 404 Selected Topicd in Human Development	1-3
MCR 492 Interior Design	3
MCR 485 Personal and Family Finance	3
MCR 491 Housing	3
MCR 493 Equipment and Energy Usage	3
HUD 409 Special Problems in Human Development	3

HUD 396 Field Experience in Human Development	3-15
<b>MINIMUM HOURS</b>	<b>15</b>

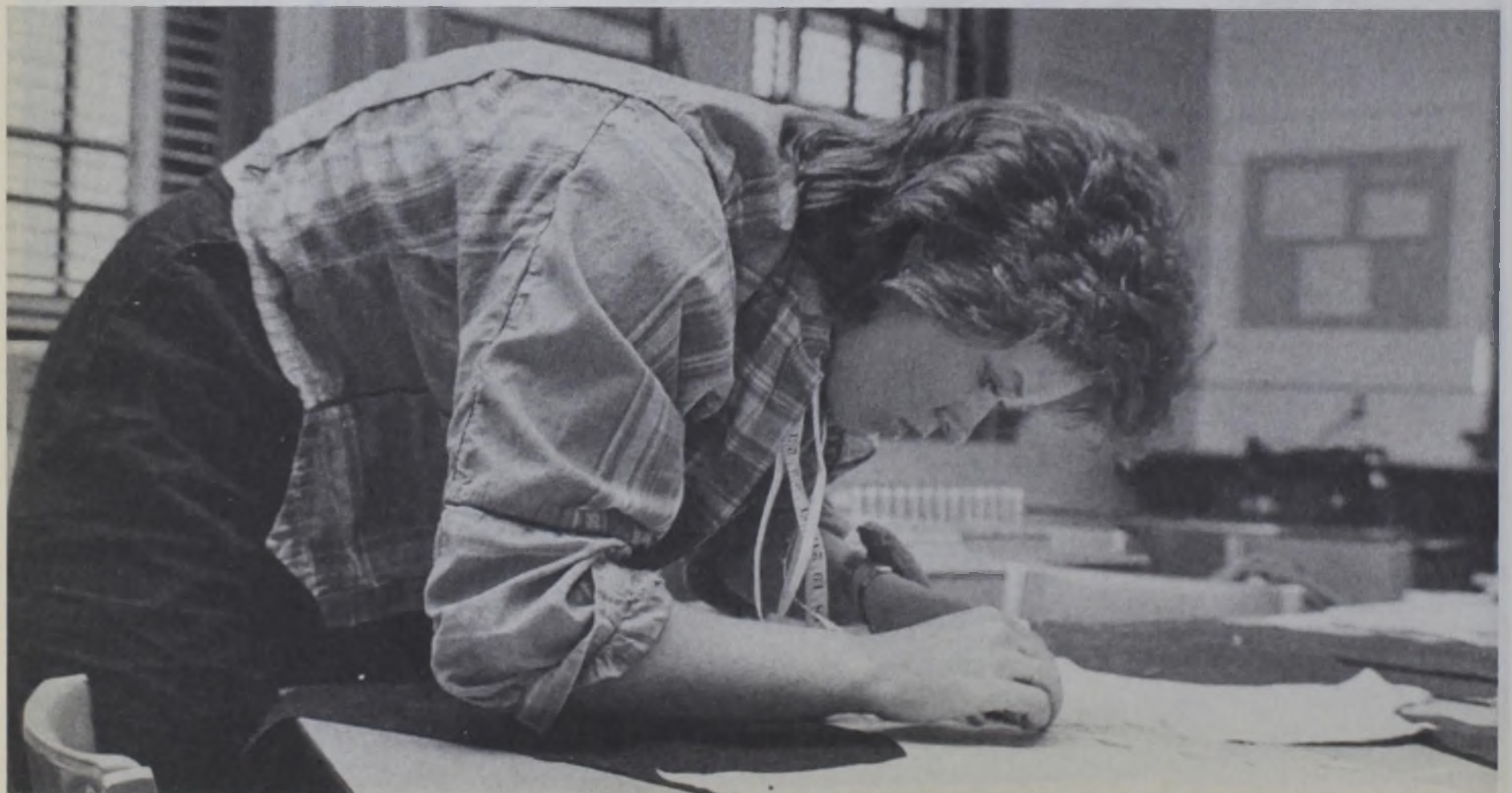
**Business and Professional Courses**

ARE 138 Agribusiness Accounting I OR	
BUA 201 Principles of Accounting I	3
ARE 465 Food and Fiber Marketing OR	
BUA 370* Marketing	3
BUA 220 The Legal Environment of Business	3
OR	
BUA 325* Principles of Management and Organization	3
JMC 250 Introduction to Advertising	3
SPC 257 Business and Professional Communication	3
COS 100 Introduction to Personal Computers	3
<b>MINIMUMHOURS</b>	<b>15</b>

**Mathematics - 6 Credit Hours**

Electives to complete 120 hours minimum. Students desiring Maine Home Economics teaching certification may choose courses to meet that requirement as an option.

\*ECO 120 and ECO 121 prerequisites.





## Bachelor of Science in Human Nutrition and Foods

This program is approved by the American Dietetic Association (A.D.A.) and is designed to give professional preparation for students who want to become dietitians, public health nutritionists, or food service administrators in commercial, industrial, publicly owned, or private food establishments. The curriculum provides the knowledge requirements and meets the Standards of Education established by A.D.A. Graduates are eligible to apply for an A.D.A. accredited dietetic internship or an AP-4 Approved Preprofessional Practice Program. Upon satisfactory completion of one of these programs the student may take the National examination leading to registration and/or licensure.

A minor in human nutrition and foods consisting of 15 credit hours above introductory level courses is available to any student.

The curriculum is approved by the American Dietetic Association and recommended for all dietitians. The university provides personal

and automobile liability insurance for students who are on field trips or field experiences.

### Curriculum for Pre-Dietetic Intern

HNF 101 Introduction to Food and Nutrition	3
HNF 102 Introductory Food and Nutrition Laboratory	2
HNF 103 Family Food Management	3
HNF 200/201 Food Service Systems Management I/II	8
HNF 270 World Food and Nutrition	3
HNF 301 Life Cycle Nutrition	3
HNF 340 Experimental Foods	3
HNF 401 Community Nutrition	4
HNF 410 Human Nutrition and Metabolism	3
HNF 420 Nutrition in Abnormal Conditions	4
BCH 207 Fundamentals of Chemistry	4
EDB 221 Educational Psychology	3
FOS 203 Science of Food	3

BUA 325 Principles of Management and Organization	3
COS 100 Introduction to Personal Computers	3
ZOL 208 Anatomy and Physiology	4
ENG 317 Technical Writing	3
MAT 122 Algebra and Trigonometry, Pre-Calculus	4
MAT 232 Principles of Statistical Inference	3
MCB 300/305 General Microbiology/Laboratory	5
BIO 100 Basic Biology	4
ZOL 377/378 Animal Physiology/Laboratory	5
ECO 110 Introduction to Economics	3
BCH 221 Organic Chemistry	4
BCH 322 Biochemistry	4
<b>TOTAL HOURS</b>	<b>91</b>

Basic college core and electives to complete 120 hours minimum.





## Bachelor of Science in Health and Family Life Education

This program is designed to provide professional preparation for those who want to become public school teachers or leaders in the newer fields of health and family life education. The content of the curriculum has been designed to fulfill national and state recommendations regarding the preparation needed for health educators.

General Education (from college requirements)	42 hours
Professional Education	32 hours
Major Courses	42 hours
Electives to complete 120 hours minimum.	

### Major Courses - Health and Family Life (42 Hours)

CHF 200 Family Interaction	3
CHF 201 Introduction to Child Development	3
CHF 351 Human Sexuality	3
CHF 431 Parenting	3
CHF 434 Adult Development and Aging	3
HNF 101 Introduction to Food and Nutrition OR	
HNF 280 Human Nutrition for the Health Professions	3
MCR 485 Personal and Family Finance	3
MCB 300/305 General Microbiology/Laboratory 5	5
BIO 100 Basic Biology	4
ZOL 208 Anatomy and Physiology	4
ZOL 316 Drug Use and Abuse	3
HPR 250 First Aid and Emergency Care	2
A course in Environment	3

### Professional Education/Certification (32 Hours)

(Certification K-12 Health)

HPR 278 Health Education	2
MCR 371 Curriculum Development in Home Economics Education and Family Life OR	
HPR 483 Planning the Health Education Curriculum	3
MCR 372 Techniques of Teaching Home Economics and Health and Family Life OR	
EDB 204 The Teaching Process	3
MCR 373 Supervised Student Teaching (full semester)	15
EDB 202 The American School	3
EDB 221 Educational Psychology	3
SED 402 Mainstreaming Exceptional Students	3

### Agency Concentration

#### (No teaching eligibility - 21 Hours)

SWK 320 Introduction to Social Work and Social Welfare	3
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PAA 200 Public Management	3
PAA 340 Public Budgeting and Financial Administration	3

Nine additional credits of CHF courses and field experience of 3 credits to total 21 credits. Additional electives to complete 120 degree hours.

### Courses in Human Development

#### 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. Cr 3.

#### CHF 201 Introduction to Child Development

Influences on human development from conception through middle childhood. Theoretical perspectives, empirical evaluation, and practical implications. 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. Prerequisite: CHF 201. Lab 2. 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. Prerequisite: CHF 201, CHF 203, CHF 331 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 processing 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. Prerequisites: 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. Cr 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. Prerequisites: CHF 200, CHF 201, or permission. Cr 3.

#### CHF 420 Creativity and Young Children

Exploration of theoretical and research evidence pertaining to the nature of creativity and the conditions requisite for its expression. Includes developmental stages, strategies, materials and workshops in specific areas including children's art, music, creative movement, story telling, play and creative dramatics. A practicum for participation and translation of theory into practice will be required. Prerequisite: CHF 203 or permission, junior standing. Cr 4.

#### 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, ECE major. Cr 6.

#### CHF 422 Field Placement in Early Childhood Environments

Individual study in selected early childhood settings such as family day care homes, counselling 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. Prerequisites: Senior or graduate student standing and consent of the instructor. (Pass/Fail Grade Only). 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. Prerequisite: CHF major; senior standing. 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 emphasis on the impact of peers, school, and family 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 200, CHF 201 or permission. 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 435 Developmental Assessment**

An introduction to the basic principles and issues of assessment. Development of observational skills necessary for assessment and interpretation of development and behaviors in family, educational and social service settings. Although the basic developmental, educational and intelligence tests will be discussed, this course is not designed to teach test administration. Prerequisite: CHF 200 and CHF 201. 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. Prerequisite: junior or senior standing, CHF 200 or SOC 318 or permission. Cr 3.

**ECE 423 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. Prerequisite: Concurrent with CHF 421 and CHF 422 or permission of instructor. (Pass/Fail Grade Only). Cr 1.

**HNF 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, and individual dietary studies. Cr 3.

**HNF 102 Introductory Food and Nutrition Laboratory**

A study of nutrition principles for application through the life-cycle utilizing videos, slides, audiocassettes, measuring devices and food demonstrations, as well as nutritional assessment through evaluation of individual dietary intake records, anthropometric measurements and bi-

ochemical parameters. Includes discussion of literature on "current" topics. Required of HNF Majors. Others by permission. Corequisite: HNF 101. Lab 4. Cr 2.

**HNF 103 Family Food Management**

Considers the criteria for making intelligent food choices and application of those standards in the planning of family meals. Limited amount of food preparation and service. Rec 2, Lab 2. Cr 3.

**HNF 170 Fundamentals of Nutrition**

Studies food selection as a means of promoting fitness and preventing disease, including eating away from home, convenience foods, nutrition labelling, food safety regulations and practices, and meeting standards with differing expenditures. Cr 3.

**HNF 200 Food Service Systems Management I**

Basic principles of quantity food production and service. Emphasis on techniques to retain nutritive value and yield quality products, recipe standardization, portion control, sanitation, and use and care of equipment. Other areas include organizational structure, efficient methods and controls in menu planning, purchasing, receiving, and storing of food, beverages, and supplies. Rec 2, Lab 4. Cr 4.

**HNF 201 Food Service Systems Management II**

Application of Management theories in a food service. Study of selected food service systems with emphasis on quality assurance, cost control, and training personnel. Covers local, state, and federal regulations, and current trends affecting management. Prerequisite: HNF 200. Rec 2, Lab 4. Cr 4.

**HNF 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. Cr 3.

**HNF 280 Human Nutrition for the Health Professions**

Designed for nursing students and others in the health professions. Discussion of both normal and abnormal nutrition, metabolism and nutrient intake evaluation. Prerequisites: BCH 208 and ZOL 208. Cr 3.

**HNF 301 Life Cycle Nutrition**

Principles of nutrition applied to meeting dietary needs of individuals throughout their life cycle. Study of relationship among nutrition, growth, development, and maturity with emphasis on physical and psychosocial considerations affecting food intake. Prerequisite: HNF 101. Cr 3.

**HNF 330 The Science of Food Preparation**

Factors that determine results obtained in preparation and preservation of food. Focus on selection of appropriate preparation techniques, considering chemical composition reac-

tions and structure. Prerequisite: HNF 103, BCH 208 or BCH 322. Lec 2, Lab 4. Cr 4.

**HNF 340 Experimental Foods**

An experimental approach to the preparation of foods. An individual project will be selected, defined, planned, executed, reported and evaluated. Prerequisites: HNF 330 or FOS 203, BCH 322 and junior and senior standing. Lec 1, Lab 4. Cr 3.

**HNF 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. Prerequisites: HNF 101, HNF 103, senior standing or permission. Lec 2, Lab 4. Cr 4.

**HNF 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: BCH 322 and ZOL 207 or equivalent. Cr 3.

**HNF 420 Nutrition in Abnormal Conditions**

Principles involved in adjusting diets for diseases and abnormal conditions that may benefit from variations in normal diets. Prerequisites: HNF 410 and ZOL 377, ZOL 378. Lec 3, Lab 2. Cr 4.

**HNF 471 Recent Advances in Food and Nutrition**

Results of recent research and trends in food and nutrition with emphasis on their import for educational programs and related subjects. Prerequisite: courses in food and nutrition or permission. Cr 3.

**HUD 396 Field Experience in Human Development**

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 in a job related to their professional career goals. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

**HUD 404 Selected Topics in Human Development**

Review of specific subject areas in the field. Subject areas vary by semester. (May be repeated for credit.) Cr 1-3.

**HUD 409 Special Problems in Human Development**

Prerequisite: permission. Cr Ar.

**HUD 501 Topics in Advanced Human Nutrition**

Basic scientific and medical discoveries in human nutrition with emphasis on biological and physiological principles. Relationships of diet to human health and well-being. Prerequisite: BCH 322, HNF 410, ZOL 377, ZOL 378 or equivalent. Cr 3.



**HUD 502 Seminar in Nutrition**

Reports on and discussion of recent developments in nutrition and related fields with special attention to critical analysis. Prerequisite: HNF 410 or equivalent. Cr 1-2.

**HUD 503 Nutrition and Food-Related Behavior**

Physiological, psychological and sociocultural influences on food-related behavior of individuals. Understanding regional food patterns and multiple influences that have a role in changing food behavior. Prerequisites: HNF 401 or permission. Cr 3.

**HUD 505 Psychodynamics of the Family**

Review of literature and research concerning the family, stressing interpersonal processes and communication. Prerequisite: Permission of the instructor. Cr 3.

**HUD 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. Prerequisites: HNF 410 and ZOL 377 or permission. Cr 3.

**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.

**HUD 531 Topics in Apparel, Textiles and Design**

Prerequisite: permission. Cr 1-3.

**HUD 535 Recent Research in Child Development**

Advanced study of topics of current interest in the field of child development. Reports and evaluation of current research. Prerequisite: Permission of the instructor. (May be taken more than once for credit). Cr 3.

**HUD 540 Theories and Concepts of Family Development**

An interdisciplinary and developmental approach to the evaluation of theories used in the study of family functioning. Prerequisite: Permission of the instructor. Cr 3.

**HUD 550 Organization and Administration of Early Childhood Education Programs**

Current organization, policies and programs for day care, nursery school, non-public kindergarten, and experimental early childhood programs are explored and evaluated. Cr 3.

**HUD 560 Seminar in Child Development**

Reports and discussions of research findings in child development. Cr 3.

**HUD 579 Special Problems in Home Economics Education**

Cr 1-3.

**HUD 596 Nutrition Education Practicum**

A planned program of nutrition education experiences in community, state and federal agencies and in an educational setting selected to meet individual needs. Prerequisite: HUD 503. Cr 1-6.

**MCR 222 Apparel Analysis and Construction**

Fundamentals of apparel construction and analysis of fit. Decision-making skills emphasized. Lec 2, Lab 2. Cr 3.

**MCR 225 Consumer Textiles**

Fundamentals of fibers, yarns, fabrications, and finishes as related to consumer selection, use and care of textiles. Cr 3.

**MCR 231 Design Appreciation**

Develops sense of line, form, color, and texture through application of design principles to achieve visual order. Practice in critical thinking and discriminating attitudes toward selection and evaluation of design forms and expression. Cr 3.

**MCR 233 Applied Design**

Application of design principles to problems in visual merchandising such as displays, advertising, and other promotional media. Prerequisite: MCR 231. Lab 2, Lec 2. Cr 3.

**MCR 270 Seminar in Merchandising and Consumer Resources**

Introduces pre-service professionals to philosophies, career opportunities and objectives, and the professional environment. Rec 1. Cr 1.

**MCR 371 Curriculum Development in Home Economics Education and Family Life**  
Current educational philosophies, principles and practices, and their application to home economics and health education through program planning and curriculum development. Prerequisite: MCR 270 or permission. Cr 3.

**MCR 372 Techniques of Teaching Home Economics and Health and Family Life**

Selection and use of teaching strategies and materials to promote development of concepts and thinking processes in the classroom. Reinforced through microteaching and experience in public school classrooms. Prerequisite: MCR 270 and MCR 371. Cr 3.

**MCR 373 Supervised Student Teaching**

Full semester student teaching in an approved junior or senior high school under direction of the local teacher and University supervisor. Students are expected to live in the school community. Opportunity to achieve competencies in teaching skills, professional role and subject matter concepts. Prerequisite: MCR 270, MCR 371 and MCR 372. Cr 15.

**MCR 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.

**MCR 424 Creative Clothing Construction**

An introduction to the principles of fashion design through the application of flat pattern methods. Students will develop a personal master pattern and create an original garment design. Prerequisite: MCR 222 or permission. Lec 2, Lab 2. Cr 3.

**MCR 425 Fashion Evolution**

Historic modes of dress from Ancient Egypt to the present day as reflection of social, political, economic and cultural developments. Costume viewed in relation to art as an integrated and characteristic expression of its period. Lec 3. Cr 3.

**MCR 428 Seminar: Dress and Adornment**

Interdisciplinary study of dress and adornment within the context of cultural, social, psychological, physical, economic, and aesthetic relationships. Cr 3.

**MCR 429 Fashion Entrepreneurship**

Principles of merchandising and managerial techniques applied to small business entrepreneurship. Covers home based business considerations and computer applications for merchandise control and record keeping. Student will develop an individual store plan. Cr 1-3.

**MCR 435 Fashion Marketing and Merchandising**

Theories of marketing, merchandising and buying applied to apparel and home furnishings. The interrelationships of the fashion industry to economic, social, political, legal and historical environments are incorporated into merchandising strategies. Prerequisites: MCR 231, MCR 225 or permission. Cr 3.

**MCR 476 Adult Education**

Explores the need for and purpose of adult education programs. Considers learning program development, organization, and administration of programs. Emphasis on adult education through the public schools, Cooperative Extension Service, and community agencies. Cr 3.

**MCR 485 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. Prerequisite: junior standing. Cr 3.

**MCR 487 The Consumer in the Present Economy**

Examination of consumer problems, dimensions of the consumer role, interactions between consumers, government and the market. Appraisal of information sources for consumers and analysis of consumer protection programs. Cr 3.



**ICR 488 Explorations in Current Consumer Issues**

Issues of legal interest to consumers. Social and economic effects on families will be emphasized. Cr 3.

**ICR 491 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. Prerequisite: junior standing. Cr 3.

**ICR 492 Interior Design**

Planning residential interiors to meet needs of individuals and families, including selections and organization of furnishing and materials, layout in floorplans and wall elevations, his-

toric and contemporary interiors and furnishings. Prerequisite: MCR 231 or permission. Cr 3.

**MCR 493 Equipment and Energy Usage**

Examines consumer buying of equipment for the home as well as energy conservation in the use of small electric and major appliances. Prerequisite: junior standing. Cr 3.

**Interdisciplinary Courses**

**INT 250 (HUD) Forum on Food**

Introduction to the broad concept of food, its procurement, distribution and relationship to human health. Not open to first-year students. Cr 3.

**INT 476 (HUD) School and Society Study Tour**

A field based, interdisciplinary study tour of educational facilities such as schools, hospitals, food services and selected agencies in foreign countries. Lectures, seminars, tours and presentations by teachers and officials will supplement guided visits to classrooms, hospitals, food services and agencies. Cr 3.





## Special College-wide Course, Programs and Minors

### College-wide Course

The course, ASA 117 Issues and Opportunities, consists of weekly group meetings with the students first year advisor. Academic and social concerns will be discussed along with personal career and professional development. (Pass/Fail Grade Only). Cr. 1.

### Honors Program

The Honors Committee of the College of Applied Sciences and Agriculture consists of J. Delphendahl, J. Dimond, M. Gershman (Secretary), S. Goltz, R. Milardo, R. Rowe, and B. Slabyj.

First year students of marked academic ability are invited to apply to the secretary for admission to the sequence of honors courses listed here. The work of the first and sophomore years, under the direction of staff drawn from all colleges of the University, provides the stimulus and guidance which should enable a superior student to begin building a perspective of the liberal arts and sciences and to lay a foundation for more specialized work to come. The Honors Program climaxes in a research project and thesis to be written during the senior year, that treats some special area within the student's major field. Students may be admitted at any stage of the Honors Program up to the end of the sophomore year. Of the courses listed below, HON 101 (Honors Seminar I), 102 (Honors Seminar II), 301 (Honors Group Tutorial I), and 302 (Honors Group Tutorial II) are taken in common with students from other colleges within the University. These courses, plus HON 397 (Honors Specialized Study), 498 (Honors Directed Study), and 499 (Honors Thesis) constitute the core of the program.

Additional information about the Honors Program and a full description of courses may be found elsewhere in this catalog.

HON 101 or 102 meets the ENG 101 requirements of the College. HON 101, 102 and HON 301, 302 may be used to meet up to nine hours of the humanities and social sciences requirements of the college. Any honors course meets the free elective requirements in any program of study.

### Minors

A *Minor* is a secondary specialization in a discipline or in a formal interdisciplinary program which complements or augments the *Major* program. Students choosing to take a minor usually do so either to strengthen their preparation in the major program or to prepare themselves for a broader range of career opportunities. Once all of the requirements of the minor program are met, the Associate Dean's office will certify to the Registrar that the minor has been completed.

The Registrar will add the words *Minor in Human Nutrition and Foods* (for example) to the student's official university transcript.

Minors are strictly optional: you are not required to complete a minor. If you do decide to complete a minor, the requirements of the minor are in addition to the specific requirements of your major. The specific requirements for each approved minor are detailed in the pages that follow, but all require at least 15 credit hours of courses above the introductory level. Most students who take a minor use their free elective credits to accommodate the requirements of the minor program. Thus, in most cases it is not necessary to take more than 120 credits to complete a minor.

If you decide to work towards a minor program in addition to the major, you need to visit the Associate Dean's Office, 106 Winslow Hall, to declare your intentions. If this is not done, we cannot guarantee that proper certification of the minor will appear on the transcript. If you should begin work on a minor but fail to meet all of the requirements, there is no penalty: no reference to the minor will appear on the transcript.

If you are majoring in a program in another college at the University of Maine, check with that college regarding their regulations on minors. Some colleges do not recognize minors; other do, but may not recognize all of the programs listed here.

### Sustainable Agriculture

(18 credits)

The minor in Sustainable Agriculture requires completion of 18 credits from the following courses.

AVA 445 Sustainable Livestock Production Systems  
BRE 248 Engineering for a Sustainable Agriculture  
INT 450 Agricultural Pest Ecology  
INT 482 Pesticides and the Environment  
PSE 101 Cropping Systems  
PSE 105 Principles and Practices of Sustainable Agriculture  
PSE 248 Soil Organic Matter and Fertility  
PSE 445 Agricultural Ecology

### Agribusiness and Resource Economics

(18 credits)

The requirements for the minor in Agribusiness and Resource Economics include:

A course in Economics (ARE 148 or INT 110)

Plus the following required core of courses:

ARE 458 Principles of Resource Business Management

ARE 459 Resource Based Business Finance

ARE 465 Food and Fiber Marketing OR

ARE 371 Introduction to Natural Resource Economics and Policy

Plus two courses selected from the following list:

ARE 422 Human Factors in Resource Development

ARE 454 Introduction to Production Economics

ARE 468 Price Analysis and Forecasting

ARE 471 Resource Economics

ARE 473 Land Economics

ARE 474 Land Use Planning

ARE 486 Government Policies Affecting Rural America

ARE 453 Farm Management

ARE 518 Mathematical Optimization Techniques

ARE 554 Production Economics

ARE 565 Marketing Theory and Concepts in Agribusiness

### Animal, Veterinary, and Aquatic Sciences

(19-21 credits)

Prior to enrolling in the minor in Animal and Veterinary Sciences, the student must consult with the chairperson of the department to select the option most appropriate to background and career goals, and to arrange any course substitutions which may be appropriate.

The requirements for the minor in Animal, Veterinary and Aquatic Sciences include:

AVA 145 Animal Science

Plus, the student selects one of the two options detailed below.

#### *Animal Industry Option*

Select two courses from the following list:

AVA 346 Dairy Cattle Technology

AVA 348 Livestock Management

AVA 285 Applied Avian Biology

Select an additional two courses from the following list:

AVA 480 Physiology of Reproduction

AVA 461 Advanced Animal Breeding

AVA 456 Applied Animal Feeding

AVA 437 Animal Diseases

Plus *one* of the following two courses:

INT 265 Meat Technology

FOS 301 Food Processing Industry Principles and Problems

#### *Animal Sciences Option*

Select one course from the following list:

AVA 346 Dairy Cattle Technology

AVA 348 Livestock Management

AVA 285 Applied Avian Biology



Plus four courses from the following list:

- AVA 437 Animal Diseases
- AVA 455 Animal Nutrition
- AVA 456 Applied Animal Feeding
- AVA 480 Physiology of Reproduction
- AVA 461 Advanced Animal Breeding
- AVA 472 Endocrinology

## Botany

(19-20 credits)

The minor in Botany is designed for non-majors who would like to develop a basic understanding of the structure, function, and diversity of plants. The requirements for the minor in botany include the following four courses:

- BOT 203 The Plant Kingdom
- BOT 435 Plant Anatomy
- BOT 452 Plant Physiology
- BOT 453 Plant Physiology Lab
- BOT 464 Taxonomy of Vascular Plants

In addition, the minor includes an additional 1-4 credits in BOT courses numbered above the introductory level. Please note that the minor in botany is not open to students majoring in biology.

## Chemistry

(15 credits)

The requirements for the minor in Chemistry include completion of at least 15 credits of CHY courses at the 200 level or above, which may include up to three credit hours of undergraduate research in Chemistry.

In order to maintain maximum flexibility in meeting a student's needs, the minor in Chemistry has no specific course requirements. Each student's minor program shall be formulated in consultation with, and approved by, a Chemistry faculty advisor. The approved program will be filed with the office of Associate Dean, Applied Sciences and Agricultural, at the time the student formally declares an intention to pursue the minor in Chemistry.

## Computer Science

(18 credits)

The requirements for the minor in Computer Science include:

- COS 220 Introduction to Computer Science I
- COS 221 Introduction to Computer Science II
- COS 230 Computer Architecture and Assembly Language

Plus any three additional COS courses at the 300 level or above.

## Education

The minor in Education is designed to prepare students in the life sciences or agricultural sciences to become certified to teach in Maine secondary schools. Students majoring in one of

the life sciences meet all science subject matter requirements as a part of their regular programs. Students majoring in the agricultural sciences (such as animal science, for example) may need to take additional science courses to meet science certification requirements.

Teacher certification for Maine is awarded by the Maine Department of Education. Applicants for certification must take the National Teachers Exam.

All students planning a minor in education must consult the College of Education early during their program. This is important so that a student can be updated on current certification requirements. In some cases it may be necessary to extend a program to complete the requirement. However, with careful planning early in the program, it may be possible to complete the program in eight semesters.

The requirements for the minor in Education include:

- PSY 100 General Psychology\*
  - EDB 202 The American School\*
  - EDB 204 The Teaching Process
  - EDB 221 Educational Psychology\*
  - EDG 400 Field Observation
  - ESC 452 Teaching Science in the Secondary School
  - STT 491 Student Teaching (Secondary)
- Courses marked by an asterisk(\*) may be counted toward meeting the LSA humanities/social sciences requirement.
- CHF 201 Introduction to Child Development
  - SED 402 Mainstreaming Exceptional Students
  - EDC 333 Curriculum Development and Evaluation

## Foods and Nutrition

(18 credits)

The courses which make up the minor in Foods and Nutrition are to be selected from the following approved list in consultation with a member of the nutrition faculty. Courses will be chosen to complement each student's academic background and to further individual career goals. While the minor is open to all ASA students, it may be of particular interest to students majoring in Child Development. The minor *does not* lead to credentialing in the field of dietetics without further study.

The courses from which the minor in Foods and Nutrition is selected include:

- HNF 101 Introduction to Food and Nutrition
- OR
- HNF 170 Fundamentals of Nutrition
- AND
- HNF 102 Introduction to Food and Nutrition Laboratory (prerequisites for all other HNF courses)
  - HNF 103 Family Food Management
  - HNF 200 Food Service Systems Management I

HNF 201 Food Service Systems Management II

HNF 340 Experimental Foods

HNF 270 World Food and Nutrition

HNF 401 Community Nutrition

HNF 280 Human Nutrition for the Health Professions

HNF 301 Life Cycle Nutrition

HNF 471 Recent Advances in Food and Nutrition

HNF 398 Special Problems in Food and Nutrition

HNF 410 Human Nutrition and Metabolism

HNF 420 Nutrition Abnormal Conditions

## Foreign Languages

(18 credits)

Minors in French, German, Latin, Russian and Spanish consist of a minimum of 18 credit hours in the chosen language above the elementary level courses.

## Geology

(18 or 20 credits)

The requirements for the minor in Geology include:

GES 101 Aspects of Natural Environment I

OR

GES 106 Geology for Engineers

Plus the following courses:

GES 102 Aspects of the Natural Environment II

GES 311 Minerology

GES 312 Introduction to Petrology

Plus an upper level geology elective.

## History

(18 credits)

The requirements for the minor in History include 6 courses from the following:

HTY 215 The World in the 20th Century I

HTY 216 The World in the 20th Century II

HTY 217 The Environmental History of Europe

HTY 277 History of the Treatment of the American Environment

HTY 332 Womanhood in America

HTY 409 Twentieth Century Europe, 1919 to Present

HTY 414 Law and American Society

HTY 420 Science and Society Since 1800

HTY 468 America Since 1945

HTY 485 The Sea and Civilization: An Introduction to Maritime Studies I

HTY 486 The Sea and Civilization: An Introduction to Maritime Studies II

HTY 491 Technology and Society Until 1800

HTY 492 Technology and Society Since 1800



## Journalism

(21 credits)

The requirements for the minor in Journalism include:

JMC 100 Introduction to Mass Communication

Plus the following core of courses:

JMC 237 Reporting and Newswriting I

JMC 238 Reporting and Newswriting II

JMC 330 Copy Editing

JMC 332 Public Affairs Reporting

JMC 375 Mass Media Law and Ethics

JMC 489 Seminar-Media Ethics and Issues

## Marine Resources

(18 credits)

Professor Robert Bayer, Coordinator

The minor in Marine Resources is designed for students in the College of Applied Sciences and Agriculture and the College of Sciences who wish to apply the knowledge and skills developed through their major programs to the problems of the marine environment. The minor consists of a common core plus two options (marine technology and marine resource utilization).

The requirements for the minor in Marine Resources include (prerequisites for courses are listed in parentheses):

AVA 220 Topics in Marine Resources

OCE 370 Introduction to Oceanography (permission)

ARE 471 Resource Economics (ARE 148 or ECO 110) OR

INT 360 Economics and the Biology Marine Fish Management (ECO 110)

Plus *ten* or more credit hours of courses from the following option lists, chosen to include at least *two* courses from one of the two areas of specialization.

### Marine Resource Utilization

INT 319 Ecology (BIO 100)

ARE 171 Economics of Environmental Quality

ARE 577 Economics of Public Choice (ECO 420)

MCB 520 Fish Diseases (ZOL 204, MCB 300 or permission)

AVA 212 Maine Mariculture (ZOL 353)

AVA 211 Aquaculture

AVA 409 Shellfisheries Biology (ZOL 443, or permission)

ZOL 470 Fishery Biology (ZOL 331, a course in ecology)

ZOL 573 Fisheries Science (ZOL 470)

BOT 473 Biology of Algae (BIO 100, BOT 203)

BOT 475 Algal Growth and Seaweed Mariculture (BIO 100, BOT 203, and one year of chemistry or permission)

BOT 503 Natural History and Ecology of Marine Algae (BOT 473, a course in ecology)

### Marine Technology Option

BRE 469 Agricultural Process Engineering (MEE 230, 360)

BRE 550 Simulation of Biological and Physical Systems (MAT 126, knowledge of FORTRAN)

CIE 458 Coastal Engineering (CIE 350)

CIE 558 Advanced Coastal Engineering (CIE 458, MAT 259)

CIE 559 Numerical Modeling of Lake and Estuarine Processes (MAT 259)

In addition to the courses listed above, co-op education courses and special problems courses (available through the individual departments in LSA) may be included in the ten credit hours of courses beyond the core. *However, inclusion of these courses requires the advance written approval of the Coordinator of the Concentration in Marine Resources.*

## Mathematics

(18-19 credits)

The requirements for the minor in Mathematics include:

MAT 152 Calculus for the Life Sciences II

MAT 228 Analytic Geometry and Calculus

MAT 262 Linear Algebra

Select one of these options:

MAT 259 Differential Equations

MAT 457 Introduction to Mathematical Modeling

OR

MAT 487 Numerical Analysis Statistics

MAT 434 Introduction to Statistics

MAT 435 Introduction to Mathematical Statistics

OR

MAT 439 Regression and Analysis of Variance Operations Research

MAT 455 Introduction to Operations Research I

MAT 456 Introduction to Operations Research II

## Philosophy

(15 credits)

The requirements for the minor in Philosophy consist of the following:

PHI 410 History of Ancient Philosophy

OR

PHI 412 History of Modern Philosophy

Plus an additional 12 credits of PHI courses, *at least 9 credits of which shall be courses above the 100-level.*

## Physics

(23 credits)

The requirements for the minor in Physics include:

PHY 111/112 General Physics I/II

OR

PHY 121/122 Physics for Engineers and Physical Scientists I/II

PHY 236 Introductory Modern Physics

PHY 238 Mechanics

Plus nine credits from the following list:

PHY 441 Electricity and Magnetism I

PHY 447 Biophysics

PHY 462 Heat and Thermodynamics

PHY 469 Quantum and Atomic Physics

PHY 470 Nuclear Physics

PHY 471 Nuclear Physics Laboratory

PHY 472 Geometric and Fourier Optics

PHY 473 Geometric and Fourier Optics Laboratory

## Plant, Soil and Environmental Sciences

(17-22 credits)

The Department of Plant, Soil and Environmental Sciences offers minors with concentrations in landscape horticulture, plant science, and soil science. Each minor consists of a core of required courses plus a group of elective courses from which the student chooses three.

The requirements for the minor in Landscape Horticulture include:

BIO 100 Basic Biology

PSE 110 Horticulture

PSE 140/141 Soil Science/Laboratory

OR

PSE 150 Forest Soil Science

PSE 370 Senior Seminar in Plant, Soil and Environmental Sciences

Plus two courses from the following list:

PSE 120 Herbaceous Landscape Plants

PSE 221 Woody landscape Plants I

PSE 222 Woody Landscape Plants II

Plus one course from the following list:

PSE 124 Greenhouse Management

PSE 223 Nursery and Garden Center Operation

PSE 328 Landscape Design

Plus one additional course selected from the following list:

BOT 201/202 Plant Biology

BOT 452/453 Plant Physiology

BOT 457 Plant Pathology

BOT 464 Taxonomy of Vascular Plants

ENT 328 Introductory Applied Entomology

PSE 410 Plant Propagation

PSE any 200 level or higher course from the above list

The requirements for a minor in Soil Science include the following:

PSE 140/141 Soil

Science/Laboratory

OR

PSE 150 Forest Soil Science

PSE 144 Soil and Water Conservation

PSE 146 Land Use Planning - Soil

Aspects

PSE 370 Senior Seminar in Plant, Soil and Environmental Sciences

PSE 440 Soil Chemistry and Plant Nutrition

PSE 442 Soil Taxonomy



Plus at least three from the following list:

- PSE 100 Plant Science
- PSE 105 Principles of Sustainable Agriculture
- PSE 160 Environmental Issues: The Atmosphere
- PSE 248 Soil Organic Matter and Fertility
- PSE 444 Soil Morphology and Mapping
- PSE 448 Soil Microbiology
- PSE 451 Physics of the Plant Environment

The requirements for a minor in Plant Science include the following:

- BOT 452/453 Plant Physiology/Laboratory
- PSE 100 Plant Science
- PSE 101 Cropping Systems
- PSE 370 Senior Seminar in Plant, Soil and Environmental Sciences

Plus one course from the following list:

- BOT 464 Taxonomy of Vascular Plants
- PSE 401 Advanced Crop Management
- PSE 410 Plant Propagation
- PSE 440 Soil Chemistry and Plant Nutrition

PSE 445 Agricultural Ecology

PSE 479 Crop Physiology

Plus two additional courses from the list above or from the following list:

- PSE 110 Horticulture
- PSE 105 Principles of Sustainable Agriculture
- PSE 120 Herbaceous Landscape Plants
- PSE 124 Greenhouse Management
- PSE 140/141 Soil Science/Laboratory OR
- PSE 150 Forest Soil Science
- PSE 248 Soil Organic Matter and Fertility
- PSE 451 Physics of the Plant Environment

### Psychology

(18 credits)

The requirements for the minor in Psychology include:

- PSY 341 Statistics in Psychology I
- PSY 345 Principles of Psychological Research
- PSY 470 History and Systems of Psychology

Plus three courses selected from the following list:

- PSY 350 Cognition
- PSY 351 Psychology of Motivation
- PSY 352 Learning and Motivation
- PSY 356 Theories of Learning
- PSY 361 Sensation and Perception
- PSY 363 Mechanisms of Animal Behavior
- PSY 365 Physiological Psychology

### Zoology

(19 credits)

The requirements for the minor in Zoology include:

ZOL 204 Animal Biology

Plus at least 15 credit hours of zoology courses at the 200 level or above. The most appropriate courses should be selected in consultation with the academic advisor of the *major* program.

NOTE: The minor in Zoology is *NOT* open to students majoring in biology.





## Technical Division

Three associate degree programs are offered at the University of Maine by the College of Applied Sciences and Agriculture (ASA) through its Technical Division. The programs are administered through their respective departments at Orono. Course offerings in the technical programs are distinct and separate in most cases, from those offered for baccalaureate degree students. The technical courses are more applied and place emphasis upon the development of skills for immediate application. Technical instruction is provided by faculty who also teach at the baccalaureate and graduate levels and conduct research in their technical areas. Laboratory instruction and field experience represent an essential part of the technical training program.

The basic objectives of educational programs in the Technical Division are: (1) to provide a practical working knowledge of fundamental principles in specific technical fields which will develop competence for gainful employment; (2) to develop competence in written and oral communications; (3) to contribute to the development of the student's intellectual and personal growth; and (4) to prepare graduates

for roles as citizens and effective community leaders.

While the programs are not specifically designed as preparatory for four-year professional curricula, there is a recognized continuum permitting able students whose educational objectives change to transfer to four-year programs upon the successful completion of an associate degree. Students graduating from associate degree programs in the College of Applied Sciences and Agriculture with an accumulative average of 2.5 or above may transfer to most four-year B.S. degree programs at UM. The student must satisfy the entrance requirements to the desired baccalaureate degree program. Two to three additional years generally are required to complete the baccalaureate degree, depending upon the program selected.

An associate of science degree is awarded to graduates of the programs. Requirements for this degree include the satisfactory completion of a prescribed technical curriculum with a minimum of 60 credit hours earned at an accumulative grade point average of 2.0.

All students admitted to programs in the Technical Division are required to take profi-

ciency exams in math, reading, and writing. Successful completion of these exams allows the student to proceed with the course requirements stated in each program. Students not passing the proficiency exams will be required to take the appropriate developmental course. Developmental courses are non-degree credit and may extend the time required to complete the degree beyond two years.

A basic core curriculum of general education subjects is required in all programs, along with the technical subjects. All students enrolled in the Technical Division are expected to complete the following group of courses representing a basic core requirement:

### Basic Core Curriculum

ASA 100A Seminar in Program	1
Major	
ENG 101A Critical Written	3
Expression	
SPE 101A Oral Communications	3
Humanities or Social Science	
Elective	3

## Associate of Science in Animal Medical Technology

The course of study provides technical training and experience for careers as veterinary aides, laboratory animal technicians in biological and medical research laboratories, small animal hospitals, and commercial testing laboratories for pharmaceutical and feed industries. The curriculum provides specialized courses in animal care, handling, anatomy, physiology, and in-laboratory clinical work. A final semester of formal course work is required with a laboratory animal facility and a veterinarian with a faculty appointment.

### Curriculum

#### Basic Core

ASA 100A Seminar in Animal	1
Medical Technology	
ENG 101A Critical Written	3
Expression	
SPE 101A Oral Communications	3

Humanities and Social Sciences	
Elective	3
MAT 101A Mathematics For the	
Consumer	3
<b>TOTAL HOURS</b>	<b>13</b>

#### Fundamental Sciences

AVA 105A Data Management for	1
Veterinarians	
AVA 109A Mammalian Anatomy	3
AVA 110A Mammalian Physiology	3
AVA 119A Laboratory Animal	
Diseases	3
BCH 125A Chemistry for Animal	
Technology	5
INT 120A Basic and Pathogenic	
Microbiology	5
<b>TOTAL HOURS</b>	<b>20</b>

#### Applied Technology

AVA 113A Large Animal Care and	3
Handling	
AVA 114A Laboratory Animal	3
Technology I	
AVA 116A Laboratory Animal	3
Technology II	
AVA 123A Clinical Laboratory	3
Methods	
AVA 124A Laboratory Methods	3
Practicum	
AVA 128A Radiology	2
<b>TOTAL HOURS</b>	<b>17</b>
AVA 130A Practicum in Animal	
Medical Technology: Externship	16

**TOTAL HOURS REQUIRED FOR ASSOCIATE DEGREE: 66**

## Associate of Science in Landscape and Nursery Management

The Landscape and Nursery Management Program is offered cooperatively by the Department of Plant, Soil and Environmental Sciences of the University of Maine and the Southern

Maine Technical College of South Portland. Students may enroll and take their first year at either institution. The second year of the program is taken at Orono and the student receives

an associate of science degree from the University of Maine.

The curriculum focuses on preparing the student for designing and interpreting landscape



plans; planting and cultivating trees, shrubs, and flowers; building and maintaining lawns; constructing landscape features including walks, paths, small pools, and walls; and the production, harvesting, and sale of ornamental plants. The program also provides a background in mathematics, English, and those areas important to those in business dealing with the public. All students in the program are required to earn four credit hours of specialized on-the-job training before graduating from the program.

The landscape and nursery industry, which services many and employs several thousand persons, has become a multibillion dollar concern in this nation. The current emphasis on environmental improvement indicates the awareness and growing interest in the use of trees, shrubs and flowers for the beautification of municipal properties, urban areas, and the countryside. This and other factors have created a shortage of skilled personnel to design, plant, care for, and distribute the ornamental plant materials used throughout the country.

According to a recent survey of the industry in Maine, many employment opportunities exist for qualified landscape and nursery technicians. The survey also indicated the increasing need for these technically trained individu-

als through the next ten years. The young person who prepares for a career in this field has almost unlimited opportunities. For more information call (207) 581-2948 or 581-2938.

### Curriculum

#### Required Courses

ASA 100A Seminar in Landscape and Nursery Management 1

#### Communications

ENG 101A Critical Written Expression 3

SPE 101A Oral Communications 3

ENG 230A Business, Professional and Technical Writing 3

TOTAL HOURS 9

#### Humanities and Social Sciences

Elective 3

TOTAL HOURS 3

#### Basic Sciences

BOT 101 Introductory Botany 4

ENT 101A Applied Entomology 3

TOTAL HOURS 7

#### Applied Sciences

BRE 107A Landscape Machinery 3

LNM 123A Nursery/Garden Center Operations 3

LNM 126A Turfgrass Management 3

LNM 128A Landscape Design 3

LNM 140A Soils and Fertilizers 4

LNM 196A Field Experience in Landscape and Nursery Management 1

PSE 110 Horticulture\* 3

PSE 120 Herbaceous Landscape Plants\* 3

PSE 124 Greenhouse Management\* 4

PSE 221 Woody Landscape Plants I\* 3

PSE 222 Woody Landscape Plants II\* 3

TOTAL HOURS 40

Electives 2

TOTAL HOURS REQUIRED FOR ASSOCIATE DEGREE: 60

TOTAL HOURS REQUIRED FOR ASSOCIATE DEGREE: 60

\*See Plant, Soil and Environmental Sciences section for course descriptions.

## Associate of Science in Merchandising (Apparel and Home Furnishings)

In recent years, the rapid technological development of new textiles, new finishing processes for existing textiles, and new materials for home furnishings has created a need for personnel in the retail field at the supervisory and managerial levels who have an understanding of these materials. The curriculum provides specialized courses in textiles, apparel, interiors and home furnishings, design elements and principles, and visual and fashion merchandising.

At the completion of the second semester, a placement training program is offered to those students who meet eligibility requirements. This course is designed to provide on-the-job training. The cooperating merchant compensates the student at the same wage level as other beginning employees in his or her organization. The student who does not elect placement training substitutes pertinent academic courses in the third semester, including a student-managed campus boutique. Upon completion of the Associate Degree with a grade point average of 2.5, students who desire a broader education and more depth of study in fashion merchandising may transfer into the baccalaureate degree program in merchandising and consumer resources. A full range of management positions and retail executive training programs is available to holders of the B.S. degree. The four-year curriculum is planned so that a student may complete the second two years with a minimum of 60 additional credit hours.

### Curriculum

#### Basic Core

ASA 100A Seminar in Merchandising 1

PSY 101A Introduction to Psychology 3

ENG 101A Critical Written Expression 3

SPE 101A Oral Communications 3

MAT 101A Mathematics for the Consumer 3

Humanity or Social Science Elective 3

TOTAL HOURS 16

#### Technical Apparel and Home Furnishings

CLD 101A Introduction to Design 3

CLD 103A Textiles: Fiber to Fabric 3

CLD 104A Designing and Furnishing the Home 3

CLD 105A Retail Management 4

CLD 106A The Apparel Consumer 3

CLD 107A Visual Merchandising 3

CLD 108A Fashion Merchandising 3

TOTAL HOURS 22

#### Business and Economics

BUS 101A Principles of Microeconomics 3

BUS 201A Marketing 3

SOC 101A Sociology 3

BUS 104A Financial Accounting 3

BUS 220A Personal Selling 3

TOTAL HOURS 15

Electives 7

TOTAL HOURS REQUIRED FOR ASSOCIATE DEGREE: 60

### Placement Training: CLD 196A.

Students electing placement training for one semester will receive 14 credit hours in place of 7 hours of elective credit, CLD 105A and BUS 201A. Students may also elect CLD 196A on a part-time basis for fewer credits.

### Courses in Agricultural and Resource Economics

#### ARE 110A Economics

Economic principles applied to solving problems of the consumer and business. Covers the interdependence of the natural resource sector with national economic forces influencing prices, competition, level of employment and economic growth. Rec 3. Cr 3.

#### ARE 120A Statistics

The nature and use of statistics, including methods of collecting, organizing, interpreting, and reporting data for business management decisions. Measurement of central tendency, trends and relationships, sampling variability, and quality control. Rec 2, Lab 2. Cr 3.



**ARE 122A Data Processing**

Introduction to the principles and techniques of microcomputer processing. Practical applications are included. Rec 3. Cr 3.

**ARE 130A Accounting**

The principles and procedures used in the preparation of balance sheets and income statements. Covers systematic recording, classifying, and analyzing of business transactions. Preparation and presentation of accounting information. Rec 2, Lab 2. Cr 3.

**ARE 132A Agribusiness Accounting**

A continuation of introductory accounting. Includes valuation and analysis of stockholders' equity and liabilities, preparation of statement of changes in financial position and consolidated financial statements, accounting for inflation, and financial statement analysis. Cr 3.

**ARE 140A Introduction to Organizational Behavior**

Describes and explains the systems and subsystems which comprise an organization's structure. Develops skills needed to successfully manage either a small scale or large scale economic institution. Cr 3.

**ARE 141A Social and Economic Problems of Rural Life**

The social and economic problems of rural life. Covers the social systems of community, family, religion, education, and economics as well as leadership, power structure and social stratification. Rec 3. Cr 3.

**ARE 154A Farm Management**

Covers managing the farm business for optimum returns, economic guides to decision making, management tools and their application, organizing resources for production, adjustments to change. Rec 3. Cr 3.

**ARE 155A Business Management**

Covers forms of business organization, economic framework, the managerial functions, managerial decision making and concepts of managerial economics. Application of the principles of management in the agribusiness sector. Rec 3. Cr 3.

**ARE 160A Marketing**

Marketing and the basic activities involved in this function of modern business. Covers theoretical principles, consumer and product characteristics, trade practices, market channels, and the improvement of markets and marketing. Includes food and agricultural marketing applications and case analysis. Rec 3. Cr 3.

**ARE 162A Sales Promotion**

Studies the use of advertising, sales and merchandising techniques. Training of sales and service personnel. an interdisciplinary approach to promotion. Rec 3. Cr 3.

**ARE 196A Field Experience in Agriculture and Resource Economics**

Provides on-the-job training in a field related to program of study, under supervision of em-

ployer and appropriate department or school in the College of Applied Sciences and Agriculture. Prerequisite: C average. (Pass/Fail Grade Only). Cr Ar.

**ARE 197A Independent Studies**

Analysis of and readings on current management problems in production, processing, distribution, and marketing. Prerequisite: permission of instructor. Cr Ar.

**Courses in Animal Medical Technology****AVA 105A Data Management for Veterinarians**

An introduction to the software program commonly used by practicing veterinarians, including running inventory, health records, billing, vaccination reminders, etc. Provides a general orientation to microcomputers. Cr 1.

**AVA 109A Mammalian Anatomy and Physiology I**

A study of mammalian anatomy. Includes dissection of the cat. Lec 2, Lab 1. Cr 3.

**AVA 110A Mammalian Anatomy and Physiology II**

Examines the function of different organ systems and their interrelationship in mammals. Emphasis on the neuro-muscular, cardiovascular, renal, respiratory, digestive, endocrine and reproductive systems. Prerequisite: AVA109A. Lec 3. Cr 3.

**AVA 113A Large Animal Care and Handling**  
Familiarizes the student with handling and restraining large animals commonly encountered in veterinary practice. Lec 2, Lab 2. Cr 3.

**AVA 114A Laboratory Animal Technology I**  
The principles of humane animal care in clinics, hospitals and research laboratories, including animal house design, equipment and management problems. Characteristics of individual animal species will be studied. Lec 2, Lab 2. Cr 3.

**AVA 116A Laboratory Animal Technology II**  
A consideration of the principles of animal genetics and the principle of animal nutrition. Included with the animal genetics section: the DNA molecule, mitosis and meiosis, mono and dihybrid matings, sex determination and sex-linked genes, quantitative inheritance and systems of mating. The animal nutrition section will include an explanation of the various nutrients and how they relate to animal growth and reproduction, the digestive process, factors effecting the value of feeds, feeding systems for laboratory animals. Lec 2, Lab 1. Cr 3.

**AVA 119A Laboratory Animal Diseases**  
Principles of disease prevention and control as they apply to common laboratory rodents, carnivores and primates. Lec 3. Cr 3.

**AVA 121A Independent Study in Animal Medical Technology** Cr Ar.

**AVA 122A Problems in Animal and Poultry Production II** Cr Ar.

**AVA 123A Clinical Laboratory Methods**  
Theoretical and practical study of current laboratory procedures in veterinary medicine. Technical procedures in urinalysis, hematology, clinical chemistry, instrumentation and parasitology will be covered. Lec 2, Lab 2. Cr

**AVA 124A Laboratory Methods Practicum**  
Hands on experience of veterinary techniques including surgical preparation, instrument preparation and sterilization, anesthesia, and the demonstration of commonly used surgical methods. Lec 1, Lab 4. Cr

**AVA 128A Radiology**  
An introduction to radiology including the positioning of animals, operation of the X-ray machine, proper precautions, and development of quality films. Cr

**AVA 130A Practicum in Animal Medical Technology**  
Fourteen weeks of field experience in assigned laboratories and local veterinary facilities with UM appointments. The student will experience practical aspects of anesthesiology, radiology, nursing, ethics, public relations, pharmacology and assisting in surgery, and laboratory techniques and procedures. Periodic visits from the AMT director will monitor the students progress. (Pass/Fail Grade Only). Cr 1

**AVA 196A Field Experience in Animal, Veterinary and Aquatic Sciences**  
Provides on-the-job training in a field related to program of study, under supervision of employer and appropriate department or school in the College of Applied Sciences and Agriculture. Prerequisite: C average. (Pass/Fail Grade Only). Cr Ar.

**Interdisciplinary Course**

**INT 120A (AVA, BMMB) Basic and Pathogenic Microbiology**  
The basic principles of Microbiology involving the cultivation, separation, identification and control of microorganisms. The identification of pathogens will be stressed. Lec 3, Lab 4. Cr

**Courses in Bio-Resource Engineering**

**BRE 107A Landscape Machinery**  
Principles of construction, operation and adjustment of tractors and machines used in landscape management. Economics related to cost and management of mechanized operation. Laboratory includes test and adjustment of small engines and related equipment. Lec 2, Lab 2. (PST majors only) Cr

**BRE 116A Power and Machinery Systems**  
Construction principles and maintenance of spark ignition and diesel engines. Power transmission and hydraulic systems for mobile equipment. Economics of machinery operation. Lec 2, Lab 2. Cr



## Courses in Landscape Nursery Management

### LNM 123A Nursery and Garden Center Operations

The principles and practices of plant propagation, production marketing and sales in relation to the landscape horticulture industry. Emphasis on production systems and nursery and garden center business management. Cr 3.

### LNM 126A Turfgrass Management

Includes characteristics and identification, soil and environmental adaptation, propagation, specific uses and management requirements of grasses for turf. Fertilizing, clipping, watering and controlling weeds, insects, and diseases are covered. Renovation and construction of turf areas by seeding and sodding. Rec 2, Lab 2. Cr 3.

### LNM 127A Landscape Construction

A study of construction techniques and materials used. Emphasis on the basic knowledge and skills needed for planning and constructing terraces, steps, walls, fences, site furniture, decks, irrigation design and paving materials. Prerequisite: permission or LNM major only. Rec 2, Lab 2. Cr 3.

### LNM 128A Landscape Design

The principles of landscape design as applied to selected problems. Designed to prepare students for situations similar to those encountered in the industry. Prerequisites: Permission or LNM major only or LNM 127A. Rec 2, Lab 2. Cr 3.

### LNM 140A Soils and Fertilizers

Soil properties and their relation to crop production with special emphasis on management and use of commercial fertilizers. Rec 3, Lab 2. Cr 4.

### LNM 150A Fundamentals of Forest Soils

A study of the basic properties and processes of forest soils with emphasis on factors influenc-

ing tree growth in commercial forests. Rec 2, Lab 2. Cr 3.

### LNM 196A Field Experience in Landscape and Nursery Management

Provides on-the-job training in a field related to the student's program of study, under supervision of employer and the department of Plant, Soil and Environmental Science in the College of Applied Sciences and Agriculture. Prerequisite: C average. (Pass/Fail Grade Only). Cr Ar.

## Courses in Merchandising

### CLD 101A Introduction to Design

Evaluation of elements and principles of design as related to harmony and visual order. Interrelationship of beauty, function, economy and individuality in aesthetic judgment. Cr 3.

### CLD 103A Textiles: Fiber to Fabric

Develops the ability to recognize quality features of fabrics and to understand fiber content, functional finish, and care. Covers fiber properties and performance data, fair claim policy, names and consumer uses of fabrics. Cr 3.

### CLD 104A Designing and Furnishing the Home-Residential Interiors

Planning functional and aesthetic qualities of residential interiors for individuals and families. Focus on selection, organization, and evaluation of furnishings and materials, and development of floor plan layouts. Cr 3.

### CLD 105A Retail Management

A study of the operations of a retail store culminating in the actual experience of managing a store. Cr 4.

### CLD 106A The Apparel Consumer

A discussion of clothing and accessories for the physical, social, psychological and economic needs of various age groups; size, cut, fit; construction and price level. Covers hanger appeal,

combining value in the wardrobe and attributes of consumer satisfaction. Cr 3.

### CLD 107A Visual Merchandising

Examines the creation of visually stimulating designs to focus and hold people's interest on a product, service, or idea. Covers problems in visual communication such as trademarks, advertisements, posters, package designs, and displays as well as lettering, illustration, and layout. Rec 1, Lab 4. Cr 3.

### CLD 108A Fashion Merchandising

Sources of fashion with charting of trends. Promotion of fashion in home furnishings and clothing. Cr 3.

### CLD 196A Field Experience in Merchandising

Provides on-the-job training in a field related to the student's program of study, under supervision of employer and appropriate department or school in the College of Applied Science and Agriculture. Prerequisite: C average; permission. (Pass/Fail Grade Only). Cr Ar.

## Technical Division Courses

### BCH 125A Chemistry for Animal Technology

An introduction to the principles of inorganic, organic, and biochemistry. Lec 4, Lab 2. Cr 5.

### ENT 101A Applied Entomology

Consideration of the benefits and detrimental effects of insects. General structure, classification, habits, and life histories of representative pest species. Study of all phases of control with emphasis on development, use and problems of pesticides. Lec 2, Lab 2. Cr 3.

### ASA 100A Seminar in (Program Major)

A review of the major area of study and a survey of career opportunities. Rec 1. Cr 0-1.







# College of Arts and Humanities

Leslie A. Flemming, *Dean*

The College of Arts and Humanities is dedicated to providing a sound education in the liberal arts and to imparting the specific knowledge and skills required for careers in one of its several representative disciplines. In conjunction with the College of Sciences and the College of Social and Behavioral Sciences, it provides the comprehensive curriculum essential to the liberal arts tradition. The College's own programs of study lead majors and non-majors alike to participate in and understand the forms, images and documents through which the human spirit and human society have evolved. This education, both in its breadth and its approach to learning, leads students to an enlightened sense of themselves, their heritage and their world; prepares them for responsible and active citizenship; and prompts those habits of thought and expression crucial to a lifetime of active learning.

There are 7 departments within the college, offering a total of 15 undergraduate degrees and 22 graduate degree concentrations. Unless otherwise noted, all undergraduate degrees are the B.A. (Bachelor of Arts). The Department of Music also offers the professional degrees of Bachelor of Music in Performance and in Education. The Department of Art, in cooperation with the College of Education, offers a Bachelor of Science in Art Education.

ART: Studio Art, Art History, Art Education

ENGLISH: English

FOREIGN LANGUAGES AND CLASSICS:

French, German, Spanish, Latin, Modern Languages, Romance Languages, International Affairs

HISTORY: History, International Affairs

MUSIC: Music (B.M. Performance, B.M. Education)

PHILOSOPHY: Philosophy

THEATRE/DANCE: Theatre

## Degree Requirements

Requirements for the B.A. degree are described in a separate section of this catalog dealing with all B.A. degrees at the University of Maine. Questions pertaining to degree programs in the College of Arts and Humanities should be directed to the appropriate department chairperson.

## Entrance Requirements

Admission requirements for the College of Arts and Humanities are the same as those for the University and are described elsewhere in this catalog.





## Art

Professor Lewis (Chairperson)

Professor Hartgen (Emeritus);

Associate Professors Decker, de Moulpied, Ghiz, Groce, Linehan

Assistant Professors Barzman, Hicks, Shepard, McCloskey

### The B.A. Degree

The Art Department, as part of the College of Arts and Humanities, offers the opportunity to study studio art and art history within a strong liberal arts curriculum. It also is possible to complete requirements for art teacher certification.

### Studio Art

The Art Department offers the B.A. degree in art with a concentration on studio art. The concentration consists of 36 credit hours in studio art (ART) and 12 credit hours in art history (ARH). It also is possible for interested students to take an enriched studio option (48 hours in studio, 12 hours in art history). The emphasis of the art program is creative studio work in the areas of drawing, painting, printmaking and sculpture. Elective studio work occasionally is available in photography and graphic arts. Art history is seen as necessary to intelligent studio development, as is the socializing of the student to the attitudes, philosophies, language, etc., of the contemporary art world.

The studio degree can lead to (1) specialized work as an artist in one of the fine art areas, (2) graduate study in studio art, (3) art related jobs in commercial art, layout, or design. It should be noted, however, that in this specific area we do not offer a specialized program of study.

### Art History

The Art Department also offers the B.A. degree in Art with a concentration in art history.

Art history students begin the program with introductory courses focusing on the development of painting, sculpture, architecture, and the graphic arts from ancient times to the present. These courses stress form and content in works of art as well as the social, political, and cultural contexts within which works are produced.

Advanced lecture courses and seminars concentrate on more specific topics. These include the study of different historical periods, art theory and criticism, and the various methods of practicing art history from connoisseurship and iconography to Marxist, psychoanalytic, feminist, and poststructuralist theories of interpretation.

One studio course (Drawing I, Two-Dimensional Design, or Three-Dimensional Design) is required to provide insight into the working

Specimen Curriculum for B.A. Degree in Art: Studio			
First Year			
First Semester		Second Semester	
ART 101 Drawing I	3	ART 102 Drawing II	3
ART 111 Basic 2-D Design	3	ART 121 Basic 3-D Design	3
OR		OR	
ART 121 Basic 3-D Design	(3)	ART 111 Basic 2-D Design	(3)
Distribution Requirements, Area I		Distribution Requirements, Area I	
or III	6	or III	6
Elective	3	Elective	3
	<u>15</u>		<u>15</u>
Sophomore Year			
First Semester		Second Semester	
ART 221 Introduction to Sculpture	3	ART 221 Introduction to Sculpture	3
OR		OR	
ART 201 Intermediate Drawing*	(3)	ART 202 Figure Drawing*	(3)
ART 233 Basic Painting I	3	ART 234 Basic Painting II	3
ARH 155 Art History I	3	ARH 156 Art History II	3
Distribution Requirements, Area I		Distribution Requirements, Area I	
or III	6-7	or III	4
	<u>15-16</u>	Elective	1-3
			<u>14-16</u>
*ART 221 is required, and may be taken in either the Fall or Spring semester. Either ART 201 or ART 202 is required in the alternate semester.			
Junior Year			
First Semester		Second Semester	
ART 241 Introduction to Printmaking	3	ART 321/333 Advanced Studio Problems	3
ARH Art History	3	OR	
Electives	9	ART 242 Intermediate Printmaking I	(3)
	<u>15</u>	ARH 262 Modern Art	3
		Electives	9
			<u>15</u>
Senior Year			
First Semester		Second Semester	
ART 321/333 Advanced Studio Problems	3	ART Elective (e.g., ART 282, 321, 333, 341, 397)	3
Electives	12	Electives	12
	<u>15</u>		<u>15</u>

methods and creative processes of practicing artists. One philosophy course and two courses in a foreign language, preferably German or French, are also required. In addition to preparing the student well for graduate level study, the art history concentration may also lead to careers in museums, auction houses, commer-

cial galleries, art libraries, or arts administration.

### The B.S. Degree: Art Education

Majors in art education follow a curriculum developed in cooperation with the College of



education leading to certification as an art teaching specialist in the State of Maine, grades K-12. This course of study includes: 33 hours of college of Education requirements; 30 hours of professional education and art education requirements; 33 hours of art studio (27 in required courses, six in studio electives); 15 hours of art history, including Art Theory and Criticism (ARH 351); and 15 hours of liberal arts electives. In order to complete the 126 credit hours required for graduation, art education students must take 9 hours of course work during May terms, summer sessions, or as an overload (over 5 hours per semester).

### Options in Art Education

Art education today is a field of research, study, and practice which has expanded beyond public school art teaching. Undergraduate study in art education not only prepares a student for teaching certification, but also for graduate work in specialized areas of art education and related fields of study. Some art education majors choose careers in museum education, art therapy, community arts education, arts administration, or other fields which involve working closely with people and art. The Art Department offers several options within the basic course of study in art education. Among these are an enriched studio option, and the Developmental Disabilities Interdisciplinary Concentration in affiliation with the Behavioral and Developmental Pediatrics Center at Eastern Maine Medical Center and its cooperating agencies. (See the University Affiliated Program, UAP in Index.) This concentration offers art and art education students an opportunity to develop understanding of the complex factors affecting the developmentally disabled. Students choosing this option may be preparing to work with mainstreamed students in public schools or to go on for graduate study in art therapy.

The final option is for students in the B.A. program in the Art Department who may wish to prepare for certification as an art teaching specialist in the State of Maine, K-12. Such students may take the 30 hours of professional education and art education requirements, including student teaching. These are counted towards electives in the B.A. program. Often, students selecting this option must take their student teaching in a ninth semester.

### Courses in Art

Most studio courses require that the student purchase a basic supply of necessary tools and equipment.

The Art Department utilizes a collection of 5,000 slides, 10,000 reproductions, and 4,200 original works of art in its teaching programs. There is also a year-round program of exhibitions in the many galleries on campus sponsored by the University of Maine Museum of Art.

## Specimen Curriculum for B.A. Degree in Art: Art History

First Year			
First Semester		Second Semester	
ARH 155 Art History I	3	ARH 156 Art History II	3
Distribution Requirements, Area I, II, or III	6	Distribution Requirements, Area I or III	6
Electives or ENG 101	6	Elective	3
	<u>15</u>	Foreign Language	3
			<u>15</u>
Sophomore Year			
First Semester		Second Semester	
ARH 200-Level	3	ARH 200-level	3
ART Requirement	3	Distribution Requirements, Area I or III	4
Distribution Requirements, Area I or III	6-7	Electives	9
Elective	3		<u>16</u>
	<u>15-16</u>		
Junior Year			
First Semester		Second Semester*	
ARH 200-300 Level	6	ARH 200-300 Level	6
Electives	9	Electives	9
	<u>15</u>		<u>15</u>
**Junior Year English Proficiency should be taken by the end of the Junior year.			
** The Philosophy Requirement (ancient or modern) should be fulfilled in the Junior year.			
Senior Year			
First Semester		Second Semester	
ARH 300-Level		ARH 300-Level	
Electives	12	Electives	12
	<u>15</u>		<u>15</u>
The ART 351 Art Theory and Criticism Requirement should be fulfilled in the Senior Year.			

#### ART 101 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. Lab 6. Cr 3.

#### ART 102 Drawing II

A continuation of the fundamentals of drawing. Prerequisite: ART 101. Lab 6. Cr 3.

#### ART 111 Basic 2-D Design

Fundamentals of 2-D design through studio experience. Emphasis on pure design. Covers analysis of design, and basic perceptual and aesthetic aspects of color. Lab 6. Cr 3.

#### ART 121 Basic 3-D Design

Study of 3-D design principles through studio exercises in form and space utilizing basic media and techniques. Prerequisite: Art majors only or permission. Lab 6. Cr 3.

#### ART 131 Fundamentals of Painting I

Basic introductions to the painting art. Exercises in color, technique and composition. Studio and outdoor subjects. All media. Prerequisite: ART 102 or permission. (Not open to art majors). Lab 6. Cr 3.

#### ART 132 Fundamentals of Painting II

Exercises in color, technique, and composition including studio and outdoor subjects utilizing all media. Prerequisite: ART 131 or permission. (Not open to art majors). Lab 6. Cr 3.

#### ART 161 Basic Photography

Fundamentals of black and white photography, including film processing, printing and print control, camera basics, exposure, photographic history, lighting, and the art of photography. Prerequisite: Art majors must have advisors' permission; Arts and Humanities credit. Cr 3.



## Specimen Curriculum for B.S. Degree in Art Education

First Year			
First Semester		Second Semester	
ART 101 Drawing I	3	ART 102 Drawing II	3
ART 111 Basic 2-D Design	3	ART 121 Basic 3-D Design	3
ARH 155 Art History I	3	ARH 156 Art History II	3
HTY 105 History of European Civilization I	3	HTY 106 History of European Civilization II	3
ENG 101 College Composition	3	ENG English Elective	3
	<u>15</u>		<u>15</u>

Sophomore Year			
First Semester		Second Semester	
ART 233 Basic Painting I*	3	ART 234 Basic Painting II**	3
EDB 202 The American School	3	EDB 221 Educational Psychology	3
AED 271 Teaching Materials for Art Education	3	Math or Science Requirement	3
Math or Science Requirement	3	Liberal Arts Elective	3
Liberal Arts Elective	3	SPC 102 Fundamentals of Interpersonal Communication	3
	<u>15</u>	OR	
		SPC 103 Fundamentals of Public Communication	
			<u>15</u>

\*Students wishing to stress sculpture, take ART 221 instead of ART 233.

\*\*Students wishing to stress sculpture, take ART 321 instead of ART 234.

Junior Year			
First Semester		Second Semester	
ART 221 Introduction to Sculpture	3	ART 221 Introduction to Sculpture	3
OR		OR	
ART 201 Intermediate Drawing*		ART 202 Figure Drawing	
ART 241 Introduction to Printmaking	3	ART Studio Elective**	3
ARH 262 Modern Art or ARH Elective	3	ARH 351 Art Theory and Criticism	3
AED 372 Foundations and Curriculum in Art Education	3	AED 373 Curriculum and Methods in Art Education	3
PSY 100 General Psychology	3	PSY 323 Child Psychology	3
	<u>15</u>	OR	
		PSY 324 Psychology of Adolescence	
			<u>15</u>

\*Take either ART 201 or 202, not both. ART 233 should be taken here by sculpture students.

\*\*ART 234 for sculpture students.

Senior Year			
First Semester		Second Semester	
ARH Art History Elective or Modern Art	3	STT 494 Full Day Student Teaching**	12
ART Art Elective*	3		
Elective (Liberal Arts)	3		
Theatre/Music	3		
ENG English Elective	3		
	<u>15</u>		

\*Choose 1 course from among ART 282, 321, 333 etc., or courses from other departments with Art Chairperson's approval.

\*\* In order to complete the 126 credit hours required for graduation, art education students must take 9 hours of course work during May terms, summer sessions, or as an overload (over 15 hours per semester). SED 402 should be taken in either Junior or Senior Year.

**ART 201 Intermediate Drawing**

Advanced study of the unique characteristics of various drawing media: charcoal, conte, pencil ink, silverpoint. Focus on the creation, imaginative and expressive compositions. Prerequisite: ART 102. Lab 6. Cr 3

**ART 202 Figure Drawing**

Creative drawing based on the human figure. Focus on understanding the basics of form and structure in human anatomy and incorporating this understanding with technical and aesthetic mastery of drawing concepts. Prerequisite: ART 102. Lab 6. Cr 3

**ART 211 Graphic Design I**

The design of booklets, catalogs, magazines, newspapers, posters, etc. Exercises in lettering and layout. Prerequisite: ART 111 or permission. Lab 6. (Offered on sufficient demand.) Cr 3

**ART 212 Graphic Design II**

Continued study of graphic design. Prerequisite: ART 211 or permission. Lab 6. Cr 3

**ART 221 Introduction to Sculpture**

Study of sculpture form and expression (control and understanding of spatial relationships). Deals with the manipulation of space and materials through bending, forging, carving, casting and joining. Students are expected to familiarize themselves with the machines and tools of sculpture. Prerequisite: ART 121. Lab 6. Cr 3

**ART 233 Basic Painting I**

Exploration of various painting concepts. Stress on composition, color, technical mastery of media, and creative imagination. Prerequisite: ART 102, ART 111. Lab 6. Cr 3

**ART 234 Basic Painting II**

A continued study of painting concepts. Prerequisite: ART 233. Lab 6. Cr 3

**ART 241 Introduction to Printmaking**

The fundamentals of intaglio and lithographic printing will be discussed, analyzed and investigated through studio experiences. Emphasis on mastery of technical, aesthetic and expressive elements. Prerequisite: ART 102, ART 111. Lab 6. Cr 3

**ART 242 Intermediate Printmaking I**

Study of intermediate studio techniques in intaglio and lithography through creative production with emphasis on technical and conceptual advancement. Concentration in the student's choice of intaglio or lithography. Prerequisite: ART 241. Lab 6. Cr 3

**ART 281 Art Materials and Techniques**

Materials, methods, and techniques for the professional artist-craftsperson. Examination, comparison, and testing of materials and processes of painting, graphics, sculpture, etc. Prerequisite: ART 102 or permission. Primarily for art majors. Lec 2, Lab 1. Cr 3

**ART 282 Introduction to Filmmaking I**

Elementary techniques of filmmaking as an expressive art form. Study of the camera and its



unction, lighting, editing, composition, sound, and film continuity and structure. Stress on the aesthetics of film through study of some outstanding examples of past and present classics. Student must pay cost of film and processing; other equipment supplied.) Permission. Lab 6. Cr 3.

**ART 283 Introduction to Filmmaking II**

Continued study of filmmaking techniques. (Student must pay cost of film and processing; other equipment supplied.) Permission. Lab 6. Cr 3.

**ART 321 Advanced Studio Problems in Sculpture I**

Advanced, guided study stressing special problems in technique and creative production and interdependence of thought and material in artistic expression. Prerequisite: ART 221. Lab 6. Cr 3.

**ART 333 Advanced Studio Problems in Painting**

Advanced, guided study stressing special problems in technique and creative production and the interdependence of thought and material in artistic expression. Prerequisite: ART 234. Lab 6. Cr 3.

**ART 341 Intermediate Printmaking II**

Study of intermediate studio techniques in the student's choice of intaglio or lithography through creative production. Considerable emphasis is on technical and conceptual advancement. Prerequisite: ART 241. Lab 6. Cr 3.

**ART 342 Advanced Printmaking**

Study of advanced studio techniques in various printing media. Stress is on mastery of technical, aesthetic, and expressive elements. Prerequisite: ART 242. Lab 6. Cr 3.

**ART 397 Independent Study in Art**

Advanced independent study or research projects in art and related areas. Prerequisite: Juniors and seniors only, and permission of the instructor. Cr Ar.

**ART 398 Directed Study in Art**

Advanced independent study of research projects in art and related areas. Cr Ar.

**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. Prerequisite: Seniors and/or permission. Cr Ar.

**ART 497 Independent Study in Studio Art**

Advanced studio tutorial in painting, sculpture, printmaking, or related areas. Independent studio research on problems designed by the student. Prerequisite: Permission only. Cr Ar.

**ART 498 Directed Study in Studio Art**

Advanced studio tutorial in painting, or related areas. Independent studio research on problems designed by the student. Prerequisite: permission. Cr Ar.

**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. Junior or senior elementary education majors or permission. Not open to art education majors. Lec 2, Lab 1. Cr 3.

**AED 271 Teaching Materials for Art Education**

Introduction of educational materials and media for use in art curricula. Exploration of newer media and technologies for art education including film, video, and computers. Required for art education majors. Open to non-art majors by permission only. Lec 1, Lab 2. Cr 3.

**AED 372 Foundations and Curriculum in Art Education**

Includes historical, philosophical, psychological and sociological foundations of art education; critical examination of current research, trends and issues in art education; introduction to art curricula approaches and development; theories of child art; observation of art classes. Art education majors only. Lec 2, Lab 1. Cr 3.

**AED 373 Curriculum and Methods in Art Education**

Exploration, development, and evaluation of curricula and instructional methods in art education. Includes instructional planning and practicum experience. Prerequisite: AED 372. Art education majors only. Lec 2, Lab 1. Cr 3.

**AED 375 Art Education Workshop and Laboratory**

Plan of study, projects and credit arranged. Limited to art education majors. Cr Ar.

**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 271, 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 271, 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 271, 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.

**ARH 151 Principles of Two-Dimensional Art**

An analysis of the fundamental premises underlying such two-dimensional art forms as painting, drawing and printmaking. Not an historical survey, although masterpieces are studied. Lec 3. Cr 3.

**ARH 152 Principles of Three-Dimensional Art**

An analysis of the fundamental premises underlying such three-dimensional art forms as architecture and sculpture. Not an historical survey, although masterpieces are studied. Lec 3. 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. 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. 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 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. Lec 3. Cr 3.

**ARH 168 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. Lec 3. Cr 3.

**ARH 251 Classical Art**

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. Prerequisite: ARH 155 or permission. Lec 3. 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. Prerequisite: ARH 156 or permission. Lec 3. 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. Prerequisite: ARH 155 and ARH 156 or permission. Lec 3. Cr 3.

**ARH 261 Nineteenth Century Art**

Survey of painting and sculpture in their context from the late 18th century to the end of the 19th century, from Neoclassicism and Romanti-



cism to Realism, Impressionism and Post-Impressionism. Prerequisite: ARH 156 or permission. Lec 3. Cr 3.

**ARH 262 Modern Art**

An historical and stylistic survey of art forms from the end of the nineteenth century through 1945, from Fauvism and Cubism to Expressionism and Surrealism. Prerequisite: ARH 156 or permission. Lec 3. Cr 3.

**ARH 263 Art Since 1945**

Survey of recent developments in art from mid-century to the present. Prerequisite: ARH 156 or permission. Lec 3. 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.

Prerequisite: ARH 155 and ARH 156 or permission. Lec 3. Cr 3.

**ARH 352 Materials and Methods in Art History**

Review and discussion of the bibliography, methods and materials of art history and application of various methods in individual and group projects. Prerequisite: ARH 155 and ARH 156 or permission. Lec 3. Cr 3.

**ARH 361 Topics in Art History**

Survey of a particular culture, period, artists or artist, or of particular issues in the history of art. Specific topic will vary from semester to semester. May be repeated for credit. Prerequisite: ARH 156 or permission. Lec 3. 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 A.

**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 A.

**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 A.

**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 A.





## English

Associate Professor Kail (Chairperson)

Professors Bennett, Donovan, Hatlen, Urbanski

Associate Professors Bauschatz, Brinkley, Brogunier, Brucher, Burnes, Evans, Ford, Hunting, Jacobs, MacKnight, Nees-Hatlen, Norris, Rogers, Wicks, J. Wilson

Assistant Professors Cowan, Everman, Mahala, Mooney

Instructors Callaway, Hakola, M. Wilson;

Lecturer Pollet

The Department of English offers a variety of courses in literature and writing, as well as specialized courses dealing with language and teaching. The skills these courses develop include reasoning, logical analysis, and persuasive communication, as well as an understanding of literary forms and literary and cultural history. An English major may go on to such fields as teaching, publishing, or journalism, and English is also a valuable pre-professional major for such diverse fields as law, business, and federal service. English is very attractive as a double major, too, as communication skills are important in all other disciplines.

English majors may choose a regular literature program or may elect a program in creative writing, expository writing or technical writing. The requirements for the English major, effective January 1990, are outlined below:

### Regular Major

1. Writing courses (exclusive of ENG 101) including at least 3 hours at the 300-level or above	6
2. Introduction to Literary Study (ENG 220)	3
3. A year-long survey of American (ENG 241/242), British (ENG 251/252), or World (ENG 231/232) Literature	6
4. English courses in literature at the 400-level or above, to include at least 9 hours British literature (at least 3 hours Pre-1800), 6 hours American literature, and 3 hours elected from 400-level courses, (not to include writing courses)	18
5. At least three additional hours of courses in English beyond ENG 101 or INT 410	3
<b>TOTAL CREDITS</b>	<b>36</b>

### Concentration in Writing (Creative, Expository or Technical)

1. Writing courses (exclusive of ENG 101) (see item 6 under additional requirements)	12
2. Introduction to Literary Study (ENG 220)	3
3. A year-long survey of American (ENG 241/242), British (ENG 251/252), or World (ENG 231/232) Literature	6

A typical four-year program in English	
First Year	
Regular Major	Concentration in Writing
ENG 101 and one or two other lower-level ENG course(s). Prospective English majors are especially encouraged to take ENG 129, which is normally limited to First Year students.	ENG 101 and one other lower-level ENG course. Prospective English majors are especially encouraged to take ENG 129, which is normally limited to First Year students.
Sophomore Year	
Regular Major	Concentration in Writing
1. The year-long survey: ENG 231 and ENG 232, or ENG 241 and ENG 242, or ENG 251 and ENG 252. 2. ENG 220 either fall or spring semester. 3. An intermediate-level writing course.	1. The year-long survey: ENG 231 and ENG 232, or ENG 241 and ENG 242, or ENG 251 and ENG 252. 2. ENG 220 either fall or spring semester. 3. ENG 212 (for students in the expository writing track); ENG 205 or 206 (for students in the creative writing track).
Junior Year	
Regular Major	Concentration in Writing
1. Three to four 400-level English courses. 2. An intermediate-level writing course, if not already completed.	1. ENG 307 and/or ENG 308 (for students in the Creative Writing track); ENG 317 and 417 (for students in the Technical Writing track); ENG 301 or ENG 310 or ENG 395 (for students in the Expository Writing track). 2. Two to three 400-level Literature courses, exclusive of writing courses.
Senior Year	
Regular Major	Concentration in Writing
1. Three to four 400-level English courses. 2. An advanced-level writing course (300 or 400 level)	1. ENG 405 (for students in the Creative Writing track); ENG 417 and/or 418 and/or ENG 496 (for students in the Technical Writing track); ENG 401 or ENG 405 or ENG 496 (for students in the Expository Writing track). 2. Two to three 400-level English courses, exclusive of writing courses.

4. English courses in literature at the 400-level or above, to include at least 9 hours British literature (at least 3 hours Pre-1800) and 6 hours American literature	15
<b>TOTAL CREDITS</b>	<b>36</b>

### Additional Requirements and Considerations

- At the advisor's discretion, some topics offerings may be designated as satisfying the British or American literature requirements. A maximum of 6 hours in topics courses (i.e., ENG 429, ENG 430, ENG 436, ENG 480, and



- ENG 481) may be taken toward satisfaction of these core requirements.
- The major requires a minimum of 36 hours in English. Students may, however, take up to 48 hours of ENG course beyond ENG 101.
  - The major requires proficiency in a foreign language at the intermediate level. Normally, "intermediate proficiency" means the equivalent of four semesters of college work.
  - To satisfy the Junior-level writing proficiency requirement, all majors must place in their student file two papers from courses, with statements from instructors of these courses certifying that these papers meet the Junior-level proficiency requirement.
  - Courses in language and linguistics with INT designation may count as ENG courses.
  - Majors with a Concentration in Writing choose a creative writing track, a technical writing track, or an expository writing track. Creative writing students usually take ENG 205 and/or ENG 206, ENG 307 and/or ENG 308, ENG 405. ENG 405 may be repeated for credit. Technical writing students usually take ENG 317, 417 and 496, and another writing course with advisement. Expository writing students choose from among the following courses: ENG 212, 301, 310, 395, 401, 405, and 496.
  - Majors in the creative writing track submit a full-length manuscript as part of their graduation requirements.

## Graduate Study

The Department of English offers the Master of Arts degree in English. Candidates for this degree may follow the regular literature program or choose a concentration in creative writing or in composition. Students in the literature program may choose either a thesis program of 30 hours (24 in course work and 6 of thesis) or a non-thesis program of not fewer than 30 hours of course work. Students in the Creative writing concentration must take 9 hours of course work in writing courses and must complete a creative thesis for which they normally receive 6 hours of thesis credit. Students in the concentration in composition must take 24 hours of course work in literature and 6 hours of course work in rhetorical theory and the teaching of writing. For further details, see the Graduate School Catalog.

## Placement in Writing Courses

Satisfactory performance on a one-hour placement examination in writing, administered during New Student Orientation, is required for all students who scored below 460 on the Verbal SAT or did not take the SAT. Students who scored above 560 on the SAT are eligible to take the placement exam and will receive credit for ENG 101 if their exam is successful. All other students should enroll in ENG 101 during the

appropriate semester. Students whose examinations indicate that they do not meet minimum entrance standards for ENG 101 will be required to enroll in ENG 001, The Writer's Workshop, at the first opportunity; this course is a prerequisite for enrollment in ENG 101 for such students and does not carry graduation credit, although it does provide from 1 to 3 semester credit hours.

## Courses in English

### 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 an individual 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. See the paragraph "Placement in Writing Courses" above. 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 emphasis on analytic and persuasive writing. Satisfactory completion of the course depends upon quality of weekly writing assignments as well as demonstration of proficiency in college-level writing. See the paragraph "Placement in Writing Courses" above. **Cr 3.**

### ENG 120 Introduction to Language and Literature

The role of language and literature in human consciousness and action. Students learn the basic elements of expressive and persuasive discourse by reading fiction and by writing imitations and analyses of works studied. May be taken before or after ENG 101. **Cr 3.**

### ENG 121 Introduction to the Drama

Close reading and analysis of about a dozen to fifteen masterpieces of the drama. Prerequisites: open to first-year students; no senior English majors; ENG 101 is strongly recommended. **Cr 3.**

### ENG 122 Introduction to Poetry

Close reading and analysis of the various kinds of poetry (lyric, narrative, elegiac, occasional; the sonnet, the ode, the epic; etc.) and an examination of the techniques (rhythm, pattern, sound, tone, imagery, metaphor, allusion, for example) used by poets of note. Prerequisite: open to first-year students; no senior English majors; ENG 101 is strongly recommended. **Cr 3.**

### ENG 123 Introduction to Fiction

Close reading and analysis of selected short stories, novellas, and novels. By considering the elements of fiction such as theme, character, plot, image, and point of view, students increase their ability to understand and appreciate the art of fiction. Prerequisites: open to first-year

students; no senior English majors; ENG 101 is strongly recommended. **Cr 3.**

### ENG 124 Introduction to Non-Fictional Prose

Extended practice in reading, reacting to, analyzing, evaluating, and imitating a variety of non-fictional forms, such as essays, biographies, and autobiographies. Students write at least 4,000 words over the semester. Prerequisite: ENG 101 or ENG 129. **Cr 3.**

### ENG 129 First-year Seminar in English

An intensive study of texts focusing on a common theme. Specific topics vary. Special attention given to strategies for reading and writing about literary works. Prerequisites: First-year students only. Exemption from ENG 101 or permission of the instructor. **Cr 3.**

### ENG 205 An Introduction to Creative Writing

Offers students experience in writing in three major forms: autobiographical narrative, fiction, and poetry. Prerequisite: ENG 101 or equivalent. **Cr 3.**

### ENG 206 Descriptive and Narrative Writing

Special emphasis on the informal, autobiographical essay. Prerequisite: ENG 101 or equivalent. **Cr 3.**

### ENG 212 Intermediate Composition

Designed for students wanting practice in those forms of expository, analytical, and persuasive prose required in the writing of essay test questions, term papers, research projects, and extended arguments. Students write on topics from their own disciplines. Prerequisites: ENG 101 and at least sophomore standing. **Cr 3.**

### ENG 220 Introduction to Literary Study

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. Prerequisites: ENG 101 and at least sophomore standing. **Cr 3.**

### ENG 229 Topics in Literature

Recent topics have included: science fiction, utopian fiction, literature and the law, literature of the third world and literature of the Vietnam war. Prerequisite: 3 hours of literature or permission. **Cr 3.**

### ENG 230 The Bible as Literature

An exploration of the literature of the Old and New Testaments as they relate to Western culture. The first half of the semester covers the primary books of the Old Testament; the second half of the semester covers most of the New Testament. **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. Recommended for English majors. (This course is identical with FOL 231.) **Cr 3.**



**ENG 232 Western Tradition in Literature:****Enlightenment to 20th Century**

A 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 with FOL 232.) 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. Prerequisite: ENG 101 is strongly recommended. 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. Prerequisite: 3 hours of literature. 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. Recommended for English majors. Prerequisite: 3 hours of literature or permission. 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. Recommended for English majors. Prerequisite: 3 hours of literature or permission. Cr 3.

**ENG 243 African-American Literature**

A survey of the main traditions and writers in African-American literature from the origins to the present. Prerequisite: 3 hours of literature or permission. 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. Prerequisite: 3 hours of literature or permission. 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. Prerequisite: ENG 101 strongly recommended. 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. Prerequisite: 3 hours of literature or permission. 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. Recommended for English majors. Prerequisite: 3 hours of literature or permission. 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. Recommended for English majors. Prerequisite: 3 hours of literature or permission. 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. Prerequisite: 3 hours of literature or permission. Cr 3.

**ENG 256 British Women's Literature**

A survey of British women writers and their traditions from the origins to the present. Prerequisite: 3 hours of literature or permission. 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. Prerequisite: 3 hours of literature. Cr 3.

**ENG 301 Advanced Composition**

A course in exposition and argument that combines a study of rhetorical theory and practice in developing a command of various expository styles. Prerequisites: ENG 101 and ENG 212 or permission. Cr 3.

**ENG 307 Writing Fiction**

A course in the writing of fiction, for students of demonstrated ability. Prerequisite: ENG 205 or ENG 206 or permission. Cr 3.

**ENG 308 Writing Poetry**

A course in the writing of poetry, for students of demonstrated ability. Prerequisite: ENG 205 or ENG 206 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. Prerequisites: ENG 220 and junior standing. Cr 3.

**ENG 317 Technical Writing**

Supervised practice in the writing of technical and business reports, professional correspondence, and related materials. Prerequisites: ENG 101 or equivalent and junior or senior standing. Cr 3.

**ENG 395 English Internship**

An advanced course in writing and collaborative writing. 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. Prerequisite: ENG 101 or equivalent and at least one other writing course (ENG 212, ENG 205, ENG 206, ENG 301, ENG 310, ENG 317), a recommendation from a UM faculty member, and submission of a writing sample. Cr 3.

**ENG 401 Topics in Writing**

Special topics in expository writing for advanced undergraduate and graduate students. Prerequisite: A 300-level writing course or 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. Admission by permission of instructor only. May be repeated for credit up to 6 credit hours. Cr 3.

**ENG 417 Advanced Technical 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. Prerequisite: 6 credits in writing, including ENG 317, and permission. Cr 3.

**ENG 418 Advanced Technical Editing**

Advanced strategies for analyzing and editing such documents as manuals, proposals, and brochures. Students become familiar with revising strategies, document design principles, desktop publishing techniques, graphics and layout and proofreading practices through their major editing projects. Prerequisites: 6 credits in writing, including ENG 317, and permission of instructor. Cr 3.

**ENG 429 Topics in Literature**

Recent topics have included Contemporary American poetry, 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). Prerequisite: 6 hours of literature or permission. (This course is identical with FOL 430.) 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. Prerequisite: 6 hours of 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. Prerequisite: 6 hours of literature or permission. 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 American novel, with attention to its portrayal of the emergent national culture and character in the 19th century, and in the 20th, to its transnational breadth and contributions to major Western literature. 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, and selected contemporary poets. 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. Prerequisite: 6 hours of literature or permission.

Cr 3.

**ENG 448 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. 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. 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. 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. 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. 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. Prerequisite: 6 hours of literature or permission.

Cr 3.

**ENG 457 Nineteenth-Century Fiction, Poetry and Essay**

Readings from the major 19th-century British novelists, such as E. Bronte, Dickens, Thackeray, and Hardy; the major poets, such as Tennyson, Browning, Arnold, and Yeats; the major essayists, such as Carlyle, Mill, Newman, and Pater. Focus on the major literary and intellectual issues from Romanticism to the 20th century. Prerequisite: 6 hours of literature or permission.

Cr 3.

**ENG 458 Twentieth-Century British Literature**

Reading and discussion of such great 20th-century writers as Yeats, Joyce, Conrad, Auden, Beckett, Woolf, and Pinter. 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. 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. Prerequisite: 6 hours of literature or permission.

Cr 3.

**ENG 468 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. 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. Prerequisite: 6 hours of literature or permission. (This course is identical with FOL 473.)

Cr 3.

**ENG 471 Feminist Critical Theory**

An examination of the major theoretical tendencies in contemporary feminist criticism, stress-

ing connections with Marxist criticism, Freudianism, existentialism, and poststructuralism. Includes a section on feminist aesthetics. Prerequisite: 6 hours of literature; ENG 246 or ENG 256 recommended.

Cr 3.

**ENG 472 The Teaching of English in the Secondary School**

Principles and practices in the teaching of literature, language, and composition. Prerequisite: 15 hours of literature. INT 410 recommended.

Cr 3.

**ENG 473 The Teaching of Composition in the Secondary School**

A discussion of principles and practices of teaching composition in the high school. Attention to be given to current trends and problems in student writing, and to traditional and new methods of dealing with them. Composition to be considered an integral part of the student's experience, not just in the English classroom.

Cr 3.

**ENG 474 Workshop for Secondary School Teachers of English**

Lectures by staff and eminent specialists in reading, composition, language, and literature. Designed for experienced secondary school English teachers who want to enrich their backgrounds in their subject matter. Enrollment limited to 25 students. Course given in Summer Session only.

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. Prerequisite: Six hours of literature; ENG 246 or ENG 256 recommended.

Cr 3.

**ENG 496 Field Experience in English**

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. Prerequisite: 24 hours in English, including ENG 212 or ENG 317 and permission. In special cases, some of the prerequisites can be waived. May be repeated for credit up to 6 credit hours. Cr 1-6.

**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. Cr 3.

**ENG 505 Creative Writing Workshop**

Discussion of work in progress by students working under faculty direction on extended literary projects. 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. Course given in Summer Session only. Cr 3.

**ENG 541 American Literature from Colonial to Romantic**

Specific period or topic studied may vary from year to year, while recognizing that, overall, the period culminates in the poetry and prose of Emerson, Hawthorne, Poe, Melville, Thoreau, Fuller, and Whitman. Cr 3.

**ENG 545 American Realism and Naturalism**

Emphasis on fiction, and especially on the novels of Twain, Howells, James, Crane, Dreiser, and Wharton. 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. 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. Cr 3.

**ENG 551 Medieval English Literature**

The major works of the Medieval period, including works by Caucer, Longland, Malory and the Pearl Poet. 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. 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. 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. Cr 3.

**ENG 556 English Romanticism**

A survey of the six major romantic poets with attention to the critical writings of the period. 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. 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. Cr 3.

**ENG 579 The Theory of Composition**

A study in the forms and functions of written language, including recent developments in linguistic, psycholinguistic, and rhetorical theory. (This course is identical with SPC 579). Cr 3.

**Interdisciplinary Course**

**INT 410 (ANT, ENG, FOL) 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.



## Foreign Languages and Classics

Associate Professor Troiano (Chairperson)

Professors Delphendahl, Flemming, Roggenbauer, Small

Associate Professors Bauschatz, Del Vecchio, L. Luszczynska, R. Luszczynski, March, Passman, Pelletier, Slott, Zollitsch

Assistant Professors Brimmer, Hall, Pyles, Sears

Lecturer Herlan

Several departments at the University of Maine have special language requirements or recommendations for B.A. degree students. Some require successful completion of six credit hours of a foreign language at the intermediate level. Listed below are the departments that require or recommend a foreign language:

**Anthropology:** Intermediate language proficiency strongly recommended.

**Art:** Intermediate level French or German is required for students who major in art history.

**Chemistry:** One year of either French, German, or Russian.

**Computer Science:** The intermediate level of a foreign language is strongly recommended.

**English:** Proficiency at the intermediate level.

**Geology:** Students contemplating graduate work are strongly encouraged to take either French, German, or Russian.

**History:** Students majoring in History are required to demonstrate intermediate level proficiency in a foreign language through course work or examination.

**Journalism and Mass Communication:** Proficiency at the intermediate level.

**Mathematics:** The intermediate level of a foreign language is strongly recommended.

**Music:** Music - One year of a foreign language which can be either the continuation of a language taken in high school or a new language.

**Philosophy:** One year of a foreign language is recommended for the B.A. degree; two years for those going on to graduate study.

**Physics:** One year of a foreign language is recommended for the B.A. degree, two years for those contemplating graduate study.

**Political Science:** At least one year of a modern foreign language beyond the intermediate level for students majoring in international affairs.

**Sociology:** Recommended if considering graduate study.

**Social Work:** Recommended if considering graduate study.

**Speech Communication:** A foreign language may be elected by the student to meet one of the department's outside requirements.

**Zoology:** Proficiency at the intermediate level.

In addition, B.A. degree students may elect to fulfill one or more of their distribution requirements with a foreign language chosen from an approved list.

Students in a B.A. degree program who have presented two years of a high school foreign language for admission will *not* receive credit for an *elementary* course in that particular language unless *five* years have passed between high school graduation and admission to a college or a university. The department recommends that these students take:

A. An intermediate or advanced course in the language studied in high school (credits earned in those courses count towards the advanced course credits in the humanities category)

OR

B. An elementary course in a new language (credits earned here count towards the introductory course credits in the humanities category).

Any language course (except for elementary courses in the student's high school foreign language) can be taken for credit as an elective.

Credits are awarded on a semester basis.

Finding the appropriate level at which to take a language course is essential for success.

During new student orientation, the Foreign Language Placement Examination will be given for purposes of both placement and credit. Only those incoming students who have completed at least three years of a high school foreign language or the equivalent will be tested.

### Credit by Examination

1. If your score on the Placement Examination is sufficiently high (see following table), you will receive three hours of degree credit equivalent to the first semester of the intermediate course.
2. As an incentive to continue your language study, you are eligible to receive an additional three credit hours equivalent to the second semester of the intermediate course by skipping the intermediate course and passing with a grade of "B" or better two semesters of language study beyond the intermediate level. For example, if you were to score 58 on the French examination, you would receive three credits equivalent to FRE 203. You then have the choice of taking FRE 204 or you may skip FRE 204 and take FRE 205 and FRE 209 or 210, or an advanced course. If you complete two courses with a "B" grade or better, then you will receive an

additional three credit hours equivalent to FRE 204. *on* If you take FRE 203 or FRE 204 for credit, you cannot receive credit for these courses by examination.

3. If you score extremely high (see table below), you will receive six hours of credit equivalent to the intermediate course. It is highly recommended that you continue to take advanced courses in the language for which you have demonstrated considerable proficiency.

Exam	Score Range	
	3 Hrs. Credit	6 Hrs. Credit
French	53-62	63 and above
German	48-60	61 and above
Spanish	50-59	60 and above

For students who score below the level for which credit is given, the examination results will be used to place such a student in the appropriate level course.

If a student does poorly on the examination and wishes to continue in the same language, he or she may take the elementary course for ONE CREDIT, followed by the intermediate course for full credit.

Alternatively, he or she may elect to start a new language for credit.

### Certificate of Achievement.

The Department of Foreign Languages and Classics awards certificates to students who complete twelve hours of language study beyond the intermediate level with at least a B (3.00 or better) in all four courses.

### Advanced Placement

The Foreign Languages and Classics Department accepts *Advanced Placement Examinations* in Foreign Language and Literature for degree credit. Scores of four and five on either exam will receive six credits; scores of three receive three credits.

### Majors

Students may major in the following fields: French, German, Spanish, Romance Languages, Modern Languages, Latin and International Affairs.

A. General Requirements for Majors in Foreign Languages

1. Demonstration of listening comprehension, oral, reading, and writing proficiency (students who have not received



at least "B" in FRE 205 or 206, or GER 205 or 206, or SPA 205 or 206 may be required to take a test in language skills), and

2. Demonstration of comprehensive coverage of literature and civilization through successful completion of appropriate course work, and
3. Beyond the intermediate level in French, German, and Spanish: 30 hours.

Special Requirements for Majors in:

*French:* 18 hours of 400 level French courses, three hours of French or French-Canadian Civilization. A three-credit course in the history of a Francophone country, and INT 410 are strongly recommended. HTY 105/106 (History of European Civilization), and/or HTY 422 (Modern France) are highly recommended.

*German:* Introduction to German Literature, GER 211 or 212 (or equivalent), 15 hours of 400 level German courses, and HTY 105/106, (History of European Civilization). HTY 425/326 (History of Germany) is highly recommended.

*Spanish:* SPA 307 or SPA 308 or equivalent, 18 hours of 400 level Spanish courses, HTY 105/106 (History of European Civilization) or HTY 447/348 (Latin America) are highly recommended.

*Romance Languages:* A minimum of 30 hours in French and Spanish beyond the intermediate level, at least 24 of which must be in 400 series; a minimum of 12 hours above the intermediate level in each of the two languages must be taken.

*Modern Languages:* A minimum of 30 hours beyond the intermediate level, representing a combination of either a Romance language and German, a Romance language and Russian, or German and Russian. A minimum of 12 hours above the intermediate level must be taken in each of the two languages and at least 18 hours must be in 400 series courses.

*Latin:* A minimum of 24 hours in Latin beyond the intermediate 200 level. LAT 247/248 should be taken in the junior year or earlier, if possible. In addition, majors are required to complete successfully 18 hours in two or more related disciplines in the arts and sciences, including other languages and courses in translation offered by the Department. Students intending to pursue Classical Studies on a graduate level also should take six hours in Greek and CLA 101/102.

## Interdisciplinary Studies

1. B.A. in French (North American option) Students may combine a program of 24 hours in French beyond the intermediate level with 18 hours of related work in three of the following departments:  
 Anthropology: ANT 422, 357, 380, GEO 350  
 History: HTY 458, 359, 360, 521  
 Sociology: SOC 431, 338

CAN 101, Introduction to Canadian Studies  
 In addition, students are required to take FRE 440 and FRE 256.

2. Linguistics (See interdisciplinary course concentrations in index). Students may combine a program of a minimum of 15 hours distributed as follows:
  - A. Core At least one course must be completed in each of the following categories for a minimum total of nine credit hours.
    1. Introduction  
 INT 410 Introduction to Linguistics
    2. Language Structure  
 FOL 453 Phonology  
 ENG 477 Modern Grammar
    3. Language in Context  
 INT 380 Sociolinguistics  
 ANT 481 Language and Culture  
 SPC 380 Language and Speech Development
  - B. Electives Students may select courses from among the following which, when added to those in the core, will complete the total of 15 credit hours.
    - ENG 476 History of English Language
    - ENG 579 Theory of Composition (dual listed as SPC 579)
    - GER 403 History of German Language
    - FRE 442 French Language of North America
    - FRE 499 Applied French Linguistics
    - FRE 500 History of French Language
    - FRE 420 French Phonetics
    - FRE 520 French Linguistics
    - COS 220 Introduction to Computer Science I
    - COS 221 Introduction to Computer Science II
    - COS 301 Programming Languages
    - COS 470 Introduction to Artificial Intelligence
    - MAT 241 Mathematical Logic
    - PHI 260 Philosophy of Language
    - PHI 450/451 Logic I and II
    - PHI 463 Theory of Knowledge
    - PSY 522 Social Development of Children
    - SPC 256 The Social Process of Interpretation
    - SPC 454 Communication Development in Children
    - SPC 405 Women and Communication
    - SPC 483 Anatomy and Physiology of the Speech Mechanism
    - SPC 484 Introduction to Speech Science
    - SPC 585 Children's Language Disorders

The enumeration here is not definitive; new courses, projects, special seminars, or pertinent readings in upper honors courses may be approved for the program.

Note that the three areas of the distribution requirements for the B.A. degree—Humanities and Fine and Performing Arts, Social Sciences, and Natural Sciences and Mathematics—are represented among the courses listed for this concentration. Working toward the latter is therefore compatible with satisfying B.A. distribution requirements.

Although one may fulfill the minimum requirements by taking five courses from Cate-

gory I and none from Category II, it is expected that students will choose one or more of the elective courses.

## Classical Studies

(Please see General Information pages).

## International Affairs in Foreign Languages

Students may combine a program of twenty four hours above the introductory level in French, German, Russian, or Spanish with nine hours in Social Anthropology, and with nine hours each in Economics, History, and Political Sciences from among courses with an international focus (see Index, International Affairs). Highly recommended is a course in contemporary civilization and geography of the culture whose language is being studied.

## Teacher Preparation

In addition to meeting the major requirements in foreign languages, students desiring certification must complete the following:

1. An advanced grammar course (FRE 400, GER 400, SPA 400, RUS 467)
2. A civilization course (FRE 457, GER 402, SPA 457/458)
3. FOL 466 The Teaching of Foreign Languages
4. EDB 202, EDB 221, EDB 204, SED 400, one methods course, a practicum experience, one curriculum course, a pre-student teaching seminar, student teaching, and in the case of French majors only FRE 420 (French Phonetics). Students also should register with the College of Education as teacher candidates before the end of the sophomore year.

## The Intensive English Institute

The Intensive English Institute (IEI) at the University of Maine is housed in the Department of Foreign Languages. It is designed to meet the needs of the following:

1. Matriculated University of Maine students who need to improve certain English language skill areas before they begin their academic studies.
2. Students who plan to study at the University of Maine, or at another college or university.
3. International students who come to America to study English.

The IEI provides intensive instruction in the skills of listening, speaking, reading, and writing. The student receives a minimum of 20 hours of instruction in the core courses, in addition to five hours of special topics such as video films, TOEFL preparation classes, word processing, language laboratory activities, media, pronunciation and sustained reading. The approach in the program is personalized and innovative.



The academic staff at IEI is experienced and enthusiastic. They have graduate degrees in ESL or related fields.

For further information regarding the Intensive English Institute, contact Mary Reutter, Director, Intensive English Institute, 11 Fernald Hall.

## Study Away

Students majoring in a foreign language are encouraged to spend a summer, a semester, or an academic year in a previously approved program of study at a foreign University as a part of their program. Consult the Chair of the department regarding these possibilities. The Foreign Language Department, in cooperation with the Canadian-American Center, sends students in the Canada Year Program from Orono to Canadian universities. In past years, UM students have attended McGill, l'Université Laval, l'Université du Québec and other schools in Canada. Interested candidates should apply to Canada Year, Canadian-American Center, 160 College Avenue.

The Department of Foreign Languages and Classics offers a number of core courses in the Canadian Studies Program, which is an interdisciplinary concentration for undergraduates. These courses examine the literature, culture, and civilization of French Canada. The specific listings appear in the French section below.

The University is administering for the Land Grant Universities of New England a Junior Year Abroad Program in Salzburg, Austria; it is affiliated through CIEE (Council of International Education Exchange) with a year or semester abroad study program at Rennes, France, and Seville and Alicante, Spain.

A credit transfer arrangement exists with the Universities of Avignon, and Aix-en Provence, France, and with the University of Kent in England and a direct exchange of qualified first year students (second semester) with advanced students is sponsored in several German Gymnasien. Arrangements for studies in Canada, e.g., at the Universities of New Brunswick, Nova Scotia, and Québec, can be made through the Canada Year Program.

Up to 36 credits may be earned through these programs, pending previous consent of the Dean, and the department chair involved.

Total immersion programs in French in Québec, in German and in Spanish are offered during the May Term (FRE, GER, SPA 297); three credits per program.

## Graduate Study

The department also offers work leading to a Master's Degree in French and M.A.T. degrees in French, German, and Spanish. See the Graduate School catalog, as well as the Summer Session Catalog, for special aspects involved when the degree is on other than full-time basis.

## Foreign Languages and Classics Offerings in English

The following courses make available in English the literature and civilization of Continental Europe and South America. They are taught by the same faculty who would ordinarily teach them in the national language for majors; in the English format, most of the courses will satisfy humanities requirements for B.A. students and will serve as electives for any other students.

### CLA 101 Greek Literature in English Translation

A survey of Greek literature. No knowledge of Greek is necessary. Cr 3.

### CLA 102 Latin Literature in English Translation.

A survey of Latin literature. No knowledge of Latin is necessary. Cr 3.

### FOL 190 Topics in Foreign Languages Cr Ar.

### FOL 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 with ENG 231). Cr 3.

### FOL 232 Western Tradition in Literature: Enlightenment to 20th Century

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 with ENG 232). Cr 3.

### FOL 293 Study Abroad

This course designation 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.

### FOL 410 Contemporary French Novel

A study of selected works of Existentialism and the New Novel in English translation. (Does not count for the French major). Cr 3.

### FOL 415 Twentieth Century French Theatre

Selected works of leading French playwrights of the 20th century in English translation. (Does not count for the French major). Cr 3.

### FOL 417 The Age of Enlightenment

Readings of the political, social, and philosophical writings of Montesquieu, Voltaire, Diderot, Rousseau, and other French writers of the 18th century, in English translation. Juniors, seniors, and sophomores with permission. May not be used to meet the requirements of a major or the M.A. degree in French. Cr 3.

### FOL 420 Twentieth Century German Literature in English

An introduction to recent German writings in the drama, novel, and poetry, with special attention

to such authors as Kafka, Mann, Brecht, and Grass. (Does not count for the German major).

Cr 3.

### FOL 425 Modern German Theatre in English

A study of German drama from 19th Century Realism to the present. Reading and discussion of works by Hauptmann, Schnitzler, Kaiser, Brecht, Durrenmatt, Fisch, Grass, Weiss and others. (Does not count for the German major).

Cr 3.

### FOL 430 Topics in European Literature

Varies in content from generic studies (the novel, the drama) to period studies (the Renaissance, Neo-Classicism). Prerequisite: 6 hours of literature or permission. (This course is identical with ENG 430). Cr 3.

### FOL 440 The Contemporary Spanish American Novel in English

The major works of Julio Cortazar, Carlos Fuentes, Mario Vargas Llosa, Gabriel Garcia Marquez and Jose Lezama Lima, and other representatives of the contemporary experimental Spanish American novel. (Does not count for the Spanish major). Cr 3.

### FOL 445 Cervantes in English

*Don Quixote* and other major works of Cervantes in English. Lectures on his life and times. (Does not count for the Spanish major). Cr 3.

### FOL 453 Phonology

The sound systems and morphophonemics manifested by natural languages are studied within the theoretical framework of transformational grammar. Prerequisite: INT 310 or equivalent. Cr 3.

### FOL 466 The Teaching of Foreign 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.

### FOL 473 Topics in Literary Theory and Criticism

Studies in the history of literary criticism, selected theoretic perspectives, or the application of specific critical approaches. Specific topic from year to year. Prerequisite: 6 hours of literature or permission. (This course is identical with ENG 470). Cr 3.

### FOL 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 investigating 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.

**FOL 480 Introduction to Dante's Divine Comedy**

Examines the literary structure, theology, cosmology, and philosophy of the work. Cr 3.

**FOL 490 Topics in Foreign Languages.**

May be repeated for credit if a different topic is created. Cr 1-3.

**FOL 493 Study Abroad**

This course designation 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.

**FOL 496 Field Work in Foreign Languages**

Supervised work in either the public or the private sector which is relevant to the study and use of a foreign language. Requirements include an initial proposal which shows the relevance of the work experience to the student's program in foreign languages and a final report or paper. Prerequisite: an appropriate level of fluency as determined by the department. Cr 1-12.

**FOL 520 Methodology 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.

**FOL 521 Seminar in Literary Research Methods**

Literary topics transcending national boundaries will be chosen to provide training in the methods and techniques of literary research for students of French, German, and Spanish literature. Cr 3.

**FOL 598 Topics in Foreign Languages.** Cr 3.

**Courses in French**

**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. Cr 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 year in high school. Prerequisite: FRE 101 or equivalent. Cr 4.

**FRE 121 Elementary French (Accelerated) I**

For students with no previous study of French or fewer than two years in high school. Must be taken in combination with FRE 122 in one

semester. A full year's work covered in one semester. Cr 6.

**FRE 122 Elementary French (Accelerated) II**

For students with no previous study of French or fewer than two years in high school. Must be taken in combination with FRE 121 in one semester. A full year's work covered in one semester. Cr 6.

**FRE 203 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. Prerequisite: FRE 102 or equivalent. Cr 4.

**FRE 204 Intermediate French II**

A continuation of FRE 203. Designed to strengthen reading, writing, speaking and comprehension skills. Prerequisite: FRE 203 or equivalent. Cr 4.

**FRE 205 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. Cr 3.

**FRE 206 French Conversation and Composition II**

Continued training in the correct usage of spoken and written French. Prerequisite: FRE 205 or equivalent. Cr 3.

**FRE 207 French Diction**

The pronunciation of French, with attention also to the rudiments of structure. Primarily a service course for the Departments of Performing Arts and Speech, e.g., vocalists, actors, radio and television announcers. Cr 1.

**FRE 208 French Play Production**

Participation in the acting and production of plays in the foreign language. Prerequisite: permission of the instructor. May be repeated for credit. Cr 3.

**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. Prerequisite: FRE 204 or the equivalent. Cr 3.

**FRE 210 Readings in French Literature II**

Continued practice in reading and discussion in French. Prerequisite: FRE 204 or the equivalent. Cr 3.

**FRE 215 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. Prerequisite: FRE 205 or permission of the instructor. Cr 3.

**FRE 223 Intermediate French (Accelerated) I**

For students who have completed FRE 102 or FRE 121, 122 or the equivalent in high school. This course must be taken in combination with FRE 224 in one semester. A full year's work covered in one semester. Cr 6.

**FRE 224 Intermediate French (Accelerated) II**

Must be taken in combination with FRE 223 in one semester. A full year's work covered in one semester. Cr 6.

**FRE 254 Popular Culture in French Canada**

An examination of modern Quebec society through the study of written texts (fiction, magazines, newspapers, etc.) films, video tapes, and audio recordings that reflect "popular" culture as opposed to "high" culture. Prerequisite: FRE 205, FRE 206 or permission. Cr 3.

**FRE 256 French Canadian Civilization**

An introductory course which examines the literature and social history of French Canada, and will attempt to explain the contemporary culture of Quebec. Cr 3.

**FRE 297 French May-Term**

Total Immersion Program. Prerequisite: FRE 204 or permission of instructor. Cr 3.

**FRE 400 Advanced French Grammar and Composition**

Designed to enhance competence in the areas of French grammar, syntax and written expression. An exposition of grammatical and syntactical principles through composition practice. Prerequisite: FRE 205 or FRE 206 or permission of instructor. Cr 3.

**FRE 401 Theme et Version**

Translation from French into English and from English into French of texts exemplifying various modes of written expression. Prerequisite: FRE 400 or permission of instructor. 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. Cr 3.

**FRE 405 Seventeenth Century French Literature**

Literary trends in French classicism: Descartes, Pascal, Corneille, Racine, Moliere, La Fontaine, Lafayette. Prerequisite: FRE 209 or FRE 210 or permission. Cr 3.

**FRE 406 Eighteenth Century French Literature**

Readings from the works of Montesquieu, Voltaire, Rousseau, Diderot, etc., with special attention to Enlightenment thought and to the novel genre. 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. 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. Cr 3.

**FRE 409 French Critical Methodology**

Examination of European critical methods from 19th century to present. Special attention to concepts of history and structural method. 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. Prerequisite: FRE 204 or the equivalent. Cr 3.

**FRE 440 Franco-American Civilization**

An interdisciplinary study of the French heritage in North America. Cr 3.

**FRE 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. Competency in reading and oral comprehension of French are recommended. Cr 3.

**FRE 452 The Novel of Quebec**

An examination of the evolution of the novel in Quebec from 1915 to the present: roman de la terre, the urban novel, the new novel. Authors studied will include Hemon, Grignon, Guevremont, Ringuet, Roy, Hebert and Aquin. Prerequisite: FRE 209 or FRE 210 or permission. Cr 3.

**FRE 456 Seminar in Quebec Studies**

An advanced study of the more complex issues which Quebec has had to confront. Students will be expected to conduct some research and to report their findings. Prerequisite: FRE 256 or permission. Cr 3.

**FRE 457 French Civilization**

Readings, discussions, lectures, written and oral reports on varied aspects of contemporary France, its people, attitudes, institutions, and culture. Prerequisite: FRE 204 or the equivalent. Cr 3.

**FRE 460 Black African Literature in French**

Lectures, readings and discussion of representative novelists, dramatists and poets of Black French Africa from 1930 to the present. Prerequisite: A reading knowledge of French and permission of the instructor. 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. Prerequisite: FRE 209 or FRE 210 or permission. Cr 1-3.

**FRE 497 Independent Projects I (undergraduate).**

Cr 1-3.

**FRE 498 Independent Projects II (undergraduate).**

Cr 1-3.

**FRE 499 Applied French Linguistics**

The French sound system, spoken grammar, basic concepts of descriptive and general linguistics. Cr 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 studied 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 512 Contemporary French Political and Social Institutions**

An investigation into political and social institutions which constitute the fabric of contemporary France. Cr 3.

**FRE 513 English-French Translation**

Intensive practice in the art of rendering English thought in French. Prerequisite: FRE 400 or FRE 401 or equivalent. 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 550 Seminar in French-Canadian Literature and Language**

Lectures, readings and analyses of representative literature of modern French Canada, with emphasis on the novel. Attention given to linguistic and cultural patterns, including those affecting New England. Prerequisite: at least one course in French literature or permission. Cr 3.

**FRE 552 Films, Video Drama and Literature in French Canada**

Visual dramas will be compared with the literary works from which they evolved. The cultural impact of these dramas will be studied within the context of current Canadian issues. Cr 3.

**FRE 591 Individual Authors I**

Cr 3.

**FRE 592 Individual Authors II**

Cr 3.

**FRE 597 Projects in French I**

Cr 3.

**FRE 598 Projects in French II**

Cr 3.

**Courses in German****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. Cr 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 of fewer than two years in high school. Prerequisite: GER 101 or equivalent. Cr 4.

**GER 111 Elementary German I (Individualized Track)**

An individualized approach to learning the basics of German for those with no previous study of the language or fewer than two years of high school German. Students will contract for varying work loads and for credits varying from 1 to 4 per semester. (Completion of 4 credits is required before beginning the next level, GER 112). Cr 1-4.

**GER 112 Elementary German II (Individualized Track)**

An individualized approach to learning the basics of German for those with no previous study of the language or fewer than two years of high school German. Students will contract for varying work loads and for credits varying from 1 to 4 per semester. (Completion of 4 credits required before advancing to GER 203). Prerequisite: GER 101 or GER 111 or equivalent. Cr 1-4.

**GER 121 Elementary German (Accelerated) I**

A systematic study of the basics of the German language. For students with no previous study



of German or fewer than two years in high school. This course must be taken in combination with GER 122 in one semester. A full year's work covered in one semester. Cr 6.

**GER 122 Elementary German (Accelerated)**

Must be taken in combination with GER 121 in one semester. A full year's work covered in one semester. Cr 6.

**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. Prerequisite: GER 102 or equivalent. Cr 4.

**GER 204 Intermediate German II**

A continuation of GER 203. Designed to strengthen reading, writing, speaking and comprehension skills. Prerequisite: GER 203 or equivalent. Cr 4.

**GER 205 Practical German I**

Conversational and composition language course designed to further develop students' comprehension, speaking and writing skills for everyday use. All classes are conducted in German. Prerequisite: GER 204 or equivalent. Cr 3.

**GER 206 Practical German II**

Continued conversation and composition. Prerequisite: GER 204, GER 205 or equivalent. Cr 3.

**GER 207 Readings in Scientific German**

For students who have completed GER 203 or equivalent and wish to be able to read scientific articles in German. The second half of the semester will be devoted to individualized readings in the student's special field of interest. Prerequisite: GER 203 or equivalent. Can be taken as an alternate to GER 204; also serves as preparation for meeting graduate school language requirements. Cr 3.

**GER 208 German Play Production**

Participation in the acting and production of plays in the German language. May be repeated for credit. Prerequisite: Permission. Cr 1-3.

**GER 209 German Diction**

The pronunciation of German, with some attention also to the rudiments of structure. Primarily a service course for the Departments of Theatre/Dance, Music and Speech, e.g., vocalists, actors, and television announcers. Cr 1.

**GER 210 Business German**

Develops skills in a specialized branch of the German language through reading, some writing of business correspondence, and practical conversation. Provides enrichment for those working toward degrees in fields (e.g., International Affairs) where a knowledge of the present social and economic climate of Germany is important. Prerequisite: GER 203 or equivalent.

Can be taken instead of GER 204. Offered in alternate years with GER 207. Cr 3.

**GER 223 Intermediate German (Accelerated)**

**I**  
For students who have completed GER 102 or GER 121, GER 122 or the equivalent in high school as determined by a placement test. Must be taken in combination with GER 224 in one semester. A full year's work covered in one semester. Cr 6.

**GER 224 Intermediate German (Accelerated)**

**II**  
Must be taken in combination with GER 223 in one semester. A full year's work covered in one semester. Cr 3.

**GER 297 German May-Term**

A fifteen-day, off-campus, total immersion program on Lake Megunticook near Camden, Maine. Prerequisite: Permission of instructor. Cr 3.

**GER 311 Readings in German Literature I**

An introduction to German literature and culture. Reading selections from contemporary literary texts and current events. Prepares students for literature and civilization courses at the 400 level. Prerequisite: GER 204 or equivalent. Cr 3.

**GER 312 Introduction to German Literature II**

Introduces students to German literature and culture. Reading selections are based on contemporary literary texts. Prepares students for literature and civilization courses at the 400 level. Prerequisite: GER 204 or equivalent. Cr 3.

**GER 400 Advanced German Grammar and Stylistics**

Advanced study of German grammar, syntax, and composition, especially for prospective teachers. An exposition of grammatical and syntactical principles through exercises and composition practice. Prerequisites: GER 205, GER 206 or equivalent, or permission of instructor. 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. 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. Prerequisite: GER 204 or the equivalent. Cr 3.

**GER 403 History of the German Language**

Studies the development of the German language from Indoeuropean 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. Prerequisite: GER 204 or the equivalent. Cr 3.

**GER 405 Enlightenment and "Storm and Stress"**

Masterpieces of prose, drama, poetry, and essays in critical thought from the 18th century. Special emphasis will be given to Lessing, young Goethe, and Schiller. Prerequisite: GER 204. 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. Cr 3.

**GER 407 Schiller**

Selected works of poetry, drama, and critical writings from Schiller's classical period, including historical background and influence on later German literature. Prerequisite: GER 204. Cr 3.

**GER 408 The Romantic School**

Readings from works of major authors of the Romantic School, including Novalis, Schlegel, Tieck, Wackenroder, Brentano, E.T.A. Hoffmann, and Eichendorff. Prerequisite: GER 204. Cr 3.

**GER 410 German Literature from 1832 to the Turn of the Century**

Readings from representative works of the 19th century realists, with special emphasis on the *Novelle*. Prerequisite: GER 204. Cr 3.

**GER 411 German Literature of the 20th Century I**

Readings and discussions of representative authors of the 20th century. Emphasis on literature before 1945. Prerequisite: GER 204. Cr 3.

**GER 412 German Literature of the 20th Century II**

Readings and discussions of representative authors of the 20th century. Focus on the development of new techniques in the novel, *Novelle*, and drama in the Germanys, Austria, and Switzerland of the post-war era. Prerequisite: GER 204 or the equivalent. Cr 3.

**GER 490 Topics in German**

Specific topics vary from semester to semester. May be repeated for credit. Cr 1-3.

**GER 497 Projects in German I (undergraduate)**

Cr 1-3.

**GER 498 Projects in German II (undergraduate)**

Cr 1-3.

**GER 597 Projects in German 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 1-3.

**GER 598 Projects in German 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.

## Courses in Greek

### 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.

### GRE 203 Readings in Greek Literature I

Selections from the work of one prose author and one playwright, including Xenophon, Plato, and the Tragedians. Cr 3.

### GRE 204 Readings in Greek Literature II

Selected readings from the works of Homer and Hesiod. Cr 3.

### ITA 215 Italian Diction

The pronunciation of Italian, with some attention to the rudiments of structure. Designed primarily for singers but may also be elected by others. Cr 1.

## Courses in Latin

### 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 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. Cr 3.

### LAT 204 Readings in Latin Literature II

Selections from Latin poetry. Meter, scansion and the interpretation of poetry will be emphasized. Prerequisite: LAT 203 or 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. Prerequisite: LAT 204 or the equivalent or permission of instructor. Cr 3.

### LAT 248 Latin Prose Composition and Stylistic II

Continued study of grammar and syntax. Required for majors; should be taken in the junior year or earlier, if possible. 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. 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 selection from: Lucretius, *De Rerum Natura*, and Cicero's philosophical essays. 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. 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*. Offered every three years. Cr 3.

### LAT 481 Virgil: The Eclogues, Georgics, Aeneid

The poet's background achievements, and influence upon later literature. 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 and differences from classical Latin prose and poetry. Offered upon sufficient demand. Cr 3.

### LAT 497 Projects in Latin I

Individual work on a project selected by the student. Prerequisite: consent of the department chairperson. (maximum: 3 hrs). Cr Ar.

### LAT 498 Projects in Latin II

Individual work on a project selected by the student. Prerequisite: consent of the department chairperson. (maximum: 3 hrs). Cr Ar.

## Courses in Russian

### RUS 101 Elementary Russian I

A systematic study of the basics of the Russian language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of Russian or fewer than two years in high school. Cr 4.

### RUS 102 Elementary Russian II

A continued study of the basics of the Russian language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of Russian or fewer than two years in high school. Prerequisite: RUS 101 or equivalent. Cr 4.

**RUS 121 Elementary Russian-(Accelerated) I**  
For students with no previous study of Russian or fewer than two years in high school. Must be taken in combination with RUS 122 in one semester. A full year's work covered in one semester. Cr 6.

### RUS 122 Elementary Russian (Accelerated) II

For students with no previous study of Russian or fewer than two years in high school. Must be taken in combination with RUS 121 in one semester. A full year's work covered in one semester. Cr 6.

### RUS 203 Intermediate Russian 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. The course also includes a systematic but gradual review of the essentials of Russian grammar. Cr 4.

### RUS 204 Intermediate Russian II

A continuation of RUS 203 designed to strengthen reading, writing, speaking and comprehension skills. Prerequisite: RUS 203 or equivalent. Cr 4.

### RUS 205 Practical Russian I

Systematic training in correct pronunciation, intonation and usage, as well as vocabulary building, with written and oral practice. Prerequisite: RUS 204 (or the equivalent) and permission. Conducted entirely in Russian. Cr 3.

### RUS 206 Practical Russian II

Continued training in practical Russian. Prerequisite: RUS 204 (or the equivalent) and permission. Course is conducted entirely in Russian. Cr 3.

### RUS 223 Intermediate Russian (Accelerated) I

For students who have completed RUS 102 or RUS 121, RUS 122 or equivalent in high school. Must be taken in combination with RUS 224 in one semester. A full year's work covered in one semester. Cr 6.

### RUS 224 Intermediate Russian (Accelerated) II

Must be taken in combination with RUS 223 in one semester. A full year's work covered in one semester. Cr 6.

## Courses in Spanish

### 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. Cr 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. Cr 4.



ng skills. For students with no previous study of Spanish or fewer than two year in high school. Prerequisite: SPA 101 or equivalent.

Cr 4.

**SPA 111 Elementary Spanish I (Individualized Track)**

A systematic study of the basics of the Spanish language. Equal emphasis is placed on developing reading, comprehension, speaking and written skills. For students with no previous study of Spanish or fewer than two years in high school. (Completion of all 4 credits is required before beginning SPA 112).

Cr 1-4.

**SPA 112 Elementary Spanish II (Individualized Track)**

A continued study of the basics of the Spanish language. Equal emphasis is placed on developing reading, comprehension, speaking and written skills. For students with no previous study of Spanish or fewer than two years in high school. (Completion of all 4 credits is required before beginning intermediate level). Prerequisite: SPA 111, SPA 101 or equivalent.

Cr 1-4.

**SPA 121 Elementary Spanish (Accelerated) I**

For students with no previous study of Spanish or fewer than two years in high school. Must be taken in combination with SPA 122 in one semester. A full year's work covered in one semester.

Cr 6.

**SPA 122 Elementary Spanish (Accelerated) II**

For students with no previous study of Spanish or fewer than two years in high school. Must be taken in combination with SPA 121 in one semester. A full year's work covered in one semester.

Cr 6.

**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. Prerequisite: SPA 102 or equivalent.

Cr 4.

**SPA 204 Intermediate Spanish II**

A continuation of SPA 203 designed to strengthen reading, writing, speaking and comprehension skills. Prerequisite: SPA 203 or equivalent.

Cr 4.

**SPA 205 Spanish Conversation and Composition I**

Develops proficiency in spoken and written English. through selected vocabulary and grammar exercises, discussions, skits, speeches, and compositions. Conducted in Spanish. Prerequisite: SPA 204 or equivalent.

Cr 3.

**SPA 206 Spanish Conversation and Composition II**

Develops proficiency in spoken and written English. through selected vocabulary and grammar exercises, discussion, skits, speeches, and compositions. Conducted in Spanish. Prerequisite: SPA 204, SPA 205 or equivalent.

Cr 3.

**SPA 213 Intermediate Spanish I (Individualized Track)**

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. Prerequisite: SPA 102, SPA 112 or equivalent. (The entire 4 credits must be earned in order to complete the course).

Cr 1-4.

**SPA 214 Intermediate Spanish II (Individualized Track)**

A continuation of SPA 213 designed to strengthen reading, writing, speaking and comprehension skills. Prerequisite: SPA 203, SPA 213 or equivalent. (The entire 4 credits must be earned in order to complete the course).

Cr 1-4.

**SPA 218 Spanish Play Production**

Participation in the acting and production of plays in Spanish. May be repeated for credit with permission.

Cr 3.

**SPA 223 Intermediate Spanish (Accelerated) I**

For students who have completed SPA 121, SPA 122 or the equivalent in high school as determined by a placement test. Must be taken in combination with SPA 224 in one semester. A full year's work covered in one semester.

Cr 6.

**SPA 224 Intermediate Spanish (Accelerated) II**

Must be taken in combination with SPA 223 in one semester. A full year's work covered in one semester.

Cr 6.

**SPA 297 Spanish (May Term)**

Total Immersion Program. Prerequisite: Permission.

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. 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. Prerequisite: SPA 206 or permission.

Cr 3.

**SPA 400 Advanced Spanish Grammar, Composition, and Stylistics**

Designed to provide an adequate foundation in Spanish grammar, syntax, and composition for prospective teachers. Applied stylistics for students with proficiency of expression interested in creative writing. Prerequisite: SPA 205 or SPA 206, SPA 307 or SPA 308 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. Prerequisite: SPA 307 or SPA 308 or permission of the instructor.

Cr 3.

**SPA 402 Comedia**

Theater of the 16th and 17th centuries, including Lope de Vega, Tirso de Molina, and Calderon de la Barca. Prerequisite: SPA 307 or SPA 308 or permission.

Cr 3.

**SPA 403 Cervantes**

A careful reading of the Spanish masterpiece, *Don Quixote*, including its historical background and continuing influence. 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. 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. Prerequisite: SPA 307 or SPA 308 or permission of the instructor.

Cr 3.

**SPA 407 Contemporary Spanish Novel**

Experimental Novel of the Twentieth Century. Prerequisite: SPA 307 or SPA 308 or permission of the instructor.

Cr 3.

**SPA 408 Latin-American Masterpieces**

A selection of key essays, poems, short stories, and novels from the colonial period to the 20th century. Prerequisite: SPA 307 or SPA 308 or permission.

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. Prerequisite: SPA 307 or SPA 308 or permission.

Cr 3.

**SPA 410 Latin American Novel**

The contemporary novel in Spanish America, with special attention on some of the novelists of the BOOM 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. 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. Prerequisite: SPA 307 or SPA 308 or permission. Cr 3.

#### SPA 413 Hispanic Women Writers

A critical study of poetry and prose produced by Spanish and Spanish-American women writers from the 17th century to the present. Focus on the discourse of these women as it confronts a male oriented and a male controlled field. Specific topics vary from year to year. Prerequisites: SPA 307 or SPA 308, or permission. Cr 3.

#### SPA 425 Medieval Spanish Literature

Introduction to the literary masterpieces of the Spanish Middle Ages (12th through 15th centuries). Refines critical skills (both written and spoken), and provides a basis for an historical understanding of the development of genres. Prerequisites: SPA 307 or SPA 308 or permission. Cr 3.

#### SPA 457 Spanish Civilization

A study of Spain, its people, institutions and culture providing the background essential to an understanding of Spanish literature, thought and artistic expression. Prerequisite: SPA 307 or SPA 308 or permission. Cr 3.

#### SPA 458 Spanish American Civilization

A study of Latin America, its people, institutions, and culture providing the background essential to an understanding of Latin America literature, thought and artistic expression. Prerequisite: SPA 307 or SPA 308 or permission. Cr 3.

#### SPA 490 Topics and Individual Authors in Spanish

Specific topic varies semester to semester. May be repeated for credit. Cr 1-3.

#### SPA 497 Projects in Spanish I

Independent study on topics selected by student and instructor. Cr 1-3.

#### SPA 498 Projects in Spanish II

Independent study on topics selected by student and instructor. 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.

#### Interdisciplinary Course

##### INT 410 (ANT, ENG, FOL) 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.

#### Courses in English as a Foreign Language

##### IEI 021 Low Intermediate ESL For International Students

Instruction in writing a very simplified form of paragraph, intensive and extensive reading, basic listening and communication skills. (Pass/Fail grade only). Cr 3-12.

##### IEI 022 Intermediate ESL For International Students

Instruction in writing elaborate paragraphs and topic sentences, reading for main ideas and supporting details, communication skills and listening strategies. (Pass/Fail grade only). Cr 3-12.

##### IEI 023 High Intermediate ESL For International Students

Students are taught writing through essays of description, process classification, cause and effect, critical reading, advanced oral skills such as debates and presentations and listening comprehension strategies. (Pass/Fail grade only). Cr 3-12.

##### IEI 024 Advanced ESL For International Students

Covers research skills, advanced reading strategies, i.e. synthesizing and interpreting, advanced communication through academic discussions and giving presentations, understanding academic lectures and note taking. (Pass/Fail grade only). Cr 3-12.





## History

Professor Nadelhaft (Chairperson)

Professors Babcock, Baker, Blanke, Doty, Schonberger, Smith, Tebrake

Associate Professors Battick, Bregman, Ferland, Grab, Judd, Petrik, Schriver, Segal

Assistant Professors Long, Weiner

The Department offers lower level baccalaureate courses (HTY 103-HTY 280), upper level baccalaureate courses (HTY 301-HTY 499), and graduate level courses (HTY 501-HTY 699). Senior history majors may take 500-level graduate courses. Other students may take graduate level courses by permission. Majors must complete at least 12 three-hour courses in history, including:

1. At least 2 courses at any level from each of the following groups:
  1. United States history
  2. European history
  3. The history of areas outside Europe and the United States or history with either a world-wide or a topical focus.
2. At least eight intermediate or advanced courses. At least four of these courses must be concentrated in a single geographical, chronological, or topical area. An additional two courses must be grouped into a minor concentration. These must be selected in consultation with the student's history advisor.
3. At least one senior seminar, normally taken during the student's final undergraduate year.

Students must achieve a 2.0 G.P.A. in their major, pass an English proficiency test, and demonstrate proficiency in a foreign language at the intermediate level either through examination or course work.

The Department offers an emphasis in the international affairs program. See International Affairs in the index.

The Department offers the M.A. degree in history, with specialties in most areas of history. In cooperation with the Department of Anthropology, the Department also offers a master's program with an emphasis in historical archaeology. The Ph.D. degree is offered in United States History and Canadian-American history. Further details may be found in the Graduate School catalog.

### Courses in History

#### 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. **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. **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. Prerequisite: first-year students only. **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. **Cr 3.**

#### HTY 107 East Asian Civilization I

A survey of China's and Japan's social, economic, cultural and political life from pre-historic 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. **Cr 3.**

#### HTY 108 South and Southeast Asia 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. **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. **Cr 3.**

#### HTY 111 Canada: From Cartier to Trudeau

An overview of Canadian history from the age of the 16th century explorers to the contemporary political scene. Emphasis on the emergence of various regional identities and the evolution of the social formation from colonial times to the modern urban era. **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 201 Classical Civilization

A basic introduction to the history, culture, art, and thought of the ancient Greeks and Romans,

emphasizing those aspects of the classical world which have had an impact on our civilization. **Cr 3.**

#### HTY 202 Medieval Civilization

Investigation of the cultural development of Europe during the Middle Ages, from late Roman times through the 15th century. Develops a broad overview of the distinctively European civilization that emerged during the period. **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 Indian life preceding white settlement, the periods of colonial, provincial, and state history are covered. No first-year students. **Cr 3.**

#### HTY 215 The World in the Twentieth Century I

The response of leaders and ordinary men and women to the events of the first half of the 20th Century: two World Wars and the Great Depression, competitive ideologies of fascism, communism, and democracy, the first stirrings of Asian, African and Latin American self-determination, and popular culture, technology, and morality in the age of the flapper to the end of World War II. **Cr 3.**

#### HTY 216 The World in the Twentieth Century II

The response of leaders and ordinary men and women to the world events since World War II: a postwar revolution, a struggle between the USA and USSR, the rise of Asian, African, Latin American, and Mideast self-determination, and changing popular culture, consumption, morality, and technology from the "baby boomers" to today. **Cr 3.**

#### HTY 217 Environmental History of Europe

Changes in the basic interrelationships between nature and human culture, emphasizing the gradual evolution of European society within its physical setting from small, isolated groups of primitive agriculturalists in prehistoric times, through the complex peasant society of the Middle Ages, to the emergence of a highly urbanized, industrialized society today. **Cr 3.**

#### HTY 250 History as People: The American Experience as Biography

Major facets of American life from the colonial period to the present explored through lectures on the lives and important actions of representative Americans. The premise of this course is



that the past is sometimes best understood through its individual people. Cr 3.

#### **HTY 272 The Industrial Worker in America**

Examines changes in the world of work during successive phases of industrial capitalist development beginning with the artisan "republic" of the Revolutionary War. Focus on the evolving factory system, worker responses to technological change, and effects of ethnicity, race, and gender. Concludes with the growing role of the state in the lives of workers, and examines a variety of contemporary labor issues from an historical perspective. Guest lectures, films, field trip to area factory. 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. Cr 3.

#### **HTY 277 History of the Treatment of the American Environment**

The attitude, policies, and behavior of Americans and their government toward the environment. Current issues evolving out of past attitudes and policies. 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. 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. 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. First-year students require permission. Cr 3.

#### **HTY 401 History of Greece**

Ancient Greece from the "Heroic Age" to the "Classical & Hellenistic" including 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 201 or 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 201 or 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. 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. Prerequisite: HTY 105 or permission. Cr 3.

#### **HTY 405 The Renaissance and Reformation**

The social, intellectual, cultural and economic achievements of the period 1300-1600. The Protestant and Catholic reforms and their effects will be evaluated. Prerequisite: HTY 105 or HTY 106 or permission. Cr 3.

#### **HTY 406 The Age of Monarchs, 1600-1789**

The socio-economic, political and cultural developments of Europe in the Early Modern period, emphasizing the history of several major countries including France, Prussia, the Austrian Empire and Russia. Prerequisite: HTY 105 or HTY 106 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 oligarchical to liberal politics, from aristocratic to middle-class tastes, from enlightened thought and the romantic reaction to Marxist and Darwinian intellectual bombshells. Prerequisite: HTY 105 or HTY 106 or permission. Cr 3.

#### **HTY 408 The Age of Liberalism, 1860-1919**

Europe from the liberalism of Bismarck, Cavour, Napoleon III, Disraeli, and Gladstone to the rise of mass democracy and the welfare state including the impact of a Second Industrial Revolution, the rise of socialism, emergence of modern thought, World War I, and the Russian Revolution. Prerequisite: HTY 106 or permission. Cr 3.

#### **HTY 409 Twentieth Century Europe, 1919 to Present**

An analysis of major political, economic, social and cultural developments in Europe since 1919, including the problems of democracy between the world wars, varieties of totalitarianism, World War II, the Russian imperium, and the development of today's affluent west-

ern European democracies. Prerequisite: HTY 105 or HTY 106 or permission. Cr 3.

#### **HTY 413 The Evolution of the American Corporation**

Intensive reading acquaints the student with the major themes in the historical development of corporate America and "big business" in general, specifically manufacturing. Prerequisite: 6 hours of history or permission. Cr 3.

#### **HTY 414 Law and American Society**

Examines our national tendency to attempt to settle our biggest problems—sex discrimination, the death penalty, desegregation—through law. Explains how laws were (and are) made, from federal and state constitutions and legislature to small-town zoning, and how law was (and is) administered by courts and agencies of every sort. Prerequisite: 6 hours of history 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. Prerequisites: 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. Prerequisites: HTY 103 or HTY 104 or permission. Cr 3.

#### **HTY 417 The American West From Lewis and Clark to World War Two**

Examines the social and political history of America West of the Mississippi River. It is organized around three main themes: land use; lives of inhabitants including Native Americans and Americans of European, African, or Asian origin; the West as an American myth. Covers topics ranging from the fur trade in Native American societies to industrialization during World War Two. Prerequisites: HTY 103 or HTY 104 or permission. Cr 3.

#### **HTY 419 Science and Society Until 1800**

Examines the development of science from antiquity to the European Scientific Revolution both "internally"—as ideas and experiments—and "externally"—as related to the societies which have produced them and upon which they in turn have had impact. Not open to first-year students. 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 American and other societies which have produced them and upon which they in turn have had impact. Not open to first-year students. Cr 3.

**HTY 422 Modern France**

French history since the French Revolution. The internal political and social challenges from the Left and Right in the failure of three monarchies and three republics, the rise and decline of the French empire, economic growth and lag, Gaullism and the Fifth Republic, and French cultural leadership from Romanticism to Existentialism. Prerequisite: HTY 105 or HTY 106 or permission. 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. Prerequisite: HTY 105 or HTY 106 or permission. Cr 3.

**HTY 424 History of Russia II**

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. Prerequisite: HTY 106 or permission. Cr 3.

**HTY 425 History of Germany I**

A survey of German history from the earliest times to the mid-19th Century, treating selected political, cultural, economic and social themes which help illuminate modern Germany. Prerequisite: HTY 105 or 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. Prerequisite: HTY 106 or permission. Cr 3.

**HTY 427 European Intellectual History I**

Interaction of ideas with society and politics from late antiquity to 1700, emphasizing changing views toward man, society, science, literature, arts, religion and government. Prerequisite: HTY 201 or HTY 103 or HTY 105. Cr 3.

**HTY 428 European Intellectual History II**

Interaction of ideas with society and politics from 1700 to the present, emphasizing changing views toward man, society, science, literature, arts, religion and government. Prerequisite: HTY 106. 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. Prerequisite: Six hours of history or permission. Cr 3.

**HTY 431 Understanding European History Through Fiction**

The discussion of British and European works of fiction as sources for understanding European political and social history from the French Revolution to the present. Prerequisite: HTY 105 or HTY 106 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 and intellectual and spiritual lives. Prerequisite: HTY 201 or PHI 101 or LAT 101 or GRE 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 106-201; PHI 101; LAT 101, 102; GRE 101, 102; ARH 251, 253, POS 389 or permission. Cr 3.

**HTY 435 History of China I**

History and culture of the Chinese people from earliest times to the 19th century. Prerequisite: HTY 107 or HTY 108 or six hours of history or permission. Cr 3.

**HTY 436 History of China II**

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 441 History of Modern China**

An examination of social structure, foreign contact, value change and popular movements from the late Qing (19th century) until present. Emphasis on the relationship between popular uprisings (White Lotus, Muslim Nian, Taiping, Boxers, Red Spears, etc.) and the Communist Revolution. The Chinese revolution will be compared to those of other East Asian countries, and to general theories of peasant revolt.

Prerequisite: HTY 107 or HTY 435 or HTY 436. 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. Prerequisite: One survey course in history. Cr 3.

**HTY 447 Latin America: Under the Conquerors**

Changes brought by Iberian conquest and colonization in the lives of the native peoples of Latin America. Individual and group resistance and accommodation, contributing to cultural change and continuity. Considerable attention to agrarian and labor themes in the central areas. Prerequisite: HTY 109 or permission. Cr 3.

**HTY 448 Latin America: Reform and Revolution**

Nineteenth and twentieth-century reform movements and revolutionary struggles in Latin America, their local historical roots and their international ramifications. Mexico, Cuba, Central America, and other case studies. Prerequisite: HTY 109 or permission. Cr 3.

**HTY 452 Topics in Latin American History**

Analysis of varying political, economic, social, and/or cultural topics highlighted in the recent scholarship on Latin American history. Prerequisite: HTY 109 or permission. 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. 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. 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. 6 hours of History. 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. Prerequisite: HTY 103 or HTY 111 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. Prerequisites: HTY 104 or HTY 111 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 Indian lands, enslavement of blacks, the role of women, the American family, and internal conflicts. 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. 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. Prerequisite: HTY 103 or permission. Cr 3.

#### HTY 467 Early 20th Century America, 1914-1945

Changes in American politics, economics, society and culture including the Wilson era of reform and intervention in World War I, the age of business, depression and the New Deal of FDR, World War II and American global power. Prerequisite: HTY 104 or permission. Cr 3.

#### HTY 468 America Since 1945

Changes in American politics, economics, society and culture including the Cold War and McCarthyism, protest movements of the 1960s, Watergate, the energy crisis and economic recession, affluence and poverty in the 1980s. Prerequisite: HTY 104 or permission. Cr 3.

#### HTY 473 American Diplomatic History I

American diplomatic history from the revolution to World War I, emphasizing the formation and application of America's major foreign policies. Prerequisite: HTY 103 or HTY 104 or permission. Cr 3.

#### HTY 474 American Diplomatic History II

American diplomatic history from World War I to the present, emphasizing the formation and application of America's major foreign policies.

Prerequisite: HTY 103 or HTY 104 or permission. Cr 3.

#### HTY 482 Canada and the American Economy

Examines the role and impact of American investment and technology on Canada, relations between American businessmen and Canadian elites, respective industrial relations systems, U.S. trade unions in Canada, trade legislation and other government policies affecting the North American economy. Prerequisite: HTY 459 or HTY 460 or ECO 438 or BUA 345 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 485 The Sea and Civilization: An Introduction to Maritime Studies I

A study of humankind in relation to the sea from prehistory to 1800 including demographic and social effects of the seas on human populations, marine technology, economics of the seas, national and international ramifications. Not open to first-year students. 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. 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 which have produced them and upon which they in turn have had impact. 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 American and other societies which have produced them and upon which they in turn have had impact. 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. 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. Prerequisites: HTY 103 or HTY 104 or permission. Cr 3.

#### HTY 496 Protest and Reform in Nineteenth-Century America

Considers America's nineteenth-century political crusades: Jacksonian democracy, the anti-slavery movement, populism, progressivism, and working-class radicalism. Covers the social tensions that gave rise to these reform movements, the leadership and organizational developments, the issues, the goals, and accomplishments. Prerequisites: 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. Prerequisites: 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; offered each semester. 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 American Diplomatic History

Advanced reading seminar. Deals with problems, interpretations, and issues in American diplomacy such as maritime neutral rights, expansion, role of military and naval powers. Content varies. Prerequisites: 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. Prerequisites: 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



outh, West, New England; their distinctive development and interrelationship to broader American history. Content varies. Prerequisites: graduate students, senior history majors and others by permission. Cr 3.

#### HTY 504 American Economic History

Advanced reading seminar. Study of American economics in its historical setting including major economic theories and their impacts and government-business relationships. Content varies. Prerequisites: 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 506 American Social History

Advanced reading seminar. Emphasis on the problems and issues of family, urban, ethnic, and labor history and historical utilization of social science methods. Content varies. Prerequisites: graduate students, senior history majors and others by permission. 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 which 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 England

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. Prerequisites: 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. 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. Prerequisite: HTY 459, HTY 460, or HTY 473, HTY 474 or POS 374 or permission. Cr 3.

#### HTY 522 Canadian Economic History

History and theory of Canadian staple development including political influences on land, resources, and industrialization policy as well as the social context shaping Canadian business elites and laboring classes and contemporary trends. Prerequisite: HTY 459, HTY 460 or ECO 438 or ARE 471 or permission. Cr 3.

#### HTY 540 Seminar in Modern Asian History

Research-oriented study of major themes of Asian history in the 19th and 20th centuries, impact of Western colonialism, rise of nationalism, and emergence of contemporary leadership in East, Southeast, and South Asia. Prerequisite: graduate students, senior history majors and others by permission. Cr 3.

#### HTY 550 Readings in Bibliography and Criticism in:

1. United States History
2. European History
3. British and Commonwealth History
4. Canadian History
5. Latin American History
6. Asian History

Cr Ar.

#### HTY 551 Latin America and the United States

United States participation and intervention in Latin American affairs from the early 19th century to the present. Prerequisite: graduate students, senior history majors, and others by permission. Cr 3.

#### HTY 570 Government-Business Relations in American History

Studies in problems such as federal regulation of business, antitrust policy, the government as

entrepreneur and as manager of the economy viewed in historical perspective. Prerequisite: Graduate students, senior history majors and others by permission. Cr 3.

#### HTY 583 The Maritime Frontier: Policies and Affairs

Examination of the relationship of maritime activity to national development from colonial times to the present, including technological developments, unionization, international competition, relationships to foreign policy, and special assistance to maritime industries. Governmental policies affecting use of the ocean as an economic resource, ranging from fisheries to oil drilling. Prerequisite: Graduate students, senior history majors, and others by permission. 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.

#### Interdisciplinary Course

#### INT 537 (HTY) The Evolution and Development of Canadian Government and Politics

Examination of theoretical structure and historical development of government and politics in Canada. Prerequisite: POS 335, HTY 460 or permission. Cr 3.



## International Affairs

A student may major in International Affairs in anthropology, economics, foreign languages, history, or political science.

During the first two years, the student of International Affairs should take courses which help to fulfill the distribution requirements for the B.A. degree. Among such courses are ANT 215 Social Anthropology, ECO 120 Principles of Microeconomics and ECO 121 Principles of Macroeconomics, HTY 106 History of European Civilization II, or HTY 107/108 Asian Civilization, POS 100 American Government, and courses in a modern foreign language. Students should consult also with International Affairs advisors in the participating departments regarding other courses they might take. To enter the junior year of the International Affairs program a student must have earned a minimum grade point average of 2.0 or have received permission from the Committee on International Affairs.

### Basic Requirements

#### International Affairs in Anthropology

- A. At least thirty (30) hours in Anthropology, including ANT 215, ANT 217 and ANT 499. Other courses which might be taken:
- ANT 441 People and Cultures of the Pacific Islands
  - ANT 442 Mediterranean Ethnology
  - ANT 453 People and Cultures of Mesoamerica
  - ANT 454 Cultures and Societies of the Middle East
  - ANT 455 Peoples and Cultures of Sub-Saharan Africa
  - ANT 461 Islamic Fundamentalism
  - ANT 464 Cultural Ecology
  - ANT 465 Political Anthropology
  - ANT 466 Economic Anthropology
  - ANT 467 Peasant Studies
  - ANT 468 Social Anthropology of Complex Societies
  - ANT 481 Language and Culture
  - ANT 491 Intercultural Understanding
  - INT 410 Introduction to the Study of Linguistics
  - INT 458 Culture and Economic Change
  - GEO 215 Cultural Geography
  - GEO 350 The Geography of Canada
- B. At least nine (9) hours each in economics, history, and political science from among the following courses:
1. Economics
    - ECO 120 Principles of Microeconomics
    - ECO 121 Principles of Macroeconomics
    - ECO 313 The Economies of Southeast Asia

ECO 435 History of Economic Thought  
 ECO 436 Marxian Economics  
 ECO 437 Comparative Economic Systems  
 ECO 438 Economic Development  
 ECO 439 International Trade and Commercial Policy

#### 2. History

HTY 107/108 Asian Civilization  
 HTY 215/216 The World in the Twentieth Century  
 HTY 407 The Age of Revolution: 1789-1860  
 HTY 408 The Age of Liberalism: 1860-1919  
 HTY 409 Twentieth Century Europe: 1919-present  
 HTY 422 Modern France  
 HTY 424 History of Russia II  
 HTY 426 History of Germany II  
 HTY 429 History of Modern Italy  
 HTY 437 History of Modern Japan  
 HTY 441 History of Modern China  
 HTY 446 History of Modern Middle East (1800-present)  
 HTY 447 Latin America: Under the Conquerors  
 HTY 448 Latin America: Reform and Revolution  
 HTY 452 Topics in Latin American History  
 HTY 456 History of England II  
 HTY 460 Modern Canada  
 HTY 473/374 American Diplomatic History

#### 3. Political Science

POS 121/122 Current World Problems  
 POS 223/224 Political Geography  
 POS 241 Politics in Contemporary Societies  
 POS 243 Canadian Government and Politics  
 POS 252 United States-Canadian Relations  
 POS 335 Democratic Governments of Europe  
 POS 336 The Communist Government of the Soviet Union  
 POS 344 Public Policy in Canada  
 POS 373 International Relations  
 POS 374 United States Foreign Policy  
 POS 387 International Law  
 POS 388 World Order Through International Organization and Law  
 POS 456 Canadian Political Parties  
 POS 465 Governments of South Asia  
 POS 466 Governments of East Asia  
 POS 467 African Politics  
 POS 468 Contemporary Politics of Latin America

POS 475 National Security Analysis  
 POS 477 Politics of the Middle East  
 POS 478 Foreign Policy of the Soviet Union  
 POS 531 Topics in Comparative Politics  
 POS 573 Problems in International Politics  
 POS 587 Problems in International Law

- C. At least one (1) year of a modern foreign language beyond the intermediate level.

#### International Affairs in Economics

- A. At least twenty-seven (27) hours in economics, one math course and one statistics course. The course requirements are:
1. Economics
    - ECO 120 Principles of Microeconomics\*
    - ECO 121 Principles of Macroeconomics\*
    - ECO 420 Intermediate Microeconomics
    - ECO 421 Intermediate Macroeconomics
    - ECO 437 Comparative Economic Systems
    - ECO 438 Economic Development
    - ECO 439 International Trade and Commercial Policy and two additional 300 level economics courses.
  2. Math: one math course from the following: MAT 113, Mathematics for Business and Economics, MAT 122 Algebra and Trigonometry, MAT 126, Analytical Geometry and Calculus, MAT 151, Calculus for the Life Sciences I, MAT 241, Mathematical Logic. MAT 126 is recommended for students considering graduate work in economics.
  3. Statistics: one course from the following: MAT 215, Introduction to Statistics for Business and Economics, MAT 232, Principles of Statistical Inference, MAT 434, Introduction to Statistics.
- B. At least nine (9) hours each in anthropology, history, and political science from among the following courses or from among others with an international focus:
1. Anthropology. (See Anthropology listing under International Affairs in Anthropology, A., above).
  2. History. (See History listing under International Affairs in Anthropology, B.2., above).
  3. Political Science. (See Political Science listing under International Affairs in Anthropology, B.3., above).
- C. At least one (1) year of a modern foreign language beyond the intermediate level.

\*ECO 110 and either ECO 120 or ECO 121 may be substituted with departmental permission. Students taking ECO 120 and ECO 121 may not receive credit for ECO 110.



**International Affairs in Foreign Languages**

- A. Twenty-four (24) hours above the introductory level in one modern foreign language.
- B. At least nine (9) hours each in anthropology, economics, history, and political science from among the following courses or from among others with an international focus:
1. Anthropology. (see Anthropology listing under International Affairs in Anthropology, A., above.)
  2. Economics. (see Economics listing under International Affairs in Anthropology, B.1., above.)
  3. History. (see History listing under International Affairs in Anthropology, B.2., above.)
  4. Political Science. (See Political Science listing under International Affairs in Anthropology, B.3., above.)
- C. Additional electives relating to international affairs arranged in consultation with major advisor. Highly recommended: a course in contemporary civilization and geography of the culture whose language is being studied.

**International Affairs in History**

- A. At least twenty-seven (27) hours in history. Among such courses may be those listed under International Affairs in Anthropology, B.2., History.
- B. At least nine (9) hours each in anthropology, economics, and political science from among the following courses or from among others with an international focus:
1. Anthropology. (see Anthropology listing under International Affairs in Anthropology, A., above.)
  2. Economics. (see Economics listing under International Affairs in Anthropology, B.1., above.)
  3. Political Science. (See Political Science listing under International Affairs in Anthropology, B.3., above.)
- C. At least one (1) year of a modern foreign language beyond the intermediate level.

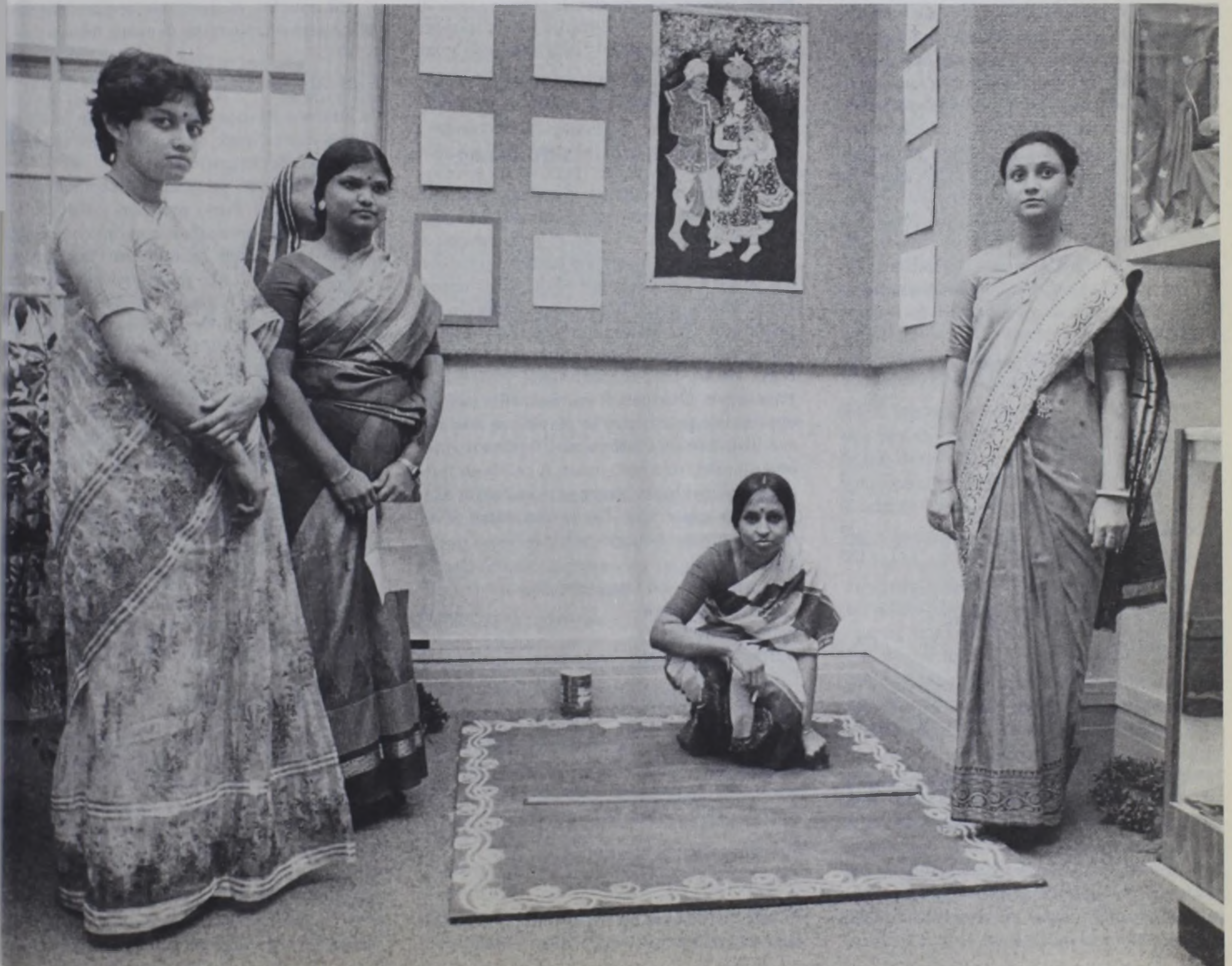
**International Affairs in Political Science**

- A. At least twenty-four (24) hours in political science in addition to POS 100. Among such courses may be those listed under Inter-

national Affairs in Anthropology, B.3., above.

- B. At least nine (9) hours each in anthropology, economics, and history or among the following courses or from among others with an international focus:
1. Anthropology. (see Anthropology listing under International Affairs in Anthropology, A., above.)
  2. Economics. (see Economics listing under International Affairs in Anthropology, B.1., above.)
  3. History. (See History listing under International Affairs in Anthropology, B.2., above.)
- C. At least one (1) year of a modern foreign language beyond the intermediate level.

Details of programs covering the last two years of study in each discipline may be obtained from the participating departments or from Walter S. Schoenberger, Coordinator, Committee on International Affairs, 33 North Stevens Hall.





## School of Performing Arts

### Music

Associate Professor Hallman (Chairperson)

Professors Cox, Jacobs, Stratton

Associate Professors Foley, Hall, F. Heath, Nesbit, Ogle, Roscetti, Voronietzky, Wieck

Assistant Professors Farnham, Marrs

Instructors Crook, Darcy, Garwood, S. Heath, Mummé

The curricula of the Department of Music lead to baccalaureate degrees as follows:

#### Bachelor of Arts Degree with a Major in Music

This program is designed for the study of music within a strong liberal arts curriculum. It offers a broad coverage of the field of music with emphasis on the study of the history and theory of music. It furnishes an appropriate background for prospective candidates for advanced degrees who are preparing for such careers as musicologists, composers, and music librarians. It does not qualify the graduate for certification as a public school music teacher. Candidates for the degree are expected to attain a level of performing ability equivalent to that required at the completion of the sophomore year in the Bachelor of Music program. A senior project is required in lieu of a recital. The total number of required semester hours in music is forty eight.

Music Theory	16
Music History and Literature	10
Performance Emphasis (eight semesters)	8
Senior Project	1
Music Organization	4
Music Electives (theory or history)	9
	<u>48</u>
Liberal Arts	72
Total Credits	<u>120</u>

#### Bachelor of Music in Music Education

This is a four-year professional degree for students who intend to make music a career either as a public school teacher or supervisor of music. The degree provides for many professional opportunities and serves also as preparation for graduate study in music education. Upon satisfactory completion of the music education course of study, the student is certified to teach music at both the elementary and secondary levels. A half-hour recital is required in the junior year. The total number of required semester hours in music is 81.

Music Theory	22
Music History and Literature	10
Major Performance Area	12
Music Organization	7
Basic Conducting	2
Instrumental concentration	18
OR	
Vocal/Keyboard concentration	18
Music Education Sequence	10
	<u>81</u>
Professional Education	18
Liberal Arts	27
Total Credits	<u>126</u>

#### Bachelor of Music in Performance

This degree is designed to assist the gifted music student to prepare for a career in music performance. It serves also as preparation for graduate study in music and teaching at the college level. Emphasis is placed on performance, music theory, music history, and studies in the liberal arts. The degree is granted in the following applied music areas: Strings, woodwinds, brass, piano, harpsichord, voice, guitar, and pipe organ. Graduation requirements include appropriate proficiency in playing or singing, excellent memory, substantial repertoire, and musicianship of a high order. A half-hour recital is required in the junior year and a full recital in the senior year. The total number of required semester hours in music is 87.

Music Theory	28
Music History and Literature	16
Performance Major	16-18
Performance Minor	4
Music Organization	8
Conducting	5
Appropriate Literature Course	1
Electives in Music	7-9
	<u>87</u>
Liberal Arts	33
Total Credits	<u>120</u>

#### Entrance Requirements for all Degree Programs

In addition to meeting the University's admission standards, applicants must demonstrate

musical ability in performance on their major instrument or voice before a jury of the music faculty. Each applicant is also required to have an interview with a faculty advisor in the student's chosen program. Auditions and interviews are arranged through the music department office where a listing of audition requirements for the various disciplines may be obtained.

All entering students are required to take placement examinations in music theory.

#### Graduation Requirements

In addition to successful completion of all required course work, all music degree students must, in order to graduate:

1. Pass a basic proficiency examination in piano. Note: Piano proficiency may be accomplished through successful completion of MUP 205, 206, 215 and 216. Piano majors are required to pass the proficiency exam for these courses. No music student other than piano majors will be allowed to study private piano until completion of MUP 216, successful completion of the equivalent piano proficiency exam or permission.
2. Candidates for the B.A. degree in Music must successfully pass the sophomore level jury examination on their applied major instrument or voice.
3. Candidates for the B.M.Ed. degree must present an approved half-hour public recital in their junior year.
4. Candidates for the B.M.Perf. degree must present an approved half-hour public recital in their junior year and an approved one hour public recital in their senior year.

#### Applied Music Fees

For Music Majors a fee of \$30 per credit hour will be charged for private instruction.

For the non-music major a fee of \$180 per semester will be charged for one one-half hour lesson per week, a fee of \$360 per semester will be charged for one one-hour lesson per week. Private instruction for the non-music major is contingent on the student's level of performance as determined by audition, and on the availability of studio time of the instructor. Ar



arrangements for such instruction and assignment of a teacher must be made through the office of the Music Department.

Practice facilities are provided in the music building. The University provides, so far as possible, practice opportunities for students who take applied music for credit.

### Courses in Applied Music

The Department of Music provides private instruction in instruments and voice. MUS 201 through MUS 308 designates semester of study or one credit hour; section number (see below) designates instrument/voice.

MUS 210 through MUS 380 designates semester of study for two credit hours; section number (see below) designates instrument/voice.

Candidates for B.Mus. and B.M.Ed. enroll for two hours of credit for the major instrument or voice, and one hour of credit for the second instrument or voice. B.A. candidates majoring in music and all other students normally enroll for one hour of credit.

#### B. MUS

First level	MUS 210-220
Second level	MUS 230-240
Third level	MUS 350-360
Fourth level	MUS 370-380

#### B.M. in MUS ED

First level	MUS 210-220
Second level	MUS 230-240
Third level	MUS 350-360

#### B.A.

First level	MUS 201-202
Second level	MUS 203-204
Third level	MUS 305-306
Fourth level	MUS 307-308

The student who does not meet the requirements for the level at the end of each semester as determined by the jury examination will continue on the previous level until the requirements are met. Upon completion of 8 credit hours of work in Applied Music, music majors will be reviewed by a jury composed of the faculty of the Department of Music to determine whether they should be advanced to upper level standing in applied music.

Section	Instructor
01 baritone horn	Heath
02 bass	Staff
03 bassoon	Staff
04 cello	Roscetti
05 clarinet	Jacobs
06 flute	S. Heath
07 french horn	Nesbit
08 classical guitar	Crook
09 harpsichord	Mummé
10 oboe	Hall
11 organ	Mummé
12 percussion	Marrs
13 piano	Foley, Voronietsky
14 saxophone	Staff
15 trombone	F. Heath

16 trumpet	Stratton
17 tuba	F. Heath
18 violin	Wieck
19 viola	Wieck
20 voice	Ogle

Courses in applied music may be repeated for credit.

Each student taking instruction in an applied area must take an examination before a jury of the faculty of music at the end of each semester. All music majors enrolled in applied music are required to enroll in MUS 100 (Recital Lab) each semester of study.

### Courses in Music Education

#### MUE 101 Music Methods for the Elementary Teacher

Methods and materials for relating music to the elementary school child. No previous experience in music required. Cr 3.

#### MUE 105 Music for the Elementary Classroom Teacher I

Basic musicianship for the classroom teacher. Emphasis on beginning theory, skill development in singing and classroom instrument techniques, and appropriate techniques for elementary classroom use. Cr 2.

#### MUE 106 Music for the Elementary Classroom Teacher II

Advanced musicianship for the classroom teacher. Continues MUE 105 with additional exposure to rhythmic movement, improvisation and instrumental techniques, and harmony are provided. Prerequisite: MUE 105. Cr 2.

#### MUE 207 Voice Class

The systematic development of the principles of good singing through class method approach. Prerequisite: MUY 101 or permission. Lab 2. Cr 1.

#### MUE 209 String Class

Basic performance and pedagogical skills pertaining to each of the four string instruments. Prerequisite: MUY 101 or permission. Lab 4. Cr 2.

#### MUE 210 Introduction to Music Education

Provides exposure to music classrooms, primary and secondary. Covers philosophies of music education, programming and evaluation. 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. Prerequisite: MUE 213. Lab 2. 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. 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. Prerequisites: MUY 101 or permission. Lab 4. Cr 2.

#### MUE 222 Percussion Class

Basic performance and pedagogical skills pertaining to the percussion instruments. Prerequisite: MUY 101 or permission. Lab 4. Cr 2.

#### MUE 320 Teaching of General Music: Elementary

First semester of a required two-semester course. 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 222. Cr 3.

#### MUE 321 Teaching of General Music: Secondary

Second semester of a required two-semester course. 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. Prerequisites: MUY 212, MUL 222, MUE 320. Cr 3.

#### MUE 400 Choral Music Education

The organization and development of techniques requisite to a successful choral program. 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. Prerequisites: MUP 345, MUE 209, MUE 213, MUE 217, MUE 222. Cr 3.

#### MUE 402 Piano Pedagogy

An introduction to pedagogical materials for piano drawn from available teaching systems and literature. Open to undergraduate piano students. Offered every two years. 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. Open to sophomore, junior and senior music education majors. Offered every fall. Lab 1. Cr 1.

### Courses in Music History

#### 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 222, or sophomore standing. For the general student, permission. 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: For the major, MUL 222, or sophomore standing. For the general student, 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.

**Courses in Music Literature****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. Open to all university students. Cr 3.

**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. Cr 3.

**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. Prerequisites: MUL 101 or permission. Cr 3.

**MUL 203 Vocal Literature**

A survey of vocal literature from the 18th century to the present day including discussion and performance of classic Italian songs, German Lieder, French art songs, and contemporary American and British songs. Cr 1.

**MUL 205 Woodwind Literature**

A survey designed to familiarize the student with the standard repertory through discussion and performance. Cr 1.

**MUL 207 Brass Literature**

A survey designed to familiarize the student with the standard repertory through discussion and performance. Cr 1.

**MUL 209 String Literature**

A survey designed to familiarize the student with the standard repertory string quartet through discussion and performance. Cr 1.

**MUL 211 Piano Literature**

A survey of standard literature for piano through discussion and performance. Cr 1.

**MUL 213 Organ Literature**

A survey of standard literature for organ through discussion and performance. Cr 1.

**MUL 221 Survey of Music Literature I**

A comparative study of styles, characteristics, forms, and performing mediums of music from the Renaissance to the present. Primarily for music majors. Cr 2.

**MUL 222 Survey of Music Literature II**

A comparative study of styles, characteristics, forms, and performing mediums of music from the Renaissance to the present. Primarily for music majors. Cr 2.

**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.

**Courses in Musical Organizations and Ensembles****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. Prerequisite: audition (requires sight reading ability). Lab 5. 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. Prerequisite: audition. Lab 2. 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. 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. (Fall semester only). Prerequisite: permission. Lab 4. 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. (Spring semester only). Prerequisite: permission. Lab 3. 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. Prerequisite: permission. Lab 2. 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. Prerequisite: audition. Lab 2. 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. Prerequisite: audition. Lab 4. Cr 1.

**MUO 131 Chamber Singers**

The study and performance of chamber music for the voice. May be repeated for credit. Lab 2. Cr 1.

**MUO 132 Opera Workshop**

Rehearsal and performance of standard opera repertoire. May be repeated for credit. Prerequisite: audition. Lab 3. Cr 1.

**MUO 141 Brass Ensemble**

The study and performance of chamber music for brass instruments. May be repeated for credit. Lab 2. Cr 1.

**MUO 142 Trombone Ensemble**

The study and performance of music for trombones. May be repeated for credit. Lab 2. Cr 1.

**MUO 143 20th Century Music Ensemble**

Rehearsal and performance of 20th century music. Membership through audition. Attendance at all rehearsals and performances required. May be repeated for credit. Lab 3. Cr 1.

**MUO 145 Woodwind Ensemble**

The study and performance of chamber music for woodwind instruments. May be repeated for credit. Lab 2. Cr 1.



**MUO 147 Horn Ensemble**

Rehearsal and performance of music written for french horns. May be repeated for credit. Prerequisite: permission. Lab 2. Cr 1.

**MUO 149 String Ensemble**

The study and performance of chamber music for string instruments. May be repeated for credit. Lab 2. Cr 1.

**MUO 170 Karl Mellon Clarinet Choir**

Rehearsal and performance of music written for clarinet choir. May be repeated for credit. Prerequisite: permission. Lab 2. 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. Prerequisite: audition. Lab 2. 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. Prerequisite: permission. Lab 4. 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. Prerequisite: permission. Lab 3. 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. Prerequisite: permission. Lab 2. 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 re-

quired. Occasional touring on class days. May be repeated for credit. Prerequisite: audition. Lab 3. 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. Prerequisite: audition. Lab 4. Cr 1-2.

**MUO 510 Chamber Singers**

Participation and a leadership role in the study and performance of chamber music for the voice. May be repeated for credit. Lab 2. 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. Prerequisite: audition. Lab 3. Cr 1-2.

**MUO 512 Brass Ensemble**

Participation and a leadership role in the study and performance of chamber music for brass instruments. May be repeated for credit. Lab 2. Cr 1-2.

**MUO 513 Trombone Ensemble**

Participation and a leadership role in the study and performance of music for trombones. May be repeated for credit. Lab 2. Cr 1-2.

**MUO 514 Twentieth Century Music Ensemble**

Participation and a leadership role in the rehearsal and performance of 20th century music. Attendance at all rehearsals and public performances required. May be repeated for credit. Permission: audition. Lab 5. Cr 1-2.

**MUO 515 Woodwind Ensemble**

Participation and a leadership role in the study and performance of chamber music for woodwind instruments. May be repeated for credit. Lab 2. Cr 1-2.

**MUO 516 String Ensemble**

Participation and a leadership role in the study and performance of chamber music for string instruments. May be repeated for credit. Lab 2. Cr 1-2.

**MUO 517 Karl Mellon Clarinet Choir**

Participation and a leadership role in the rehearsal and performance of music written for clarinet choir. May be repeated for credit. Lab 2. 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. Cr 1-2.

**MUO 519 Horn Ensemble**

Participation and a leadership role in the study and performance of music for french horn. May be repeated for credit. Lab 2. Cr 1.

## Courses in Music Performance Techniques

**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. Prerequisite: Music majors only. Lab 2. Cr 1.

**MUP 206 Piano Class II**

A continuation of MUP 205, designed to provide basic command of the keyboard. Prerequisite: Music majors only. Lab 2. Cr 1.

**MUP 215 Piano Class I**

A continuation of MUP 205, MUP 206 designed to complete the proficiency examination in secondary piano. Prerequisite: MUP 205, MUP 206 or permission. Music majors only. Lab 2. Cr 1.

**MUP 216 Piano Class II**

A continuation of MUP 205, MUP 206 designed to complete the proficiency examination in secondary piano. Prerequisite: MUP 205, MUP 206 or permission. Music majors only. Lab 2. Cr 1.

**MUP 220 Masterclass**

Supplements private lessons. Emphasizes proper preparation for performance and provides frequent opportunities for students to perform before others in the same studio. Open to all students studying voice or a particular instrument with a music department faculty member for credit. Offered at the discretion of the studio teacher. Prerequisite: permission. Cr 1.

**MUP 251 Accompanying I**

Student functions as accompanist for individual lessons and recitals, or for a major performing organization. Required of all piano majors. Lab 2. Cr 1.

**MUP 252 Accompanying II**

A continuation of MUP 251. Required of all piano majors. Lab 2. Cr 1.

**MUP 340 Basic Conducting**

Introduction to conducting techniques with emphasis on practical application to vocal and instrumental groups. Prerequisite: MUY 212. Lab 3. 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 second-



ary applied area for the graduate student. May be repeated for credit. Prerequisite: Consent of advisor and instructor. (Lab fee of \$180.). Cr 2.

#### **MUP 402 Performance-Secondary Instrument II**

A continuation of MUP 401. May be repeated for credit. Prerequisite: consent of advisor. (Lab fee of \$180.). Cr 2.

#### **MUP 405 Keyboard Musicianship I**

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 406 Keyboard Musicianship II**

A continuation of MUP 405. 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: permission. Cr 2.

#### **MUP 512 Advanced Chamber Music II**

A continuation of MUP 511. Prerequisite: 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.

### **Special Courses in Music**

#### **MUS 100 Recital Lab**

Experience in recital performance and in listening to performances of one's peers. May be repeated. Required of music majors enrolled in applied music. Lab 1. 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. 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. Required for first-year voice majors in B.M. Ed. and B.M. programs; open to others by 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-Harpsichord; 05-Percussion Ensemble; 06-Individual Performance Practice; 07-Popular Music; 08-Applied Music, Special Study; 09-Electronic Music Composition; 10-Experimental Music; 11-Singing for the Musical Theatre; 12-Introduction to Music Therapy; 13-Piano Class for Non-Majors; 14-Field Practicum in Music Education; 16-Applied Classroom Instruments; 17-Choral Conducting; 18-Music Education Project; 20-Studies in European Culture; 22-Diction for Singers; 23-Music Literature Music Majors. Prerequisite: permission. Cr 1-3.

#### **MUS 498 Senior Project**

A research paper, original composition, or by special permission a lecture-recital presented in lieu of a recital. Required of all music majors in the Bachelor of Arts degree program. Accomplished under the guidance of an assigned faculty member during the senior year. Cr 1.

#### **MUS 510 Special Subjects in Music**

Specific topics and approaches will be chosen jointly by interested students and the staff. This offering is designed to address the undergraduate course issues not covered in regular offerings. 01-Piano Pedagogy and Literature; 02-Foundations in Suzuki Pedagogy; 03-Seminar in Marching Band Techniques; 04-Fundamentals of Instrumental Pedagogy; 06-Seminar in Contemporary Music; 07-Literature for Two Pianos/Four Hands; 08-Chamber Music; 09-Vocal Pedagogy; 11-Harpsichord; 13-Analytical Survey of Music of Charles Ives; 14-Set-theory and Application; 15-Canon and Fugue. Prerequisite: Permission. Cr 1-3.

#### **MUS 590 Musical Perception**

Perception of musical relations in their bearing on the theory, history aesthetics, performance and learning aspects of music. Cr 3.

### **Courses in Theory**

#### **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. For the general student. Cr 3.

#### **MUY 102 Fundamentals of Music (Advanced)**

A continuation of MUY 101 with emphasis on more advanced aspects of rhythm, melody and harmony in music. For the general student. Prerequisite: MUY 101 or permission. Cr 3.

#### **MUY 111 Elementary Harmony I**

Diatonic chordal relationships through written work, analysis, and keyboard application. Primarily for music majors. Prerequisites: MUY 101 or permission. Cr 2.

#### **MUY 112 Elementary Harmony II**

A continued study of chordal relationships. Primarily for music majors. Prerequisite: MUY 111. 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. Lab 3. Cr 2.

#### **MUY 114 Elementary Sight Singing and Ear Training II**

Sight singing, ear training and dictation. Lab 3. 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 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 Analytical Orchestration I**

The practical application of harmonic and structural analysis of musical forms as concerned with orchestral and band instrumentation and reductions. Prerequisite: MUY 212. Cr 3.

#### **MUY 452 Analytical Orchestration II**

The practical application of harmonic and structural analysis of musical forms as concerned with orchestral and band instrumentation 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.

#### **MUY 462 Composition II (Large Forms)**

Composition in the Song Forms, including AB ABA, song form with trio, the rondo forms and a setting for voice. Prerequisite: MUY 461. Cr 2.



## Theatre

Professor Snider (Chairperson)  
 Professors Cyrus, Wilkinson  
 Assistant Professors Hardy, Merritt, Mikotowicz

The major in Theatre leads to a B.A. degree in theatre. In addition to the general major, one may pursue specific studies in: (1) Acting; (2) Directing; (3) Design and Technical Production; or (4) Literature, history and criticism. Specific requirements for the degree specific studies or concentrations are available at the office of the Department of Theatre/Dance, Alumni Hall.

All majors are expected to participate in the many laboratory and performance activities offered by the major, the studio productions of the Maine Masque Theatre, and in the activities of the Dance Division.

The Department of Theatre/Dance offers the Master of Arts degree. Students may apply for the Creative Thesis as well as the traditional thesis. Further details may be found in the Graduate School Catalog.

The Theatre Program (Maine Masque Theatre) presents three or four major productions each year, as well as numerous laboratory and student-directed productions. We use two facilities for training and laboratory work: a 600-seat proscenium thrust theatre, and a 150-seat /4-round theatre. All students in the University are eligible to try out for, and participate in all aspects of the Theatre Program.

### Courses in Theatre

#### THE 111 Introduction to Theatre

Introduces basic theatrical elements and techniques. Emphasis on the principles that underlie theatre practice and the process by which plays are translated into theatrical expression. For the general student as well as prospective theatre majors. Cr 3.

#### THE 112 Masterpieces of World Drama I

World drama from Greek through 16th century Tudor, studied as literature and as theatre. Stress on dramatic form and content, and on the unique manner in which drama reflects its philosophical, social, and political environment. Cr 3.

#### THE 113 Masterpieces of World Drama II

French, Spanish, Italian and English drama, 16th through 19th century. studied as literature and as theatre. Stress on dramatic form and content, and on the unique manner in which drama reflects its philosophical, social, and political environment. Cr 3.

#### THE 116 Play Production

Covers the basic principles of stage directing including choosing and analyzing plays, scheduling rehearsals, blocking action, and determin-

ing stage business. Backstage work on major and laboratory theatre production is recommended. Lec 3. Cr 3.

#### THE 117 Fundamentals of Acting

Focus on the basic skills of acting, including internal preparation for playing a role and development of external techniques for projecting to an audience. Cr 3.

#### THE 118 Stage Makeup

Study of principles and techniques of stage makeup including practical application in class and production experience opportunities. (Fulfills Visual and Performing Arts, rather than Arts and Humanities requirements). 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 will provide the student with the knowledge and experience to perform comfortably backstage. Students will explore the development of scenery, properties, costumes, lighting and sound and their relationship to the final product, the performance. Cr 3.

#### THE 201 Fundamentals of Characterization

Designed to help student actors develop a methodology and technique for analyzing and performing scenes from the modern theatre repertoire. Prerequisite: THE 117 or permission. Cr 3.

#### THE 224 Stage Properties and Scene Painting

Two-part stagecraft module will explore the intricacies of stage properties; script analysis, acquisition, construction and performance management. Classroom studio activities, assignments, and practical experience with the productions of the department and the Maine Masque Theatre. Part two will offer experience in the planning and execution of scene painting. The practical application of color theory and painting technique will be explored through the creation of drops and scenic units dependent upon paint for their effectiveness. Additional experience may be gained in the course's companion laboratory, THE 224L. Theatre majors are required to enroll in the lab and it is highly recommended to all others. Prerequisite: THE 119 or permission. Cr 3.

#### THE 224L Stage Properties and Scene Painting Laboratory

Will be conducted in connection with the department's stage productions and offers the student a practical application of the course mate-

rial. Prerequisite: THE 119. Corequisite: THE 224. Cr 1.

#### THE 225 Stage Lighting and Theatre Sound

Examines the aesthetics and mechanics of two rapidly growing design and technical areas. The development of designs in each component will be explored through studio and assignment work in script analysis, conceptual development, and communication. Craft mechanics and their relationship to the design will be taught through studios in drafting, equipment identification and handling, and through a companion laboratory providing practical experience in the productions of the department and the Maine Masque Theatre. Theatre majors are required to enroll in the laboratory, THE 225L, and it is highly recommended for all participants. Prerequisite: THE 119 or permission. Cr 3.

#### THE 225L Stage Lighting and Theatre Sound Laboratory

Will be conducted in connection with the department's staged productions and offers the student a practical application of the course material. Prerequisite: THE 119. Corequisite: THE 225. Cr 1.

#### THE 226 Introduction to Scenic Construction and Design

The evolution of the designs from script interpretation through its execution in the shops and installation on the stage will be explored. Class and studios will provide experience in the drafting and graphic presentation of designs and the analysis and application of contemporary construction techniques. Practical experience may be gained through the companion laboratory, THE 226L. This lab is a requirement for theatre majors and highly recommended to all participants. Prerequisite: THE 119 or permission. Cr 3.

#### THE 226L Introduction to Scenic Construction and Design Laboratory

Will be conducted in connection with the department's staged productions offers the student a practical application of the course material. Prerequisite: THE 119. Corequisite: THE 226. Cr 1.

#### THE 227 Introduction to Costume Construction and Design

Basic processes of theatre costume construction and design. Includes measuring, building and fitting techniques developed through participation in the construction of a costume. Design portion includes introduction to script analysis, elements of design, and fabric and color selec-



tion. A lab in related production work, THE 227L, is required for majors, optional for others. Prerequisite: THE 119 or permission. Cr 3.

**THE 227L Introduction to Costume Construction and Design Laboratory**  
Laboratory in costume production work. Required for theatre majors. Prerequisite: THE 119. Corequisite: THE 227. Cr 1.

**THE 268 Theatre Practicum, Technical**  
Supervised experience in Theatre and Dance Division productions in the areas of stage managing, publicity, scenery, lighting, and costumes. Prerequisite: 6 hours of theatre courses and permission. May be repeated for a maximum of six hours. 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. Prerequisite: 6 hrs of Theatre courses and permission of chairperson. May be repeated for a maximum of three hours. Cr 1-3.

**THE 400 Voice and Speech for the Actor**  
A studio course in the principles and development of the actor's voice and speech. Cr 3.

**THE 402 Movement Training for Actors**  
Methods of acting based on non-naturalistic approaches, which may include mime, puppetry, mask work, circus and clown techniques, guerrilla, environmental or street theatre, choral and sound expression. Prerequisite: THE 117, DAN 101. Cr 3.

**THE 403 Styles and Techniques of Acting**  
Concentrates on technical problems in acting, such as verse, non-modern language, historical styles and theatre conventions. Prerequisite: THE 117, THE 201. Juniors and Seniors. Cr 3.

**THE 418 Advanced Costume Techniques**  
Examination of the major aspects of the costumer's craft, including drafting and pattern modification, mask and accessory construction, and dyeing and other fabric modification techniques. Emphasis may vary, depending upon the production requirements of the plays offered each semester. Prerequisite: THE 227 or permission. Cr 3.

**THE 419 Advanced Theatre Technology**  
Detailed examination of techniques, materials and methodology for scenery and lighting. Preparation for professional work. Prerequisite: THE 214, THE 215. Cr 3.

**THE 430 Children's Theatre Production**  
Production and performance of plays for young children. Includes hands-on experience with set

and costume design and construction, acting, directing, writing, and stage management. Prerequisite: THE 116 or permission. Cr 3.

**THE 440 Playwriting, Directing and Performing Lab**  
Providing a matrix for playwriting, directing, and performing. A laboratory in which students can work on a wide variety of original projects. Each student will have the opportunity to create a traditional script or a non-traditional performance piece. Projects will be written, analyzed, rewritten, directed, and performed by members of the class. There will be a final showcase of projects. Prerequisite: THE 116 or permission. Cr 3.

**THE 461 Theatre History I**  
The development of the drama, physical theatre, and modes of production. Fall semester: Greek theatre through the Renaissance. Limited to juniors and seniors. Cr 3.

**THE 462 Theatre History II**  
The development of the drama, physical theatre, and modes of production. Spring semester: Restoration to the present day. Limited to juniors and seniors. 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. Lec 2, Lab 2. Cr 3.

**THE 467 Drama Colloquium**  
In depth study of a play being presented by the Maine Masque Theatre and examination of selected works by the same author. Participation in the production required. Prerequisite: permission. Cr 3.

**THE 468 Theatre Management**  
Covers the principles and practices involved in selecting and selling a season, running the box office, budgeting, graphic arts production, advertising and publicity in the media, audience development and public relations. Prerequisite: THE 111 and permission. 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, THE 113, ENG 447, ENG 467) or permission. Cr 3.

**THE 473 Scene Design**  
Study of principles, methods, and materials used in scene designing. Laboratory projects includes preparation of a complete design for a particular production, including drawing and plans. Prerequisite: THE 224 and THE 226. Cr 3.

**THE 474 Stage Lighting**  
Study of principles, methods, and materials used in stage lighting, including artistic and technical applications. Projects include problems in lighting particular productions. Shop work required. Prerequisite: THE 225. Cr 3.

**THE 475 Costume Design Theory and Practice**  
Principles of theatrical costume design, including script interpretation, methods of research illustration techniques and fabric selection. Techniques learned are applied in design projects with selected scripts. Prerequisite: THE 227 or permission. Cr 3.

**THE 497 Independent Study in Theatre I**  
Cr 1-3.

**THE 498 Independent Study in Theatre II**  
Cr 1-3.

**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 564 Asian Theatre**  
A study of the traditional theatres of China and Japan, with emphasis on the classical Peking Opera, Japanese Noh, Kabuki and Bunraku, and composites of these with Western forms. Prerequisite: permission. Cr 3.

**THE 574 Aesthetics of Modern Scene Design**  
Studies approaches, techniques and theories of modern scenic designers. Includes intensive practice in rendering and visual design techniques. Prerequisites: THE 214, THE 215 and THE 463 or acceptable portfolio. Cr 3.

**THE 596 Field Services in Theatre Production**  
Provides experience in producing theatre in the field, through stage directing, designing scenery and/or lighting, building scenery, stage managing, costuming, handling publicity, etc. at a local elementary or secondary school, community or professional theatre. Prerequisite: Senior theatre majors and Graduate students with permission of the Chairperson. Credit depends on length and complexity of assignment. Cr 1-3.



## Dance

Assistant Professor Kim David Arrow (Coordinator of Dance)  
Instructors Teresa Torkanowsky, Alex Cooke

In addition to the concentration offered in the theatre program, a concentration is offered in the department of HPER, Health, Physical Education and Recreation.

The Dance Program offers dance technique in a variety of styles and produces formal, informal and a Dance Tour Show annually.

### Courses in Dance

#### DAN 101 Beginner Modern Dance

Fundamental concepts and practice of dance technique: body alignment, stretch/strengthening, movement vocabulary, body coordination, musicality and spatial awareness. For the general student at the beginning dance level.

Cr 2.

#### DAN 102 Beginner Ballet

An introduction to classical 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.

Cr 2.

#### DAN 103 Beginner Jazz

Fundamentals of jazz dance technique with emphasis on body alignment, coordination and movement vocabulary. Preparation for expressive movement in relation to modern jazz music.

Cr 2.

#### DAN 104 Beginner Flamenco

Fundamentals of movement as a basis for various aspects of dance: strength, control, rhythmic awareness and coordination. The cultural underpinning of Flamenco style will be explored.

Cr 2.

#### DAN 112 Production/Rehearsal

Dance production and performance with emphasis on repertory, costuming, lighting in relation to choreography, staging, publicity and rehearsal. Off campus concerts may be included as part of the UM Dance Company Tour. May be repeated with permission. Prerequisite: audition or permission. (Pass/Fail grade only).

Cr 1.

#### DAN 201 Intermediate Modern Dance

Continuation of DAN 101. Emphasis on solving more complex movement problems. Provides an enhanced movement vocabulary and further principles of body alignment, stretch/strengthening and musicality. May be repeated for credit. Prerequisite: DAN 101 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 102 or permission.

Cr 2-3.

#### DAN 203 Intermediate Jazz

A continuation of DAN 103. 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 103 or permission.

Cr 2.

#### DAN 204 Intermediate Flamenco

A continuation of DAN 104 with emphasis on the development of performance quality. Students are encouraged to simply enjoy the stimulation of this cultural experience; career opportunities are discussed. May be repeated for credit. Prerequisite: DAN 104 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 primitive ritual to the present century.

Cr 3.

#### DAN 268 Elementary Dance Notation (Labanotation)

Analysis of directions, levels, timing and dynamics of movement. Covers notation fundamentals (Labanotation), elementary notation of dance technique, reading of folk dances, and simple modern dance and ballet studies. Prerequisite: DAN 101, DAN 104, DAN 102 or DAN 103, DAN 201, or DAN 301 or previous dance experience.

Cr 3.

#### DAN 301 Advanced Modern Dance

A continuation of DAN 201. Emphasis on performance quality, phrasing, musicality, and choreographic retention. The advanced dancer may develop his/her personal style and to expand his/her movement 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 vocabulary and choreographic retention. May be repeated for credit. Prerequisite: DAN 202 or permission.

Cr 2-3.

#### DAN 303 Advanced Jazz

A continuation of DAN 201. Further emphasis on musicality, movement vocabulary and phrasing of advanced floor combinations. May be repeated for credit. Prerequisite: DAN 201 or permission.

Cr 2.

#### DAN 304 Advanced Flamenco

A continuation of DAN 204. Provides an in depth study of the folk dancing, customs and traditions of Spain's 49 regions, costumes, instruments and the influence of Greek, Jewish, and Arabic elements on the Flamenco and Classical Spanish dances. May be repeated for credit. Prerequisite: DAN 204 or permission.

Cr 2.

#### DAN 375 Dance in the Twentieth Century

Special focus on ballet and American Modern Dance. Also covers popular dance (social, stage and cinema). Dance developments related to concurrent achievements in 20th century art, music, psychology, literature, architecture, education and the theatre. Prerequisite: DAN 266 or permission.

Cr 3.

#### DAN 398 Dance Project

For the Intermediate level student who wishes to work on a special project in jazz, flamenco, ballet or modern dance. The special project may be teaching, choreography, repertory, research, and/or technique. Prerequisite: Intermediate level technique or permission.

Cr 2.

#### DAN 498 Dance Project/Thesis

(1) a supervised practicum in choreographic process and/or performance and a written analysis of this practicum (2) an advanced level research topic, designed jointly by the student and the instructor. Prerequisite: Advanced level technique or permission.

Cr 3.



## Philosophy

Professor White (Chairperson)  
 Professors Allen, Skorpen  
 Associate Professors Howard, Sawicki  
 Assistant Professor Halford

Philosophy is rigorous reflection on human nature, culture, and the world. It is analytic in clarifying the concepts and methods particular to the humanities and to the sciences. It is synthetic in interpreting the descriptive and evaluative findings of all branches of human inquiry, including its own. It is also essential to the development of professional, occupational, environmental, and applied ethics elsewhere.

### The Humanities Requirement

All courses taken in Philosophy may be used toward fulfilling the Arts and Humanities distribution requirement for the B.A. degree. Philosophy courses open without prerequisite are: PHI 101, The History and Problems of Self-Knowledge; PHI 102, Philosophy and Modern Life; PHI 103, Methods of Reasoning; PHI 105, Introduction to Religious Studies; PHI 106, Social Issues in Recent Religious and Philosophical Thought; PHI 107, Existentialism; PHI 108, Ways of Understanding the Bible. Other courses in the department carry prerequisites, usually three or six hours in philosophy.

### Philosophy Major

Requirements for the Philosophy major are:

1. A minimum of 27 hours in philosophy;
2. At least 21 hours (seven courses) in philosophy must be upper level courses, i.e., courses above the 100 level;
3. PHI 200;
4. Six hours in the History of Philosophy sequence (PHI 210, PHI 311- PHI 322), including PHI 210;
5. PHI 475 - Junior/Senior Philosophy Seminar.

The department encourages double majors. We recognize that requirements of other departments may make it difficult or impossible for a student to complete a double major and the above requirements especially when the decision for a double major comes late in a student's undergraduate career. Accordingly, the department will accept petitions for waiver of one or more of the requirements. Petitions are assessed on a case by case basis.

### Concentration in Religious Studies

The concentration in religious studies is designed to provide students with the critical tools and scholarly background required for a critical understanding of the influential traditions of religion contributing to human culture.

Students graduating with a Concentration in Religious Studies will fulfill the departmental requirements as well as: 1) PHI 105 or PHI 108; 2) either PHI 286 or PHI 287; 3) one of the following upper-level courses: 381, 385, 489, 490; 4) a minimum of 18 hours in Religious Studies, 9 hours of which must be above the 200 level.

### Courses in Philosophy

#### PHI 101 The History and Problems of Self-Knowledge

An introductory historical analysis of major theories of self-understanding from pre-history to the present. Readings include Lorenz, Plato, Kant and others. Lectures are supplemented by film presentations such as Clark's "Civilization."

Cr 3.

#### PHI 102 Philosophy and Modern Life

A study of contemporary works such as Foucault's *Discipline and Punishment* and deBeauvoir's *The Second Sex*, traditional philosophic texts, on problems of existence, knowledge, and conduct.

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.

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.

Cr 3.

#### PHI 106 Social Issues in Recent Religious and Philosophical Thought

An examination of various philosophical and religious treatments of the most relevant social issues of our time. Considers analyses of such issues as sexism, racism, imperialism, violence and nonviolence, integration and separatism, capitalism and socialism.

Cr 3.

#### PHI 107 Existentialism

A critical study of the philosophical significance of individual choices and actions, involving questions of personal identity, responsibility and authenticity, and the possibility or desirability of "disinterested objectivity." Authors read include Kierkegaard, Heidegger and Sartre.

Cr 3.

#### PHI 108 Ways of Understanding the Bible

An introduction to the Bible as a literary work and as a sacred text, (i.e. as an imaginative product of ancient cultures that expresses ideas and experiences that were and continue to be deeply valued). Historical, literary, comparative, feminist and psychological methods of interpreting the Bible will be discussed.

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. Prerequisite: One course in philosophy or permission.

Cr 3.

#### PHI 201 Religion and Psychology I: Freud and Jung

An exploration of the relationship between religion and mythology and the psychologies of Sigmund Freud and C.G. Jung. Focus on both similarities and differences in the thought of these psychoanalysts and their perspectives on religion. The implications of their thought for contemporary religious thinking will be discussed. Prerequisites: One course in philosophy; sophomore, junior or senior standing or permission.

Cr 3.

#### PHI 203 Ancient Greek Religion

An exploration of the myths and rituals of ancient Greek religion through historical, literary, feminist and psychological perspectives. Attention given to the place and meaning of religion in ancient Greek culture. Prerequisites: One course in philosophy; sophomore, junior or senior standing 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. Prerequisite: One course in philosophy, excluding PHI 103 or permission of instructor.

Cr 3.

#### PHI 230 Ethics

Readings and discussions of works by Mill, Kant, Nietzsche, Tillich, Dewey, and some other



systematic 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. Prerequisite: Sophomore, junior, senior standing. 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. Prerequisite: sophomore, junior, senior standing. Cr 3.

#### **PHI 240 History of Western Social and Political Philosophy**

A critical study of the development of social and political philosophy from Plato to Marx 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 is on normative rather than descriptive theory. Prerequisite: one course in philosophy excluding PHI 103 or permission of instructor. 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. Prerequisites: PHI 240, POS 212 or POS 390 or permission. Cr 3.

#### **PHI 250 Formal Logic**

Introduces 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. Prerequisite: Sophomore, Junior, Senior standing. 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. Prerequisite: PHI 200 or permission. Cr 3.

#### **PHI 261 Existentialism and Literature**

A critical study of existentialist literature, with special attention to literary technique. Explores the philosophical significance of individual choices and actions involving questions of personal identity, responsibility and authenticity. Prerequisite: sophomore standing. Cr 3.

#### **PHI 262 Philosophy of Art**

Investigates 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 en-

vironment. Readings from by Tolstoy, Hume, Dewey, Langer, Bell, Danto, Dickie and Beardsley, among others. Prerequisites: PHI 101, PHI 102, PHI 107 or PHI 200 or permission. Cr 3.

#### **PHI 286 Religions and Philosophies of the East: Hinduism**

The religious and philosophical foundations of Hinduism including the Vedas, the Bhagavad-Gita, the Upanishads, Yoga, and Vedanta. Prerequisite: Sophomore, junior, senior standing. 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. Prerequisite: Sophomore, junior, senior standing. Cr 3.

#### **PHI 312 History of Modern Philosophy**

An interpretation of modern philosophy from Bacon and Descartes in the 17th century, through 18th century rationalism and empiricism and culminating in the system of Kant. Prerequisite: two courses in philosophy or permission of instructor. Cr 3.

#### **PHI 320 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. Prerequisite: PHI 312 or permission. Cr 3.

#### **PHI 322 Philosophical Classics**

A seminar dealing with the works of a major philosopher or school. Topics vary. May be repeated for credit. Prerequisite: two courses in philosophy. Cr 3.

#### **PHI 335 Meta-Ethics**

An analysis of traditional moral concepts and issues including the meanings of justice, equality, and happiness, and the nature of first principles, practice, and summary rules. Prerequisite: Two courses in philosophy including PHI 230 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. Additional readings from Friedrich Engels and Mao Zedong. Prerequisite: two course in philosophy; sophomore, junior, senior standing 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 feminist. Prerequisite: Two courses in philosophy including PHI 342; sophomore, junior, senior 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. Prerequisite: 6 hours of philosophy or 6 hours of natural science. Cr 3.

#### **PHI 353 Philosophy of Behavioral Science**

A critical examination of the conceptual foundations of modern behavioral science. Covers reinforcement versus role-rule explanations, law-like regularities versus generative principles and assorted "Black Box" theories. Prerequisite: 6 hours of philosophy, behavioral science, or permission. Cr 3.

#### **PHI 363 Theory of Knowledge**

An examination of recent philosophical studies in epistemology including the application of modern philosophical analysis to some theory outside philosophy (e.g., a theory in psychology, literature, biology or history), with emphasis on the usefulness of philosophies of sensation, belief, truth, meaning, memory and imagination for theory construction. Prerequisite: two courses in philosophy including PHI 200 or permission. Cr 3.

#### **PHI 381 The Nature of Religious Experience**

Presents different methodological approaches to religious experience, with primary emphasis on the phenomenology of religion. Describes and interprets religious phenomena through analysis of the nature of religious symbolism. Prerequisite: Two courses in philosophy including one religious studies or permission. Cr 3.

#### **PHI 385 Recent Religious Thought**

Examines different systems of religious thought arising since World War II including Post-Holocaust, Black, Native American, Feminist and Liberation theologies, among others. Prerequisite: two courses in philosophy, once must be in religious studies. Sophomore, junior or senior standing or permission. Cr 3.

#### **PHI 439 Feminist 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. Prerequisite: junior, senior standing. 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: Two courses in



philosophy including PHI 200 or permission. Junior/Senior standing. **Cr 3.**

**PHI 466 Readings in Philosophy**

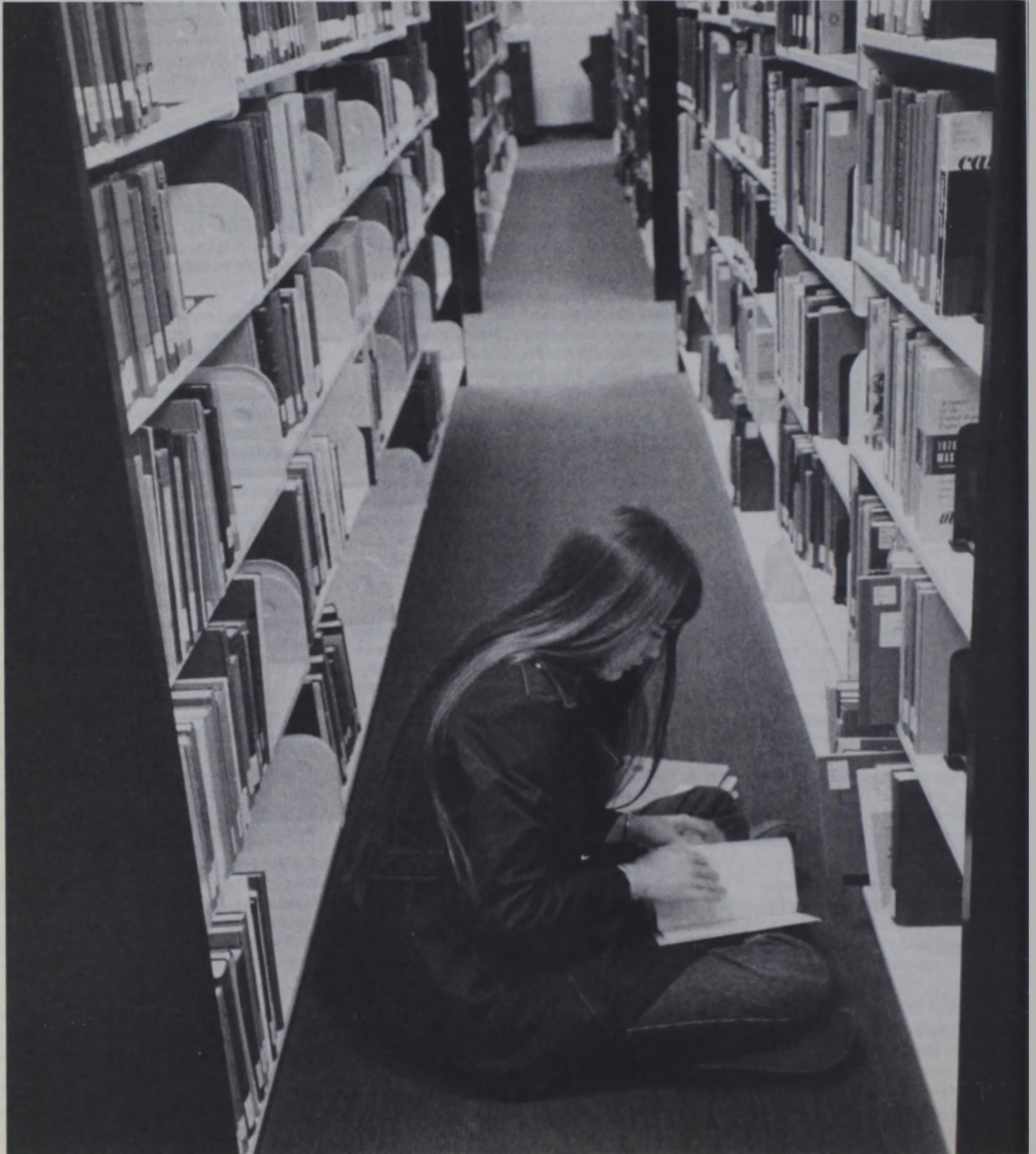
Individual study of a selected topic, agreed upon by the student and the instructor. Designed to address advanced issues not covered

in normal offerings. Prerequisite: 9 hours in philosophy and permission of department and instructor. **Cr 1-3.**

**PHI 490 Topics in Religious Studies**

Small class study of a theme, thinker or fundamental problem in religious thought. Topics

vary. May be repeated for credit. Prerequisite: Two courses in philosophy 200 level or above. One must be in religious studies; junior or senior standing or permission. **Cr 3.**





# College of Business Administration

*W. Stanley Devino, Dean*

*Merrill D. Bartlett, Associate Dean*

Professors Alpander, Devino, Ford, Forsgren, Gilmore, Givens, McClure, Naor  
Associate Professors Bartlett, Garsombke, Gibson, Strong  
Assistant Professors Carter, Gehrt, Lawson, McConnell, J. Pinto, M. Pinto, Rauch, Spurrell, Worobetz  
Lecturer Ingalls, Instructors Austin, Pechinski

Both the undergraduate program and the MBA program in the College are accredited by the American Assembly of Collegiate Schools of Business. The AACSB is recognized by the Council on Postsecondary Accreditation and by the Office of Postsecondary Education, U.S. Department of Education, as the sole accrediting agency for baccalaureate and master's degree programs in business administration.

The College of Business Administration offers a four-year program in the major area of business administration. Upon successful completion of the prescribed curriculum the student is awarded the Bachelor of Science degree.

The College also provides a graduate program leading to the degree of Master of Business Administration. The graduate offerings of the College of Business Administration are described in the Graduate School Catalog.

## Undergraduate Program

The primary objective of the undergraduate program in business administration is to develop the student's abilities to assume the responsibilities of business management. The program is aimed at providing the broad training necessary for successful business management in a rapidly changing economy. No attempt is made to provide detailed specialized training in particular business tasks. The program aims, rather, at developing skills and attitudes that will enable the student to cope successfully with the changing problems of business management in the years ahead. Implementation of this program takes place in three general phases. First, students acquire broad training in the liberal arts and sciences for the necessary foundation upon which their future education will build; second, students pursue a program of study designed to provide them with an understanding of the major functional areas common to most business operations and with a knowledge of certain fields which are particularly relevant to the study of business management (this is referred to as the "core" program and includes basic courses in accounting, management information systems, economics, finance, International business, the legal environment of business,

marketing, and general management); third, students undertake to acquire a deeper knowledge of the field of concentration which they have selected. This is done largely during the senior year and is accomplished by taking 15 credit hours of work beyond the introductory course in the chosen field. The five fields of concentration in which advanced work may be done are accounting, finance, management information systems, marketing, and management.

## General Information

### Admission

Students are usually admitted to the College of Business Administration as first-year students in the University. For the specific requirements for admission see the "Admission" section. All deficiencies in entrance requirements must be removed before registering for the junior year. Students who transfer from other colleges with advanced standing must satisfy all basic entrance requirements within one year.

### Transfer Credit

Under the accreditation standards of the American Assembly of Collegiate Schools of Business, no transfer credit is granted for business courses taken during the first year and sophomore year, with the exception of six semester hours for Principles of Accounting and three semester hours for the Legal Environment of Business. However, a transfer student from an institution designated as regionally accredited who has taken a business course at the lower division level which is offered at the upper division level at the University of Maine may request validation of said course. The method of validation consists of an examination procedure to demonstrate acceptable proficiency consonant with the overall educational experience required of all students in the College of Business Administration. Also, no transfer credit is granted for any course completed at another accredited institution in which grades below "C" have been received. Responsibility for evaluating course work for which transfer credit is requested rests with the Director of Admissions

and the Dean of the College of Business Administration.

Students from other campuses of the University of Maine System who wish to transfer to the College of Business Administration must present an academic record that meets at least the minimum standards of quality established by the University. Also, they are required to complete at least one full year of academic work as students in the College of Business Administration.

### Change of College Policy at UM

1. For students in baccalaureate programs transferring from other colleges at UM, the minimum grade point requirement is 2.5.
2. For students in two-year programs, the minimum grade point requirement is 2.8.
3. Students in University College programs should refer to the UC transfer policy.

### Enrollment Policy In Business Administration Courses

1. First preference is given to College of Business Administration students.
2. Second preference is given to students in other programs requiring the Business course(s).
3. All others are given third preference.

In the event students cannot be accommodated in any BUA course(s), they are invited to sign up on a waiting list for each course. (The course may be offered the following semester or the following year.) The waiting list will be on a "first-come, first-served" basis. However, the list will follow the priority listed above.

### Senior Year in Residence

To receive a B.S. in Business Administration degree at the University of Maine, a student must fulfill the senior year residency requirement. This means the last 30 degree hours in the academic program must be completed at the University of Maine.

### Foreign Language Placement and Credit

During new student orientation, the Foreign Language Placement Examination will be given for purposes of both placement and credit. All incoming business administration students



## Specimen Curriculum

## First Year

Fall Semester	Spring Semester
Intermediate Foreign Language I FRE 203, GER 203, RUS 203 or SPA 203	Intermediate Foreign Language II FRE 204, GER 204, RUS 204 or SPA 204
ENG 101 College Composition	MAT 115 Applied Mathematics for Business and Economics
MAT 114 Calculus for Business and Economics	SPC 103 Fundamentals of Public Communication
PSY 100 General Psychology	English Elective
Free Elective	Humanities or Social Science Elective

## Sophomore Year

Fall Semester	Spring Semester
BUA 201 Principles of Accounting I	BUA 202 Principles of Accounting II
ECO 120 Principles of Microeconomics	ECO 121 Principles of Macroeconomics
MAT 215 Introduction to Statistics for Business & Economics	BUA 220 The Legal Environment of Business
Science and Technology Elective	COS 2** (any 200-level COS course)
Humanities or Social Science Elective	Science and Technology Elective

## Junior Year

Fall Semester*	Spring Semester**
BUA 325 Principles of Management & Organization	BUA 337 Production and Operations Management
BUA 335 Principles of Management Information Systems	BUA 343 Introduction to International Business
BUA 350 Business Finance	Humanities or Social Elective
BUA 370 Marketing	Free Elective or BUA course in field of concentration
Humanities or Social Science Elective	Free Elective or BUA course in field of concentration

\*Students concentrating in Accounting must take BUA 301 - Intermediate Accounting I and BUA 305 - Cost Accounting. These students should postpone the Humanities or Social Science Elective and one of the BUA courses listed above until the Spring Semester.

\*\* Students concentrating in Accounting must take BUA 302 - Intermediate Accounting II and should also take BUA 306 - Advanced Managerial Accounting.

must take the Language Placement Examination. If the student's score is very high, up to six hours of degree credit may be awarded. If a student does poorly on the examination and wishes to continue in the same language, he or she may take the elementary course for no credit, followed by the intermediate course for credit. Typically, a student who has had two years of the foreign language in high school will qualify for admission to the intermediate course which would then be taken for credit.

**Study Away**

Students who are in good academic standing may take advantage of various opportunities available for spending one or two semesters studying business administration and other subjects in a foreign country. Such study is usually limited to students who are in the junior year of study. One example is the spring semester at the University of Grenoble in

France. The Universities of Maine, Connecticut, New Hampshire, Rhode Island and Vermont cooperate in the sending of business students and a faculty coordinator to this program. Students have an opportunity to further their knowledge of international business in an English-speaking program while gaining exposure to France's history, language, and culture.

**Honors Program**

Robert Strong, Honors Secretary

First year students and sophomores of marked academic ability are encouraged to consider participation in the University Honors Program. Qualified students may be admitted to the Honors Program at any time up to the beginning of the junior year. HON 101, HON 102, HON 201, HON 202, HON 301, and HON 302 are taken in common with students from other colleges within the University. These courses all satisfy College of Business Administration re-

quirements in the area of humanities/fine arts or free electives. HON 397, HON 498, and HON 499 are taken during the junior and senior years, and involve individual research and the writing of the senior honors thesis. Additional information about the Honors Program will be found in the "Honors" section of this catalog.

**Graduation Requirements**

Completion of the required work of the College of Business Administration leads to the degree of Bachelor of Science. All students are required to complete 120 degree hours.

Students must have a 2.0 accumulative average to graduate. The accumulative average is computed as follows: Total hours taken divided into total quality points received.

All course work taken in business and economics must be completed with a 2.0 ("C") accumulative average for a student to be eligible for a degree.

The required course work for the B.S. in Business Administration is given below:

**B.S. in Business Administration Program****A. General Foundation Subjects (59 credits)****1. Humanities and Fine Arts (26 credits)**

- ENG 101 College Composition
- ENG 317 Advanced Professional Exposition
- SPC 103 Fundamentals of Public Communication
- Intermediate Level Foreign Language: FRE 203-204, GER 203-204, RUS 203-204, or SPA 203-204

At least three of the remaining 9 credit hours must have an ENG designation. The remainder may be selected in such fields as: art, the classics, English composition, foreign languages, history, journalism, literature, music, philosophy, speech, and theatre.

**2. Social and Behavioral Sciences (15 credits)**

- PSY 100 General Psychology
  - ECO 120 Principles of Microeconomics
  - ECO 121 Principles of Macroeconomics
- No additional economics course may be taken to fulfill this requirement. The remaining 6 credits may be taken in such fields as: anthropology, Canadian studies, modern society, political science, psychology, and sociology.

**3. Mathematics and Science (18 credits)**

- MAT 114 Calculus for Business and Economics\*
- MAT 115 Applied Mathematics for Business and Economics
- MAT 215 Introduction to Statistics for Business and Economics\*\*

\* MAT 126 Analytical Geometry and Calculus may be substituted for MAT 114.

\*\*MAT 434 - Introduction to Statistics may be substituted for MAT 215.



## COS 2xx (Any 200-level COS course)\*\*\*

The remaining 6 credits must be taken in science and technology. Courses may be selected from such fields as: animal science, aquaculture, astronomy, biology, botany, chemistry, ecology, entomology, environmental science, food sciences, geology, horticulture, physics, plant science, soil science and zoology.

## Core Requirements in Business (30 credits)

BUA 201 Principles of Accounting I

BUA 202 Principles of Accounting II

BUA 220 The Legal Environment of Business

BUA 325 Principles of Management and Organization

BUA 335 Principles of Management Information Systems

BUA 337 Production and Operations Management

BUA 343 Introduction to International Business

BUA 349 Administrative Policy and Business Environment (Seniors only)

BUA 350 Business Finance

BUA 370 Marketing

Field of Concentration (15 credits) All students must complete a field of concentration in one of the functional areas of Business Administration: Accounting, Finance, Management Information Systems, Management and Marketing.

## 1. Accounting (15 credits)

Required:

BUA 301 Intermediate Accounting I

BUA 302 Intermediate Accounting II

BUA 305 Cost Accounting I

BUA 307 Advanced Accounting I

BUA 310 Auditing

Students concentrating in accounting are strongly encouraged to take the following courses as free electives:

BUA 306 Advanced Managerial Accounting

BUA 308 Advanced Accounting II

BUA 312 Federal Tax Reporting

BUA 314 Accounting Control Systems

## 2. Finance (15 credits)

Required:

BUA 351 Corporate Treasury Dynamics

BUA 352 Financial Institutions

BUA 353 Investment Strategy

BUA 366 Decision Support Systems for Management

Any one of the following:

BUA 301 Intermediate Accounting I

BUA 305 Cost Accounting I

BUA 354 Speculative Markets

ECO 471 Public Finance and Fiscal Policy

ECO 472 State and Local Government Finance

ECO 420 Intermediate Microeconomics

ECO 475 Industrial Organization

\*\*\*COS 220 - Introduction to Computer Science is required for students concentrating in Management Information Systems.

Senior Year - Accounting Field	
Fall Semester	Spring Semester
BUA 307 Advanced Accounting I	BUA 308 Advanced Accounting II
BUA 310 Auditing	BUA 312 Federal Tax Reporting
BUA 314 Accounting Control Systems	BUA 349 Administrative Policy and Business Environment
Humanities or Social Science Elective	Free Elective
Free Elective	Free Elective
Senior Year - Finance Field	
Fall Semester	Spring Semester
BUA 351 Corporate Treasury Dynamics	BUA 349 Administrative Policy and Business Environment
BUA 352 Financial Institutions	BUA 354 Speculative Markets
BUA 353 Investment Strategy	BUA 366 Decision Support Systems for Management
Free Elective	Free Elective
Free Elective	Free Elective
Senior Year - Management Field	
Fall Semester	Spring Semester
BUA 326 Dynamics of Organization and Behavior	BUA 327 Seminar in Contemporary Management Problems
BUA 330 Personnel Management and Industrial Relations	BUA 331 Labor-Management Relations
BUA 345 International Management	BUA 349 Administrative Policy and Business Environment
Free Elective	Free Elective
Free Elective	Free Elective
Senior Year - Management Information Systems Field	
Fall Semester	Spring Semester
BUA 361 Data and File Structures for Business Applications	BUA 349 Administrative Policy and Business Environment
BUA 364 Database Management Systems	BUA 365 Business Systems Development
BUA 363 Distributed Information Systems for Business Applications	BUA 366 Decision Support Systems for Management
Free Elective	Free Elective
Free Elective	Free Elective
Senior Year - Marketing Field	
Fall Semester	Spring Semester
BUA 372 Marketing Research	BUA 349 Administrative Policy and Business Environment
BUA 374 Sales Management	BUA 376 International Marketing
BUA 382 Consumer Behavior	BUA 380 Managerial Marketing
Free Elective	Free Elective
Free Elective	Free Elective

## 3. Management (15 credits)

Required:

BUA 326 Dynamics of Organization and Behavior

BUA 327 Seminar in Contemporary Management Problems

BUA 330 Personnel Management and Industrial Relations

BUA 345 International Management

And any one of the following:

BUA 328 Canadian/U.S. Business: A Comparison

BUA 331 Labor-Management Relations

BUA 340 Problems of Small Business

BUA 364 Database Management Systems

BUA 366 Decision Support Systems for Management

BUA 384 Business Logistics

## 4. Management Information Systems (15 credits)

Required:

BUA 361 Data and File Structures for Business Applications

BUA 364 Database Management Systems

BUA 365 Business Systems Development

And any two of the following:



BUA 305 Cost Accounting  
 BUA 330 Personnel Management and Industrial Relations  
 BUA 351 Corporate Treasury Dynamics  
 BUA 363 Distributed Information Systems for Management  
 BUA 366 Decision Support Systems For Management  
 BUA 378 Marketing Research

#### 5. Marketing (15 credits)

Required:

BUA 376 International Marketing  
 BUA 378 Marketing Research  
 BUA 380 Managerial Marketing  
 BUA 382 Consumer Behavior

And any one of the following:

BUA 366 Decision Support Systems for Management  
 BUA 372 Advertising  
 BUA 374 Sales Management  
 BUA 384 Business Logistics

#### D. Free Electives (16 credits)

Minimum credits required for graduation—  
 120 Hours

#### 300-Level Course Policy

College of Business Administration students, as well as all other students, must have junior standing (53 or more degree hours) in order to take all BUA undergraduate courses except BUA 201, BUA 202, and BUA 220. Students are strongly advised to take BUA 201, BUA 202, and BUA 220 during their sophomore year (these courses are not open to first year students).

#### Courses in Business Administration

##### BUA 201 Principles of Accounting I

An introduction covering the fundamental accounting equation, basic principles of accounting measurements, accounting cycle, construction of financial statements, and asset analysis and valuation. Prerequisite: sophomore standing. Cr 3.

##### BUA 202 Principles of Accounting II

A continuation of BUA 201 covering analysis and valuation of liabilities and stockholder's equity, basic principles of consolidated statements, and the cashflow statement, cost accumulation methods and management decision-making. 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. Prerequisite: BUA 201 or permission, sophomore standing. Cr 3.

##### BUA 301 Intermediate Accounting I

A study of principles regarding the valuation and recording of working capital items and

noncurrent items, capital stock and surplus, statement analysis. Prerequisite: BUA 202.

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.

Cr 3.

##### BUA 305 Cost Accounting

The principles and methods of job order costs, including inventory control and pricing, labor, and analysis and allocation of factory overhead. Principles and practices of process cost accounting. Prerequisite: BUA 202.

Cr 3.

##### BUA 306 Advanced Managerial Accounting

A comprehensive study of joint and by-product costs, estimated and standard costs, distribution and differential costs. Also covers budgeting, analysis of cost structure, and management use of standards. Prerequisite: BUA 305.

Cr 3.

##### BUA 307 Advanced Accounting I

Principles, theory and procedures of parent and subsidiary accounting. A comprehensive study of consolidated statements, affiliation structures, and consolidations and mergers. Also includes home office and branch accounting. Prerequisite: BUA 301.

Cr 3.

##### BUA 308 Advanced Accounting II

Application of accounting principles to accounting problems arising in connection with: partnerships, joint ventures, insurance, consignments, installment sales, statement of affairs, receiverships, estates and trusts, statement of realization and liquidation, foreign exchange, and governmental and institutional accounting. Prerequisite: BUA 301.

Cr 3.

##### BUA 310 Auditing

The systematic verification of financial statement including a study of the responsibilities, liabilities and ethics of the independent public accountant. Prerequisite: BUA 301.

Cr 3.

##### BUA 312 Federal Tax Reporting

A study of federal tax laws as they affect individuals, partnerships, corporations, and estates. Familiarizes students with federal tax forms. Prerequisites: BUA 202, BUA 305.

Cr 3.

##### BUA 313 International Accounting and Taxation

Examines financial, managerial and tax accounting and auditing in multinational enterprises. Compares practices and procedures in different countries. Prerequisite: BUA 301.

Cr 3.

##### BUA 314 Accounting Control Systems

An upper level management accounting course emphasizing accounting as a system for information and control. Focus on the organizational and behavioral implications of accounting. Prerequisites: BUA 305, BUA 325.

Cr 3.

##### BUA 319 The Environment of Accounting

Facilitates the transition from school to employment in the accounting profession. Prerequisite: Accounting major with senior standing.

Cr 1.

##### 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. Prerequisites: ECO 120 and ECO 121, junior standing.

Cr 3.

##### BUA 326 Dynamics of Organization and Behavior

An analysis of business organization and problems encountered by administrators in an interpersonal setting. Emphasis on the findings of behavioral sciences relevant to the management of economic enterprises. Examines interdisciplinary approaches to human relations and adjustment problems in modern organizations, as well as motivation, leadership, and organization theory as related to work and productivity. Prerequisite: BUA 325.

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. 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. Prerequisites: 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. Prerequisite: junior standing.

Cr 3.

##### BUA 335 Principles of Management Information Systems

Studies the role of information systems and data processing in business planning and control in



uding technology of information systems, economics of information, planning, decision-making and control in business organizations. Prerequisites: MAT 215 and any 200 level COS course, junior standing. Cr 3.

#### **BUA 337 Production and Operations Management**

The place of production planning and control in 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, junior standing. Cr 3.

#### **BUA 340 Problems of 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. Prerequisites: BUA 325, BUA 350, BUA 370 and senior standing with permission. Cr 3.

#### **BUA 341 Dynamics of Small Enterprises**

Background understanding of problems of small business and consulting techniques is focused on the special problems of entrepreneurship, venture capital, and growth management provided through the Small Business Administration's Small Business Institute program. Includes participation in problem solving teams. Prerequisite: BUA 340. 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. Prerequisites: ECO 120, ECO 121. Cr 3.

#### **BUA 345 International Management**

Examines management problems of organizations with international interests, including the significance of cultural traditions and social structures for business conduct. Covers various international styles of managerial functions, structure, and processes. Prerequisite: BUA 325. Cr 3.

#### **BUA 349 Administrative Policy and Business Environment**

A study of administrative decision making and policy setting, with consideration of social and political forces, and ethical values. Prerequisites: BUA 325, BUA 335, BUA 337, BUA 350, and BUA 370, senior standing. Cr 3.

#### **BUA 350 Business Finance**

Examines the promotion, organization, and financing of the single proprietorship, partner-

ship, and corporation, through advanced case studies and problems. Prerequisites: ECO 120, ECO 121, and BUA 201, junior standing. Cr 3.

#### **BUA 351 Corporate Treasury Dynamics**

Traces counterflows of cash between the corporate unit and the money market due to seasonal, cyclical, and secular demands. Includes numerous approaches to debt limit determination, and explores the problem of making optimal financing decisions in specific corporate and bank management settings. Prerequisite: BUA 350. Cr 3.

#### **BUA 352 Financial Institutions**

The operations and economic roles of financial institutions: commercial banks, investment houses, and investment markets; savings and insurance institutions; governmental agencies. An institutional introduction to the fields of private and public finance. Prerequisites: ECO 120, ECO 121, BUA 350. Cr 3.

#### **BUA 353 Investment Strategy**

Examines the construction and management of investment portfolios. Prerequisites: ECO 120, ECO 121, BUA 350. Cr 3.

#### **BUA 354 Speculative Markets**

Examines the futures and options markets, concentrating on the use of derivative assets in risk management. Special emphasis on the ways in which a hedger may transfer unwanted risk to a speculator who is willing to bear it. Prerequisite: BUA 350. Cr 3.

#### **BUA 361 Data and File Structures for Business Applications**

Covers program, data, and file structures through advanced applications development and maintenance projects. Provides an in-depth understanding of a business-oriented programming language and introduces theories of efficient structuring of large data files. Principles of software engineering are integrated throughout the course. Prerequisite: COS 220. Cr 3.

#### **BUA 363 Distributed Information Systems for Management**

Introduces the design and management of information systems in distributed environments. Covers telecommunications, networks, advanced office systems, and strategic considerations in distributing databases, processing, and support. 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 or equivalent and permission. Cr 3.

#### **BUA 365 Business Systems Development**

Integrates computer technology, systems analysis, systems design, and organizational behavior to assist the student in developing man-

agement information and decision support systems. Explores state-of-the-art structured systems analysis and design methodologies and presents a rigorous approach to information systems development. Prerequisites: Senior standing, BUA 364 and COS 220 or equivalent. Cr 3.

#### **BUA 366 Decision Support Systems for Management**

Covers the managerial use of computer-based modelling to aid decision making with special emphasis on modelling complex systems under conditions of uncertainty. Principles of decision making, business modelling methods, decision analysis, decision support systems, and expert systems are covered. Prerequisite: BUA 335. 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 promotion methods. Prerequisites: 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 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 370. 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. Prerequisites: BUA 370 and MAT 215. Cr 3.

#### **BUA 380 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. Prerequisites: BUA 378 and BUA 382. Cr 3.

#### **BUA 382 Consumer Behavior**

An exploration of consumer purchase decision processes. Analyzes existing consumer be-



havior 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 384 Business Logistics**

An introduction to the logistical system including consideration of transportation modes, plant and warehouse location, inventory size determination, etc. Cases and problems are utilized to sharpen analytical techniques. Culminates in a consideration of the total cost approach to logistical system analysis and decision-making. Prerequisites: BUA 325 and BUA 370.

Cr 3.

#### **BUA 396 Field Experience-Cooperative Education**

From one to six semester hours of degree credit will be granted for field experience in business

and managerial fields relevant to the student's educational development and career goals. Prior approval of the project and of the precise number of credits is required, and will be based on a detailed written plan presented by the student. Students will not be granted credit either retroactively or for field experience courses taken at another university or another campus of this university. Prerequisite: junior or senior in the College of Business Administration and permission.

Cr 1-6.

#### **BUA 400 Introduction to Accounting**

Provides pre-MBA students with an introduction to the basic principles underlying the preparation of financial statements and the analysis of financial information. Prerequisite: Pre-MBA students only, permission of the Director of the MBA Program.

Cr 3.

#### **BUA 430 Quantitative Methods for Business**

Provides pre-MBA students with an applied introduction to the elementary mathematical functions, systems of equations and inequali-

ties, elements of analytical geometry, linear programming for business applications, matrix algebra, selected topics from calculus, and basic statistics for business. Major topics of normal probability distributions, sampling, estimation, hypothesis testing, regression and correlation analysis and Bayes' Theorem as related to business applications are covered in the statistics segment. Prerequisite: Permission of the Director of the MBA Program.

Cr 3.

#### **BUA 440 Computer-Based Information Systems**

An intensive and accelerated introduction to computerized information systems, designed to provide pre-MBA students with a foundation for understanding and analyzing information systems for business planning and control. Prerequisite: Permission of the Director of the MBA Program.

Cr 3.



# College of Education

Robert A. Cobb, *Dean*

Professors Chiappone, Cobb, Davis, Harris, McIntire, Pechinski, Roberts, Salesi, Sanford, Work, von  
 Associate Professors W. Abbott, E. Brazee, P. Brazee, Butterfield, Coladarci, Donaldson, Estler, Gulse-Killacky, Kristo, Perry, Pooler, Qualia, Rabineau, Rog, Schutz, Skehan, Zeph  
 Assistant Professors Brawner-Jones, Breen, Brown D., Magnus-Brown, King, Laird, H. Lehnhard, R. Lehnhard, Maddaus, Nelson, Nicoll, Power, Reif, Rogg, Scantlebury, Spector  
 Lecturers Fox  
 Cooperating Professor Lewis  
 Cooperating Associate Professor White  
 Cooperating Assistant Professor Anderson, Hicks, Jordan  
 Cooperating Lecturers Ames, Ballinger, Dwyer, Dyer, Keeling, Lender, Roberts, Wren, Young

The College of Education offers four-year programs designed to prepare elementary, and secondary school teachers, teachers of physical education and teachers of art. The College also provides, to undergraduates from other divisions of the University and to graduate students, instruction in the professional subjects essential for certification as a teacher by the state of Maine.

## General Information

The College of Education serves those students who are planning a career in the field of education. Undergraduate programs are designed to include a substantial amount of general education and a concentration in an academic area reflecting special teaching interests.

Additional information about programs may be obtained by writing the Director of Admissions or the Dean of the College of Education.

## Admission

Students ordinarily are admitted to the College of Education as first-year students in the four-year program. The specific admission requirements are given in the "Admission" section of this catalog. A student admitted with advanced standing must satisfy all basic entrance requirements in the College of Education and have maintained at least a 2.5 GPA in their College Courses prior to admission.

## Program Options

### Elementary Education

Students admitted to the College Education seeking a B.S. degree in elementary Education will participate in the Professional Preparation Team program. Their program includes: (1) 60 or more credits in disciplines related to the arts and humanities, social sciences and natural sciences, including a 24-hour concentration in one of several; (2) Professional coursework, in-

cluding EDB 202, 204, 221, CHF 201, SED 402, EDF 201, six methods courses and EDG 399; (3) Field experiences in participating school districts, culminating in two internships (student teaching) totaling 12 credits and lasting one entire semester in the senior year.

### Secondary Education

Student admitted to the College of Education seeking a B.S. degree in secondary education will participate in the Professional Preparation Team program. Their program includes: (1) 71-83 (depending on specialization) or more credits in disciplines related to the arts and humanities, social sciences and natural sciences including a 50-52 hour specialization in either mathematics, science (several subspecialties) English, social studies or foreign language and culture; (2) Professional coursework, including EDB 202, 204, 221, CHF 201, SED 402, a methods course in teaching their field of specialization, and EDG 399; and (3) 16 credits of field experience in participating school districts culminating in two internships (student teaching) totaling 12 credits and lasting one entire semester in the senior year.

### Art Education

A four-year program in art education is offered by the College of Education for students who intend to teach art or to become supervisors of art in public or private schools. Majors in art education register in the College of Education and follow a curriculum outlined by the Department of Art in conjunction with the College of Education. Specific requirements for the degree may be obtained from the Department of Art, Carnegie Hall, or from the College of Education. Upon satisfactory completion of this course of study, the student is certified to teach on both the elementary and secondary levels.

### Health, Physical Education and Recreation Programs

The professional curriculum of the health, physical education, and recreation programs prepares qualified students for service to

schools and communities in the areas of teaching, administration, and leadership with a focus on physical education, health-fitness, leisure, and sport. A bachelor of science degree in education is awarded to graduates of this program.

## Certification

Individuals who have completed a degree or are enrolled in a college other than the College of Education and who wish to be certified through transcript analysis by the State of Maine may seek certification through coursework offered in the College.

## Transfer Students: Admission with Advanced Standing

Students from other institutions who already have completed a portion of college work, or who desire to change their professional plans and enter education, are invited to apply for admission by transfer. Students who are accepted will be given advanced standing in the College of Education for work already completed if that work meets the established standards and the specific course requirements of the program to which they are seeking admission.

## Residence Requirements

A minimum of 30 semester hours of credit must be earned as a student at the University of Maine to qualify a candidate for a degree. This requirement may be met by one academic year of residence or by attending Summer Sessions; however, regularly enrolled students in the University who wish to transfer to the college may find it necessary to complete additional semesters to meet degree and program requirements. For students enrolled in Continuing Education Division and Summer Session courses, the 30 hours of residence credit may be obtained over an extended period of time and need not be continuous. Work taken in C.E.D. is considered



resident credit for undergraduate students in the College of Education.

## Summer Session and Continuing Education Students

Students whose only work in the College of Education has been or will be in the Summer Session or Continuing Education Division program are strongly urged to apply for admission to the University as part-time degree candidates. This recommendation applies both to students who expect to work for degrees in the various colleges of the University and to those who have not yet decided on a major. **At least 30 credit hours of Orono courses must be completed to receive a degree from the University of Maine.**

Among the advantages of being admitted to the University are immediate assignment of a major advisor to counsel on registration, requirements, etc., and eligibility for guidance and counseling services. Students who expect their work to be in the Summer Session should apply before their first registration; students whose first work is to be by Continuing Education classes should apply during their first course.

Application for admission should be made directly to the Director of Admissions, University of Maine.

Off-campus students, before enrolling for a course, should ascertain from the Associate Dean for Academic Services of the College of Education the amount of such work allowed toward fulfilling the requirements for the degree.

Exceptions to these rules will be permitted only by a vote of the faculty.

## Graduation Requirements

Completion of the required work of the College of Education leads to the degree of Bachelor of Science in Education (B.S. in Ed.).

A minimum of 120 degree hours of required college work is necessary for graduation. Some programs require more than 120 hours such as the specialized program of Health, Physical Education and Recreation which requires a minimum of 130 degree hours. In addition, each student must meet the grade point averages of the University and his/her respective program in order to graduate.

**General Education Subjects Required.** Information concerning the specific courses required in general education is available from the Office of the Dean. These subjects are: English, speech, social studies, science and mathematics, psychology, fine arts, and humanities.

Recent state legislation and national accreditation requirements may result in program changes. Students are responsible for monitoring current requirements.

**Professional Subjects Required.** The professional subjects required for a degree from the College of Education meet and exceed the current state requirements for a teaching certificate. Additionally, the state has mandated that in-

dividuals take the National Teacher Education exam before being certified.

The required professional subjects are designed to acquaint the student with the general aims of education and the techniques and principles of teaching. These courses and related field experiences are arranged so they culminate in the supervised student teaching experience.

## Education Courses in the Summer Session and in the Continuing Education Program

Numerous education courses are offered during the Summer Session and by class extension through the Continuing Education Division. Detailed information regarding the Summer Session and the Continuing Education Division course offerings may be obtained from the program's director at Chadbourne Hall, UM, Orono, Maine 04469.

## Double Degrees

A student wishing to pursue double degrees across college lines normally must make a declaration of intent in the sophomore or junior year. The double degree must be in two distinct and separate areas. All requirements of both colleges and both majors must be fulfilled, including major requirements for work required outside the department. Students intending to become candidates for such double degrees must declare their intent to the deans of both colleges no later than the beginning of their junior years, and familiarize themselves with the requirements of both colleges.

## The Honors Program

The University of Maine offers its Honors Program to above-average students who are interested in interdisciplinary courses. The faculty of the College of Education encourages able students to participate. Students may initiate candidacy by requesting written endorsement of their academic advisors.

Honors courses meet general education and major requirements on an individualized basis, determined upon consultation with the faculty advisor and the college's Honors secretary. (See index under "Honors Program.")

## Certificates for Teachers

It should be clearly understood that the Maine Department of Education, (MDE) Augusta, Maine, has sole authority to issue certificates for teaching. The office of the Dean of the College of Education, however, is in a position to advise prospective teachers concerning certification.

To provide for the many types of school positions, MDE issues several types of certificates. Upon successful completion of his or her program and the National Teacher Examination the undergraduate student in the College of Educa-

tion generally will be eligible for the provisional teaching certificate at either the elementary or secondary school level.

In addition to furnishing courses for its own students, the College of Education acts as a service agency to provide professional training for students from other teaching units of the University who wish to qualify for a teaching certificate. Such students are enrolled in the same classes with students from the College of Education. **It is the responsibility of these students to secure current certification information and the actual certification directly from MDE.** It is very important that individuals who wish to take coursework for certification through the College of Education, contact the Assistant Dean for Academic Services or the Certification Advisor to be certain they know what College requirements have to be met.

## Placement for Teachers

The University of Maine Career Center includes, among its services, assistance to prospective teachers in finding teaching positions, a credentials service, on-campus interviewing, weekly job listings and resume critiques. Information regarding this service may be obtained from the University of Maine Career Center, Chadbourne Hall, University of Maine, Orono, Maine 04469.

## Courses in Education

Courses numbered 100-299 are associate and/or lower level baccalaureate degree. Courses numbered 300-399 are upper level (junior/senior) baccalaureate degree courses. Courses numbered 400-499 are upper-level baccalaureate degree courses; with appropriate qualifications and permission, may be taken for graduate credit. Courses numbered 500-599 are graduate level courses; with appropriate qualifications and permission, they may be taken for undergraduate credit.

## Counseling

### CEC 450 Guidance and the Teacher

Examines the role of the classroom teacher in a comprehensive guidance program including resources available from school counselors and the community, methods of studying individual pupils, teacher-parent communication. For classroom teachers at all grade levels.

Cr 3.

### CEC 453 Career Education: The Elementary/Middle School

General overview, conceptual model, and rationale for career education through classroom and curriculum practices including methods for infusion of career information within regular school subjects.

Cr 3.

### CEC 454 Career Education: Secondary School/Adult Education

General overview, conceptual model, and rationale for career education through classroom and curriculum practices in secondary



schools, adult education, and human resource development settings, including methods for infusion of career information within academic and vocational courses. Cr 3.

#### **CEC 510 Effective Communication in Personal Development**

Training in communication skills for non-counseling majors. 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 effective attributes. Prerequisite: Basic knowledge of measurement and statistics. Cr 3.

#### **CEC 524 Individual Intelligence Testing**

Intensive training in administration, scoring, and interpretation of the Revised Stanford-Binet Scale, the Wechsler Adult Intelligence Scale and Wechsler Intelligence Scale Children-Revised. Historical background and current problems in theory and practice of testing. Prerequisite: CEC 523 or permission. Cr 4.

#### **CEC 550 Introduction to Community Agency Counseling**

Surveys counseling functions in community agency, private practice and human resource development programs. Emphasizes a holistic approach to developmental, preventative and rehabilitative counseling services. Cr 3.

#### **CEC 551 Introduction to School Guidance**

Survey of the philosophy, objectives, principles, and practices of school guidance (kindergarten through grade twelve). Provides an understanding of a well-balanced school guidance program. 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. 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. Counselor Education Majors only. Cr 3.

#### **CEC 554 Counseling Children and Adolescents**

Examines the goals of counseling, counseling philosophy and operational issues in counseling children and adolescents. Studies verbal and non-verbal aspects of counseling by psychologists, psychiatrists, social case workers and school counselors. Prerequisite: CEC 553. Cr 3.

#### **CEC 555 Adult Career Development**

Examines personal and environmental factors which prompt career changes during adult-

hood including forces changing the content of work and the workplace. Discusses the mutual responsibility of the worker and the organization for career path development. Prerequisite: Permission. Cr 3.

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

#### **CEC 557 Play Media**

Designed for graduate students preparing to become elementary school counselors, teachers and child development specialists. Provides a background in play media theories, uses and techniques which relate to child development. Cr 3.

**CEC 558 Recent Development in Counseling**  
For the practicing counselor in educational and other institutional settings, emphasizing pragmatic approaches. Focuses on recent applications of contemporary theories. Prerequisites: CEC 553, CEC 556 or equivalent or permission. Cr 3.

**CEC 559 Career Information in Counseling**  
Collecting, evaluating and using informational materials in career counseling. 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. Prerequisites: CEC 523, CEC 552, CEC 556, CEC 559. Cr 3.

#### **Administration**

##### **EAD 500 Fundamentals of Administration**

A required introductory examination of the fundamentals and responsibilities of personnel supervision in educational organizations, including establishment of mission, staff roles, supervision and evaluation practices, and staff development. Cr 3.

##### **EAD 504 The School Administrator and the Pupil Personnel Services**

Designed for pre- and in-service school administrators. Focus on the study of effective pupil personnel programs and the role of the administrator in their planning, implementation and evaluation. Prerequisite: Graduate standing or permission. Cr 3.

##### **EAD 510 Educational Supervision**

Includes creative supervision, techniques of working with professional staff, improvement of curriculum, observational and evaluation techniques. Prerequisites: EDB 202, EDB 203, 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 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. Prerequisites: EDB 202, EDB 203, EDB 204 or equivalents. Cr 3.

#### **Adult Education**

##### **EAE 400 Trends in Adult Education**

Examines the need for and purpose of adult education programs and the program development, organization, and administration of programs. Emphasis on adult education through public schools, Cooperative Extension Service, and community agencies. Cr 3.

##### **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 which distinguish adult learners. The concepts and theories studied 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.



**EAE 551 Workshop in Adult/Continuing Education**

Focus on development of products useful to adult education administrators, teachers, or counselors. Competency of skill development is stressed. Specific activities, such as simulation design, grant proposals, instructional design and staff development, will be determined as registration. Prerequisite: EAE 523 or permission. Cr 3.

**Bilingual Education****EBI 380 Methods and Materials for Bilingual Instruction**

An exploratory overview of bilingual education in the school curriculum. Examines organizational models, methods, strategies and materials appropriate for bilingual education. Prerequisite: EDB 204, junior standing or permission. Cr 3.

**EBI 390 Introduction to Bilingual Education**

Reviews bilingual education from an international perspective and examines the purposes and components of various educational models used globally and nationally. Maine's native French-speaking population provides the focus for case studies. Cr 3.

**EBI 560 Advanced Studies in Bilingual Education**

Research of a specific area of bilingual education related to the student's field of study. Possible topics include: cultural pluralism, language planning, language and culture, cognitive and developmental issues in second language learning. Prerequisite: EBI 390 or permission. Cr 3.

**Measurement and Testing****EDA 520 Topics in Educational Measurement**

Possible topics include: applied performance testing, unobtrusive measures, domain-referenced testing, sequential, testing, item, response theory, sources of response bias in cognitive and affective measures, retrospective measurement in the affective domain. Cr 3.

**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, EDB 203 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.

**Appraisal and Basic Professional Courses****EDB 202 The American School**

Examines the nature, role, purposes, and curriculum of public elementary and secondary

schools with special attention to the place and function of the teacher. Prerequisite to student teaching in all regular undergraduate programs. 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 undergraduate programs. Prerequisite: Sophomore standing 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 262 Special Topics in Elementary Education**

Current issues and problems in elementary education presented in modular format. Cr 1-3.

**EDB 272 Special Topics in Secondary Education**

Current issues and problems in secondary education presented in modular format. Cr 1-3.

**Curriculum****EDC 313 Principles of Curriculum Construction (Conservation) for Elementary School Teachers**

Provides opportunities for production of instructional materials or natural resource conservation, including reference and reading materials for children, units of study, instructional guides, bibliographies, and many types of visual aids. Prerequisite: Conservation Education Workshop or its equivalent. Cr 3.

**EDC 320 Principles of Team Teaching**

Theory and practice of instructional teams. Emphasis on cooperative planning, pupil groupings, and curriculum innovations. Prerequisites: EDB 202, EDB 221, EDB 204 or their equivalents. Cr 3.

**EDC 323 Principles of Curriculum Construction (Conservation) for Secondary School Teachers**

Provides opportunities for production of instructional materials on natural resource conservation, including reference and reading materials for children, units of study, instructional guides, bibliographies, and many types of visual aids. Prerequisite: Conservation Education Workshop or its equivalent. Cr 3.

**EDC 332 Student Activities in Secondary Schools**

The function, organization and direction of student activities in the modern secondary school. Prerequisites: EDB 202, EDB 221, EDB 204 or their equivalents. Cr 3.

**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. Prerequisites: EDB 202, EDB 204, EDB 221. Cr 3.

**EDC 470 Teaching Maine Studies K-12**

For teachers of social studies at all grade levels who are teaching or wish to teach about Maine. Covers background, methods, and instructional resources in relation to Maine's social life, geography and natural resources, government, and economy. Cr 3.

**EDC 511 Planning the Elementary School Curriculum**

Studies the aims and philosophy of elementary education. Includes status of the curriculum, factors affecting curriculum changes, development and modern child psychology. Prerequisites: EDB 202, EDB 221, EDB 204 or equivalents. Cr 3.

**EDC 521 Planning the Secondary School Curriculum**

Planning curriculum revision and reorganization, with special attention to bringing the curriculum into harmony with needs of modern life. Prerequisites: EDB 202, EDB 221, EDB 204 or equivalents. Cr 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. Prerequisites: EDB 202, EDB 204, EDB 221 or equivalents. Cr 3.

**EDC 550 Curriculum and Methods for Economic Education**

Students examine basic economic and consumer education concepts as well as contemporary issues affecting the national economy, with emphasis on Maine economy, and develop teaching materials for implementation in their classrooms applicable to K-12 teaching. Prerequisite: Employment in a public or private school and/or permission. Cr 3-6.

**EDF 201 Great Ideas, Critical Issues**

A selective introduction to the liberal curriculum through multidisciplinary studies of



curring ideological tensions in western civilization, especially as reflected in conflicts between the individual and society. Emphasis on close reading and critical discussion through extensive prose writing. Cr 3.

#### General

#### EDG 298 Professional Preparation Team Field Experience

Only for first and second year students in the Professional Preparation Team (PPT) program. Students will observe in public school classrooms, complete activities, and assist the teachers. To be taken simultaneously with EDB 205, EDB 206, EDB 207 or EDB 208. May be repeated for a total of four semesters. Cr 1.5 - 3.

#### EDG 399 Professional Preparation Team Senior Seminar

Only for seniors in the Professional Preparation Team (PPT) program, in the semester preceding internship. Students learn about issues of professional interest, identify and research a particular issue in depth and become oriented to the particular teacher and class with whom they will be doing their internships. Cr 1.

#### EDG 400 Field Observation (Activity)

Study of educational 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. Prerequisite: permission. Cr 1-6.

#### EDG 410 Workshop for Cooperative School Personnel (Activity)

Considers the nature and scope of the activities of the supervisor, resource teacher, team leader, critic teacher, and teacher's aide in cooperation with other school personnel, including some discussion of relevant literature, research practices and materials. Cr 3.

#### EDG 498 Problems in Education

Individual work on a problem selected by the student. Primarily for Education majors. Cr Ar.

#### 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.

#### History and Philosophy of Education

##### EDH 102 History of Education

Examines educational thought in historical context with emphasis on current theories in relation to the values, objectives, purposes, and outcomes of American education. Not open to first-year students. Cr 3.

##### EDH 145 Education Sociology

Major principles of sociology applied to the institution of education including the culture con-

cept and its application, school-community interaction, social groups and patterns of social behavior. Cr 3.

##### EDH 330 Trends in Education

Considers trends in American education as they relate to current and emerging practices in organization curriculum and teaching methods. Cr 3.

##### EDH 351 Education for Intercultural Understanding

Examines the sources of cultural, racial and religious conflict in contemporary community life and ways in which schools can assist in defining cultural conflicts. Cr 3.

##### EDH 410 Foundations of Community Education

Traces the development of community education from its beginnings in the mid-1930's to the present with emphasis on its relation to current political, economic, social, and educational concerns. Cr 3.

##### EDH 499 Seminar in the Foundations of Education

The nature, role, policies and curriculum of elementary and secondary schools are re-examined with special attention given to the place and function of the teacher. Prerequisites: STT 490, STT 491, STT 494 or concurrent registration. Cr 3.

##### EDH 500 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 531 School Law and the Teacher

A study of the legal bases of public education with specific reference to the State of Maine. Prerequisites: EDB 202, EDB 221, EDB 204 or equivalents. 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.

##### EDH 561 Comparative Education

A study of systems of education in representative countries of the world including an analysis of cultural forces that create differences among them. Countries will be selected from Europe, Asia, the Americas and others. Prerequisites: EDB 202, EDB 204 or permission. Cr 3.

##### EDL 420 Changing Roles of Men and Women in Education

Provides an understanding of changing sex roles in the U.S. and implications for all educational levels, theories and research related to

the school's place in sex-role socialization, identification of sex-role stereotyping, and an overview of innovative approaches, programs and practices. 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.

#### Research

##### 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. Prerequisite: graduate status or permission. Lec 3. Cr 3.

##### EDS 520 Educational Measurement

Covers basic measurement theory, construction of test items in achievement and aptitude, evaluation of teacher-made and standardized tests, descriptive statistical techniques used in educational measurement. Cr 3.

##### EDS 521 Statistical Methods in Education

Introduction to descriptive and inferential statistics as applied to education and human behavior. Emphasis on parametric statistics. Cr 3.

##### EDS 530 Naturalistic Observation Research in Learning Environments

The acquisition of foundational knowledge and practical application of ethnography, interaction analysis, duration recordings and other naturalistic observation techniques for the study of learning environments. Specific focus on current trends in classroom research methodologies, literature reviews and proposal designs. 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. Prerequisites: EDS 521, EDS 530 or equivalent and permission. Cr 3.

##### EDU 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.



**EDU 481 Educational Travel (Area)**

A summer session study tour investigates the educational, social, economic, historical, and geographic aspects of the locale visited, particularly of areas that have made major contributions to our cultural heritage. Tours currently conducted in U.S., Europe, Maritime Provinces and Quebec. **Cr 3-6.**

**EDU 520 Micro-Computer Instruction in Education**

Introduces the theoretical and practical aspects of Computer-Assisted Instruction (CAI) and Computer-Managed Instruction (CMI) including discussion of CAI/CMI authoring systems and applications of CAI/CMI in educational settings. Major emphasis on reviewing, evaluating and selecting microcomputer software used in curriculum. Prerequisites: EDU 400 or permission. **Cr 3.**

**EDU 540 Microcomputer Based Instruction in Special Education**

Theory and practice of effective microcomputer based instruction of handicapped students. Prerequisites: EDU 400, SED 400. **Cr 3.**

**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.**

**Vocational and Driver Education****EDV 251 Basic Driver Education**

A short, basic, intensive course in driver education for teachers arranged in cooperation with the American Automobile Association. Designed to aid high schools in establishing plans for a course in driver education. Not for teaching an individual how to drive. **Cr 3.**

**EDV 252 Driver and Traffic Safety Education**

An intensive course in driver and traffic safety education for teachers who have completed EDV 251 and at least one year's teaching experience in this area. Covers problems experienced in teaching driver education and highway safety. Prerequisite: EDV 251. **Cr 3.**

**EDV 253 Driver Education Simulation**

Provides driver education teachers with the necessary knowledge and skills including driver education simulation as an effective part of the total driver education program. **Cr 3.**

**EDV 254 Basic Motorcycle Driver Education**

Trains Maine driver education teachers in motorcycle driver education in the requirements of the 1973 motorcycle legislation. Includes both classroom and laboratory (on-the-road) activities. Prerequisite: EDV 251. **Cr 3.**

**EDV 550 Systems and Practices in Vocational Education**

Orients school administrators, counselors and personnel workers to the goals and objectives of vocational education. An overview of major vocational delivery systems, funding laws and curriculum innovations with emphasis on the development and implementation of vocational education in Maine. **Cr 3.**

**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.**

**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.**

**Mathematics Education****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.**

**EMA 555 Problem Solving in Secondary School Mathematics**

Considers problem generation, problem posing and problem solving in a wide variety of situations, applications and recreational mathematics. Prerequisite: MAT 305 or equivalent. **Cr 3.**

**EMA 565 Teaching Algebra**

Explores current issues in teaching algebra including readiness for algebraic concepts, use of calculators and computers and other alternative teaching methods. Prerequisite: MAT 305 or equivalent. **Cr 3.**

**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.**

**EPT 522 Advanced Educational Psychology**

A seminar to explore theoretical and empirical issues in educational psychology. Prerequisites: EDB 221 and EDS 521 or equivalents. **Cr 3.**

**Reading and Language Arts****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, directed reading lessons, literature based reading and writing programs, recreational reading and evaluation. Prerequisite: PSY 100, junior or senior standing. **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 concurrently 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 440 Teaching Reading in the Secondary School**

An exploratory course for high school teachers who wish to develop competence in teaching reading. Covers the nature of the reading process, rationales for continuing reading instruction in junior and senior high schools, teaching reading and study skills, improving rates of reading, organization, evaluation. **Cr 3.**

**ERL 450 Newer Practices in Reading**

Objectives, materials, and procedures for improving teaching of reading including methods and materials used in evaluating the reading program, comparison of current practices in reading instruction. Prerequisite: ERL 313 or ERL 440 or their equivalents. **Cr 3.**

**ERL 495 Understanding Reading**

A study of the processes and (2) proficient reading. Presents theoretical and empirical information relating to communication, structure of language, acquisition of speech, physiology in reading, learning to read, and proficient reading. Prerequisite: sophomore standing. **Cr 3.**

**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



anning 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 senior high, secondary school, and public library. Emphasis on recently published books of this nature and the important contributions of the past. Cr 3.

#### **ERL 519 The Library in the School Program**

Consideration of the interrelating roles of the librarian and teacher in designing programs, materials, and activities for the learning and reading experiences of students. Intended for teachers and librarians. Cr 3.

#### **ERL 520 Storytelling**

Designed for teachers, librarians, or individuals interested in the art of storytelling. Includes techniques and materials for storytelling, practice work with children in schools and libraries. Prerequisite: ERL 317 or permission. Cr 3.

#### **ERL 530 Advanced Study in Language Arts**

Intensive study of literature, research, and current practices in teaching language. For thesis candidates. Prerequisite: permission. Cr 3.

#### **ERL 535 Developmental Reading**

Exploration of the fundamentals of reading instruction including history of approaches to reading instruction, early reading, content reading, and current issues in reading instruction. 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, evaluation, researcher and implementer. Cr 3.

#### **ERL 537 Reading and Writing Across the Curriculum**

Examines reading, writing, studying and thinking as elements of content discipline instruction. Cr 3.

#### **ERL 553 Remedial Reading and Writing**

Discussion of both process and product assessment measures for reading and writing and factors affecting these areas. Exploration of a range of instructional options for individuals, small groups and classrooms. Prerequisites: ERL 535 and ERL 536 or equivalents or permission. Cr 3.

#### **ERL 569 Clinical Practices in Reading and Writing**

Supervised experience in diagnoses, prescription, and implementation of reading and writing instruction for small groups of students (K-12). Analyses and interpretation of test data and preparation of case report writing. Prerequisite: ERL 553 or equivalent or permission. Cr 3-6.

#### **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.

#### **Science Education**

##### **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. Prerequisite: EDB 221, EDB 204 or EDB 207, EDB 208 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. 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. Cr 3.

##### **ESC 348 Natural History-Inland (K-12)**

Introductory field studies for pre-service or inservice 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. Prerequisites: ESC 316 or ESC 452 and permission. Cr 3.

##### **ESC 441 Studies in the Physical Sciences II**

Laboratory-centered investigations in such areas as bonding in crystals, electric charges, atomic models, ions, molecules, non-ionic substances. Prerequisite: ESC 340 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. Prerequisite: Permission. 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. Cr 3.

##### **ESC 447 Marine Education for Secondary Teachers**

Multidisciplinary study of the world's oceans, particularly the Gulf of Maine. Topics include geology, physical and chemical oceanography, ecology, natural resources. Field experiences in Acadia National Park, Mount Desert Island and other significant coastal locations in Maine are a major component. Marine education curriculum materials and appropriate instructional strategies are also emphasized. 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. Prerequisite: EDB 221 and EDB 204 or EDB 207, EDB 208. 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 473 Workshop in Environmental Education for Secondary Teachers**

Natural resource concepts from an ecological perspective. Students will develop a course design for secondary 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 secondary students. Cr 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 stu-



dent 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.

**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. Not open to first-year students. Cr 3.

**ESS 320 Teaching Geography in the Elementary School**

A study of materials, methods, devices, activities, and appropriate background information. Not open to first-year students. Cr 3.

**ESS 343 Teaching Geography in the Secondary School**

A study of materials, methods, devices, activities, and appropriate background information. 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. Not open to first-year students. Cr 3.

**ESS 515 Contemporary Issues in Social Studies Education**

Focus on current trends in social studies education in relation to its historical and philosophical foundations and to implications for practice. Prerequisites: ESS 315, ESS 441 or equivalent. Cr 3.

**ESS 541 Social Studies Curriculum**

Studies in development of the curriculum, materials, resources, and methods of social studies instruction. Prerequisites: ESS 315, ESS 441 or equivalent. Cr 3.

**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.

**Media**

**INM 433 Instructional Media**

An introduction to the effective use of instructional media and related materials including learning principles in relation to visual communication media, nature and applications of media and instructional materials, evaluation and selection of media and instructional materials. Cr 3.

**INM 434 Media Production**

Planning and producing inexpensive instructional materials for both elementary and secondary school subjects, involving either photographic or graphic media. Cr 3.

**INM 537 New Media in Education**

Development and utilization of new media in educational instruction. Prerequisite: EDB 202, EDB 221, EDB 204 or equivalents. Cr 3.

**Special Education**

**SED 400 Survey of Exceptionality**

An overview of special education to assist the development of exceptional children. Focus on characteristics, identification procedures, educational provisions, and relevant issues and concerns related to categories of exceptional children. Cr 3.

**SED 401 Introduction to the Education of Severely Handicapped Students**

Provides an overview of the severely handicapped child/adolescent and his/her complex educational needs. Includes history of education of the severely handicapped, service delivery models, terminology, etiology, the role of other related disciplines, health related issues. Prerequisites: Experience with the severely handicapped (professional or volunteer), SED 400. Cr 3.

**SED 402 Mainstreaming Exceptional Students**

Integrating exceptional students into the regular education program. Prerequisites: EDB 204 or EDB 207, EDB 208 and EDB 221. Cr 3.

**SED 430 Assessing the Learning and Behavior of Exceptional Children**

A skills course in which students will have the opportunity to gain knowledge and competencies in informal assessment of children's academic performance, development, and social behavior. Prerequisite: Field experience in special education, SED 400. Cr 3.

**SED 440 Behavioral Intervention in Educational Settings**

A study of the behavior of children in classrooms and the environmental factors affecting it. Considers various methods of teaching appropriate classroom behavior including behavior modification and psycho-social interventions. Field placement required for course activities. Prerequisite: field experience in special education, SED 400. Cr 3.

**SED 460 Characteristics and Identification of the Gifted and Talented**

A study of the national perspective and leading state identification models, as well as the history of gifted and talented education. The problem of meeting the need of gifted and talented students living in rural communities will receive special attention. Prerequisite: EDB 203. Cr 3.

**SED 465 Educational Programming for Exceptional Children**

Examines educational, social and vocational planning for the handicapped in both school and the community including educational curriculum, curriculum development, legal requirements, funding sources and the organization of state and private agencies. Prerequisites: Field experience in special education, SED 400, SED 460. Cr 3.

**SED 470 Methods of Teaching the Retarded Child**

Methods, materials, and techniques in teaching retarded children at the special class level. Prerequisite: SED 400. Cr 3.

**SED 475 Instructional Strategies for Exceptional Children**

Examines clinical teaching methods appropriate for children with intellectual, behavioral and/or learning deficiencies. Prerequisite: field experience in special education, SED 400. Cr 3.

**SED 509 Curriculum Development for Severely Handicapped Students**

In-depth study of curriculum for severely handicapped students including curriculum development, definition, content, philosophical foundations, models, and modification of programs to meet their specific needs. Prerequisite: SED 536. Cr 3.

**SED 510 Planning the Curriculum for the Retarded Child**

Explores aims and philosophy of education for the retarded child, status of the curriculum, factors affecting current curriculum changes. Prerequisite: SED 400 or equivalent. Cr 3.

**SED 515 Organization and Management of the Special Education Resource Program**

Explores the rationale, history, and current status of public school efforts to educate moderately and mildly handicapped children. Various models will be examined with primary emphasis on the organization and operation of the special education resource program in both elementary and secondary schools. Prerequisites: SED 400, and SED 592 or SED 533. Also by permission. Cr 3.

**SED 520 Administration and Supervision in Special Education**

Prepares personnel to develop, administer, and supervise special education programs for handicapped individuals at all age levels and with degrees of handicapping conditions from mild to severe. Prerequisite: SED 550. Cr 3.



**ED 522 Administration and Supervision of Programs for Severely Handicapped**  
An overview of administrative and supervisory considerations in a variety of settings serving severely handicapped individuals, including related laws and regulations, interagency cooperation, community and public school integration, staff and program evaluation, staff development, IDT/PET team building, communication and interpersonal relationships, leadership style, and funding issues. Prerequisite: SED 401 permission. Cr 3.

**ED 532 Teaching Students With Behavioral Disorders**  
Approaches to teaching constructive social behavior to students with behavioral disorders. Prerequisite: SED 592 or equivalent. Cr 3.

**ED 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. Prerequisite: SED 400 or equivalent. Cr 3.

**ED 534 Learning Disabilities-Educational Methods**  
Application of major systems and methods of working with school-age children with specific learning disabilities including development of appropriate programs for individual children. Prerequisite: SED 533 or equivalent. Cr 3.

**ED 536 Educational Strategies For Severely Handicapped Students**  
An in-depth analysis of current strategies used to educate severely handicapped students in relation to the overall process of education and curriculum. Prerequisite: SED 401 or permission. Cr 3.

**ED 550 Theories of Exceptionality**  
An examination of theories related to the cause and treatment of a variety of handicapping conditions including their historical antecedents and resultant issues and trends are also examined. Prerequisite: SED 400. Cr 3.

**ED 551 Methods and Curriculum for the Handicapped**  
A consideration of educational principles and practices essential to the development of effective instructional strategies for handicapped children and youth. Prerequisite: SED 550 Cr 3.

**ED 552 Consultation and Families in Special Education**  
Models for consulting with teachers and parents of handicapped children and youth. Prerequisite: SED 400. Cr 3.

**ED 553 Assessment in Special Education I**  
Provides experiences with testing instruments designed to assess educational functioning of students ranging from mildly to severely handicapped. Prerequisite: SED 400 Cr 3.

**ED 554 Assessment in Special Education II**  
Provides advanced training and preparation in psycho-educational test analysis and dissemi-

nation of information related to mild to severely handicapped students. Prerequisite: SED 553. Cr 3.

**SED 555 Transitional Programs for Handicapped Adolescents**  
Explores models for preparing handicapped youth in pre-secondary and secondary level programs for post-secondary alternative opportunities. Prerequisites: SED 533, SED 592 and SED 590 or SED 401. Cr 3.

**SED 565 Teaching the Gifted Student**  
Methods, materials and techniques for teaching gifted students including curriculum and programming alternatives. Prerequisite: SED 360. Cr 3.

**SED 586 Workshop in Special Education (Activity)**  
Provides insight into educational problems of mentally retarded, emotionally disturbed, neurologically impaired, deaf, visually handicapped or gifted students. Special attention given to literature, research practices and materials relating to an aspect of special education. Prerequisite: SED 400. Cr 3-6.

**SED 590 Mental Retardation - Theory and Characteristics**  
Theories underlying the definitions and treatment of mental retardation. Characteristics of the condition and their relationship to appropriate curriculum are discussed. Prerequisite: SED 400 or equivalent. Cr 3.

**SED 592 Behavior Disorders - Theory and Characteristics**  
Examines theoretical explanations, research and educational assessment strategies related to behaviorally disordered students. Prerequisite: SED 400 or equivalent. Cr 3.

**STT 490 Full-Day Student Teaching (Elementary)**  
A full-day, off-campus internship program in a selected school. 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. Prerequisites: Early application and permission. Cr 1-12.

#### Student Teaching

**STT 494 Student Teaching K-12 (Music, Art or Physical Education)**  
Observation and student teaching in selected elementary and/or secondary schools. Prerequisites: EDB 202, EDB 221, EDB 204 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. Prerequisite: STT 490 and permission of the Director of Educational Field Experiences. (Pass/Fail Grade Only). Cr 2-6.

**STT 497 Advanced Internship (Secondary)**  
A full-day, off-campus advanced internship, teaching in a selected school. Seminars and conferences. Prerequisite: STT 491 and permission of the Director of Educational Field Experiences. (Pass/Fail Grade Only). Cr 2-6.

#### Health, Physical Education and Recreation

**HPR 222 Personalized Health Fitness**  
To develop an understanding of basic principles of health fitness and to develop a personal fitness program. Modern strength training techniques including free weights, plyometrics, and resistance machines. Prerequisite: HPER major or permission. Cr 2.

**HPR 230 Archery**  
Instruction to develop skills and teaching techniques in this leisure activity. HPER major or permission. Cr 1.

**HPR 231 Badminton**  
Instruction to develop skills and teaching techniques in this leisure net sport. Prerequisite: HPER major or permission. Cr 1.

**HPR 232 Golf**  
Instruction to develop skills and teaching techniques in this leisure activity. Prerequisite: HPER major or permission. Cr 1.

**HPR 233 Volleyball**  
Instruction to develop skills and teaching techniques in this leisure net sport. Prerequisite: HPER major or permission. Cr 1.

**HPR 234 Racquetball**  
Racquetball skills and teaching techniques along with instructions and rules will be presented. Prerequisite: HPER major or permission. Cr 1.

**HPR 235 Rhythmic Activities**  
The purpose of this course is to develop skills, teaching techniques and an understanding of basic rhythms, particularly as they relate to folk, social, and square dance patterns. Prerequisite: HPER major or permission. Cr 1.

**HPR 236 Dance Fitness**  
To develop skills and teaching techniques in performing and teaching aerobic dance. Cr 1.

**HPR 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: HPER major or permission. Cr 1.

**HPR 238 Tennis**  
Instruction to develop skills and teaching techniques in this leisure net sport. Prerequisite: HPER major or permission. Cr 1.

**HPR 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 2.



**HPR 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 2.

**HPR 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 2.

**HPR 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 2.

**HPR 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 2.

**HPR 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 2.

**HPR 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 2.

**HPR 249 Methods of Coaching and Teaching Swimming and Diving**

Stroke analysis, training and conditioning for competitive swimming, springboard diving, basic synchronized swimming and pool management. Cr 2.

**HPR 250 First Aid and Emergency Care**

This course 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 how to correctly handle bleeding, wounds, shock, musculo-skeletal injuries, and various medical emergencies. Prerequisite: HPER major or permission. Cr 2.

**HPR 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: HPER major or permission. Cr 3.

**HPR 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: HPER major or permission. Cr 3.

**HPR 271 History and Philosophy of Physical Education and Recreation**

This course is designed to provide an introduction of the fields of health, physical education and recreation. The history and philosophy of both fields will be discussed and career opportunities will be identified. Cr 2.

**HPR 273 Prevention and Care of Athletic Injuries**

Prevention and care of common injuries associated with the athletic, school or recreational setting. Use of proper personal and field equipment support methods, medical examinations and therapeutic aids. Prerequisite: ZOL 208. Cr 3.

**HPR 278 Health Education**

The purpose of this course is to examine all the factors that influence health. This course 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.

**HPR 310 Outdoor Preparedness**

Prepares students to meet the challenge of wilderness travel and survival. Map and compass work, summer and winter survival, canoe skills and fitness will be offered. Students will be required to test their skills in field work. Lab fee will be charged. Cr 3.

**HPR 344 Principles of Coaching**

Principles of Coaching would supply an appreciation and background in the art of coaching. This course would deal 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. Prerequisites: sophomore standing. Cr 3.

**HPR 348 Field Experience**

Supervised experience in conducting recreation programs in camp, community, social agency or institution situations. Enrollment by permission. Cr 3-6.

**HPR 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: HPER major or permission. Cr 3.

**HPR 361 Organization and Administration of Physical Education and Recreation**

This course will provide the student with an opportunity to organize and administer a physical education or recreation program. The student will develop skills in curriculum development, budgeting, bidding and purchasing, scheduling, hiring, evaluating, and insuring as they organize and administrate their program. Cr 3.

**HPR 362 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. Cr 3.

**HPR 363 Curriculum and Instruction in Secondary Physical Education**

This course will provide the preservice teacher with an opportunity to practice learned effective teaching behavior in various teaching settings. The course will also provide the preservice teacher with an overview of secondary schools. Prerequisite: HPR 362. Cr 3.

**HPR 364 Elementary School Physical Education**

This course is 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: HPR 362. Cr 3.

**HPR 367 Mainstreaming in Physical Education-Recreation**

An introductory course to help 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.

**HPR 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. Cr 3.

**HPR 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. Prerequisites: ZOL 208, HPR 253. Cr 3.

**HPR 378 Physiology of Exercise**

Develops an understanding of the integration and regulation of physiological functions



ing physical activity. Through investigation of factors affecting human performance, and coordinated adjustment of body functions to the stress of exercise, students will become more aware of the theoretical and practical applications of exercise science. Prerequisites: EDB 208, HPR 253, HPR 376. Cr 3.

**HPR 380 Health, Physical Education and Recreation Programs in the Elementary School**

Integrates the goals, objectives and concepts of physical education with the curriculum of the elementary school. Emphasis on purposeful, pre-directed movement and the important contributions physical education makes to the health, fitness and development of the elementary school child. Cr 3.

**HPR 384 Practicum in Physical Education**

Leadership experiences under staff supervision in the service program. Limited opportunities do exist in local public schools. Consult either Dr. Woodbury or Dr. Cobb before registering. Cr 1-3.

**HPR 398 Problems in Health and/or Physical Education and Recreation**

Individual work on a problem in the area of health, physical education or recreation. Cr 1-3.

**HPR 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: HPR 378. Cr 3.

**HPR 425 Wellness Programming**

Will allow the student to be exposed to lifestyle concerns which are typically addressed through intervention programs. Programs to be discussed are as follows: smoking cessation, diabetes, musculoskeletal (osteoporosis, arthritis, low back), weight management and stress management. Students will learn how to incorporate a multi-discipline approach for the management of these specific conditions. Prerequisite: HPR 374. Cr 3.

**HPR 426 Exercise Leadership and Class Management**

This course provides specific knowledges, skills and competencies needed to appropriately develop, prescribe, instruct and manage various kinds of exercise programs for diverse populations. Prerequisite: HPR 424. Cr 3.

**HPR 468 Advanced Prevention and Care of Athletic Injuries**

Acquaints teachers and athletic coaches with modern principles and practices in prevention, treatment, rehabilitation, and safety in physical education and athletics. Cr 3.

**HPR 483 Planning the Health Education Curriculum**

Assists students in more thoroughly understanding health education in relation to the total school curriculum. Concepts of curriculum development, national considerations, and current research related to health curriculum construction. Cr 3.

**HPR 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. Prerequisites: HPR 378 and permission. Cr 3.

**HPR 570 Interpretation of Health, Physical Education and Recreation**

Analytical interpretation of activity through history. Philosophy, methods, measurement, content, public relations and professional preparation. Cr 3.

**HPR 572 Planning the Physical Education Curriculum**

Selection of activities, sequentially arranged and organized to produce a curriculum for physical education for the modern school including time allotments, facilities, individual characteristics, problems of appraisal. Cr 3.

**HPR 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: EDB 203 and/or permission. Cr 3.

**HPR 574 Organization and Administration of Recreation Programs**

**HPR 575 Current Studies in Health, Physical Education, and Recreation**

Analysis of current and emerging trends in health, physical education, and recreation based on experiments, research, literature and empirical observations. Cr 3.

**HPR 577 Organization and Administration of Health, Physical Education and Recreation**

Provides the student with an overview of the organization and administration of physical edu-

cation and recreation programs. Develops an understanding of the essential components (interpersonal interaction, budgeting, scheduling, evaluating, etc.) of an effective program. Cr 3.

**HPR 579 Current Studies in the Administration of Athletics**

**HPR 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: HPR 376. Cr 3.

**HPR 581 Recreation in the American Community**

**HPR 582 Physical Education for the Exceptional**

Modifications of instructional programs for atypical individuals in the regular school curriculum. Evaluation of body mechanics, programs of correction, recognition of behavior patterns. Cr 3.

**HPR 583 Admin of Elementary and Secondary School Health Programs**

**HPR 584 Evaluative Procedures in Health, Physical Education and Recreation**

Introduces the student to various evaluative techniques which are designed to improve teaching effectiveness and student learning. Emphasis will be placed on utilizing various strategies of evaluation in the instructional setting. Prerequisite: HPR 372. Cr 3.

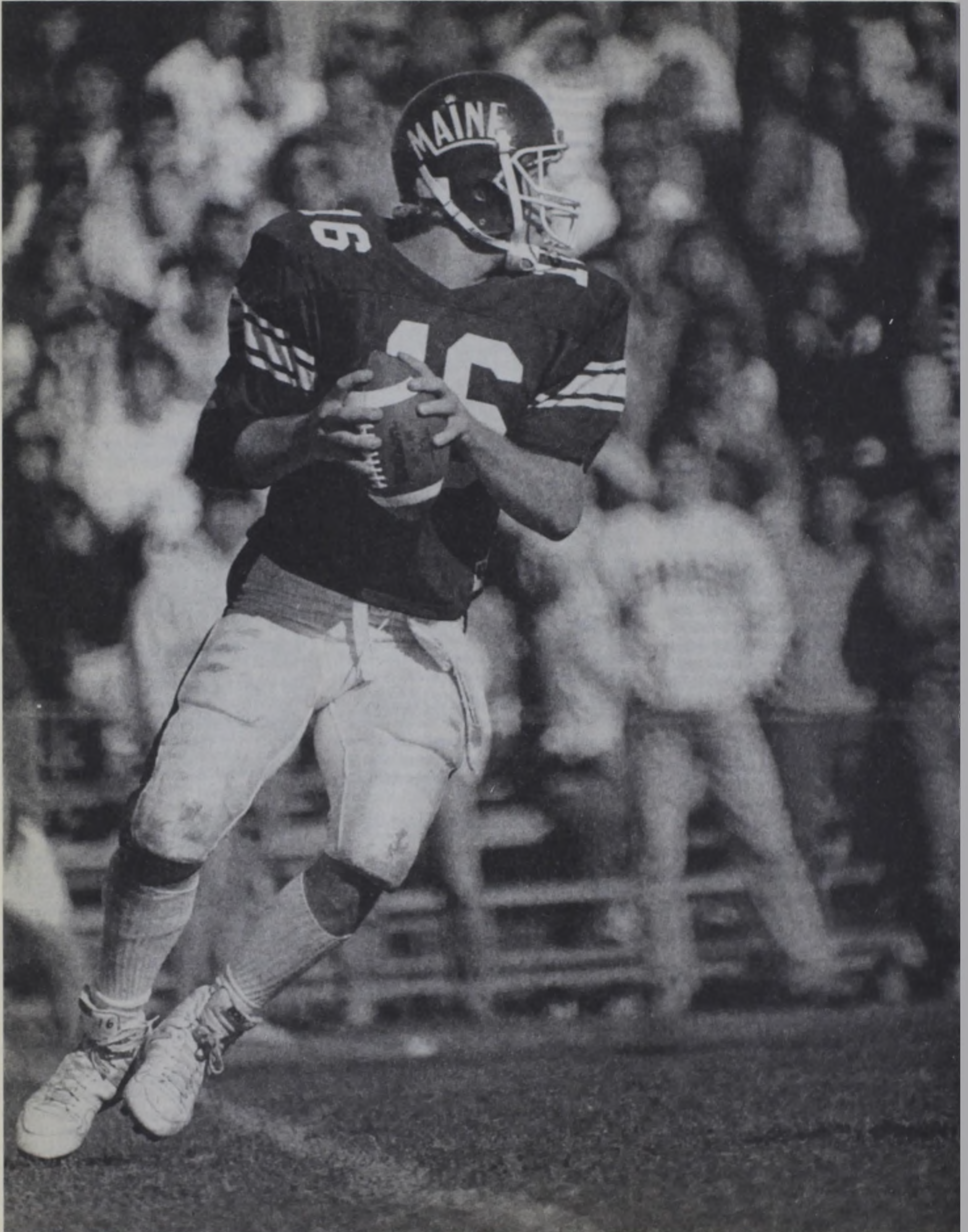
**HPR 585 Development of an Adapted Physical Education and Recreation Program**

This course is designed to assist professionals in developing and implementing a full range adapted physical education or recreation program. It addresses the program needs for children and adults of various types and levels of severity of handicapping conditions. Prerequisite: HPR 367 and HPR 372, or their equivalent. Cr 3.

**HPR 588 Advanced Exercise Physiology**

The purpose of this course is to broaden the knowledge base of graduate students and to identify potential research areas. The course involves in depth study of selected topics in exercise physiology and requires students to extensively utilize the current research literature. Prerequisite: HPR 378 and permission. Cr 3.







# College of Engineering

Norman Smith, *Dean*

Wayne A. Hamilton, *Associate Dean*

Clinton H. Winne, Jr., *Assistant Dean*

The College of Engineering offers the following study opportunities:

- A. Two-year associate of science degree programs, administered by the School of Engineering Technology: Civil Engineering Technology, Electrical Engineering Technology, Mechanical Engineering Technology
- B. Four-year bachelor of science in engineering technology degree programs, administered by the School of Engineering Technology: Construction Management Technology, Electrical Engineering Technology, Mechanical Engineering Technology
- C. Four-year bachelor of science degree programs: Bio-Resource Engineering (jointly with the College of Applied Science and Agriculture) Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Physics, Forest Engineering (jointly with the College of Forest Resources), Mechanical Engineering, Pulp and Paper Technology, Surveying Engineering

## Graduation Requirements

- A. In all programs:
  1. An accumulative average not less than 2.0.
  2. Passing grades in all required courses.
  3. Additional requirements listed under each program description.
- B. In the programs leading to bachelor of science degrees in Engineering. Students graduating from engineering programs are required to complete the following:
  1. 16 credits of mathematics
  2. 16 credits of basic science
  3. 32 credits of engineering science
  4. 16 credits of engineering design
  5. 18 credits of humanities and social science\*
  6. All additional departmental requirements listed under each program description.

\*The 18 credit humanities and social sciences requirement also applies to the Bachelor of Science degree in Pulp and Paper Technology.

Many courses contain subject matter in more than one of these categories. A list of courses showing the breakdown by category is maintained by each Engineering Department.

The humanities and social sciences are listed in the catalog under Anthropology, Art, Economics, English, Foreign Languages and Classics, History, Music, Philosophy, Modern Society, Political Science, Psychology, Public Administration, and courses of a cultural and non-technical nature offered in the School of Performing Arts. No more than three credits in applied theatre or three credits in applied music may be applied toward this requirement. English composition, scientific German, and courses treating accounting, finance, industrial management, personnel administration, and statistics do not fulfill this requirement. Each department maintains a list of acceptable social science and humanities courses.

## Cooperative Work-Study Opportunities

A number of cooperative work-study programs are available in the College of Engineering. Details of each program may be obtained from the appropriate department.

## Technology and Society

The Technology and Society Project is intended to develop ways to enhance the humanities and social sciences component of undergraduate engineering programs, to work with other colleges in developing the study of technology as a human activity and to infuse this study into the undergraduate curriculum of the university. The project is responsible for operation of a pilot program for Engineering students involving an interdisciplinary introduction to humanities and social science fields followed by a liberal studies concentration and senior seminar series.

Courses dealing with technological development and with topics involving the interfaces of technology and society are also offered by the project. These courses are usually taught by teams of faculty members in which each member can provide a different perspective on the subject matter. Some courses fulfill part of the Humanities/Social Science requirements for

Engineering students. Courses covering the Technology and Society area are:

HTY 419 Science and Society Until 1800

HTY 420 Science and Society Since 1800

HTY 485 World Maritime History I

HTY 486 World Maritime History II

HTY 491 Technology and Society Until 1800

HTY 492 Technology and Society Since 1800

TSO 198 Technology and Society

TSO 251 Transportation and Social Change

TSO 398 Special Topics in Technology and Society

## Courses in Technology and Society

### TSO 198 Technology and Society

A survey study of the development of modern technology and its impacts. The interaction of engineering with other facets of modern society will be examined through study of several issues of current or recent interest. **Cr 3.**

### TSO 199 Technology and Society II

a survey study of the interaction of modern technology and contemporary societies with a more detailed examination of particular cases and technologies of current interests. The course will conclude with discussion of possible scenarios for future technological and societal developments based on present trends. **Cr 3.**

### TSO 351 Transportation and Social Change

An interdisciplinary study of the technological development and social impacts of rail, air, and automobile transportation. The course will be taught by engineers, social scientists, and humanists working as an interactive team. One or more appropriate field trips will be held. Prerequisite: At least sophomore standing or permission of the instructor. **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. The course may be taken more than once. Prerequisite: Normally,



junior standing or permission of the instructor.

Cr 3.

## Honors Program

Qualified students in the College of Engineering are encouraged to participate in the University Honors Program. For academic and admission requirements of the Honors Program, consult the index. In the College of Engineering, the Honors Program consists of two major segments: studies in the humanities and studies in the student's own field. Successful completion of HON 101 or 102 will exempt a student from the college ENG 101 requirement. HON 101 or 102 (whichever is not used to replace ENG 101), HON 201, 202, 301, and 302 may be used towards completion of the college requirements in humanities and social sciences. Other honors work, including the senior thesis (HON 498-499), may be used to replace portions of the curriculum as specified by the chairperson of the student's engineering department. The area of honors work will show on the student's transcript.

## Transfer Credit

All students who transfer to the College of Engineering from another institution must earn a minimum of 30 hours of "Orono" courses to qualify for the B.S. degree. Degree credit will normally be allowed for courses in which grades of "C" or above have been received. Evaluation of such courses for approval of degree credit and possible equivalency rests with the Dean of the College of Engineering. Credits from military

service schools do not transfer. Normally credits from associate degree programs may be used for elective credits only. Associate Degree level mathematics and science courses do not fulfill the requirements for the B.S. program.

CLEP credit will be granted only for the appropriate subject exams. No credit is given for the CLEP general examinations.

## Double Major

Double majors are permitted between most disciplines in the College of Engineering. The requirements for meeting the double major state that a student must meet all requirements of two separate and distinct disciplines. Students also may obtain a double major or double degrees across colleges by satisfying the requirements for both colleges and majors. Students intending to become candidates for double majors or degrees across colleges must declare their intent to the deans of both colleges no later than the beginning of their junior year.

## Away Status

Students wishing to register for "Away" status must be in good academic standing and must obtain prior approval from their academic advisor and dean. Course equivalencies should be determined prior to registration.

Before students of the College of Engineering pursue Summer Session courses in any institution (including UM), they must be in good academic standing and secure the approval of the dean and the chairperson of the student's major

department if they expect degree credit for such work.

## Repeating a Course

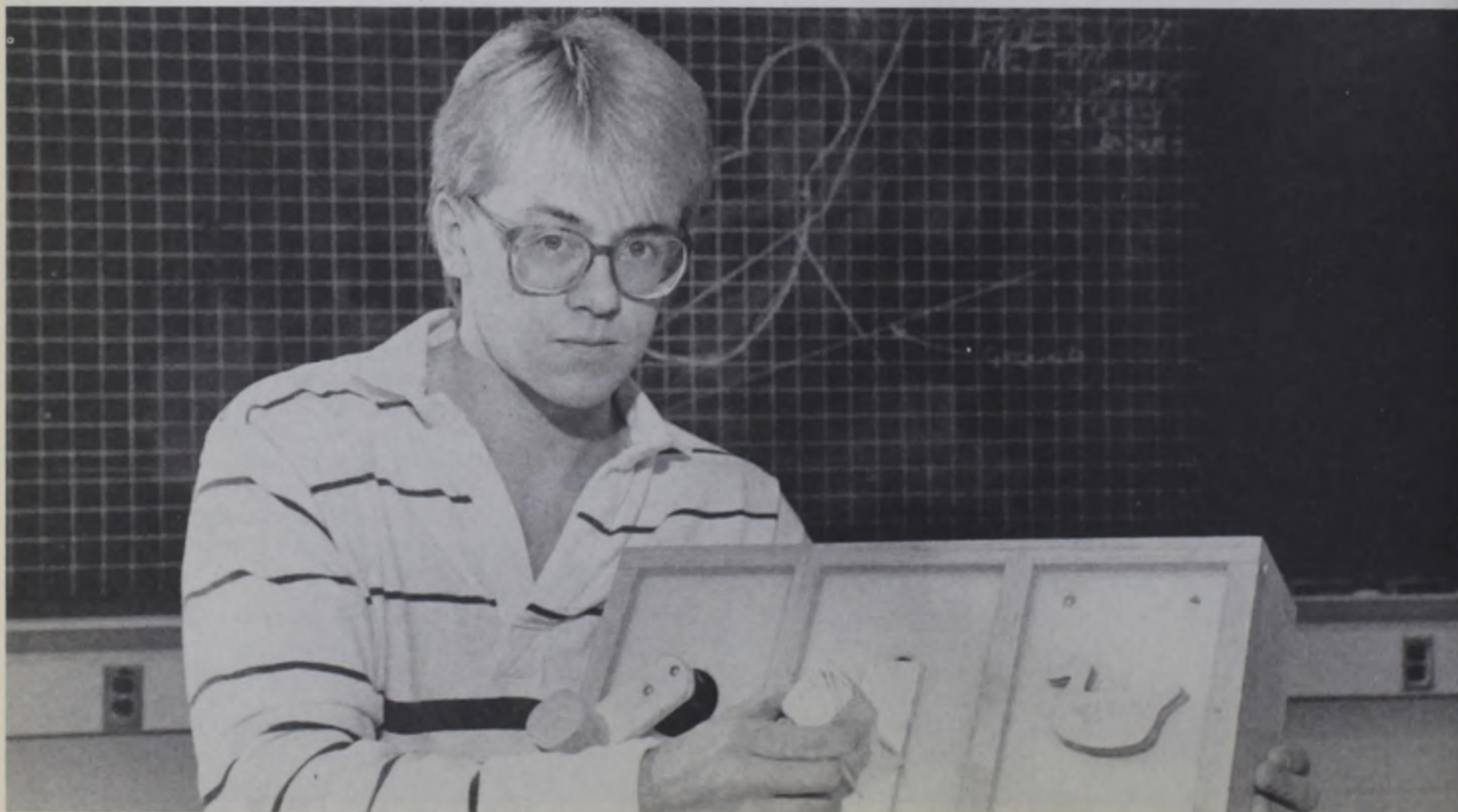
When a course is repeated, both grades continue to be used to determine the accumulative point-hour ratio until the student applies for and completes a repeated course form available in the office of the dean. A course may not be repeated after an advanced course in the same field has been passed if the course that the student desires to repeat was a prerequisite for the advanced course.

## Pass/Fail

Students enrolled in the College of Engineering may not take courses that are to be used to fulfill the degree requirements on a Pass/Fail basis.

## Departments of Instruction

Courses numbered 100-299 are undergraduate courses. Courses numbered 300-499 are upper-class undergraduate courses. Courses numbered 500-599 are graduate courses which may be elected by undergraduate honor students, or those undergraduates whose advancements in the field will permit their taking a graduate level course among graduate students without disadvantage to themselves. Courses numbered 600-699 are graduate level courses which may be taken only by students admitted to the Graduate School.





## Aerospace Studies

Professor of Aerospace Studies Lt. Col. Jerome P. Palanuk  
 Assistant Professors Captain Williams, Captain Schneider  
 JCOIC Master Sergeant Gagnon  
 Information Management NCO Staff Sergeant Bazile

### Purpose

The Air Force Officer Training Corps (ROTC) is an educational program designed to provide you the opportunity to become an Air Force commissioned officer while completing requirements for an undergraduate or graduate degree. A Four- or Two-Year Program is available.

### Four-Year Program

The more popular and preferred program is the traditional Four-Year Program. You may enroll in Aerospace Studies courses in the same manner as for other college courses. There is no military obligation for the first two years of Air Force ROTC unless you have an Air Force ROTC scholarship. After completing the first two years, known as the General Military Course (GMC), you may compete for the Professional Officer Course (POC) during the last two academic years remaining in college (undergraduate, graduate, or any combination). If accepted, you will attend a four-week summer Field Training between your sophomore and junior years before entering the POC. Cadets in the POC receive a nontaxable subsistence allowance of \$100 each academic month.

### Two-Year Program

The Air Force ROTC Two-Year Program is primarily available to junior college transfers, to veterans, or to colleges and universities that do not offer Air Force ROTC. It's also for those who did not take the first two years of Air Force ROTC. To be eligible, you must have at least two academic years remaining either at the undergraduate level or graduate level or a combination of the two. If accepted, you'll attend a six-week summer Field Training encampment before entering POC.

### Military Obligation

You have no military obligation while enrolled in the first year student and sophomore courses of Air Force ROTC. Only when you enter the Professional Officer Course will you incur an active duty obligation. After being commissioned a second lieutenant, nonflying officers will serve four years of active duty, while pilots serve ten years and navigators six years after completing the training.

### Air Force ROTC College Scholarships

Air Force college scholarships for 2 to 4 years worth around \$10,000-\$40,000 are available on a competitive basis to you in the following career or academic areas: Selected engineering and science majors (majority in engineering); Selected nontechnical academic majors (very limited - 2 to 4 years); Navigator or missile launch officer with any major (last 3, 2 1/2, or 2 years of a bachelor's degree); Prehealth profession (physician/osteopath only)(last 2 or 3 years of a bachelor's degree); Nursing (last 2 or 3 years of a bachelor's degree in nursing). Application inquiries and submissions are made to the professor of aerospace studies at the Air Force ROTC detachment during your first or sophomore year of college. Selections are based on scores achieved on the Air Force Officer Qualifying Test, overall grade-point average and the rating from an interview.

The majority of scholarships pay full college tuition and most laboratory, textbook and incidental fees, plus a \$100 monthly nontaxable allowance during the school year.

### 326th Air Force ROTC Cadet Group

In order to present a situation for encouraging leadership and Air Force experiences, the cadets of the Air Force ROTC program are organized into a Cadet Group composed of a Cadet Group Commander, the Commander's staff, two squadrons, and four flights. Cadets are issued uniforms and accessories (at no cost) which are worn on certain days and to Leadership Laboratory.

### Leadership Laboratory

This course is taken every year. You will spend one class period each week putting into practice the leadership skills and management theory acquired in class. Leadership Laboratory is a cadet-centered program that will improve your ability to perform as an Air Force officer. You also will take orientation flights, listen to military speakers, take field trips to military bases, view films and take part in social functions.

### Other Activities

As a cadet in the 326th Air Force ROTC Group, you will have the opportunity to participate in

a number of other activities. These include: Arnold Air Society, the AFROTC Drill Team, air refueling missions on Maine Air National Guard KC-135s, and the Advanced Training Program (AER 435).

### Field Training

Before entering the POC, you will attend Field Training - a four-week summer camp for a four-year cadet and a six-week camp for a two-year cadet. Training is conducted at Air Force bases throughout the country and includes jet trainer flights, survival, small arms marksmanship, career orientation, and leadership training. You will receive pay and allowances authorized at the time of attendance.

### Flight Screening Program

Air Force ROTC pilot candidates who do not possess a civilian or military pilot rating must successfully complete an Air Force ROTC sponsored course of flight screening to remain eligible for Undergraduate Pilot Training after commissioning. Flight screening includes both ground and flight training. The ground training is taught by Air Force personnel and includes topics such as basic aerodynamics, aircraft systems, and emergency procedures. The flight screening syllabus consists of 14 flying hours, including 1 solo flight.

### Professional Officer Course Qualifications

- Be a United States citizen.
- Be a full-time student.
- Be 18 years of age or 17 years with parent or legal guardian consent.
- Be physically qualified.
- Be of good moral character.
- Be in good academic standing.
- Successfully pass the Air Force Officer Qualifying Test.
- Have two academic years remaining.
- Be interviewed and selected by a board of AF officers.
- Complete a 6-week Field Training course if 2-year cadet or a 4-week course if a 4-year cadet.
- Complete all commissioning requirements as follows: pilot/navigator candidate—before age 26 1/2; scholarship recipient—before age 25 as of June 30 in eligible year of commis-



sioning; nonscholarship recipient—before age 30.

### General Military Course

The General Military Course (GMC) consists of the first year student and sophomore level courses. The first year of this course may be waived if you have completed the three-year high school junior ROTC program (of any service). Students with prior active or reserve military service also may receive waivers for this portion. In addition to the classroom courses, Leadership Laboratory, AER 125, must be taken each semester by all students in the GMC. You may enroll in any of the GMC courses regardless of whether you plan to pursue a commission as an Air Force officer.

### The Professional Officer Course

The Professional Officer Course (POC) consists of the junior- and senior-level courses designed to complete the professional military education of competitively-selected students preparing for commissioning and entry in the U.S. Air Force upon graduation. In addition to the classroom courses (AER 311/312 and AER 411/412) normally taken sequentially, Leadership Laboratory, AER 325, must be taken by all students in the POC.

### Courses in Aerospace Studies

#### AER 111 Introduction to the Air Force I

Examines the missions, organization and operational concepts of the United States Air Force in relation to the role of U.S. strategic and defensive forces. Covers the concept of officership, the factors which comprise national power, and the basic Air Force organizational structure and doctrine. Includes study of several major air commands. **Cr 1.**

#### AER 112 Introduction to the Air Force II

A continuation of AER 111. Covers the functions of strategic offensive and defensive forces, general purpose forces, and all related aerospace support forces. Reviews the missions and operations of the Army, Navy, Marine Corps and Coast Guard. Examines factors of U.S. security and compares U.S. Forces with those of potential adversaries. Emphasizes improvements in communications skills. **Cr 1.**

#### AER 125 Leadership Laboratory (GMC)

Mandatory for all cadets enrolled in AER 111/112, 211/212 and members of the 326th Air Force ROTC Group. Meets one hour weekly. (Pass/Fail Grade Only). **Cr 0.**

#### AER 211 History Of Military Aviation Through World War II

A survey of military aviation in the United States from its earliest days through World War II. Examines the evolution of technology, strategy and tactics. Covers the philosophy and nature of war, especially as it relates to present day national security and strategic thinking. **Cr 1.**

#### AER 212 History Of Air Power Into The Space Age

A continuation of AER 211. A study of the development of air power from World War II to the present. Particular emphasis on the creation of the United States Air Force as a separate service and interservice relationships. Examines the Berlin Airlift, the Korean War, the Vietnam Conflict and recent developments in technology and space and strategic thinking. **Cr 1.**

#### AER 298 Selected Studies in Aerospace Studies

Topics in Air Force history, organization, doctrine, professionalism, mission, technology, management, and philosophy not covered in other courses. Content varies. May be repeated for credit, with departmental permission, for a maximum of 3 credit hours (only one credit hour may be used for Humanities credit in the College of Engineering. Prerequisite: permission. **Cr 1-3.**

#### AER 311 Introduction to Leadership

Study of basic leadership theories and styles. Considers motivational and behavioral processes with emphasis on individual and group dynamics. Management functions and responsibilities with emphasis on the relationship between leadership and management. Covers written and spoken communications systems and basic speaking skills. Prerequisite: AER 335 or AER 345 or permission. **Cr 3.**

#### AER 312 Air Force Management

A study of management and leadership roles in the Air Force including decision-making in a dynamic environment, analysis and discussion of the functions of management. Examines military and civilian performance appraisal systems, power and politics as they relate to the military manager, organizational and personal value conflicts, the importance of ethics in leadership and management. Prerequisite: AER 335 or AER 345 or permission. **Cr 3.**

#### AER 325 Leadership Laboratory (POC)

Mandatory for all students enrolled in the POC and the 326th Air Force ROTC Group. Meets one hour weekly. (Pass/Fail Grade Only). **Cr 0.**

#### AER 335 Field Training (4-Week Course) (Lab)

Summer field training encampment of four-weeks duration at selected Air Force bases located throughout the United States. Examines the mission, organization, and functions of an Air Force base. Includes marksmanship, survival, physical training, aircraft orientation, career briefings. Prerequisite: AER 212 and selection for POC entry. **Cr 0.**

#### AER 345 Field Training (6-Week Course) (Lab)

Summer field training encampment designed for students in the two-year program who have not participated in the GMC as first-year students and sophomores. In addition to work covered in AER 335, includes two weeks of course work covering AER 111/112 and AER 211/212. Prerequisite: Selection for POC entry. **Cr 0.**

#### AER 411 National Security Policy Issues

A study of the U.S. civil-military relations and the formulation and implementation of defense policy, including political, social and economic constraints, DOD planning, budgeting and management, the mechanics of national decision-making processes. Examines changes in the nature of conflict since WW II and problems associated with nuclear capabilities. Emphasizes international alliance building, international peace-keeping forces and conflict and arms control. Considers regional issues and their impact on American national security including Soviet Union, East Asia, the Middle East, Sub-Sahara-Africa and Latin America. Prerequisite: AER 335 or AER 345 or permission. **Cr 3.**

#### AER 412 The Professional Officer

Examines the role of the professional officer in a democratic society including socialization process and value orientation. Critical examination of concepts of military professionalism by MacArthur, Huntington, Janowitz, Moskos and others. Studies the moral and ethical standards of military professionalism in a changing world. the Uniform Code of Military Justice, courts-martial, and appellate and review procedures. Prerequisite: AER 335 or AER 345 or permission. **Cr 3.**

#### AER 435 Advanced Training Program (ATP)

A two-week summer training program for selected senior members of the POC conducted at various Air Force bases. Includes specialized motivational orientation in an Air force specialty area appropriate to the cadet's category for commissioning. **Cr 0.**



## Bio-Resource Engineering

Professor Riley (Chairperson)  
 Professors Smith, Rowe;  
 Associate Professors Christensen, Hedstrom, Huff, Soule;  
 Assistant Professor McBurnie

The bio-resource engineering curriculum combines study in engineering and mathematics, the biological sciences, and the physical sciences to provide a unique background for solving engineering problems associated with agriculture, aquaculture, food and fibre processing.

The basic curriculum is strengthened by elective options which permit students to specialize in one of three areas according to their interests and needs. Areas of concentration are: (1) agricultural engineering; (2) aquacultural engineering, and (3) food engineering. Electives in engineering and the life sciences aid in providing a broad base of knowledge for engineering practice.

With the rapidly expanding world population, a rising demand for higher standards of living, and with limited natural resources, bio-resource engineering graduates are in great demand. Employment opportunities are as diverse as the food and fibre industries themselves. Graduates in bio-resource engineering may be employed as design engineers by machinery and aquacultural systems manufacturers; as sales engineers by machinery, food, or chemical companies; as research engineers by industry, government, or state experiment stations; or in teaching or extension positions by universities. Some practice as consulting engineers. An increasing number of opportunities for foreign service are available.

The curriculum in bio-resource engineering is a joint responsibility of the College of Engineering and the College of Applied Sciences and Agriculture and is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

This degree requires satisfactory completion of at least 130 degree hours at an accumulative grade point average of not less than 2.0.

### Concentrations

#### Agricultural Engineering

PSE 140 Soil Science	3
MEE 380 Design I	3
BRE 466 Irrigation & Containment	3
with one of the following:	
BUA 220 The Legal Environment of Business	3
INT 110 Modern Economic Problem	3
and a minimum of 8 credits from the following list:	
PSE 100 Plant Science	4
PSE 101 Crop Systems	4

### Specimen Curriculum

First Year			
Fall Semester		Spring Semester	
BRE 220 Introduction to Bio-Resource Engineering	3	BRE 255 Materials in Bio-Resources Engineering	3
BIO 100 Basic Biology	4	BRE 257 Computer Applications in Bio-Resource Engineering	3
ASA 117 Issues & Opportunities	1	MAT 127 Analytic Geometry and Calculus II	4
MAT 126 Analytical Geometry and Calculus	4	PHY 121 Physics for Engineering and Physical Scientists I	4
CHY 113 Chemical Principles I	4	BRE 268 Computer Aided Drafting and Design	3
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>17</b>
Second Year			
Fall Semester		Spring Semester	
BRE 281 Surveying	1	BRE 282 Introduction to Bio-Resource Engineering Research	2
ENG 101 College Composition	3	MEE 230 Thermodynamics	3
MEE 150 Applied Mechanics: Statics	3	MEE 270 Applied Mechanics: Dynamics	3
MAT 228 Analytical Geometry and Calculus	4	MAT 259 Differential Equations	4
PHY 122 Physics for Engineers & Physical Scientists II	4	SPC 103 Fundamentals of Public Communications	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>
Third Year			
Fall Semester		Spring Semester	
MEE 360 Fluid Mechanics	3	MEE 251 Strength of Materials	3
BRE 465* Soil and Water Resources Engineering	3	ELE 215 Electrical Circuits	3
BRE 469* Process Engineering	3	BRE 491 Design Project I	1
ENG 317 Technical Writing	3	BRE 460* Power and Machinery	3
Electives	6	Electives	6
<b>TOTAL HOURS</b>	<b>18</b>	<b>TOTAL HOURS</b>	<b>16</b>
Fourth Year			
Fall Semester		Spring Semester	
BRE 492 Design Project II	2	BRE 493 Design Project II	1
BRE 480 Senior Seminar	1	BRE 463* Structures and Environmental Design	3
BRE 462* Power Transmission and Control	3	Electives	12
BRE 464* Instrumentation and Control Systems	3	<b>TOTAL HOURS</b>	<b>16</b>
Electives	8		
<b>TOTAL HOURS</b>	<b>17</b>		
<b>TOTAL REQUIREMENT FOR GRADUATION: 130 CREDIT HOURS</b>			
Electives: 12 Credit hours must be Humanities or Social Sciences courses. 20 Credit hours must be from Concentration recommendations - see text.			
* These courses are taught on an alternate year schedule so may be taken in either the 3rd or 4th years.			



MEE 381 Design II	3	CIE 458 Coastal Engineering	3	MEE 432 Heat Transfer	3
MEE 455 Advanced Strength of Materials	3	ZOL 472 Aquatic Food Webs	3	Students transferring to the University of Maine under the Regional Program from the Universities of Massachusetts, New Ham- shire, Rhode Island, or Vermont after the sophomore year should check the bulletins of those institutions for curricula for the first two years in Bio-Resource Engineering.	
BRE 452 Fluid Power and Robotics	3	ZOL 213 Introduction to Marine Science	3	<b>Graduate Work in Bio-Resource Engineering</b>	
MEE 435 Internal Combustion Engines	3	<b>Food Engineering</b>		The degrees of Master of Science (Bio-Resource Engineering) and Master of Engineering (Bio- Resource Engineering) are offered with options for specialization in soil and water engineering, farm structures, agricultural power and machinery, electric power and processing, and aquacultural systems.	
MEE 471 Mechanical Vibrations	3	CHE 350 Automatic Control	3	Several research assistantships are available each year. Incumbents devote half time to re- search work on approved projects of the Agri- cultural Experiment Station.	
<b>Aquacultural Engineering</b>		FOS 301 Introduction to Food Science	3		
AVA 211 Aquaculture	3	FOS 502 Food Processing I	4		
AVA 220 Topics in Marine Resources	2	FOS 503 Food Processing II	4		
OCE 370 Introduction to Oceanography	3	with one of the following:			
with one of the following:		BUA 220 The Legal Environment of Business	3		
BUA 220 The Legal Environment of Business	3	INT 110 Modern Economic Program and a minimum of 3 credits from the	3		
INT 110 Modern Economic Problem and a minimum of 9 credits from following list:	3	following list:			
BRE 466 Irrigation and Water Supply Design	3	ARE 365 Food & Fiber Marketing	3		
AVA 212 Maine Mariculture	3	MCB 300 General Microbiology	3		
AVA 409 Shell Fisheries Biology	3	MEE 231 Thermodynamics II	3		
		MEE 386 Refrigeration and Air Conditioning Systems Design	3		





## Chemical Engineering

### Including Pulp and Paper Technology

Professor Kraske (Chairperson)

Professors Ceckler, Chase (Emeritus), Genco (Calder Professor of Pulp and Paper Engineering and Science), Hassler, Kiran (Gottesman Research Professor of Chemical Engineering), Mummé (Undergraduate Coordinator), Pendse, Thompson (University of Maine Pulp and Paper Foundation Professor of Chemical Engineering)

Associate Professors Co, Hill, Hwalek, (University of Maine Pulp and Paper Foundation Faculty Fellow)

Assistant Professors Bousfield, Lisius

Adjunct Professor Robbins

Faculty Associate Marshall

Chemical engineers are primarily concerned with designing, operating and managing processing systems to alter and upgrade products and materials so that they are more useful for mankind, and to do so with the greatest possible economy and the least possible harm to the environment. The basic chemical engineering curriculum provides the educational breadth and depth necessary to prepare students to perform these important roles in society.

Student candidates for the B.S. degree in Chemical Engineering are prepared for satisfying and challenging careers involving design, operation, and improvement of chemical processes, materials, and products in the chemical and related industries. A chemical engineering education is an excellent component of training for a professional career that leads to management. The broad educational background prepares students for careers in other areas; chemical engineers are active in improving the environment, planning for utilization of resources, food production, health services, and systems analysis. Chemical engineering training provides a unique background for solving problems, especially those involving physical and/or chemical changes in materials.

The curriculum provides a broad background in the fundamentals of science and en-

gineering. Opportunities are afforded for application of these fundamentals to typical chemical engineering problems to illustrate how comprehensive problems are analyzed and solved. The curriculum also provides the student an opportunity to select a specialized area and develop skills needed to work more effectively in that area. A background in the humanities and social sciences is provided so that the graduate can understand our society and make decisions which contribute to its development and improvement.

The study of chemistry, physics, and mathematics which are the foundations of engineering, begins in the first year of the chemical engineering curriculum. Courses in organic and physical chemistry provide the extensive knowledge of chemistry required in the education of chemical engineers and in the practice of chemical engineering. Basic knowledge of electricity and mechanics is essential and is provided by courses in the appropriate departments. Applications-oriented chemical engineering courses begin during the first year so that students may gain an early understanding of the significance of their major field.

Students are assisted by faculty counselors in developing an elective program in the humanities and social sciences to satisfy their individual interests within the general college re-

quirements. In addition, the department requires that the humanities and social studies program contains one nine-hour course sequence in a single subject.

During the latter part of the student's academic training, the student must select an area of engineering within which he or she will receive more specialized technical education (technical electives option). The technical electives option requires a minimum of nine hours. A faculty counselor will assist each student in selecting an appropriate option and in scheduling specific courses to meet this requirement. Technical elective options have been defined in process control, polymer engineering, and pulp and paper engineering. Other special options may be approved upon petition to the department.

The four-year curriculum leads to the degree of Bachelor of Science in Chemical Engineering, which is fully accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. Although the curriculum provides excellent preparation for an effective professional career, superior students can elect to take additional courses; they are encouraged to do so during the latter stages of their academic training.

## Pulp and Paper Technology Program

Manufacture of pulp and paper products from wood and other fiber resources is one of the largest industries in the United States and the world. It depends in a major way upon chemical engineering for research, design, and man-

agement of a wide range of both organic and inorganic chemical processes in complex and integrated systems.

The Department of Chemical Engineering at the University of Maine pioneered the first pro-

gram to study pulp and paper engineering in the United States, and continues to provide instruction in the multidisciplinary application of engineering sciences to the varied and complex operations of this forest resources industry. The



## Specimen Curriculum for the Degree of Bachelor of Science in Chemical Engineering

First Year			
First Semester		Second Semester	
MAT 126 Analytic Geometry and Calculus	4	MAT 127 Analytic Geometry and Calculus	4
CHY 113 Chemical Principles I	4	CHY 114 Chemical Principles II	4
PHY 121 Physics for Engineers and Physical Scientists I	4	PHY 122 Physics for Engineers and Physical Scientists II	4
CHE 111 Introduction to Chemical Engineering	2	CHE 112 Introduction to Chemical Engineering II	2
Humanities/Social Sciences Elective*	3	Humanities/Social Sciences Elective*	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>17</b>

Sophomore Year			
First Semester		Second Semester	
MAT 228 Analytic Geometry and Calculus	4	MAT 258 Introduction to Differential Equations and Linear Algebra	4
CHY 251 Organic Chemistry Lecture I	3	CHY 252 Organic Chemistry Lecture II	3
CHY 253 Organic Chemistry Laboratory I	2	ELE 215 Electric Circuit Fundamentals	3
CHE 200 Fundamentals of Chemical Engineering	4	CHE 385 Chemical Engineering Thermodynamics I	3
Humanities/Social Sciences Elective	3	MAT 332 Statistics for Engineers	3
<b>TOTAL HOURS</b>	<b>16</b>	Humanities/Social Sciences Elective	3
		<b>TOTAL HOURS</b>	<b>19</b>

Junior Year			
First Semester		Second Semester	
CHY 371 Physical Chemistry I	4	CHY 372 Physical Chemistry II	4
CHE 360 Elements of Chemical Engineering I	4	CHE 362 Elements of Chemical Engineering II	4
CHE 352 Process Control	3	CHE 361 Chemical Engineering Laboratory I	2
CHE 386 Chemical Engineering Thermodynamics II	3	CHE 368 Chemical Engineering Kinetics	3
CHE 330 Engineering Materials	3	Technical Elective I	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>16</b>

Senior Year			
First Semester		Second Semester	
MEE 252 Statics and Strength of Materials	3	CHE 479 Process Design Projects	4
CHE 477 Elements of Chemical Process Design	3	CHE 493 Chemical Engineering Seminar	1
CHE 493 Chemical Engineering Seminar	0	Technical Elective III	3
CHE 363 Chemical Engineering Laboratory II	2	Humanities/Social Sciences Elective	3
Technical Elective II	3	Humanities/Social Sciences Elective	3
Humanities/Social Sciences Elective	3	<b>TOTAL HOURS</b>	<b>14</b>
<b>TOTAL HOURS</b>	<b>14</b>		

TOTAL DEGREE HOURS: 130

\*One must be ENG 101 or equivalent.

modern and extensive paper industry of this state provides an exceptional opportunity for cooperative interaction of university-based programs with real life problems of industrial operations and development.

Students with a special interest in this industry, and whose commitment to the full curriculum for the B.S. degree in Chemical Engineering is subordinate to other goals, can elect a four-year educational program leading to the degree of Bachelor of Science in Pulp and Paper Technology. This curriculum is process-engineering oriented. Specialized courses designed for work specifically in this industry are substituted for some of the science and engineering courses that are required in chemical engineering.

### Advanced Study in Pulp and Paper Management

Students with a B.S. degree can program a fifth-year extension of their undergraduate curriculum to fulfill requirements for a *Certificate of Advanced Study in Pulp and Paper Management*. One half of the fifth year covers basic fiber science and the engineering technology of pulp and paper production. The other half can be an elective sequence to develop special interests in process engineering, systems engineering, environmental engineering, applied computer sciences, polymer science, process control, plant design, operations economics, engineering management, business administration, and others.

Students at the University of Maine who are enrolled in a B.S. degree program can undertake an integrated program where the requirements of the fourth year of their basic curriculum and the additional courses of the five-year option are distributed to reinforce each other over the last two years of a five-year program. The B.S. degree and the certificate are awarded concurrently at the end of the fifth year.

Requirements for a *Certificate of Advanced Study in Pulp and Paper Management* include the successful completion of a minimum of 30 credit hours beyond the B.S. degree requirements. These hours must include the courses PPA 365, PPA 366, PPA 473, PPA 474, PPA 695 and PPA 696 unless written permission is obtained from the faculty advisor. PPA 499 may be substituted for PPA 473 or PPA 474 but not for both. The remaining credits are to be taken in courses that constitute a minor field and are usually taken from the College of Art and Humanities, the College of Business Administration, the College of Engineering, the College of Sciences, the College of Social and Behavioral Sciences and the College of Forest Resources. They are selected to enhance the career preparation of the student. A variety of elective courses programs can be developed to meet individual needs of the student in consultation with and with approval of the faculty advisors so that requirements for a *Certificate of Advanced Study in*



*Pulp and Paper Management* can be completed within one academic year beyond the B.S. degree.

The certificate program may be taken concurrently with some M.S. programs with consent of the academic organizations involved. However the certificate program is a fifth-year extension of studies at the undergraduate level in those courses which are required, and courses taken for this certificate will not satisfy degree requirements for an M.S. program unless prior permission by the student's graduate advisory committee has been obtained.

### Cooperative "Work-Experience" Program Option in Chemical Engineering

Students with satisfactory academic standing at the conclusion of their fourth semester in the B.S. curriculum of chemical engineering or pulp and paper technology may petition for and accept opportunities provided by cooperating companies to undertake the special "Co-op" program. This involves work as a chemical engineering intern for two periods of supervised and paid professional experience. These periods alternate with two regular terms of study over a continuous 15-month period, which normally begins in June of the sophomore year and ends in September immediately before the fall semester of the senior year. While college credit is granted for this program, the credits cannot be used as substitutes for courses required in the curriculum for the B.S. degree. These credits are in addition to the minimum required for the B.S. degree. Students in the "Co-op" program can complete their study program to graduate with a B.S. degree at the same time as do other members of their class. Students should consult with the chairperson or faculty advisors of the Department of Chemical Engineering for additional details.

"Co-op" program positions are awarded on a competitive basis, with collective consent of the faculty, the selected student, and the industrial "Co-op" employer. Students who complete the requirements of the "Co-op" program are awarded a Certificate of Chemical Engineering Internship together with their B.S. degree.

### Graduate Work in Chemical Engineering

The Department offers M.S. and Ph.D. degree programs. Students with a B.S. in chemical engineering are required to complete 30 semester hours of graduate work, including a thesis, two seminars, and six courses to receive an M.S. in chemical engineering. The Ph.D. degree requires a minimum of 90 semester hours of graduate work beyond the B.S. in Chemical Engineering or a minimum of 60 semester hours of graduate work beyond an M.S. in chemical engineering; these requirements are accounted for

## Specimen Curriculum for the Bachelor of Science in Pulp and Paper Technology

First Year			
First Semester		Second Semester	
MAT 126 Analytic Geometry and Calculus	4	MAT 127 Analytic Geometry and Calculus	4
CHY 113 Chemical Principles I	4	CHY 114 Chemical Principles II	4
PHY 121 Physics for Engineers and Physical Scientists I	4	PHY 122 Physics for Engineers and Physical Sciences II	4
CHE 111 Introduction to Chemical Engineering	2	CHE 112 Introduction to Chemical Engineering II	2
Humanities/Social Sciences Elective (1)	3	Humanities/Social Sciences Elective (1)	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>17</b>
Sophomore Year			
First Semester		Second Semester	
MAT 228 Analytic Geometry and Calculus	4	MAT 258 Introduction to Differential Equations and Linear Algebra	4
CHE 200 Fundamentals of Chemical Engineering	4	MEE 231 Thermodynamics II (2)	3
MEE 230 Thermodynamics I (2)	3	ELE 215 Electric Circuit Fundamentals	3
CHY 251 Organic Chemistry Lecture I	3	CHY 252 Organic Chemistry Lecture II	3
CHY 253 Organic Chemistry Laboratory I	2	MAT 332 Statistics for Engineers	3
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>16</b>
Junior Year			
First Semester		Second Semester	
CHE 360 Elements of Chemical Engineering I	4	CHE 362 Elements of Chemical Engineering II	4
PPA 365 Pulp Technology	3	PPA 366 Paper Technology	3
CHY 371 Physical Chemistry I	4	CHY 455 The Chemistry of Cellulose and Wood (3)	3
BOT 203 The Plant Kingdom	4	WTY 416 Wood Anatomy	4
Humanities/Social Sciences Elective	3	Humanities/Social Sciences Elective	3
<b>TOTAL HOURS</b>	<b>18</b>	<b>TOTAL HOURS</b>	<b>17</b>
Senior Year			
First Semester		Second Semester	
CHE 477 Elements of Chemical Process Design	3	PPA 474 Paper Manufacture and Testing	4
PPA 473 Pulp Manufacture and Testing	4	MEE 251 Strength of Materials	3
CHE 330 Engineering Materials	3	Humanities/Social Sciences Elective	3
MEE 150 Applied Mechanics: Statics	3	Humanities/Social Sciences Elective	3
Humanities/Social Services Elective	3	Technical Elective	3
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>16</b>

**TOTAL DEGREE HOURS: 133**

1. One must be ENG 101 or equivalent.

2. CHE 385 and CHE 386 may be substituted for MEE 230 and MEE 231.

3. CHY 240 Quantitative Analysis may be substituted for CHY 455.



by a dissertation, four seminars, and six graduate courses. In addition to completing the course and research requirements, Ph.D. students are required to pass a qualifying examination and a research examination on their plan of dissertation.

Highly qualified and motivated graduates with a B.S. in a discipline other than chemical engineering may be admitted to the M.S. program. They are required to take selected undergraduate chemical engineering courses in addition to the required graduate work.

Details for the requirements for the degree of Master of Science in Chemical Engineering and Doctor of Philosophy in Chemical Engineering are given in the Bulletin of the Graduate School of the University of Maine, and can be obtained from the Graduate School or the Department of Chemical Engineering.

Fellowships and assistantships are available to graduate students.

## Courses in Chemical Engineering

### CHE 111 Introduction to Chemical Engineering

Introduces the fundamentals of chemical engineering studies, career development and professional practice. Includes emphasis on oral and written communication skills and career planning development. Admission: first-year students only. Rec 2. Cr 2.

### CHE 112 Introduction to Chemical Engineering II

Introduction to the application of computers to chemical engineering problems. Topics include computer programming, the use of packaged software for computations and graphics and general use of PC DOS. Rec 2. Cr 2.

### CHE 200 Fundamentals of Chemical Engineering

Applies the principles of material and energy balances to the solution of problems in chemical engineering operations and processes through quantitative correlation of basic concepts of chemistry, physics, and mathematics. Prerequisite: CHY 114 or permission. Lec 4. Cr 4.

### CHE 330 Engineering Materials

Studies relationships between structure of matter and functional properties of engineering materials. Applies principles of materials resistance and to material selection for design. Prerequisites: CHE 385. Corequisite: CHE 386 or permission. Lec 3. Cr 3.

### CHE 350 Elements and Applications of the Theory of Automatic Control

Introductory survey of the theory of automatic control systems. Operational techniques support laboratory practice in application of theory to some specific examples of industrial process control systems. Not available to Chemical En-

gineering majors. Prerequisite: MAT 259. Rec 2, Lab 2. Cr 3.

### 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. Prerequisites: MAT 258 or MAT 259 or permission. Rec 3. 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 the chemical engineering unit operations. Prerequisite: CHE 200. Rec 4. Cr 4.

### CHE 361 Chemical Engineering Laboratory I

Applies the principles of the unit operations and process control in the laboratory, using pilot scale equipment with emphasis on formal reports. Prerequisite: CHE 352, CHE 360. Lab 4. Cr 2.

### CHE 362 Elements of Chemical Engineering II

A continuation of CHE 360. Prerequisite: CHE 200, CHE 360. Rec 4. Cr 4.

### CHE 363 Chemical Engineering Laboratory II

Application of the principles of the unit operations and process control in the laboratory, using pilot scale equipment. Emphasis is placed upon formal reports. Prerequisites: CHE 352, CHE 362. Lab 4. Cr 2.

### CHE 368 Chemical Engineering Kinetics

A study of the rates and mechanisms of ordinary and catalyzed reactions with the purpose of providing the data for process design. Corequisite: CHY 372. Rec 3. 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. Prerequisite: CHE 200. Rec 3. 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. Prerequisite: CHE 385. Rec 3. Cr 3.

### CHE 431 Polymer Chemistry and Reactions

Synthesis and production of polymeric materials from monomers or by modification of natu-

ral polymers. Various polymerization reactions, their catalysis and their mechanisms and kinetics are considered as well as industrial systems used for polymerization. Prerequisite: CHY 252. Corequisite: CHY 372. Lec 3. Cr 3.

### CHE 432 Polymer Structure and Properties

Examines structure and properties of polymeric materials. Polymer structure and morphology, transitional phenomena, crystallinity, solution behavior, characterization, and basic rheology and properties related to chain structure are studied. Prerequisite: CHY 372. Corequisite: CHE 386 or permission. Lec 3. Cr 3.

### CHE 433 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 modelling of processes and the effects of processing on the products formed. Prerequisites: CHE 431, CHE 362, CHE 386, CHY 372 or permission. Lec 3. Cr 3.

### CHE 454 Introduction to Digital Computer Process Control

Considers real-time process programming concepts, the z transformation and design of digital controllers using Nyquist and Root Locus methods. Includes laboratory control project. Prerequisites: CHE 352. Lec 3. Cr 3.

### CHE 456 Advanced Process Control I

Examination of dynamic systems in state variable form including state variable models, interaction and decoupling, controllability and observability, multivariable systems. Prerequisite: CHE 352 or permission. Lec 3. Cr 3.

### CHE 458 Advanced Process Control II

Principles and methods of parameter estimation, system identification, and search techniques. Considers advanced process controller and control law design and stochastic systems. Includes applications and examination of current literature. Prerequisites (or concurrent registration): CHE 454, CHE 456 or permission. Lec 3. 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. Prerequisite: Senior standing. Rec 3. 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. Prerequisite: CHE 477. Rec 1, Lab 3. Cr 4.

**CHE 493 Chemical Engineering Seminar**  
Discussion of recent developments in chemical engineering and related fields. Prerequisite: senior chemical engineering standing. Cr 0-1.

**CHE 494 Chemical Engineering Practice**  
A cooperative work experience in some commercial operation of the chemical process industry. May be repeated for credit to a maximum of 8 credit hours. Prerequisite: permission. Pass/Fail Grade Only). Cr Ar.

**CHE 497 Independent Study**  
Individual and independent study of a specialized topic under staff supervision. Maximum of 8 accumulated credit hours. Prerequisite: permission. Cr Ar.

**CHE 498 Special Topics in Chemical Engineering**  
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. Prerequisite: permission. Cr 3.

**CHE 499 Undergraduate Thesis**  
Original investigation of a chemical engineering problem, and reporting of the results. Maximum of 3-6 accumulated credit hours. 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. Cr 3.

**CHE 520 Colloid Technology**  
Study and application of chemical and physical factors underlying interfacial phenomena. Includes thermodynamics of absorption, surface tension, capillarity, wetting and spreading, electrical properties of interfaces, electrokinetics, surfactant, aerosols, emulsions, foams. Cr 3.

**CHE 521 Intermediate 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. Cr 3.

**CHE 522 Chemical Engineering Plant Design**  
Advanced study in plant design. Students work on an individual basis. Cr 3.

**CHE 523 Economic Balance**  
This problem course emphasizes quantitative evaluation of various factors in design and control of chemical plant equipment to achieve cost effective operation. Cr 3.

**CHE 530 Introduction to Polymer Science**  
Introduces research techniques for synthesis and modification of organic and inorganic mac-

romolecules and analytical methods for relating molecular and phase structure with solubility, transport and interfacial properties. Cr 3.

**CHE 531 Advanced Chemical Engineering Kinetics**  
Examines theory of homophase and heterophase catalysis and chemical transformation as a base for process design. Includes chain reactions, acidbase catalysis, enzymes, and commercial case studies such as hydrocarbon synthesis, organic oxidations, cracking, and platforming. Cr 3.

**CHE 542 Advanced Process Dynamics and Control**  
Analysis and design of digital, computer-based process control systems, using Z-transform theory and state variable methods includes process identification methods. Dynamics and stability of closed loop systems. Cr 3.

**CHE 552 Special Problems in Computer Programming and Systems**  
Includes an application to real process using interrupts and direct digital control in a real-time environment. Experimental optimization and search techniques, principles, applications of various system identification techniques. Cr 3.

**CHE 553 Special Problems in Computer Programming and Systems II**  
A continuation of CHE 552 including analysis Digital, analog, and hybrid computers for process control. Cr 3.

**CHE 560 Heat Transfer**  
Applies theories of transfer of mass, momentum, and heat from phase boundaries to flowing fluids to the design and prediction of the performance of heat transfer devices under both steady-state and transient conditions. Cr 3.

**CHE 562 Mass Transfer**  
Applies engineering science and mathematical techniques to comprehensive problems of mass transfer in chemical engineering operations. Covers non-isothermal and unsteady-state systems and development of physical models of mass transfer processes. Cr 3.

**CHE 570 Chemical Engineering of Pulp and Paper Manufacture**  
Advanced study of important operation in the manufacture of pulp and paper including flow of fluids, heat transfer, absorption, evaporation, drying. 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. Cr 3.

**CHE 594 Chemical Engineering Practice**  
Individual or group investigation of the operation of commercial processes or practices in industrial situations. Cr Ar.

**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. Prerequisite: permission. Cr Ar.

## Courses in Pulp and Paper Technology

**PPA 264 Survey of the Paper Industry**  
Introductory overview of the structure and technology of the U.S. 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. Suitable for non-technical students. Rec 3. Cr 3.

**PPA 365 Pulp Technology**  
The chemical and engineering principles of manufacturing various wood pulps. Prerequisite: Junior standing, CHE 200, or permission. Rec 3. Cr 3.

**PPA 366 Paper Technology**  
The chemical and engineering principles of paper manufacturing from the preparation of fiber furnishes to the final stage of drying. Prerequisite: CHE 200 or permission. Rec 3. 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. Prerequisite: PPA 365 (may be taken concurrently). Lab 8. Cr 4.

**PPA 474 Paper Manufacture and Testing**  
A problem-oriented laboratory course involving the process design of paper making and finishing systems. Prerequisite: PPA 366 (may be taken concurrently). Lab 8. Cr 4.

**PPA 475 Mathematical Modeling of Pulp and Paper Systems**  
Introduces computer modeling in the analysis and design of the equipment and processes involved in the manufacture of pulp and paper. Prerequisite: MAT 259 or equivalent. Rec 3. Cr 3.

**PPA 499 Undergraduate Thesis**  
Original investigation of a pulp and paper problem and reporting of the results. Prerequisite: permission. Cr Ar.

**PPA 573 Design Practices in the Pulp and Paper Industry I**  
Problem-oriented laboratory course on analysis and design of products and processes related to manufacture of pulp, paper, and chemical by-products. Emphasis on extraction of pulp or other chemicals from wood. Prerequisites: (may be taken concurrently) PPA 365, PPA 366. Rec 1, Lab 5. Cr 3.



### PPA 574 Design Practices in the Pulp and Paper Industry II

Problem-oriented laboratory course on analysis and design of products and processes related to manufacture of pulp, paper, and chemical by-products. Emphasis on conversion of pulp and other silvichemical intermediates into useful consumer products. Prerequisites: (may be taken concurrently) PPA 365, PPA 366. Rec 1. Cr 3.

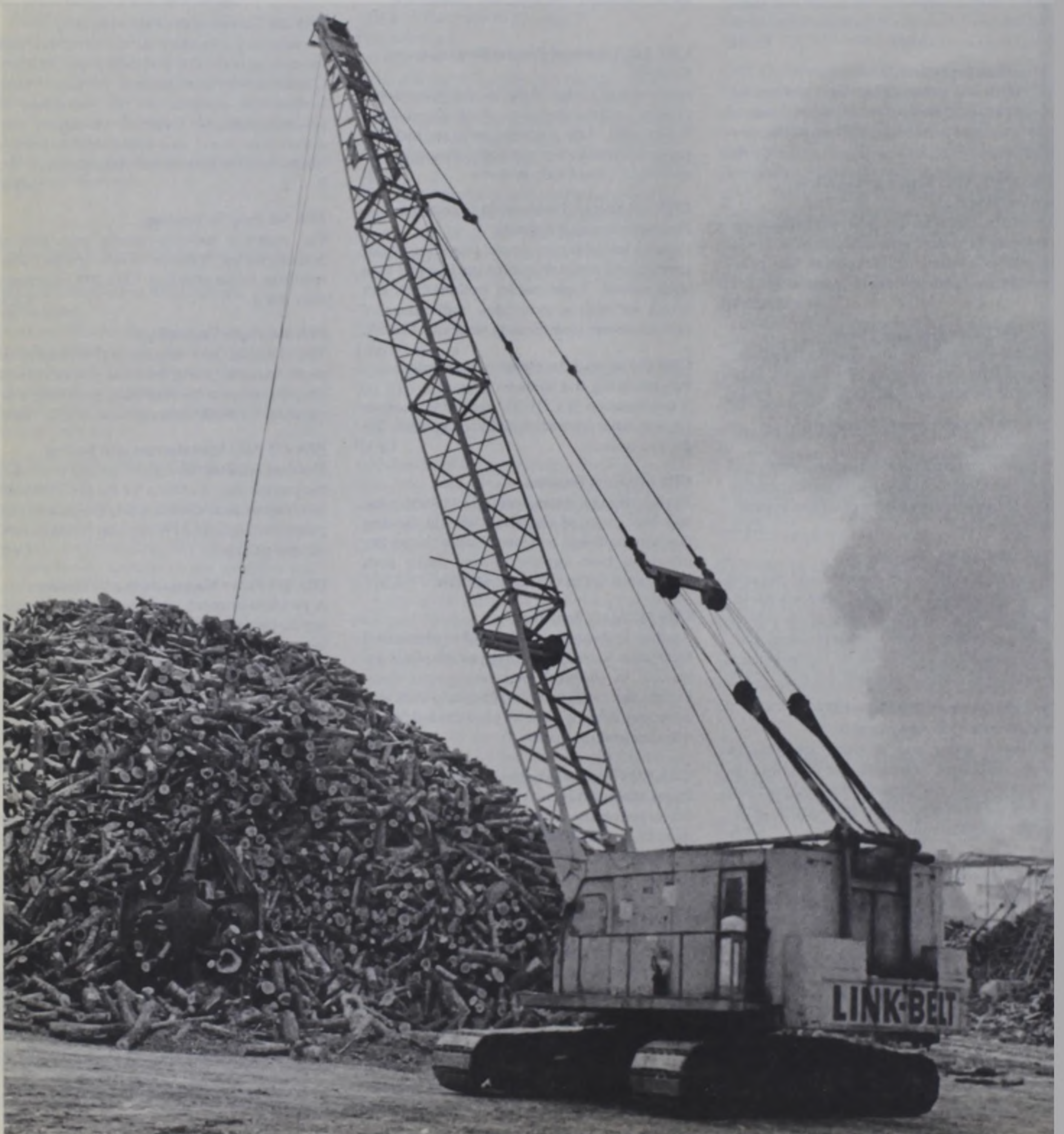
### Interdisciplinary Courses

**INT 233 (CHE) Introduction to Engineering**  
Lectures on computer programming (FORTRAN), pulp and paper processes, and an engineering problem of current topical interest such as energy or ecology. Typical group laboratory projects include ecology and environment, pulp and paper processes, analytical instru-

mentation, energy, materials science, and computer programming and applications. Cr 1.

### INT 398 (CHE, CHY, ELE) Undergraduate Research Participation

Research topics chosen by students in consultation with faculty members in the College of Engineering. Students submit a final report describing their research and present an oral seminar. Cr 1.





## Civil Engineering

Professor Alexander (Chairperson)  
 Professors Brutsaert, Elgaaly, Greenwood, Nightingale, Pearce  
 Associate Professors Rock, Sandford  
 Assistant Professors Dagher, Humphrey, Katz, Panchang, Spirakos  
 Faculty Associates Hamilton, Wardwell, Woodard

### Undergraduate Programs

The Civil Engineering Department offers a four-year undergraduate program leading to the bachelor of science degree in civil engineering.

Civil engineers are primarily responsible for planning, designing, and constructing facilities to serve society. They design and construct highways and railroads, bridges and tunnels, airports and harbors, hydroelectric dams and power plants, irrigation and flood control projects, and the foundations and frames of buildings. Civil engineers also plan and design water purification plants, pollution control facilities, and other environmental protection projects.

A civil engineer may specialize in one or several of these areas and may further specialize in a particular function, such as design or management. Consequently, the curriculum provides a broad-based program stressing the fundamentals common to the many branches of civil engineering. This curriculum is designed to provide the student with a well-founded civil engineering education while allowing the student the option of selecting electives in one or more disciplines such as environmental, geotechnical, structures, transportation, water resources, construction, and coastal engineering. Course work also is provided in the humanities and social sciences to give the student a broader view of cultural, political, and economic aspects of society and their relationship to engineering.

The program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC-ABET).

### Graduate Programs

The Department of Civil Engineering offers programs of study and research leading to the Master of Science (thesis), Master of Engineering (non-thesis) and Doctor of Philosophy degrees in Civil Engineering. Students with a B.S. in Civil Engineering are required to complete 30 semester hours of graduate work. For the M.S. degree, the 30 credit hours include 24 course credits and six credits for the thesis. In the non-thesis program the student must complete 30 course credit hours. The Ph.D. requires additional course work and dissertation beyond the M.S.

The graduate program is designed to allow students to obtain specialized training that ex-

pands the knowledge gained at the undergraduate level. Specialized areas of study include:

Environmental and Water Resources Engineering  
 Geotechnical Engineering  
 Structural Engineering and Mechanics.

Descriptions of the programs and general requirements for advanced degrees are described in the Graduate School catalog. Teaching assistantships and research assistantships are available through the Department.

### Courses in Civil Engineering

#### CIE 110 Materials

A study of the structure, properties, and testing of engineering materials and their use in constructed facilities including metals, woods, concrete, bituminous mixtures, plastics, insulation, adhesives and corrosion of materials. The design process is introduced by problems involving material selection and the design concrete mixes and insulating systems taking into account economic, safety and aesthetic factors as well as technical considerations. Lec 3. Cr 3.

#### CIE 111 Materials Laboratory

Evaluation of material performance under applied loads for engineering applications. Physical properties of concrete, bituminous materials, metals and timber. Prerequisite: Concurrent with CIE 110. Lab 2. Cr 1.

#### 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 the horizontal and vertical alignment, drainage, and pavement structure and safety features for a section of roadway. Prerequisite: Civil Engineering majors or permission. Corequisite: SVE 111. Lec 3. Cr 3.

#### CIE 294 Civil Engineering Practice

Work experience in civil engineering. May be repeated for credit. Prerequisite: sophomore standing. Cr 1-3.

#### CIE 331 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. Prerequisite: CHY 111 or CHY 113. Lec 3. Cr 3.

#### CIE 340 Introduction to Structures

Includes the cyclic process of analysis and design, structure idealization and modeling, design methodologies and loads considerations, building codes and specifications, the analysis of determinate trusses, beams and frames. Introduction to indeterminate structures and the use of personal computers in structural computations. Prerequisite: MEE 251. Lec 3, Lab 3. Cr 4.

#### CIE 350 Hydraulics

Presents fundamental principles of fluid flow and their applications to engineering problems. Includes study of hydrostatics, liquid measuring devices, and channel and pipe flow. Prerequisite: MEE 150. Lec 3. Cr 3.

#### CIE 351 Hydraulics Laboratory

Application of hydraulic principles in laboratory experiments. Includes experiments on buoyancy and flotation, venturi meter calibration, pipe friction, forces on submerged planes and others. Prerequisite: CIE 350 or concurrent. Lab 2. Cr 1.

#### CIE 365 Soil Mechanics

An introduction to fundamental physical properties, engineering behavior and performance of soils and rocks. Prerequisite: MEE 251, COS 215. Lec 3. 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. Corequisite: CIE 365, ENG 317. Lab 2. Cr 1.

#### CIE 411 Engineering Project Management

CPM, PERT and basic principles of management are presented within the overall framework of project design including planning, scheduling and control of engineering work. Prerequisite: senior standing or permission. Lec 3. Cr 3.

#### CIE 412 Engineering Decisions

Applies various analysis methods to engineering design decisions. Examines economic, financial, legal, and ethical factors effecting engineering design. Topics include: engineering economy, consideration of risk and uncertainty, and evaluation of ambiguous and intangible factors in engineering design. Senior standing or permission. Lec 3. Cr 3.



**CIE 426 Advanced Roadway Design**

Examines design of roadway pavement structures with wearing surfaces ranging from surface treatments through heavy duty bituminous and concrete pavements, design of roadway drainage needs and earth movement schemes, geometric design of at-grade intersections, pavement management systems. Prerequisite: CIE 225. Lec 3. Cr 3.

**CIE 432 Water Supply Engineering Design**

Theory and design of water supply, treatment facilities, and distribution systems. Design projects cover design and economics of pipeline, pumping station, and distribution systems. Includes computer software applications in all areas. Prerequisite: CIE 331, CIE 350. Lec 3. Cr 3.

**CIE 433 Environmental Engineering Chemistry**

Fundamental aspects of chemistry emphasizing environmental engineering applications includes laboratory methods for the analysis of water and wastewater. Prerequisite: CIE 331. Lec 2, Lab 3. Cr 3.

**CIE 434 Wastewater Engineering Design**

Theory and design of wastewater collection, treatment, and disposal. Design project covers development of a facility plan, sewer design, process design, and sludge disposal. Prerequisite: CIE 331, CIE 350. Lec 3. Cr 3.

**CIE 440 Structural Analysis I**

Classical and matrix methods in the analysis of linear redundant systems. Emphasis on the basic concepts of equilibrium, stress-strain relations, and compatibility. Manual and introductory computer aided solution techniques are utilized. Prerequisite: CIE 340. Lec 3, Lab 3. Cr 4.

**CIE 442 Reinforced Concrete Design**

The behavior design and detailing of reinforced concrete structures: beams, columns, beam-columns, slabs, footings, retaining walls. Micro-computer aided design. Prerequisite: CIE 340. Lec 3, Lab 3. 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 and computer aided design. Prerequisite: CIE 340. Lec 3, Lab 3. Cr 4.

**CIE 444 Design of Wood Structures**

Covers mechanical properties and design stresses, vertical and lateral load transfer in wood buildings, structural glulam, trusses, plywood and other structural panels, plywood lumber beams, horizontal diaphragms, shear walls, connections and connection hardware, curved beams, arches and domes, wood bridges. Includes design of beams, column, and beam-columns both solid and laminated. Microcomputer-aided design project. Prerequisite: CIE 340 or WTY 425. Lec 3. Cr 3.

**CIE 445 Building Design**

The conceptual, preliminary and final design of a building project, with consideration of

**Civil Engineering Curriculum**

First Year			
First Semester		Second Semester	
CIE 110 Materials	4	ENG 101 College Composition	3
CIE 111 Materials Laboratory	1	GEE 101 Introduction to Engineering Design	3
MAT 126 Analytic Geometry and Calculus	4	MAT 127 Analytic Geometry and Calculus	4
CHY 111 General Chemistry I Humanities/Social Sciences Elective (1)	4	PHY 121 Physics for Engineers and Physical Scientists I	4
	3	COS 215 Introduction to Computing Using FORTRAN	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>17</b>
Sophomore Year			
First Semester		Second Semester	
CIE 225 Transportation Engineering	3	MEE 251 Strength of Materials	3
MEE 150 Applied Mechanics: Statics	3	MAT 258 Introduction to Differential Equations and Linear Algebra	4
SVE 111 Plane Surveying	4	Basic Sciences Elective (2)	4
MAT 228 Analytic Geometry and Calculus	4	Engineering Science Elective (3)	3
PHY 122 Physics for Engineers and Physical Scientists II	4	Humanities/Social Sciences Elective	3
<b>TOTAL HOURS</b>	<b>18</b>	<b>TOTAL HOURS</b>	<b>17</b>
Junior Year			
First Semester		Second Semester	
CIE 331 Fundamentals of Environmental Engineering	3	CIE 365 Soil Mechanics	3
CIE 340 Introduction to Structures	4	CIE 366 Soil Mechanics Laboratory	1
CIE 350 Hydraulics	3	ENG 317 Advanced Professional Exposition	3
CIE 351 Hydraulics Laboratory	1	Civil Engineering Elective (4)	3
MAT 332 Statistics for Engineers Humanities/Social Sciences Elective	3	Civil Engineering Elective	3
	3	Humanities/Social Science Elective	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>16</b>
Senior Year			
First Semester		Second Semester	
Civil Engineering Elective	3	CIE 411 Engineering Project Management	3
Civil Engineering Elective	3	CIE 412 Engineering Decisions	3
Civil Engineering Elective	3	Technical Elective(6)	3
Engineering Science Elective	3	Technical Elective	3
Humanities/Social Sciences Elective	3	Humanities/Social Sciences Elective	3
Free Elective(5)	3		
<b>TOTAL HOURS</b>	<b>18</b>	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL CREDIT HOURS: 133</b>			

Elective courses are used to meet part of the EAC-ABET accreditation requirements for basic science, engineering science, engineering design, and humanities/social sciences as listed in the general college requirements, above. Students are assisted by faculty advisors in developing an elective program to meet the accreditation requirements, and the students' individual needs.

1. It is required that the humanities/social science portion of the program contain at least one nine-hour sequence in a specific subject, and that the sequence include at least two upper level courses. A total of 18 credits of approved humanities/social sciences electives are required.
2. Four credits of approved basic science electives in geology, chemistry, physics, or life sciences are required.
3. Six credits of approved engineering science electives, usually in mechanical or electrical engineering, are required.
4. A minimum of 15 credit hours of Civil Engineering electives are required for graduation. At least nine elective credit hours must be in design and at least one elective credit hour in engineering science.
5. The free elective is either a technical or non-technical course offered for credit by an academic unit of the University. (Remedial courses are excluded).
6. Technical electives are advanced-level engineering, science, or mathematics courses. A minimum of 18 credits must be taken in Civil Engineering courses and technical electives. It is strongly recommended that students take a second course in three of the four areas (construction/transportation, environmental, geotechnical, structures) to ensure the breadth required by most civil engineers.



conomic, engineering, and sociopolitical constraints. Explores owner, architect, engineer, and contractor relationships. Practicing architects, engineers, planners, and contractors are actively involved. Prerequisite: CIE 440 and one structural design course. Lec 2, Lab 3. Cr 3.

#### **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. Prerequisite: CIE 350 or equivalent. Lec 3. 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. Prerequisite: CIE 350. Lec 3. Cr 3.

#### **CIE 456 Groundwater Hydrology and Hydraulics**

Fundamentals of the hydromechanics of flow through porous media, and the development and application of methodology for solving the many open-ended problems of groundwater flow, supply and pollution. Considers concepts of groundwater modelling design and aspects of field variability and uncertainty. Prerequisite: CIE 350 and MAT 258 or MAT 259 or permission. Lec 3. Cr 3.

#### **CIE 458 Coastal Engineering**

Applies principles of fluid mechanics and coastal hydraulics to civil engineering problems in coastal areas. Covers linear wave theory, wave transformation in coastal areas (shoaling, refraction, diffraction), wave forecasting, sediment transport, wave forces on pilings and walls, design of rubble mound structures. Case study of coastal engineering project. Project work to include estimation of wave heights in a coastal area and providing design and cost for a breakwater. Prerequisite: CIE 350. Lec 3. 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. Prerequisite: CIE 365. Lec 3. 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. Prerequisite: CIE 110, CIE 225. Lec 2, Lab 3. Cr 3.

#### **CIE 473 Construction Equipment and Methods**

The equipment and methods used in heavy and highway construction. Topics include: organizational and legal framework in U.S. construc-

tion practice, basic physical and economic principles governing the efficiency of construction practice, and selection of types and combinations of equipment for heavy and highway construction operations. Prerequisite: CIE 470 or permission. Lec 2, Lab 3. Cr 3.

#### **CIE 498 Selected Studies in Civil Engineering**

Topics in civil engineering not regularly covered in other courses. Specific topics vary. May, with consent of the department, be repeated for credit. Prerequisite: permission. Cr 1-3.

#### **CIE 499 Undergraduate Thesis**

The study and reporting of some original investigation or design. Prerequisite: permission. Cr 2-3.

#### **CIE 539 Water Quality**

Studies the effects of organic, nutrient, toxic, and thermal pollutants on water quality in streams, lakes, reservoirs, and estuaries. Application of water quality standards. Prerequisite: CIE 331, CIE 433 or concurrent. Lec 3. Cr 3.

#### **CIE 540 Structural Analysis II**

Microcomputer based analysis of linearly elastic trusses, frames, beams and grids and limited analysis of continuous beams and frames. Covers substructuring. Reviews selected commercial structural analysis software packages. Includes techniques for verifying computer generated results. Prerequisite: CIE 440. Cr 3.

#### **CIE 541 Finite Element Analysis of Structures**

Review of matrix analysis of structures and preliminary topics in elasticity and energy principles. Covers the finite element concept, plane stress and strain analysis, axisymmetric solids and flat shells of revolution, three dimensional solids, plate bending and flat shell elements, isoparametric elements, natural coordinates and numerical integration. Application and introduction to computer programs. Prerequisites: CIE 440 or MEE 456. Lec 3. Cr 3.

#### **CIE 542 Advanced Reinforced Concrete Design**

Continuous concrete structures; torsion; serviceability; slender and biaxially loaded columns; design of two-way floor systems; joints; introduction to prestressed concrete; computer-aided building design project. Prerequisite: CIE 442. Lec 3. Cr 3.

#### **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 systems with distributed properties. Introduction to seismic design, machine foundations and structural dynamics computer programs. Prerequisite: CIE 440. Cr 3.

#### **CIE 546 Probabilistic Methods in Structural and Geotechnical Engineering**

Covers uncertainties in structural and geotechnical engineering, review of probability theory,

probabilistic models for load and resistance variables, fundamentals of reliability theory, Monte-Carlo simulations and numerical integration techniques, introduction to the reliability of structural systems, introduction to time-dependent reliability, load combinations, applications to code development. Prerequisite: MAT 332 and one 400-level design course and CIE 365. Cr 3.

#### **CIE 556 Advanced Groundwater Hydrology and Modelling**

Advanced topics in the groundwater system and flow through porous media pertaining to the modelling of fluid flow and mass transport in the groundwater environment. Prerequisite: CIE 456 or equivalent. Cr 3.

#### **CIE 557 Water Resources Engineering**

Development, control, and engineering of water resources systems with emphasis on basin-wide and regional analyses. Introduction to systems engineering techniques applied to water resources problems. Prerequisite: CIE 455 or permission. Lec 3. Cr 3.

#### **CIE 558 Advanced Coastal Engineering**

The principles of hydraulics applied to civil engineering problems in lakes and coastal areas. Topics include: wave forecasting, shoaling, refraction, sediment transport, stability of rubble mound structures and design of coastal structures. Emphasis on analysis and development of material not covered in CIE 458. Prerequisite: CIE 458, MAT 258 or MAT 259 or permission. Lec 3. Cr 3.

#### **CIE 559 Numerical Modeling of Lake and Estuarine Processes**

Using various numerical models as case studies, strategies for environmental modeling are discussed. Emphasis on calculation of flows and transport of water-borne material and pollutants. Topics include the relative validity of different numerical formulations as well as considerations of stability, economy, and accuracy. Discussion of model verification using field data and measurement techniques. Prerequisite: MAT 258 or MAT 259. Lec 3. 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. Prerequisite: CIE 365. Lec 3. 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. 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. 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. 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. 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. 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. 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. Cr 1.

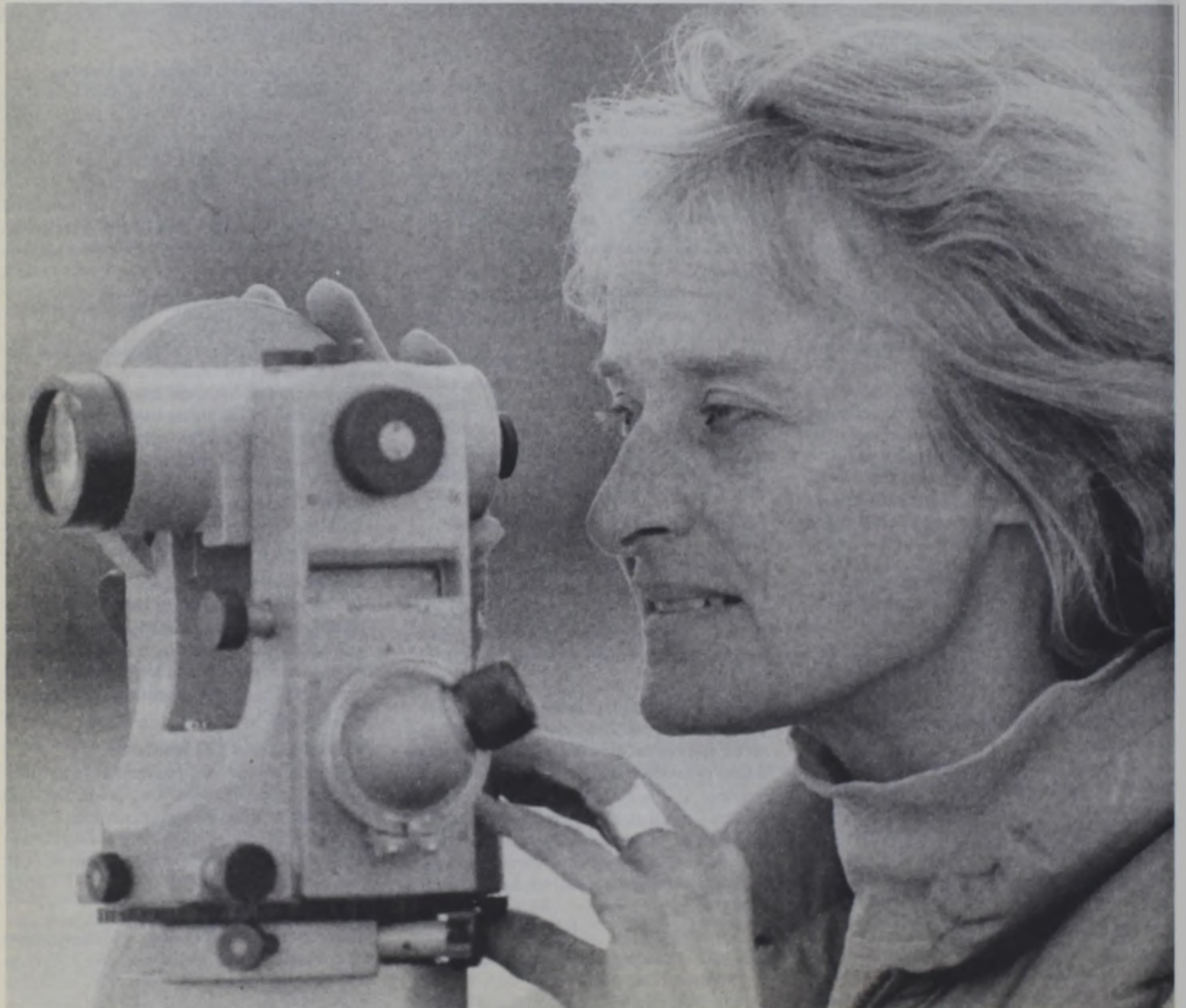
**CIE 598 Selected Studies in Civil Engineering**

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. Prerequisite: permission. Cr 1-3.

**Interdisciplinary Course****INT 230 (ARE, CIE, TSO) Waste Management**

The study of the history and current problems of society's municipal solid waste. Waste generation, recycling and disposal will be covered for both Maine and the nation. Social, economic and engineering aspects will be examined. Cr 3.





## Electrical Engineering (Including Computer Engineering)

Professor Field (Chairperson)

Professors Irons, Peake, Sheppard, Vetelino

Associate Professors Hanselman, Musavi

Assistant Professors Eason, Hummels, Patton, Wolpert

Lecturers Beenfeldt, Whitney

Adjunct Professors Feger, Josse

Research Professor Lec

Teaching Associates Littlefield, Robash.

### Computer Engineering

The Computer Engineering Program provides its graduates with the knowledge necessary to design systems based on computers and complex digital logic devices. These systems find use in such diverse tasks as computation, communication, entertainment, information processing, artificial intelligence and control. There are many career opportunities in the public and private sectors for persons with a background in Computer Engineering. Some of these opportunities are in computer-aided design, computer-aided manufacturing as well as developing hardware and software for computer-based systems.

A computer engineer must know how to select and interconnect the electronic and mechanical devices which make up a computer-based system. This is the kind of work usually associated with electrical engineering. However, the computer engineer must also be capable of developing the software that makes a computer system perform its task. He or she might need to know, for example, which programming language is best for a particular need or what is the most efficient way to store or process data. This area is normally associated with computer science. Thus, a computer engineer must be proficient with computer science material as well as electrical engineering material.

The curriculum also provides a knowledge of basic sciences, mathematics and electrical engineering as well as public speaking, social studies, humanities and English. The choice of technical elective courses is based on individual interest and presently allow specialization in areas like Computer Aided Design, Digital Control, Communications, Robotics and Computer Graphics.

A cooperative work program is available for those students who wish to include relevant industrial experience in their curriculum. In addition, opportunities exist for students to enhance their practical experience by working with faculty on projects and assisting with laboratory instruction.

### Academic Policies for Computer Engineering

The Computer Engineering Program is divided into lower and upper divisions. The lower con-

### Computer Engineering Curriculum

First Year			
First Semester		Second Semester	
CHY 113 Chemical Principles	4	MAT 127 Analytic Geometry and Calculus	4
MAT 126 Analytic Geometry and Calculus	4	PHY 122 Physics for Engineers and Physical Scientists II	4
PHY 121 Physics for Engineers and Physical Scientists I	4	COS220 Introduction to Computer Science I	3
ELE 172 Logic Systems	4	ELE 171 Microcomputer Architecture and Applications	4
<b>TOTAL HOURS</b>	<b>16</b>	ENG 101* College Composition	3
		<b>TOTAL HOURS</b>	<b>18</b>
Sophomore Year			
First Semester		Second Semester	
MAT 228 Analytic Geometry and Calculus	4	MAT 258 Differential Equations and Linear Algebra	4
ELE 210 Network Fundamentals I	4	ELE 211 Electrical Networks II	3
COS 221 Introduction to Computer Science II	3	ELE 212 Electrical Networks Laboratory	3
SPC 103 Fundamentals of Public Communications	3	ELE 262 Physical Electronics	3
Humanities Elective**	3	COS 250 Discrete Structures	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>16</b>
Junior Year			
First Semester		Second Semester	
COS 301 Programming Languages	3	CEN 401 Computer Engineering Design Project	1
ELE 300 Seminar	1	ELE 475 Sequential Logic Systems	3
ELE 314 Linear Circuits and Systems	3	ENG 317 Advanced Professional Exposition	3
ELE 342 Electronics I	4	COS 331 Operating Systems	3
ELE 471 Microcomputer Applications Engineering	3	Humanities Elective**	3
Humanities Elective	3	Technical Elective	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>16</b>
Senior Year			
First Semester		Second Semester	
CEN 402 Computer Engineering Design Project	4	CEN 403 Computer Engineering Design Project	2
MAT 332 Statistics for Engineers Basic Science	3	Humanities Elective**	3
Humanities Elective**	4	Humanities Elective**	3
Technical Elective	3	Technical Elective	3
<b>TOTAL HOURS</b>	<b>17</b>	Technical Elective	3
		<b>TOTAL HOURS</b>	<b>17</b>
<b>TOTAL HOURS TO GRADUATE 134</b>			

\*ENG 101 is a prerequisite for ENG 317. Certain students may meet this prerequisite by examination.

\*\*A list of courses qualifying for humanities credit is available in the EE office. At least 2 humanities and/or social science electives must be courses which have, as prerequisites, introductory courses in the appropriate area.



sists of the courses normally taken in the first four semesters while the upper consists of those courses taken in the last four semesters. A lower division student may, with permission, take up to 9 credit hours of upper division courses. However, a lower division student may not take an upper division course having another upper division course as a prerequisite. To graduate, a student must meet the University requirements, Computer Engineering Curriculum requirements, and also have a GPA of 1.8 in upper division ELE and COS courses without benefit of lineout. A course may not be repeated more than once without the Dean's approval. No admission into ELE 210 with more than one D<sup>+</sup> grade in required first year Mathematics and Physics courses. No admission into any ELE or COS course unless all prerequisites have been satisfied. A student may be admitted to the upper division of the Computer Engineering program upon:

1. Completing the lower division courses with a GPA of 2.0 or better without accumulating more than 3 course repeats. and
2. Obtaining grades of C- or better in each of the lower division required ELE and COS courses.

A student may be recommended for discontinuance because of any of the following indications of unsatisfactory progress.

1. Failure to be admitted to the upper division.
2. Two failures in any single course in the program.
3. Two successive semesters with a GPA less than 2.0 in ELE and COS courses.

## Electrical Engineering

The electrical engineering curriculum is designed to provide students with the relevant skills and the basic scientific background needed to advance today's technology and to keep abreast of future developments in the electrical engineering profession. The program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The early part of the program emphasizes electrical engineering skills which form the background for the upper level elective and design courses. The required and elective electrical engineering courses are supplemented with basic courses in physics, chemistry, basic science, mathematics, computer science and mechanical engineering, while 18 credit hours of humanities electives allow students to expand their cultural and intellectual horizons. Technical electives can be chosen in the junior and senior years when students' individual interests have had a chance to develop.

Two important features of the electrical engineering curriculum are the ELE 300 seminar series and the ELE 401-ELE 403 project courses. The junior ELE 300 seminar furnishes career orientation and professional values at a time

\* "D grade" includes D+, D, or D-

## Electrical Engineering Curriculum

First Year			
First Semester		Second Semester	
CHY 113 Chemical Principles I	4	MAT 127 Analytic Geometry and Calculus	4
MAT 126 Analytic Geometry and Calculus	4	PHY 122 Physics for Engineers and Physical Scientists II	4
PHY 121 Physics for Engineers and Physical Scientists I	4	COS 220 Introduction to Computer Science I	3
ELE 172 Logic Systems	4	ELE 171 Microcomputer Architecture and Applications	4
<b>TOTAL HOURS</b>	<b>16</b>	ENG 101 *College Composition	3
		<b>TOTAL HOURS</b>	<b>18</b>
Sophomore Year			
First Semester		Second Semester	
MAT 228 Analytic Geometry and Calculus	4	MAT 258 Differential Equations	4
ELE 210 Electrical Networks I	4	ELE 211 Electrical Networks II	3
Engineering Science Elective (5)	3	ELE 212 Electrical Networks Laboratory	3
Humanities Elective (1)	3	ELE 262 Solid State Electronic Devices	3
Basic Science (2)	4	Engineering Science Elective (5)	3
<b>TOTAL HOURS</b>	<b>18</b>	<b>TOTAL HOURS</b>	<b>16</b>
Junior Year			
First Semester		Second Semester	
ELE 300 Seminar	1	ELE 323 Energy Transmission and Conversion	4
ELE 314 Linear Circuits and Systems	3	ELE 343 Electronics II	4
ELE 342 Electronics I	4	ELE 383 Communication Engineering	3
ELE 351 Fields and Waves	3	ELE 401 Electrical Engineering Design Project	1
Humanities Elective (1)	3	ENG 317 Advanced Professional Exposition	3
Math Elective (3)	3	Humanities Elective (1)	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>18</b>
Senior Year			
First Semester		Second Semester	
ELE 402 Electrical Engineering Design Project	4	ELE 403 Electrical Engineering Design Project	2
SPC 103 Fundamentals of Public Communications	3	Technical Elective (4)	3
Technical Elective (4)	3	Technical Elective (4)	3
Technical Elective (4)	3	Humanities Elective (1)	3
Humanities Elective (1)	3	Humanities Elective (1)	3
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>14</b>

**TOTAL HOURS TO GRADUATE: 133**

\*ENG 101 is a prerequisite for ENG 317. Certain students may meet this prerequisite by examination.

1. A list of courses qualifying for humanities credit is available in the electrical engineering office.
2. Suggested basic science courses include AST 110/AST 215, CHY 114, PHY 236, or BIO 100 (four hours required).
3. A list of courses qualifying for the math elective credit is available in the electrical engineering office.
4. Technical electives must include three courses within the electrical engineering department. Other electives can be chosen from engineering departments, physics, chemistry, math, and computer sciences. Technical electives must include at least four hours of engineering design.
5. A list of courses qualifying for engineering science elective credit is available in the electrical engineering office. One Engineering elective must be either MEE 230 or MEE 252.



When it is most appropriate and is designed to make students aware of electrical engineering activities and opportunities. The design project occurs during the last three semesters of the program and allows students to demonstrate engineering abilities by proposing, completing, and reporting on detailed design projects.

Students who desire engineering experience in industry or government laboratories can apply for the department's co-op program where individuals can work on current engineering problems; those who are more research-oriented can request the opportunity of working closely with individual faculty members in their areas of interest.

### Academic Policies for Electrical Engineering

The electrical engineering program is divided into two divisions, lower and upper. The lower will consist of the courses normally taken in the first four semesters of the electrical engineering program while the upper will consist of those courses taken in the last four semesters.

A lower division student may, with permission, take up to 9 credit hours of upper division ELE courses. However, a lower division student may not take an upper division course having another upper division course as a prerequisite.

To graduate a student must meet the University requirements, obtain admission to the upper division, meet the electrical engineering curriculum requirements, and also have a GPA of 1.8 in upper division ELE courses without benefit of lineout.

A course may not be repeated more than once without the Dean's approval.

No admission into ELE 210 with more than one D\* grade in required first year math and physics courses.

No admission into any ELE course unless all prerequisites have been satisfied.

A student must meet the following basic requirements before being considered for admission to the upper division of the Electrical Engineering program.

1. Upon completion of the lower division courses, have an overall GPA of 2.0 or better without accumulating more than three course repeats, and
2. After lineouts, have no more than one D\* grade in all required lower division courses.

A student may be recommended for discontinuance because of any of the following indications of unsatisfactory progress.

1. Failure to be admitted to the upper division.
2. Two failures in any single course in the program.
3. Two successive semesters with a GPA less than 2.0 in ELE courses.

The above policy applies to those students who are pursuing a BSEE degree. Deviations from this policy require approval of the Electrical Engineering Faculty.

\* "D grade" includes D+, D, or D-

### Double Majors and Double Degrees

Students may wish to consider having a double major or obtaining a second degree. For example, common choices are to combine electrical and computer engineering or electrical and mechanical engineering. Ordinarily this will take approximately one more year of study. However, the student should see his or her advisor early in the process to be sure all requirements will be met.

### Graduate Work in Electrical Engineering

Programs leading to the degree of Master of Science in Electrical Engineering and Master of Engineering (Electrical) are described in the University of Maine Graduate School Catalog.

### Courses in Electrical Engineering

#### CEN 401 Computer Engineering Design Project

First of a three semester sequence of courses involving the design, implementation and reporting of an engineering program or system by an individual student or small group. Part one: project selection, feasibility studies and proposal writing. Prerequisites: three of the following four courses: COS 301, ELE 314, ELE 342, ELE 471. Cr 1.

#### CEN 402 Computer Engineering Design Project

Second of a three semester sequence of courses involving the design, implementation and reporting of an engineering program or system by an individual student or small group. Part two: implementation of the program or system. Prerequisite: CEN 401. 4 Design Cr. Cr 4.

#### CEN 403 Computer Engineering Design Project

Third of a three semester sequence of courses involving the design, implementation and reporting of an engineering program or system by an individual student or small group. Part three: written and oral presentation of the completed project. Prerequisite: CEN 402. 2 Design Cr. Cr 2.

#### CEN 477 Hardware Applications Using C

Programming examples will include hardware application, timing, sound generation and instrumentation interfacing. Review of the necessary features of the C programming language will be included. Prerequisites: ELE 171, COS 220. Lec 3, Design Cr 1. Cr 3.

#### ELE 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. Rec 3, Lab 3. 1 Design Cr. Cr 4.

#### ELE 172 Logic Systems

Introduction to the design of logic systems including combinatorial and sequential logic and use of SSI and MSI. Lec 3, Lab 3. 2 Design Cr. Cr 4.

#### ELE 210 Electrical Networks I

Covers basic circuit laws and theorems, natural and forced responses of first and second order systems, phasor concepts, application of basic circuit theorems to steady-state a-c networks. Characteristics and proper use of basic circuit instruments. Introduces the PC as a network analysis tool. Prerequisite: MAT 127, PHY 122. Lec 3, Lab/Comp 3. Cr 4.

#### ELE 211 Electrical Networks II

Covers steady-state power concepts, analysis of polyphase circuits and magnetically coupled circuits, frequency domain analysis, network representation using two-port parameters, Fourier series applications. Prerequisite: MAT 228, ELE 210; also ELE 212 concurrently or permission. Lec 3. Cr 3.

#### ELE 212 Electrical Networks Laboratory

Practical application of concepts developed in ELE 210/211. Covers tools and techniques of electrical measurements, computer analysis of electrical networks, op-amp applications. Corequisite: ELE 211. Lec 2, Lab 3. Cr 3.

#### ELE 215 Electric Circuit Fundamentals

Covers direct and alternating circuits, first order transients, three phase circuits, operational amplifiers. Prerequisites: PHY 122, MAT 127. Not open to Electrical Engineering majors. Lec 3. Cr 3.

#### ELE 224 Instrumentation

Application and characteristics of electronic instrumentation including the oscilloscope and digital indicators, sensitivity and frequency limitations, meters and bridges, instrumentation systems. Prerequisites: ELE 210 or ELE 215. Lec 3, Lab 3. 1 Design Cr. Cr 4.

#### ELE 262 Solid State Electronic Devices

Examines basic characteristics of materials important to device applications. Introduces the theory of pn junctions, bipolar and field effect transistors. Prerequisites: CHY 113, PHY 122. Corequisite: MAT 259. Lec 3. Cr 3.

#### ELE 300 Seminar

Exploration of career opportunities, organizational structure of industry and professional responsibilities. Prerequisite: Junior standing. (Pass/Fail Grade Only). Lec 1. Cr 1.

#### ELE 314 Linear Circuits and Systems

Analysis of continuous and discrete linear systems including Fourier series, Fourier transforms, and Laplace transform techniques; convolution, transfer functions and state variable system representations; discrete Fourier transform and Z-transform techniques. Prerequisites: MAT 258, ELE 211, COS 220. Rec 3. Cr 3.

#### ELE 323 Energy Transmission and Conversion

Introduction to energy conversion concepts including magnetic circuits, power transformers,



electric machines and generators, and power converters. Prerequisite: ELE 211 and ELE 212. Rec 3, Lab 3. Cr 4.

#### **ELE 342 Electronics I**

Covers the fundamentals of digital electronic devices and circuits, diodes, FET's, BJT's, monolithic IC fabrication, LSI Fundamentals, design of logic gates and families, combinational and sequential logic circuits. Prerequisites: ELE 211, ELE 262. Lec 3, Lab 3. 1 Design Cr. Cr 4.

#### **ELE 343 Electronics II**

Covers the fundamentals of analog electronic circuits and systems, design of analog semiconductor circuits, amplifiers, frequency response, op amp characteristics and applications feedback. Prerequisite: ELE 342. Lec 3, Lab 3. 1 Design Cr. Cr 4.

#### **ELE 351 Fields and Waves**

Topics include: static electric and magnetic fields, field mapping, 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. Prerequisite: MAT 258, PHY 122. Lec 3. .5 Design Cr. Cr 3.

#### **ELE 383 Communications Engineering**

A study of basic principles of modern communication engineering including methods of analysis, modulation techniques, effects of noise, information transmittal. Prerequisite: ELE 314. Lec 3. Cr 3.

#### **ELE 394 Electrical Engineering Practice**

Work experience in electrical engineering. May be repeated for credit. Prerequisite: sophomore standing and permission. (Pass/Fail Grade Only). Cr 1-3.

#### **ELE 401 Electrical Engineering Design Project**

First of a three semester sequence of courses involving the design, implementation and reporting of an engineering device or system by an individual student or small group. Part one: project selection, feasibility studies and proposal writing. Prerequisites: ELE 314 and ELE 342. 1 Design Cr. Cr 1.

#### **ELE 402 Electrical Engineering Design Project**

Second of a three semester sequence of courses involving the design, implementation and reporting of an engineering device or system by an individual student or small groups. Part two: resource location, component interconnection and subassembly testing. Prerequisites: ELE 401 and must have passed at least two of the following four courses: ELE 323, ELE 343, ELE 351, ELE 383. 4 Design Cr. Cr 4.

#### **ELE 403 Electrical Engineering Design Project**

Third of a three semester sequence of courses involving the design, implementation and reporting of an engineering device or system by an

individual student or small group. Part three: written and oral presentation of the completed project. Prerequisite: ELE 402. 2 Design Cr. Cr 2.

#### **ELE 414 Feedback Control Systems**

Analysis and design of continuous and discrete 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. Occasional laboratory experimentation. Prerequisite: ELE 314, basic knowledge of matrix algebra. Lec 3. (2 Design Cr.). Cr 3.

#### **ELE 416 Design of Control Systems**

Continuation of topics covered in ELE 414 including control system design using the LAM method, design of DC servomotor systems, modeling and analysis of nonlinear systems. Includes laboratory experimentation and computer simulation. Prerequisite: ELE 414. Lec 1, Lab 6. 2 Design Hours. Cr 3.

#### **ELE 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, vision in robot application. Prerequisite: COS 215 or COS 220; MAT 228; knowledge of matrix algebra and some familiarity with basic control and rigid body mechanics suggested. Lec 2, Lab 3. 1.5 Design Cr. Cr 3.

#### **ELE 425 Control Devices and Systems**

Topics include: characteristics of power electronic devices, control of heating, dc motor control systems, adjustable frequency drives for three phase motors, effect of harmonics on system performance, computer stimulation of electromechanical systems. Prerequisite: ELE 323 or permission. Lec 3. 1 Design Cr. Cr 3.

#### **ELE 427 Electric Power Transmission**

Topics include: line constants per unit quantities, symmetrical components and study of power system faults, power transformers, transmission line parameters, and load flow studies. Prerequisite: ELE 323. Lec 2, Lab 3. 1 Design Cr. Cr 3.

#### **ELE 428 Electric Power Systems**

Covers power system control and stability, power flow, AC/DC power lines, analysis of faulted power systems, relaying. Prerequisite: ELE 427. Lec 2, Lab 3. 2 Design Cr. Cr 3.

#### **ELE 436 Electro-acoustics**

Includes acoustic wave specifications and levels, human ear physiology and protection, electro-mechanical and acoustical lumped circuits, electro-mechano-acoustic systems of mi-

crophones and loudspeakers, fundamentals of architectural acoustics, acceptable noise standards and criteria, instrumentation. Prerequisites: Senior or graduate standing. Rec 3 with several laboratory periods substituted for equivalent class time. 1.5 Design Cr. Cr 3.

#### **ELE 437 Environmental Noise Control**

Examines sound energy propagation in porous acoustical materials and in solid structures, basic design of mufflers and vibration isolation, air handling system noise control, sound energy propagating outdoors, transportation vehical noise, statistical specification of industrial and urban noise, rudiments of community noise control. Prerequisite: ELE 436. Lec 3. 3 Design Cr. Cr 3.

#### **ELE 441 Micro-Electronics Filter Theory and Design**

Design of inductorless electric filter stressed. Standard forms of lowpass, bandpass, high-pass, and bandstop realized with op-amps. Applications include data and voice communication systems in modern micro-electronic engineering. Prerequisite: ELE 314 and ELE 342. Lec 3. 3 Design Cr. Cr 3.

#### **ELE 444 Analog Integrated Circuits**

Considers topics in the internal circuit design and system applications of analog integrated circuits; current sources, differential amplifiers, level shifters, op amps, regulators, high frequency considerations; digital-to-analog and analog to digital converters, phase-locked loops. Prerequisite: ELE 314 and ELE 343. Lec 3. 2 Design Cr. Cr 3.

#### **ELE 445 Analysis and Design of Digital Integrated Circuits**

Analysis and design of digital circuits for compatibility with integrated circuit processing technology. Reviews device physics with emphasis on switching behavior. Includes computer device models, analysis of inverters and basic gates, logic families, regenerative logic circuits, memory technologies. Brief introduction to circuit design for LSI and VLSI. Overview of gallium arsenide digital IC's. Prerequisite: ELE 342. Lec 3. Design Credit 2. Cr 3.

#### **ELE 453 Microwave Engineering**

Topics include: high-frequency transmission lines, impedance matching, graphical methods, microwave circuits, measurement techniques, microwave components, rectangular and cylindrical waveguides, antennas. Prerequisite: ELE 351. 1 Design Cr. Cr 3.

#### **ELE 463 Solid State Electronic Devices II**

Introduction to the theory of selected devices including pnpn structures and optoelectronic devices. Covers device characterization and design. Prerequisites: ELE 262. Lec 3 with an occasional laboratory period substituted for equivalent class time. 1 Design Cr. Cr 3.

#### **ELE 464 Microelectronics**

Emphasis on fabrication topics, process design. Prerequisite: ELE 262. Lec 3 with an occasional



laboratory period substituted for equivalent class time. 1 Design Cr. Cr 3.

#### **ELE 471 Microprocessor Applications Engineering**

Application of micro-processors to the solution of design problems, including hardware characteristics, peripheral control techniques and system development. Prerequisites: ELE 471, ELE 172. Lec 2, Lab 3. 2 Design Cr. Cr 3.

#### **ELE 475 Sequential Logic Systems**

Methods of design and testing for logic systems with memory. Includes sequential machine flow charting and algorithmic approaches to design, test procedures and the design of system tests. Prerequisite: ELE 172. Lec 3. 2 Design Cr. Cr 3.

#### **ELE 484 Communications Engineering II**

Topics include: digital communication systems, multiplexing, signal space, information theory and coding. Prerequisite: ELE 383. Lec 3. Cr 3.

#### **ELE 486 Digital Signal Processing**

A study of processing signals in discrete form. Review of z-transforms, discrete Fourier series and transforms. Covers flow graph and matrix representations of digital filters, digital filter design techniques and fast Fourier transforms. Emphasis on using the computer both to design and to realize various signal processors. Prerequisites: ELE 383. Lec 3. 1.5 Design Cr. Cr 3.

#### **ELE 487 Digital Image Processing**

Introduction to optical and computer image processing techniques and their applications including the physics of images and sensors, image digitizer organization and computer communication; image generation, sampling and quantization; thresholding, binary images, gray level images, pseudo-color, coding techniques; image processing mathematics, two dimensional discrete Fourier transform, convolution and correlation, image transforms; masking, image smoothing, image sharpening, highpass and lowpass filters, histogram, image enhancement. Use of image processing facilities and laboratory. Prerequisite: ELE 314. Lec 2, Lab 3. 1.5 Design Cr. Cr 3.

#### **ELE 498 Selected Topics in Electrical 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. Prerequisite: permission. Cr 1-3.

#### **ELE 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. Prerequisites: ELE 314, MAT 262. Cr 3.

#### **ELE 514 Modern Control Systems**

Analysis and design of continuous and discrete control systems. Includes state variable, linear algebraic, and quantitative feedback design; tracking and disturbance rejection; optimal, robust and adaptive control; application to motion control. Prerequisite: ELE 512. Cr 3.

#### **ELE 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. Prerequisite: graduate standing, ELE 383 or equivalent. Lec 3. Cr 3.

#### **ELE 521 High Voltage Engineering**

Examines high voltage generation and measurement techniques, field distribution, stress control, electrical breakdown of gases, solids, and liquids. Also covers circuit breakers, surge arresters, lighting phenomena, and system insulation design. Prerequisite: ELE 323 or equivalent; ELE seniors with permission. Lec 3. Cr 3.

#### **ELE 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. Prerequisite: ELE 512 or permission. Lec 3. Cr 3.

#### **ELE 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. Prerequisite: ELE 417. Lec 2, Lab 3. Cr 3.

#### **ELE 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 systems and their applications in automation. Prerequisite: COS 215 or COS 220 and ELE 314 or equivalent. Lec 2, Lab 3. Cr 3.

#### **ELE 550 Electromagnetic Theory**

Reviews of Maxwell's Equations and waves in dielectric and lossy media. Covers Image Theory, Induction Theorem and Green's Functions; plane cylindrical and spherical wave functions; radiation and antennas; rectangular, cylindrical and spherical waveguides and cavities; perturbational and variational techniques. Prerequisite: ELE 351 or equivalent. Lec 3. Cr 3.

#### **ELE 552 Wave Propagation**

Considers theory of propagation of electromagnetic waves, sound waves and unbounded media. Presents theoretical techniques and their applications to wave propagation in the ocean,

ionosphere and the earth. Prerequisite: ELE 453 or equivalent. Lec 3. Cr 3.

#### **ELE 553 Microwave Circuits and Devices**

Examines the generation, transmission, control and detection of energy at microwave frequencies including active and passive microwave devices (klystrons, magnetrons, traveling wave tubes), solid state devices (microwave semiconductor diodes, tunnel diode amplifiers, Gunn oscillators, IMPATT and Josephson junction devices), and microwave integrated circuits (filters, couplers, circulators and combiners). Prerequisite: ELE 550. Lec 3. Cr 3.

#### **ELE 562 Microwave Acoustics**

A study of the theory of acoustic wave propagation in nonpiezoelectric and piezoelectric media. Focus on bulk acoustic waves, surface acoustic waves, plate modes, pseudo surface acoustic waves and Bleustein-Gulyaev waves and use of these waves may be utilized in microwave acoustic devices. Prerequisite: ELE 550 or permission. Lec 3. Cr 3.

#### **ELE 563 Design and Fabrication of Surface Wave Devices**

Covers the design, fabrication and measurement of surface acoustic wave (SAW) devices, e.g. delay lines, filters, resonators, oscillators, convolvers, and sensors. Topics include: planar fabrication techniques, surface properties of piezoelectric crystals, photolithography, vacuum technologies for thin film deposition, electronic systems for the measurement of impulse and frequency response, phase and group velocity, insertion loss, distortions, and spurious effects. Prerequisites: ELE 550, ELE 562 or permission. Lec 2, Lab 3. Cr 3.

#### **ELE 565 Semiconductor Devices I**

A study of physical principles underlying device operation. Topics include: elementary excitation in semiconductors such as phonons, photons, conduction holes and electrons, carrier trapping and recombination, effect of high doping, contacts. Prerequisite: ELE 463 or equivalent. Lec 3. Cr 3.

#### **ELE 566 Semiconductor Devices II**

Application of the principles of ELE 565 to specific devices. Prerequisite: ELE 565. Lec 3. Cr 3.

#### **ELE 567 VLSI Devices and Technology**

Covers VLSI device and process modeling, alternative device structures. Prerequisite: ELE 464. Cr 3.

#### **ELE 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. Prerequisite: ELE 471 or permission. Lec 2, Lab 3. Cr 3.

#### **ELE 580 Communications Engineering III**

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. Prerequisite: ELE 383 or equivalent. Lec 3. Cr 3.

#### **ELE 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. Prerequisite: permission. Cr 3.

#### **ELE 595 Graduate Seminar**

Detailed study of some aspect of electrical engineering and preparation of a paper or solution to a pertinent comprehensive problem. Cr 1-3.

#### **ELE 598 Selected Advanced Topics in Electrical Engineering**

Advanced topics not regularly covered in other courses. Content varies. May be repeated for credit. Prerequisite: permission. Cr 1-3.

#### **ELE 599 Selected Study in Electrical Engineering**

Advanced independent study for qualified students who present suitable projects for intensive investigation in the area of faculty interest. Prerequisite: permission. Cr 1-3.

#### **Interdisciplinary Courses**

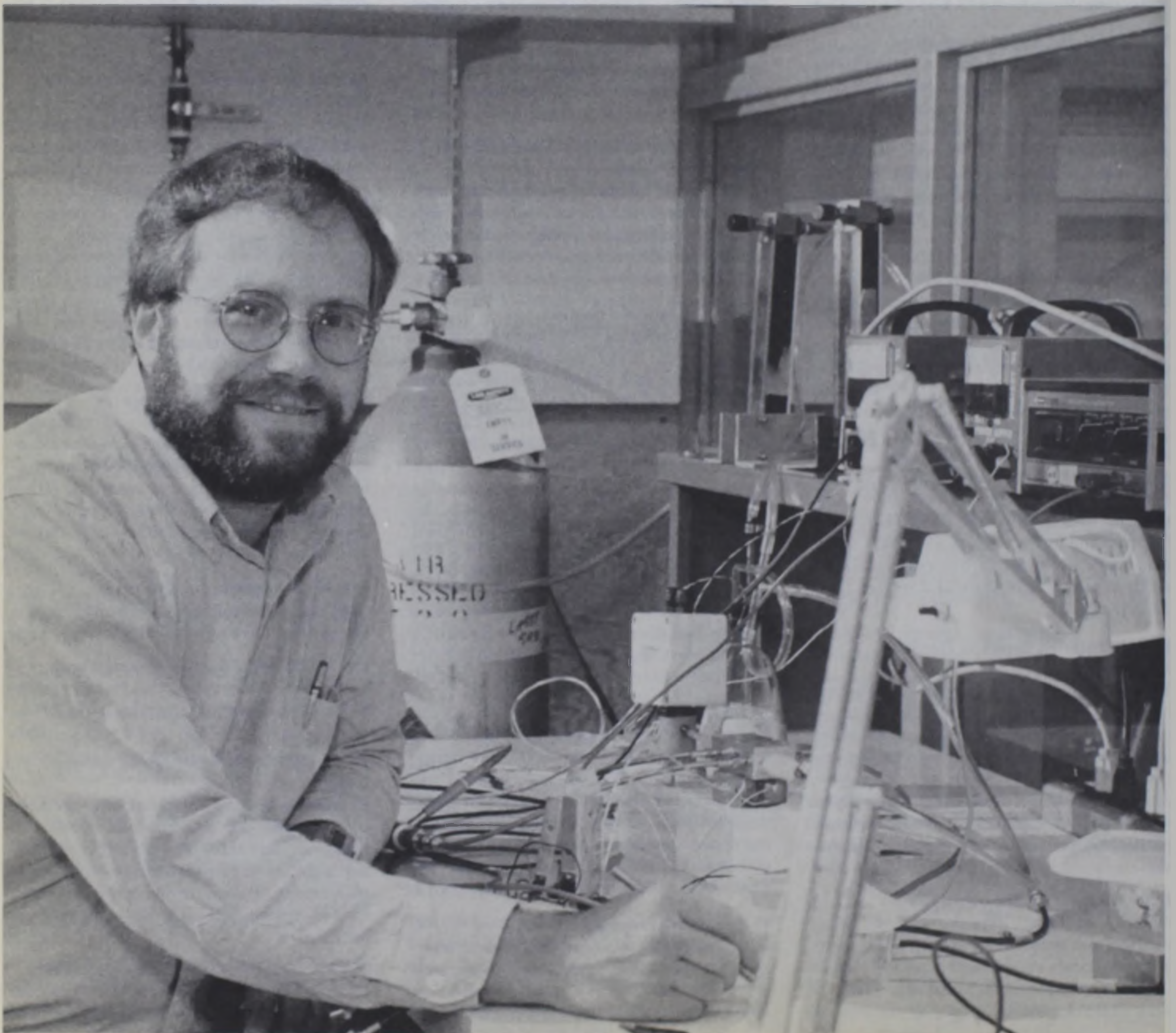
##### **INT 454 (ELE, PHY) Optical Communications**

A study of theory of optical dielectric waveguides including light propagation, attenua-

tion, pulse broadening, and mode coupling in fiber-optic waveguides. Includes coupling components, semi-conductor light sources and detectors, modulation and switching of light, repeaters for fiber-optic systems, optical integrated circuits and optical communication systems. Prerequisite: permission. Lec 3. 1 Design Cr. Cr 3.

##### **INT 398 (CHE, CHY, ELE) Undergraduate Research Participation**

Research topics chosen by students in consultation with faculty members in the College of Engineering. Students submit a final report describing their research and present an oral seminar. Cr 1-3.





## Engineering Physics

Professor Smith (Chairperson)

Professors Brownstein, Camp, Carr, Comins, Czavinszky, Grunze, Hess, Kleban, Krueger, Morrow, Orr, Unertl

Associate Professors Harmon, Mountcastle,

Assistant Professors Batuski, Lad, McClymer, McKay

Lecturer Clark.

This curriculum meets the career needs of students who have a strong interest in engineering and science. It affords such students the opportunity to maintain a high degree of flexibility in designing a program to meet their specific career goals. This program is basically one of applied science, together with a sequence of engineering electives in one or more of the traditional engineering fields. It is developed around a framework of required courses in intermediate and advanced physics and mathematics, in addition to a meaningful group of engineering courses, some required and some elected. Thus, the emphasis is placed upon both engineering and physics. The program is particularly well suited to those students who have a broad range of engineering interests and who are likely to work in a number of engineering areas during their careers. The program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The curriculum also is suited to those students who, by virtue of their abilities and interests, may be preparing to do graduate work. Graduates have successfully pursued graduate study in physics and in various fields of engineering.

### Engineering Physics and Cooperative Education

Any student in good standing enrolled in the engineering physics curriculum who has completed the second year of undergraduate work has the option of working for the degree within a cooperative education program. Cooperative education is the integration of practical work experience, obtained through specific periods of employment in industry, business, or government, into the on-campus classroom and laboratory course curriculum. A student in the Cooperative Education Program works as a paid employee in an engineering environment at a job selected by mutual agreement with the student, the employer, and the Cooperative Education Coordinator of the Department of Physics. Academic credit is received through enrollment in PHY 495, Engineering Physics Practice.

### Specimen Curriculum

First Year			
First Semester		Second Semester	
PHY 121 Physics for Engineers and Physical Scientists I	4	PHY 122 Physics for Engineers and Physical Scientists II	4
CHY 113 Chemical Principles I	4	Humanities Elective I (1)	3
MAT 126 Analytic Geometry and Calculus	4	MAT 127 Analytic Geometry and Calculus	4
GEE 101 Introduction To Engineering Design	3	COS 220 Introduction to Computer Science (2)	3
<b>TOTAL HOURS</b>	<b>15</b>	Engineering Sequence Elective I (3)	3-4
		<b>TOTAL HOURS</b>	<b>17-18</b>
Sophomore Year			
First Semester		Second Semester	
PHY 236 Introductory Modern Physics	4	PHY 238 Mechanics	3
PHY 229 Physical Measurements Laboratory I	2	PHY 230 Physical Measurements Laboratory II	2
MAT 228 Analytic Geometry and Calculus	4	MAT 259 Differential Equations	4
Engineering Sequence Elective II	3	MET 109 Machine Shop and Welding	2
Humanities Elective II	3	Engineering Sequence Elective III	3
<b>TOTAL HOURS</b>	<b>16</b>	Humanities Elective III	3
		<b>TOTAL HOURS</b>	<b>17</b>
Junior Year			
First Semester		Second Semester	
PHY 454 Electricity and Magnetism I	3	PHY 455 Electricity and Magnetism II	3
PHY 441 Physical Electronics Laboratory	2	PHY 442 Modern Experimental Physics	2
MAT 453 Partial Differential Equations I	3	PHY 472 Geometrical and Fourier Optics	3
Engineering Sequence Elective IV	3	Math Elective (4)	3
Engineering Sequence Elective V	3	Humanities Elective V	3
Humanities Elective IV	3	Engineering Sequence Elective VI	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>17</b>

- Humanities Electives: 18 credit hours from an approved list are required for accreditation: at least two of these courses should be upper level.
- Students with programming experience may substitute ELE 172, Logic Systems (Cr 4).
- Engineering physics majors select an area of engineering concentration normally from among electrical, mechanical, chemical, and civil engineering. The engineering sequence consists of at least seven three-credit engineering courses. The college requirement of 16 hours of engineering design and 33 hours of engineering science normally can be met only through careful selection of the engineering sequence courses and those marked by \*. The list of possible courses is available in the department office.
- Choose from MAT 454, MAT 459, MAT 262, MAT 471, or an approved similar math course. Students also may satisfy this requirement by taking PHY 475, Mathematical Physics, in the fall of their senior year. PHY 475 may be counted either as a math elective or a physics elective, but not both.



### Graduate Work in Physics and Engineering Physics

Graduate opportunities and requirements for the master of science degree in physics and the doctor of philosophy degree in physics, and the master of engineering degree in engineering physics are described in the catalog of the Graduate School.

### Engineering Physics Curriculum

The course schedule represents the program for a typical student in the engineering physics curriculum. There are possible alterations to this schedule and substitutions may be made for some courses on approval of the Chairperson of the Department of Physics. Students desiring to transfer from another engineering program in their first or sophomore years may do so without loss of credit or delays in graduation. The considerable flexibility in the engineering physics program will allow a student to design an individual curriculum with the assistance of his or her advisor.

### Courses in Engineering Physics

Consult courses listed under Physics and Astronomy in the College of Sciences.

### Specimen Curriculum, *continued*

		Senior Year	
First Semester		Second Semester	
PHY 469 Quantum and Atomic Physics	3	PHY 482 Project Laboratory in Physics II	3
PHY 481 Project Laboratory in Physics I	3	PHY 489 Physics Seminar II	1
PHY 488 Physics Seminar I	1	Humanities Elective VI	3
Engineering Sequence Elective VII	3	Technical Elective* (6)	3
Physics Elective* (5)	3	Technical Elective*	3
Free Elective*	3	Free Elective	2-3
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>15-16</b>

TOTAL DEGREE HOURS: 130

5. Possible Physics Electives: First Semester: PHY 463, Statistical Mechanics; PHY 470 and 471 Nuclear Physics; PHY 475, Methods of Mathematical Physics; INT 454, Optical Communications; PHY 501, Mechanics; AST 451, Astrophysics I. Second Semester: PHY 447, Molecular Biophysics; PHY 462 Physical Thermodynamics; PHY 480, Physics of Materials; AST 452, Astrophysics II.

6. Technical Elective: physics, engineering, or approved science course. Engineering Physics students receive instruction and evaluation in technical writing as part of PHY 441 and PHY 442. Students not evaluated as satisfactory may be required to take an additional course (ENG 101 or ENG 317); this can be counted as a free elective.

Students admitted to the Honors Program can substitute Honors courses for appropriate humanities and physics courses.





## Forest Engineering

Professors Ashley (Emeritus), Brann, Corcoran, Hoffman (Emeritus), Riley, Smith  
Associate Professors Christensen, Hedstrom, Soule

The forest engineering curriculum, a joint administrative responsibility of the Bio-Resource Engineering Department and the Department of Forest Management, combines study of basic physical sciences, mathematics, engineering, and forestry to provide students with the in-depth education necessary in a career emphasizing the design, planning, and management of tree harvesting systems, logging equipment, and environmental engineering in general.

Forest engineering is engineering in a natural environment. Forest engineers are involved in reforestation methods, systems for wood production and harvesting, handling and transportation, forest road systems, design of improvised bridges, soil-water control, and conservation and recreational development.

A unique feature of the forest engineering curriculum is that it provides the academic background necessary for full association with both professional engineering and forestry societies. Founded upon intensive study in the physical and natural sciences, the professional subject matter contained in the program is directed toward off-campus as well as on-campus study. The realities encountered in the use of mechanized logging equipment in a natural environment are recognized as the inherent constraints imposed by the interaction of technology, biology, and social order.

In addition to basic engineering and forestry courses, four specific areas of forest engineering are dealt with: forest machinery, soil and water control, forest roads and structures, and logging systems planning.

Graduates may find employment as forest engineers with companies producing forest machinery and equipment, with pulp and paper and lumber firms, and with federal and state agencies. Positions are open in research and development work, or in direct wood production and processing fields. Opportunities are nationwide in this area.

### Forest Engineering Curriculum

The curriculum in forest engineering is a joint offering of the Colleges of Engineering and Science, Applied Sciences and Agriculture, and Forest Resources. It is accredited by the Society of American Foresters and the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The curriculum requires completion of 141 degree hours (including six degree hours in Forestry Field Practice) at an accumulative degree point average of not less than 2.0.

Specimen Curriculum			
First Year			
First Semester		Second Semester	
BRE 220 Principles of Mechanization	3	BRE 255 Materials in Bio-Resource Engineering	3
FTY 105 Introduction to Forest Measurements	3	BRE 257 Computer Applications in Agricultural and Forest Engineering	3
MAT 126 Analytic Geometry and Calculus	4	OR	
CHY 113 Chemical Principles I	4	COS 220 Introduction to Computer Science	(3)
Communications Elective	3	MAT 127 Analytic Geometry and Calculus	4
<b>TOTAL HOURS</b>	<b>17</b>	PHY 121 Physics for Engineers and Physical Scientists I	4
		FTY 204 Statistical Inferences in Forest Resources	3
		<b>TOTAL HOURS</b>	<b>17</b>

The curriculum for the first year is shown in the box, above. The balance of the curriculum is made up of courses from five areas, as follows:

#### Basic Sciences and Math

CHY 113 Chemical Principles I	4
PHY 121 Physics for Engineers and Physical Scientists I	4
PHY 122 Physics for Engineers and Physical Scientists II	4
MAT 126 Analytic Geometry and Calculus	4
MAT 127 Analytic Geometry and Calculus	4
MAT 228 Analytic Geometry and Calculus	4
MAT 258 Differential Equations/Linear Algebra	4
FTY 204 Statistical Inference in Forest Resources	3
BRE 257 Computer Applications in Agricultural and Forest Engineering	3
OR	
COS 220 Introduction to Computer Science	(3)
Elective*	7
<b>TOTAL HOURS</b>	<b>41</b>

#### Basic Engineering

BRE 281 Plane Surveying	1
OR	

\*Recommended Bio-Earth Science electives include: PSE 140/140L Soil Science, BOT 101 Plant Biology, BOT 233 Dendrology, INT 256 Forest Protection

SVE 111 Plane Surveying	(4)
MEE 150 Applied Mechanics: Statics	3
MEE 230 Thermodynamics	3
MEE 251 Strength of Materials	3
MEE 270 Applied Mechanics: Dynamics	3
MEE 360 Fluid Mechanics	3
OR	
CIE 350 Hydraulics	(4)
BRE 268 Computer Aided Drafting and Design	3
<b>TOTAL HOURS</b>	<b>19</b>
<b>Forest Engineering</b>	
FOE 206 Photogrammetry and Remote Sensing	3
FOE 453 Harvesting of Forest Crops	2
BRE 220 Principles of Mechanization	3
BRE 255 Materials in Bio-Resource Engineering	3
BRE 465 Soil and Water Engineering	3
BRE 462 Power Transmission and Control	3
FOE 471 Production Analysis in Forestry	2
FOE 472 Planning and Control of Forestry Operations	2
FOE 473 Forest Roads and Structures	3
BRE 460 Power and Machinery	3
BRE 491 Design Project I	1
BRE 492 Design Project II	2
BRE 493 Design Project III	1
<b>TOTAL HOURS</b>	<b>31</b>



<b>Forestry</b>				<b>Humanities and Social Sciences</b>	
FTY 105 Introduction to Forest Measurements	3	FTY 407 Forest Ecology	3	Economics	6
FTY 255 Forest Inventory and Growth	3	FTY 408 Silviculture	2	Electives	16
FTY 241 Field Practice in Forest Management	3	FTY 409 Forest Ecology and Silviculture Field Laboratory	2	<b>TOTAL HOURS</b>	<b>22</b>
FTY 441 Advanced Field Practice in Forest Management	3	FTY 446 Forest Policy and Planning	3		
		FTY 470 Forest Management	3		
		FTY 450 Forest Resources Valuation	3	<b>TOTAL CREDIT HOURS REQUIRED FOR GRADUATION: 135 + 6 (May Term)</b>	
		<b>TOTAL HOURS</b>	<b>28</b>		





## General Engineering

### Courses in General Engineering

#### GEE 101 Introduction To Engineering Design I

Graphic principles, concepts, and techniques involving applied problems and creative exercises in orthographic projection, dimensioning, and stress analysis. Exercises will be done in the form

of sketches or created in 2D/3D form using CADD software. Lec and Rec 4. Cr 3.

#### GEE 302 Introduction to Microcomputer-Aided Design

The engineering design process utilizing the microcomputer as a tool in vector graphics, descriptive geometry, three-dimensional rotation

for area and volume calculations, and statistical graphs. A creative design project incorporating the microcomputer to produce a set of working drawings is required. Prerequisite: GEE 101. Lec 1, Lab 4. Cr 3.





## Mechanical Engineering

Professor Grant (Chairperson)

Professors Lyman, Hill, Rivard, Sucec

Associate Professors Boyle, Chapman, Johnson, Matthews, Poland, Sayles

Assistant Professors Caccese, Dewhurst

This program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Mechanical engineering is responsible for applying and creating knowledge in the fields of mechanics and thermal science. Mechanics is the study of the interaction between forces and objects, the transmission of forces through materials, the motions and deformations that fluid and solid materials receive from applied forces. Thermal science is the study of the methods of producing high temperature sources and refrigerated regions of thermal energy, and the transmission and use of this energy and its conversion to other useful forms such as electricity and the motion of vehicles.

The program provides the education needed for the pursuit of professional careers in both mechanics and the thermal science-based activities of mechanical engineering. The program has 10 elective courses among the total of 40 courses required for the degree. By careful use of this flexibility, students may pursue in depth their particular interests in technical and non-technical subjects. Student design and experimental projects are a learning-by-doing characteristic of the program's senior year. This breadth and flexibility results in a wide choice of opportunities upon graduation, including law, medicine, and business administration.

Mechanical engineers are employed in all industries. Their activities include equipment and product design and development, field installation and service of equipment and systems, manufacturing processes design and management, sales, research, teaching, and administration. Many graduates become self-employed as professional consulting engineers or operators of their own technically-based companies.

### Graduate Work in Mechanical Engineering

Programs leading to the degrees of master of science in mechanical engineering and master of engineering (mechanical) are described in the University of Maine Graduate School Catalog.

### Double Major: Mechanical and Electrical Engineering

A student who earns a BSME can earn a BSEE by taking the additional courses: ELE 171, 172, 211, 212, 262, 300, 314, 323, 342, 343, 351, 383, 400, and the mathematics elective. ELE 212 can be used to replace ELE 224 in the mechanical en-

Mechanical Engineering Curriculum			
First Year			
First Semester		Second Semester	
MAT 126 Analytic Geometry and Calculus	4	MAT 127 Analytic Geometry and Calculus	4
PHY 121 Physics for Engineers and Physical Scientists I	4	PHY 122 Physics for Engineers and Physical Scientists II	4
GEE 101 Introduction To Engineering Design	3	MEE 150 Applied Mechanics: Statics	3
ENG 101 English Composition Elective*	3	COS 215 Introduction to Computing Using FORTRAN	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>17</b>
Sophomore Year			
First Semester		Second Semester	
MAT 228 Analytic Geometry and Calculus	4	MAT 258 Differential Equations	4
CHY 113 Chemical Principles I	4	ELE 215 Electric Circuit Fundamentals	3
MEE 230 Thermodynamics I	3	MEE 231 Thermodynamics II	3
MEE 251 Strength of Materials	3	MEE 270 Applied Mechanics: Dynamics	3
Elective*	3	Elective*	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>16</b>
Junior Year			
First Semester		Second Semester	
ELE 224 Instrumentation	4	MEE 320 Materials Engineering and Science	3
MEE 340L Machine Tool Processing	2	MEE 341 Mechanical Laboratory I	3
MEE 360 Fluid Mechanics	3	MEE 381 Design II	3
MEE 380 Design I	3	MEE 456 Introduction to Computational Methods	3
Elective*	3	ENG 317 Technical Writing	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>
Senior Year			
First Semester		Second Semester	
MEE 342 Mechanical Laboratory II	2	MEE 343 Mechanical Laboratory III	2
MEE 387 Design III	4	MEE 388 Design IV	4
MEE 432 Heat Transfer	3	Elective*	3
Elective*	3	Elective*	3
Elective*	3	Elective*	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>

\*The curriculum contains 10 elective courses, six of which (18 credit hours) must be approved humanities or social sciences, and four must be technical with the courses selected from specified groups. Lists of courses qualifying for the electives are available in the mechanical engineering office.

gineering curriculum. In addition, any of the courses ELE 314 Linear Circuits and Systems, ELE 342 Electronics I, ELE 343 Electronics II, ELE 351 Fields and Waves, or ELE 323 Energy Transmission and Conversion can be used to

satisfy the Group 2, Engineering Science, elective requirement in the mechanical engineering curriculum.

A student who earns a BSEE can earn a BSMI by taking the additional courses GEE 101, MEI



10, 230, 231, 251, 270, 340L, 341, 342, 343, 360, 381, 387, 388 and 432. Several of these can also satisfy technical elective requirements in the electrical engineering curriculum.

A minimum of one extra year will be required for the double major regardless of whether the basic degree is in mechanical or electrical engineering.

## Mechanical Engineering Department Cooperative Education Program

The Mechanical Engineering Department provides students the opportunity to participate in a cooperative education course, MEE 394. The course is under the direction of a mechanical engineering co-op coordinator who monitors the student's progress in the course. The course requires that design project work be assigned by the cooperating company or agency.

## Pulp and Paper Option in Mechanical Engineering

This senior year mechanical engineering and fourth year pulp and paper program is described in the Chemical Engineering section of this catalog. It leads to the BSME degree and the pulp and paper certificate.

## Courses in Mechanical Engineering

### MEE 150 Applied Mechanics: Statics

Study of force systems and equilibrium, structural models, friction, distributed forces. Designed to develop the ability to analyze and solve engineering problems. Rec 3. Cr 3.

### MEE 230 Thermodynamics I

Covers energy and energy transformations, the first and Second Laws applied to systems and control volumes, thermodynamic properties of systems, availability of energy. Prerequisite: MAT 127. Rec 3. 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. Prerequisite: MEE 230, COS 215 or equivalent. Rec 3. 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. Prerequisite: MEE 150, MAT 127 and COS 215 or equivalent. Rec 3. 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. Prerequisite: MAT 127. Rec 3. 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. Prerequisite: MEE 150 or MEE 252, and MAT 228. Rec 3. 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. Prerequisite: MEE 230 and MEE 251. Rec 3. Cr 3.

### MEE 340L Machine Tool Processing

Topics include: the characteristics and operation of machine tools, numerically controlled machining, computer directed machining from memory contained blueprints. Lab 3. Cr 2.

### 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. Prerequisite: MAT 259, MEE 251 and MEE 360. Rec 1, Lab 3. Cr 3.

### MEE 342 Mechanical Laboratory II

A continuation of MEE 341. Mechanical engineering problems in a laboratory setting. Prerequisite: MEE 231, MEE 341 or permission. Lab 3. Cr 2.

### MEE 343 Mechanical Laboratory III

A continuation of MEE 342. Mechanical Engineering problems in a laboratory setting. Prerequisites: MEE 231, MEE 341, MEE 342 or permission. Cr 2.

### MEE 360 Fluid Mechanics

Includes fluid statics, kinematics, Bernoulli equation, free-surface flow, viscosity, friction, dimensional analysis and similitude, and an introduction to compressible flow. Prerequisite: MEE 230, MEE 270 and MAT 259. Rec 3. Cr 3.

### MEE 380 Design I

Kinematical design of machines. Prerequisite: MEE 270. Rec 3. Cr 3.

### MEE 381 Design II

Includes analysis of mechanical elements. Advanced concepts in mechanics of materials, stress concentration, fatigue, factor of safety. Introduction to creative synthesis and economic design. Prerequisite: MEE 251 or MEE 252, MAT 259. Rec 3. Cr 3.

### MEE 383 Turbomachine Design

Topics include: the theory and design of turbomachinery flow passages, control and performance of turbomachinery, gas-turbine engine processes. Prerequisite: MEE 230. Rec 3. Cr 3.

### MEE 384 Power Plant Design and Engineering

A study of power station engineering and economy, including design, construction and

operating theory of steam, internal-combustion, and hydroelectric power plants. Introduction to nuclear power plants, solar energy, fuel cells, and associated problems. Prerequisite: MEE 230. Rec 3. Cr 3.

### MEE 385 Heating and Ventilating System 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 designs, layout and control. Prerequisite: MEE 230. Rec 3. Cr 3.

### MEE 386 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 387 Design III

Design of mechanical engineering systems components, including problem definition, analysis, synthesis and optimization. Prerequisite: MEE 231, MEE 381; MEE 432 concurrently or permission. Rec 4. Cr 4.

### MEE 388 Design IV

Design of mechanical engineering systems, including problem definition, analysis, synthesis and optimization. Prerequisite: MEE 231, MEE 381, MEE 432. Rec 4. Cr 4.

### MEE 394 Mechanical Engineering Practice

Full-time engineering design work with companies participating in the Mechanical Engineering Department Cooperative Education Program. (Pass/Fail Grade Only). Cr 3.

### MEE 397 Seminar

Rec 1. Cr Ar.

### MEE 421 Metallography

Covers methods of preparation of metal specimens for optical microstructure examination, microstructure interpretation, effect of processes on microstructure, photomicroscopy, microhardness testing. Includes experimental problems. Prerequisite: MEE 320 or permission. Lab 6. Cr 3.

### MEE 422 Thermal and Mechanical Processing of Engineering Metals

Explores microstructure and mechanical property control of carbon and alloy engineering steels, tool steels, stainless steels, cast irons and selected nonferrous alloys through heat treatment and mechanical working. Constraints imposed on design, fabrication, and service environment by processing and failure analysis also covered. Prerequisite: MEE 320. Rec 3. 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. Prerequisite: MAT 259 and MEE 360. Rec 3. 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. Prerequisite: MEE 230. Rec 3.

Cr 3.

**MEE 434 Thermodynamic Design of Engines**

An introduction to combustion, with applications to the design of propulsion systems, such as gas turbines, I-C engines, rocket engines. Prerequisite: MEE 231. Rec 3.

Cr 3.

**MEE 435 Internal Combustion Engines**

Application of thermodynamic laws and principles to internal combustion engine cycles, design and operation; fuels and combustion, carburetion, detonation, cooling, and lubrication. Prerequisite: MEE 230. Rec 3.

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. Prerequisite: MEE 251. Rec 2, Lab 2.

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. Prerequisite: MEE 251. Rec 3.

Cr 3.

**MEE 456 Introduction to Computational Methods**

Introduces numerical methods for solution of partial differential equations. Existing and prepared programs are applied to engineering problems in heat transfer, solid mechanics, and fluid dynamics. Prerequisite: MAT 259. Rec 3.

Cr 3.

**MEE 457 Advanced Application of the Finite Element Method**

Applies the finite element method to problems in Mechanical Engineering including flow in porous media, transient and steady state heat transfer, linear/nonlinear problems in viscous flow, solid mechanics and dynamics problems. Emphasis on use of available computer pro-

grams to solve specific physical problems. Prerequisite: MEE 456 or permission. Rec 3.

Cr 3.

**MEE 461 Compressible Fluid Flow I.**

Fundamental equations and concepts considered in isentropic flow, normal shock waves, flows in constant area ducts, and generalized one-dimensional continuous flow. Prerequisite: MEE 230 and MEE 360. Rec 3.

Cr 3.

**MEE 462 Fluid Mechanics II**

Considers flow in multiple-pipe systems, boundary-layer flows, inviscid incompressible flow, compressible flow, open-channel flow. Prerequisite: MEE 360. Rec 3.

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. Prerequisite: MEE 270 and MAT 259. Rec 3.

Cr 3.

**MEE 472 Advanced Dynamics**

Covers particle dynamics, planetary motion, projectiles, variable mass motion, angular momentum, impact; generalized constraints, coordinates and forces; Hamilton's principle, Lagrange's equations; gyroscopes. Prerequisite: MAT 259 and MEE 270. Rec 3.

Cr 3.

**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 523 Fatigue Failure**

Examines mechanisms of metal fatigue, and metallurgical, mechanical and environmental factors. Covers methods of failure analysis. Prerequisite: MEE 320 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 554 Theory of Elasticity**

Includes plane stress and plane strain, stress function; problems in Cartesian and polar co-

ordinates; photo-elasticity, strain energy; three-dimensional problems. Prerequisite: MAT 259 and MEE 251. Rec 3.

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 or permission.

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 non-linear vibrations. Prerequisite: 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 434.

Cr 3.

**Interdisciplinary Course****INT 485 (MEE, PSY) Human Factors Engineering**

Introduces theoretical bases and practical applications of Human Factors Engineering and Man-Machine Systems Analysis. Prerequisite: third year standing in any field of engineering or permission.

Cr 3.



## Military Science

Professor of Military Science LTC Porter  
 Instructors CPT Fofi, CPT Bucchin, MAJ Toderico, MSG DeRaps, SFC Gernaey  
 Supply Technician Mr. Smith

### General

The Department of Military Science conducts general military science education at two levels, basic and advanced military studies. MS I and II level courses are open to all university students. Students taking 100 and 200 level courses are under *no obligation to the U. S. Army in any way!* Students may take MS courses at the 300 and 400 level with the permission of the Professor of Military Science. Students wishing to contact and pursue a commission in the U.S. Army as a Second Lieutenant may do so in one of three ways: 1. be selected and accept an ROTC scholarship, 2. complete MIS 101, 102, 201 and 202 classes with a grade of C or better, be recommended by the MS II advisor and sign a contract either the end of their sophomore year or during the first semester of their junior year, 3. complete "basic camp" at Fort Knox, KY, during the summer between their sophomore and junior year, at which time the student is eligible to contract if he/she desires to do so.

### The Advanced Course

The Advanced Course is open to students who have been accepted by the professor of military science and have completed the Basic Course or the equivalent. Students must complete the courses numbered greater than 300. In addition, students are required to attend a six-week ROTC Advanced Camp at Fort Bragg, North Carolina, between their junior and senior years. In exceptional cases, ROTC Advanced Camp may be deferred by the Professor of Military Science until the student completes the senior year. Students receive \$100.00 a month and may be commissioned in either the Army Reserve, Army National Guard or Active Army.

### Scholarship Program

The Department of Army offers four, three and two year Guaranteed Reserve Forced Duty and Basic Comp ROTC scholarships to selected students, regardless of enrollment in the Military Science Program, who have demonstrated outstanding leadership and scholastic ability. These scholarships pay full tuition for the respective number of years at the University, mandatory fees, a stipend for textbooks, and \$100 per month during the academic year for the duration of the scholarship. Four year scholarship winners (with 1100 SAT Score) or three-year Advance designated Scholarship winners (with 1200 SAT Score) who attend the

University of Maine will receive an *additional \$1,000 per year grant* from the University.

### Simultaneous Membership Program

Students who are members of the Army National Guard or the Army Reserve and who have completed basic training may qualify for entry into the Advanced Course upon completion of their sophomore year and have 4 academic semesters remaining. The student is automatically advanced to the pay grade of E-5 in his or her Guard/Reserve unit upon entering the ROTC program and receives training as a "third lieutenant." Upon completion of the Advanced Course, the student is eligible to be commissioned as a Second Lieutenant in the National Guard, Army Reserve, or Active Army.

### Professional Military Education Courses

All ROTC cadets must complete the following undergraduate *type* courses. (CCR145-3)

1. Written Communication Skills.
2. Human Behavior Skills.
3. Military History.
4. Computer Literacy.
5. Math Reasoning.

Recommended Courses:

1. Management Skills.
2. National Security Studies.

All colleges will accept up to 15 credit hours of Military Science courses as free electives towards degree completion, except the College of Arts and Humanities, College of Sciences and the College of Social and Behavioral Sciences which accepts only Advanced Course credits (10) and the College of Education which requires students to meet with their advisors to determine course applicability toward program requirements. All Military Science credits count towards a student's overall GPA.

### Areas of Specialization

Military Science	Credits
MIS 040 Mountain School	0
MIS 050 Northern Warfare School	0
MIS 060 Air Assault School	0
MIS 070 Airborne School	0
MIS 100 Leadership Laboratory (R-O)	0
MIS 101 Introduction to Leadership (R-O)	1

(R) Required  
 (R-O) Required-Optional depending on specific commissioning program  
 (E) Elective

MIS 102 Introduction to the United States Army (R-O)	1
MIS 105 Military Physical Fitness (E)	1
MIS 201 Basic Military Skills (R-O)	1
MIS 202 Orienteering (R)	1
MIS 290 Basic Camp (RO)	6
RPM 300 Global Wilderness Survival (E)	3
MIS 310 Advanced Leadership (R)	3
MIS 320 Advanced Tactics (R)	3
MIS Advanced Camp (R)	0-6
MIS 410 Military Management and Justice (R)	3
MIS 420 Leadership and Ethics (R)	3
<b>TOTAL</b>	<b>15-21</b>

### Courses in Military Science

#### MIS 040 Mountain School

A 22 day school conducted in Vermont stressing basic mountaineering training, ropes, knots and rappelling as appropriate to the training conditions. Available only to students in the ROTC Program. (Pass/Fail Grade Only). **Cr 0.**

#### MIS 050 Northern Warfare School

A 30 day school conducted at the Northern Warfare school in Alaska. Available only to students in the ROTC Program. (Pass/Fail Grade Only). **Cr 0.**

#### MIS 060 Air Assault School

A 10 day school conducted at Ft. Campbell, Kentucky, on the tactical utilization of Army Helicopters. Available only to students in the ROTC Program. Students who graduate are awarded the Army Air Assault Badge. (Pass/Fail Grade Only). **Cr 0.**

#### MIS 070 Airborne School

A 3 week school conducted at Fort Benning, Georgia. Available only to students in the ROTC Program. Students who graduate are awarded the Army Parachutist Badge. (Pass/Fail Grade Only). **Cr 0.**

#### MIS 100 Leadership Laboratory

Required for all regular program cadets. Cadets develop and improve military leadership skills. Includes continuous counselling and periodic evaluations of cadet performance. In case of class conflicts an alternate Leadership Lab will be arranged. (Pass/Fail Grade Only). **Cr 0.**

#### MIS 101 Introduction to Leadership: Theory and Application

Includes study and discussions of leadership concepts, traits, beliefs, values, and ethics. Pro-



vides increased self-confidence through physical training in rappelling, mountaineering skills, leadership reaction course, and first aid. Practical application of leadership skills in classroom and outdoor laboratory environments. Leadership self assessment paper required. Participation in Leadership Laboratory (MIS 100) is suggested but optional. **Cr 1.**

#### **MIS 102 Introduction to the United States Army**

Considers past and current Army leaders and contrasting styles of leadership, the politics of leadership at increasing levels of responsibility and introduces the organizational structure role of the Army. Provides awareness and study of physical fitness and mental health interrelation. Develops communication skills to improve individual performance and group interaction. Participation in Leadership Lab (MIS 100) required. **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 Basic Military Skills**

Study and practice in military skills required during completion of the Army ROTC Basic Course: Physical Fitness Program Planning, Military Correspondence, Oral Briefings and Communications, Command and Staff Functions, Basic Military First Aid and the Leadership Assessment Program. Subjects promote understanding of the Roles and Organization of the Army, World Military Powers, and the Principles of War. The Leadership Assessment Program investigates leadership techniques and the processes used in leadership situations. Participation in Leadership Lab (MIS 100) is required. **Cr 1.**

#### **MIS 202 Orienteering**

A study of map reading and land navigation based on the sport of Orienteering and using topographic maps and compasses to study and practice navigation skills. Participants will need

appropriate outdoor clothing and may experience rigorous physical activity. Participation in Leadership Lab (MIS 100) is suggested but optional. **Cr 1.**

#### **MIS 290 ROTC Basic Camp**

A 6 week summer camp conducted at Fort Knox, Kentucky. The student receives pay, and travel costs are defrayed by the Army. No military obligation 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. Satisfies all Basic Course requirements. Four different cycles offered during the summer, but 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. **Cr 6.**

#### **MIS 310 Advanced Leadership and Army History (1770 to 1898)**

Examines advanced principles of leadership applicable to both civilian and military careers. Includes fundamentals of leadership theory, psychology of leadership, leadership environment, interpersonal communication and contemporary human problems. Historical survey of U.S. Army, its leadership and contributions into the formative period of America history, 1770-1898. Participation in Leadership Laboratory (MIS 100) and FTX's is required. **Cr 3.**

#### **MIS 320 Advanced Tactics**

Covers rifle squad, platoon level tactics including offensive and defensive tactics, squad and platoon level patrolling skills, operation orders, combined arms tactics, field fortifications, camouflage and concealment at squad and platoon level. Students participate in intensive physical training, primary marksmanship instruction, land navigation skills and other basic soldier level training in preparation for attending Advanced Camp the summer between their junior and senior year. Participation in Leadership Laboratory (MIS 100) and FTX's is required. **Cr 3.**

#### **MIS 390 ROTC Advanced Camp**

A 6 week camp conducted at Fort Bragg, NC. The student receives pay. Travel costs are defrayed by the U.S. Army. Environment is highly structured, stressing physical training and basic tactical training at squad and platoon leadership levels. Individual leadership training is evaluated throughout the full training period. Training includes: advanced land navigation skills, marksmanship training, tactical training, combined arms demonstrations, Army branch orientation and air mobile operations. Eight different cycles are offered during the summer. Participation in a structured physical fitness program during the spring semester prior to attending advanced camp is required. (Pass/Fail Grade Only). **Cr 0-6.**

#### **MIS 410 Military Management, Justice and Leadership Assessment**

Training management including preparation of training schedules and Battalion Training Management System. Military Law at the unit level and higher, non-judicial punishment and the Uniform Code of Military Justice, the uses and requirements of the Army installation and post support system, and the function and manipulation of the Army logistics system. Utilization of simulations to assess leadership potential through recognition, classification, and evaluation of behavior; feedback to provide basis for behavioral modification. Participation in Leadership Laboratory (MIS 100) and FTX's is required. **Cr 3.**

#### **MIS 420 History (WWI to present), Leadership and Ethics Seminar**

A consideration of military ethics including situations ranging from peacetime conduct to wartime activities through training and writing projects as well as case studies. Includes intensive investigation of the rules and regulations governing conduct during war, the staffing and operations of larger units, U.S. Army history from WWI to the present. Participation in Leadership Laboratory (MIS 100) and FTX's is required. **Cr 3.**



## Naval Science

Professor of Naval Science CDR Willey  
Associate Professor CDR Radner  
Assistant Professors LT Born, LT Burpee, LT Gale

### General Information

The Naval ROTC program is designed to train and educate well-qualified students for ultimate commissioning and active service as officers in the United States Navy and United States Marine Corps. In order to be eligible for application for this program a student must:

- be a U.S. citizen
- be at least 17 but less than 21 years of age
- be physically qualified
- possess satisfactory records of academic ability and moral integrity
- demonstrate those characteristics desired of a Naval Officer; and
- have no moral obligation or personal conviction that will prevent the bearing of arms.

The NROTC Scholarship Program offers the following benefits: all tuition paid, books furnished, \$100 per month subsistence allowance during the school year and a substantial uniform allowance. Graduates of this program receive regular commissions in the United States Navy and Marine Corps and are required to serve on active duty for four years. High school students may apply for the national scholarship program between March 1st of their junior year to November 15th of their 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 in a UM may also be eligible for non-national scholarships. Call the NROTC unit at 581-1551 for further information.

The NROTC College Program offers students not selected to receive a scholarship an opportunity to participate in NROTC. The monetary benefits of the College Program include: a substantial uniform allowance and \$100 per month subsistence allowance during their junior and senior class years. Graduates of the

College Program receive reserve 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. For further information concerning either program, contact your local Navy recruiter or the NROTC unit. (Telephone: 207-581-1551)

### Courses in Naval Science

#### NAV 101 Introduction to Naval Science

Examines the historical development of the Navy, the development of seapower, and its application in today's geopolitical world. Introduces the many career paths available in aviation, surface warfare, nuclear power, and the Marine Corps. Focus on the responsibilities of a naval officer, the Navy's mission, general military information. **Cr 2.**

#### NAV 102 Naval Ships Systems I (Engineering)

Examines the engineering systems currently in use aboard a U.S. Naval Ship. Emphasis on shipboard propulsion systems with additional coverage of auxiliary equipment and ship structural design. **Cr 3.**

#### NAV 200 Sailtraining

This course will be conducted through the use of various U.S. Navy ships, ashore training facilities and primarily onboard the unit's sail training yachts. Includes approximately 3 weeks aboard the yachts. **Cr 3.**

#### NAV 201 Naval Ships Systems II (Weapons)

An indepth study of the theory and principles of operation of contemporary naval weapons systems. Includes coverage of weapons system types, capabilities and limitations; theory of target acquisition, identification and tracking; trajectory principles; basics of naval ordinance. **Cr 3.**

#### NAV 202 Seapower and Maritime Affairs

An overview of United States Naval History. Introduces the nature of the Soviet challenge in the oceans of the world and explores current trends in maritime developments. **Cr 3.**

#### NAV 301 Navigation and Naval Operations I

Provides the prospective Naval Ensign with a fundamental understanding and practical working capability in safe navigation. Includes a comprehensive treatment of coastal piloting and an introduces celestial and electronic navigation methods. **Cr 3.**

#### NAV 302 Navigation and Naval Operations II

Considers the functions and responsibilities of the Junior Naval Officer in the areas of shipboard operations and administration. Includes a comprehensive study of Naval communications procedures, formation maneuvering, replenishment at sea, fundamentals of three dimensional warfare and a thorough overview of inland and international rules. Prerequisite: NAV 301. **Cr 3.**

#### NAV 303 Naval Leadership and Management I

A study of effective management and leadership with focus on the human side of the complex, formal organizational reality of the Navy. **Cr 3.**

#### NAV 304 Naval Leadership and Management II

A study of the duties, responsibilities, and overall authority of a newly commissioned Naval Officer including personnel and equipment management, counseling and interviewing, performance appraisal, the Navy Human Resource Management Support System, military law and division administration. **Cr 3.**



## Surveying Engineering

Professor Tyler, (Chairperson)

Professor Frank

Associate Professors Ehlers, Hintz, Leick, Onsrud

Assistant Professor Beard-Tisdale, Egenhofer

Faculty Associates Mundo

### Undergraduate Program

The Department of Surveying Engineering offers a four-year undergraduate program leading to a bachelor of science degree in surveying engineering. Surveying Engineers design and use automated systems and techniques for efficiently collecting, processing, analyzing and disseminating spatial information about land and natural resources. Earth-orbiting satellites, cameras and digital imaging systems and computers capable of handling very large data sets are a few of the tools used by surveying engineers. Particular emphasis is placed on understanding and evaluating the quality of information. Surveying Engineers play a key role in both the protection of the environment and in the wise utilization of the nation's resources. They are involved in the design and construction of the nation's housing, roads, utilities and other built facilities.

The surveying engineering undergraduate program provides scientific and technical background and analytic capabilities necessary for the professional practice of surveying in its broadest sense. Included are the sub-disciplines of boundary surveying, cadastral systems, cartography, engineering surveying, geodesy, geographic information systems, hydrographic surveying, image processing, land information management, land use planning, photogrammetry, remote sensing and resource mapping.

Surveying engineers may work in large cities or in remote wilderness areas. They may be located in modern office buildings or in exposed outdoor locations. Some graduates of this program work for large multi-national corporations while others have elected to work for small firms in rural areas using their skills to address local problems. A few graduate are self employed in the surveying, mapping and land information fields. Although the curriculum provides thorough preparation for an effective professional career, graduates may also further their education with graduate programs in surveying engineering or they may do graduate work in law, business, or related engineering disciplines.

The program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

### Graduate Programs in Surveying Engineering

The Department of Surveying Engineering offers programs of study and research leading

to Master of Science (thesis), Master of Engineering (non-thesis) or Doctor of Philosophy degrees in Surveying Engineering. Descriptions of the programs and general requirements for the advanced degrees can be found in the graduate school catalogue.

### Courses in Surveying Engineering

#### SVE 101 Introduction to Surveying

An overview of the profession of surveying including the institutions of property and ownership, land survey and recording systems, professionalism, surveying in the United States, the present and future role of surveyors, the relationships between surveyors and users of surveying expertise. Lec 1. Cr 1.

#### SVE 111 Plane Surveying

Introduces plane surveying concepts including reference planes and surfaces, distance and angular measurement, traverse computations, horizontal and vertical curves, error propagation, area determination and stadia mapping. Prerequisite: high school trigonometry. Lec 3, Lab 3. Cr 4.

#### SVE 112 Advanced Plane Surveying

A continuation of SVE 111 including horizontal control networks, state plane coordinate systems, surveying, astronomy, earthwork computations and engineering surveys. Prerequisite: SVE 111, MAT 126. Lec 3, Lab 3. Cr 4.

#### SVE 221 Legal Aspects of Land Surveying

Covers property law, boundary law, conveyance of property, recording systems and procedures, interpretation and writing of land description. Prerequisite: SVE 111. Lec 3. Cr 3.

#### SVE 222 Land Surveying

Covers boundary law, U.S. public land system, subdivision layout, design permit requirements and procedures. Prerequisite: SVE 221. Lec 3. Cr 3.

#### SVE 271 Introduction to 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 trans-

formations, and analysis. Prerequisite: Sophomore standing. Lec 2, Lab 1. Cr 3.

#### SVE 281 Advanced Computer Usage for Surveyors

The first half of the course is an extensive introduction to operating systems using Digital equipment's VMS and system utilities and PASCAL programming on the VAX. Includes discussion of the file system and compilation processes, and software engineering tools. The second half of the course introduces FORTRAN programming with applications in the area of matrix algebra, non-linear equations (iterative solutions), and other numerical aspects. Examples are taken from photogrammetry and geodesy problems. Includes uses of systems libraries such as IMSL and Calcomp. Prerequisites: COS 220, MAT 127. Lec 3. Cr 3.

#### SVE 321 Cadastral Systems

Covers concepts of property, land tenure and land ethics, land registration systems, the function and design of multi-purpose cadastres, political, economical and social constraints of land information systems. Introduction to management concepts. Prerequisite: sophomore standing. Lec 3. Cr 3.

#### SVE 331 Photogrammetry

Includes procedures and methods used for deriving metric information from photographs, analogue 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. Prerequisite: SVE 111. Lec 2, Lab 3. Cr 3.

#### SVE 361 Adjustment Computations

Covers least squares adjustment as applied to surveying, propagation of random errors and variance-covariance propagation, observation equation model, conditions between parameters, sequential solutions, observed parameters, minimal constraint solutions, statistical tests, laboratories. Some concepts from linear algebra and statistics reviewed. Prerequisite: MAT 258, MAT 262 or consent, SVE 281. Lec 3. Cr 3.

#### SVE 393 Junior Seminar

Selected topics of current interest within the surveying profession are discussed by outside speakers and enrolled students. Juniors in Surveying Engineering must research, prepare and present a paper to receive credit. The seminar is



open to anyone who chooses to attend. Prerequisite: junior standing or permission. Lec 1.

Cr 0-1.

#### SVE 394 Field Practice

Work experience in surveying engineering through the cooperative education program. Prerequisite: sophomore standing and 2.5 GPA.

Cr 3.

#### SVE 411 Hydrographic Surveying

Examines functions of hydrographic instruments operating from different types of marine platforms as well as the planning and operational aspects of hydrographic surveys. Emphasis on measurement instruments for position, tidal control and depth and magnetic, bottom, water and geological parameters. Prerequisites: SVE 112, MAT 228, SVE 441. Lec 3.

Cr 3.

#### SVE 425 Land Development Design

Advanced design covering all phases of the land development process. Site evaluation includes consideration of boundary surveys, topographic surveys, control surveys, soil analysis, hydrographic analysis, traffic evaluation, plus environmental, aesthetic and cultural considerations. Students design lot and building arrangements and design all streets, drainage channels, detention basins, culverts, and consider the layout of sanitary and storm sewers. Prerequisite: Senior standing in SVE or CIE with at least one of the following: SVE 112, CIE 350, CIE 455. Lec 3, Lab 3.

Cr 4.

#### SVE 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. Prerequisite: SVE 331, SVE 361 or equivalent. Lec 3, Lab 3.

Cr 4.

#### SVE 433 Remote Sensing

Provides definition and overview of remote sensing, sensors, signatures and information. Topics include: electromagnetic radiation and interactive mechanisms, photographic systems, photometry and spectroradiometry, electro-optical sensors, non-imaging sensors, radar system, space platforms, information systems, processing, interpretation, application and practical utility of remotely sensed data, term project. Prerequisite: MAT 228, PHY 122. Lec 3, Lab 1.

Cr 4.

#### SVE 441 Geodetic Models

Include 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 com-

## Surveying Engineering Curriculum

First Year			
First Semester		Second Semester	
SVE 111 Plane Surveying	4	SVE 112 Advanced Plane Surveying	4
SVE 101 Introduction to Surveying	1	ENG 101 College Composition	3
MAT 126 Analytic Geometry and Calculus	4	MAT 127 Analytic Geometry and Calculus	4
CHY 113 Chemical Principles I	4	PHY 121 Physics for Engineers and Physical Scientists I	4
ECO 120 Principles of Microeconomics	3	ECO 121 Principles of Macroeconomics or Humanities/Social Sciences Elective (2)	3
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>18</b>
Sophomore Year			
First Semester		Second Semester	
SVE 221 Legal Aspects of Land Surveying	3	SVE 281 Advanced Computer Usage for Surveyors	3
MAT 228 Analytic Geometry and Calculus	4	SVE 321 Cadastral Systems	3
PHY 122 Physics for Engineers and Physical Scientists II	4	MAT 434 Introduction to Statistics	4
COS 220 Introduction to Computer Science I	3	MAT 258 Introduction to Differential Equations and Linear Algebra	4
SVE 271 Introduction to Geographic Information Systems	3	Humanities/Social Science Elective (2)	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>17</b>
Junior Year			
First Semester		Second Semester	
SVE 361 Adjustment Computations	3	SVE 441 Geodetic Models	4
SVE 451 Engineering Databases	4	SVE 432 Advanced Photogrammetry	4
SVE 331 Photogrammetry	3	SVE 452 Geometry and Computer Graphics	4
GES 101 Aspects of the Natural Environment I	OR	SVE 393 Junior Seminar	1
GES 106 Geology for Engineers Humanities/Social Science Elective (2)	4	ENG 317 Advanced Professional Exposition	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>16</b>
Senior Year			
First Semester		Second Semester	
SVE 433 Remote Sensing	4	SVE 425 Land Development Design	4
ARE 473 Land Economics Engineering Science/Design Elective	3	SVE 493 Senior Seminar	1
Engineering Science/Design Elective	3	ARE 474 Land Use Planning Engineering Science/Design Elective	3
Engineering Science/Design Elective	3	Free Elective (2)	3
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>15</b>

MINIMUM CREDIT HOURS: 130

#### Electives:

1. 18 credit hours of humanities and social sciences are required for graduation. Of the 18 required credits, it is required that the humanities program must contain at least one 9-hour sequence in a specific sequence include at least two upper level courses.
2. Free electives are any technical or non-technical courses offered for credit by any academic unit of the University.



plex variables. Prerequisite: MAT 228, SVE 111, SVE 281. Lec 3, Lab 1. Cr 4.

#### **SVE 451 Engineering Databases and Information Systems**

Students develop a theoretical foundation for representation of knowledge in information systems. Logic based programming considered as a tool for fast prototyping and design of data structures. Also covers 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. Prerequisite: COS 220 and SVE 281 or permission. Lec 3, Lab 1. Cr 4.

#### **SVE 452 Geometry and Computer Graphics**

A study of analytical geometry on computer systems, including representation of topological and metric properties of two dimensional geometric structures. Overview of raster based systems. Examines computer graphics hardware, design of device independent programs for graphics output, coordinate systems and transformation, principles of effective visual communication and their applications. Prerequisite: SVE 451 or permission. Lec 3, Lab 1. Cr 4.

#### **SVE 493 Senior Seminar**

Presentations by students and faculty of pertinent happenings in surveying. Discussions based upon term projects, literature reviews, current events, or thesis topics. Professional practice and ethics are explored with members of the surveying community. Each participant prepares and moderates a seminar session. A paper is required. Prerequisite: senior standing or permission. Lec 1. Cr 1.

#### **SVE 496 Surveying Engineering Practice**

Applies theoretical concepts introduced in previous surveying, geodesy, photogrammetry and adjustments to the solution of comprehensive problems in surveying engineering. Emphasis on laboratory work including field observations. Prerequisite: SVE 112, SVE 361, SVE 432, SVE 542. Lec 2, Lab 3. Cr 3.

#### **SVE 498 Selected Studies in Surveying Engineering**

Topics in surveying, photogrammetry, remote sensing, land information systems, and geodesy not covered in other courses. Content varies. May be repeated for credit, with departmental permission. Prerequisite: permission. Cr 1-3.

#### **SVE 499 Senior Thesis**

Required for seniors in Surveying Engineering. Students select an area of study, perform a full literature search, conduct the necessary research and report results in thesis format. The

thesis must meet University format requirements. Prerequisite: senior standing. Lec 1. Cr 3.

#### **SVE 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. Prerequisite: permission. Lec 3. Cr 3.

#### **SVE 531 Analytical Photogrammetry**

Considers optimization of data collection for control extension by photogrammetry and semi-analytical and analytical methods of aerotriangulation. Examines reliability considerations in large blocks of aerial photographs. Covers real-time and a posteriori blunder detection techniques including sparsity of equations in large blocks of photographs, recursive partitioning techniques, self-calibration in aerotriangulation, analytical applications in digital imagery, techniques in stereo-correlation. Prerequisite: SVE 361, SVE 432. Lec 3. Cr 3.

#### **SVE 532 Close Range Photogrammetry**

Topics include network optimization in non-topographic mensuration, auxiliary constraints in photogrammetric adjustments, methods of calibration of close-range cameras, use and limitations of non-metric cameras, accident and crime scene reconstruction, applications in architecture, construction, industry, mining, biomedicine, X-ray photogrammetry, and scanning electron microscopy. Prerequisite: SVE 361, SVE 432. Lec 3. Cr 3.

#### **SVE 533 Image Processing in Remote Sensing**

Introduction to image processing techniques suitable to the processing of remotely sensed data. Topics include 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; multispectral imaging concepts, supervised and unsupervised classification techniques, clustering; Fourier transforms, intensity-hue-saturation transform; interfaces to image processing systems. Prerequisite: SVE 433. Lec 2, Lab 2. Cr 3.

#### **SVE 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. Prerequisite: SVE 361. Lec 3. Cr 3.

#### **SVE 542 Integrated Geodesy**

Topics include: measurement of gravity and gravity gradients; gravimeters; reduction due to height, terrain, and tides; isostasy; normal gravity fields, geodetic reference systems, height systems, spirit leveling and gravity; elements of potential theory, spherical harmonic expansions of global fields such as geoid undulations, deflections of the vertical, gravity anomalies; Bruns, Stokes and Meinesz formulae; the integrated geodetic model; local geoid from GPS satellites and gravity. Prerequisite: SVE 361. Lec 3. Cr 3.

#### **SVE 551 Interactive Query Languages**

Covers types of interactive query languages, specific needs in Land Information System applications, transformation between the database conceptual schema and user views. Advanced topics (e.g. automatic name placement, generalization). Prerequisite: SVE 452. Lec 3. Cr 3.

#### **SVE 552 Interactive Land Information Systems**

Advanced treatment of the interactive input and update of data in a Land Information System. Emphasis on treatment of consistency constraints (including geometrical consistency constraints) and solution to a conceptual simple model of interaction with the user. Prerequisite: SVE 551. Lec 3. Cr 3.

#### **SVE 561 Advanced Adjustment Computations**

Topics include: condition equation model, mixed model, generalized inverses of matrices, inner constraint solutions; multi-dimensional normal distributions and confidence regions; generalized linear hypothesis testing; internal and external reliability of geodetic networks; blunder detection and data snooping; variance component estimation; deformation networks and analysis; large systems (banded and patterned normal matrices, reordering). Prerequisite: SVE 361. Lec 3. Cr 3.

#### **SVE 598 Selected Studies in Surveying 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.



## School of Engineering Technology

Professor McDonough (Director)  
 Professors Crosby, Hamilton, Hayes  
 Associate Professors Elliott, Furbish, Gould, Gray, Johnston, Metcalf  
 Assistant Professors Dvorak, Hermansen, Viger, Walk  
 Instructor Madden  
 Lecturers Johnson, Newman

Engineering technology programs are offered at both the Associate's and Bachelor's Degree. Matriculation will normally be in the bachelor's program. The associate degree is available upon request.

### Associate of Science in Engineering Technology

Associate degree programs are offered in civil, electrical, and mechanical engineering technology. The programs are designed to develop technical competence for a career as an engineering technician, and as a basis for further study. The three programs are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology. (TAC/ABET)

#### Graduation Requirements

- 1. An accumulative average of 2.0 in all major courses (i.e., CET, EET, MET).
- 2. An accumulative average of 2.0.
- 3. Passing grades in all other required courses in the program of study.
- 4. A minimum of 62 degree hours (depending on program).

### Bachelor of Science in Engineering Technology

Bachelor's programs are offered in bio-resource engineering technology, construction management technology, electrical and mechanical engineering technology. The programs are designed to prepare students for practical work in the application of scientific and engineering principles in the solution of practical problems. The BSEET and BSMET programs are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.

#### Graduation Requirements

1. An accumulative average of 2.0 in all major courses (i.e., CET, EET, MET).
2. An accumulative average of 2.0.
3. Passing grades in all other required courses in the program of study.
4. A minimum of 64 degree hours beyond the associate degree studies (depending on program).

### Transfer Credit

All students who transfer to the School of Engineering Technology from another institution must earn a minimum of 18 hours of Orono courses to qualify for the A.A.S. degree, and 36 hours of Orono courses to qualify for the B.S. degree.

Degree credit will be allowed for appropriate courses in which grades of "C" or above have been received from accredited *degree* programs. Degree credit is not allowed for courses taken in certificate or diploma programs.

All students who transfer to the School of Engineering Technology B.S. programs with an appropriate Associate degree from a TAC/ABET accredited program (Technology Accreditation Commission of the Accreditation Board for Engineering and Technology) will receive full credit for that degree.

Evaluation of all such courses and programs for approval of degree credit and possible equivalency rests with the Director of the School of Engineering Technology.

### Bachelor of Science in Bio-Resource Engineering Technology

The B.S. in Bio-Resource Engineering Technology is offered by the faculty of the Department of Bio-Resource Engineering.

The curriculum provides training in specific aspects of engineering technology together with instruction in business, economics, computing and accounting. It is designed to prepare graduates for jobs in the application of equipment, systems and technologies to the production, processing, shipping, storage and handling of food and fiber products from agriculture, forestry, fisheries and aquaculture.

Graduates will find employment as managers or maintenance supervisors of production and processing facilities, technical representatives for machinery and equipment companies, and support, testing or installation personnel for manufacturers, material suppliers, processors, contractors and primary producers.

This degree requires satisfactory completion of at least 124 degree hours at an accumulative grade point average of not less than 2.0 in a course of study which conforms to the following curriculum.

Graduates of the associate degree programs in the College of Engineering who are qualified

for transfer into baccalaureate programs may transfer up to 60 credits for courses in which they have received a grade of "C" or better. Two additional years will be required to complete the degree of Bachelor of Science in Bio-Resource Engineering Technology.

### Civil Engineering Technology

The Associate Degree curriculum is designed to provide the student with a basic grounding in the physical and mathematical sciences, engineering graphics, computer usage, communication skills, surveying, materials testing, structures, highways and construction. In addition to these basic courses, students specialize in one of two tracks: the construction track or the surveying track. The construction track offers additional courses in construction techniques and construction management and the surveying track offers additional courses in advanced surveying topics.

These specialized studies are coordinated to prepare the associate degree graduate as an engineering technician in the areas of surveying, materials testing, structural engineering, public works engineering and construction engineering. The emphasis in all work is on the practical applications and aspects of civil engineering design and construction. Employment opportunities are excellent for the well-trained civil engineering technician.

### Construction Management Technology

The Bachelor of Science Degree program in Construction Management Technology was implemented in the Fall of 1988. The first two years of study follow the Civil Engineering Technology Construction Track (see Construction Curriculum). The second two years of study provide a solid background in construction management, accounting, and economics. The program prepares graduates for supervisory and management positions in building and heavy and highway construction. Graduates employed by construction contractors, administrators, construction managers, architects/engineers and owners who are involved in the construction process in both the private and public sectors. Electives are available in 221 East Annex.



## Electrical Engineering Technology

This curriculum is designed to provide a strong background in the fundamentals, and a broad exposure to a variety of subject areas in the electrical field. Based on solid preparation in circuit analysis, mathematics, physics, and computer techniques, the student will take applied courses in digital and linear electronics, communications, microprocessors, power systems and control systems. All EET courses have a strong practical orientation, and nearly all courses are supplemented with hands-on laboratory experience. Subject matter is generally similar to that covered in the electrical engineering curriculum, with less emphasis on mathematical and theoretical rigor, and a greater bent to the applied.

Electrical engineering technology graduates are intended to fill a niche between the technician and the design engineer; graduates find professional entry-level positions in the production engineering, manufacturing engineering, field engineering, test engineering, and quality control fields, as well as related areas, in such firms as public utilities, paper mills, electronics manufacturers, etc. Students enter the bachelor of science program upon admission; after successful completion of the first four semesters, the student may elect to receive the associate of science degree.

## Mechanical Engineering Technology

The field of mechanical engineering technology includes mechanical design, manufacturing processes, energy utilization, such as power generation and heating or air conditioning buildings, and the economics of these activities. Students also obtain a solid basic sciences, mathematics, communication skills and the humanities.

Classes emphasize applied engineering and are supplemented by extensive laboratory experience. Students enroll in a four year program leading to a Bachelor of Science degree in Mechanical Engineering Technology. Students may elect at the end of the sophomore year to receive an associate degree in mechanical engineering technology. Students are urged to obtain technical employment during each summer recess. Participation in an optional Co-op program is also encouraged. Graduates work in a wide range of careers including product development, design, testing, manufacturing, operation and maintenance, marketing, sales and administration.

## Courses in Engineering Technology

### CET 101 Elementary Surveying

A study of surveying instruments and their use in the measurement of angles and distances including methods and computations for control, topographic and engineering surveys. Preparation of topographic maps, profile and cross section sheets. Corequisite: MAT142A. Lec 3, Lab 3.

Cr 4.

### CET 102 Advanced Surveying

Introduces photogrammetry and boundary surveying. Covers subdivision computations and layout, higher-order control surveying, state plane coordinates, construction surveying. Prerequisites: CET 101 and MAT142A. Lec 3, Lab 3.

Cr 4.

### CET 121 Materials Properties and Testing

The study and testing of the properties of materials (timber, steel, asphalt, concrete, and aggregates) used in civil engineering construction. Also introduces elementary statistics in the eval-

uation of data from tests of construction materials. Prerequisite: PHY 111. Lec 3, Lab 2. Cr 4

### CET 130 Construction Drawing

A study of basic building structural systems materials, and methods, and the graphical representation of same in the most customary forms of construction drawings as prepared by architects, engineers, and contractors. Prerequisite: GET 121. Lec 2, Lab 2. Cr 3

### CET 211 Structural Mechanics

Considers analytical solutions of force systems. Load, shear, moment and deflection values are

## Curriculum for B.S. Degree in Bio-Resource Engineering Technology

First Year			
Fall Semester		Spring Semester	
BRE 268 Computer Aided Drafting and Design	3	BRE 229 Basic Shop Techniques	2
ENG 101 English Composition	3	ARE 123 Micro-Computer Applications for Agriculture	3
ASA 117 Issues and Opportunities	1	MAT 164A Analytical Geometry and Introductory Calculus	3
ARE 148 Economics	3	SPC 103 Fundamentals of Public Communications	3
MAT 142A Algebra & Trigonometry	3	PHY 112 General Physics II 4 SPTAB2 = OR	4
PHY 111 General Physics I 4 SPTAB2 = OR	4	PHY 108 Basic Physics	4
PHY 107 Basic Physics	4	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>17</b>		
Second Year			
Fall Semester		Spring Semester	
BRE 220 Introduction to Bio-Resource Engineering		EET 210 Curcuits, Machines, and Electronics	4
ARE 138 Agribusiness Accounting I	3	ENG 317 Technical Writing	3
BCH 207 Fundamentals of Chemistry	4	MET 150 Statics	3
MAT 246A Introductory Calculus	4	Humanities Electives	3
<b>TOTAL HOURS</b>	<b>14</b>	Technical Electives	3
		<b>TOTAL HOURS</b>	<b>16</b>
Third Year			
Fall Semester		Spring Semester	
BRE 235* Water Supply and Waste Management	3	BRE 236* Power	3
BRE 281 Elementary Plane Surveying	1	BRE 237* Automation and Process Control	3
MET 233 Thermodynamics	3	BRE 238* Electrification	3
MET 219 Strength of Materials	3	MET 355 Materials	3
Humanities Elective	3	Technical Elective	3
Technical Elective	3	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>16</b>		
Fourth Year			
Fall Semester		Spring Semester	
BRE 231* Processing Machinery	3	BRE 232* Buildings and Environment	3
BRE 233 Fluid Power Technology	3	BRE 239* Processing Technology	3
BRE 380 Senior Seminar	1	Humanities Elective	3
BUA 220 The Legal Environment of Business	3	Technical Elective	3
Technical Elective	3	Technical Elective	3
Technical Elective	3	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>16</b>		
<b>TOTAL CREDITS FOR GRADUATION: 124</b>			
* These courses are taught alternate years so may be taken in either the third or fourth years.			



lved for in beams, trusses, and frames under static loading. Study of stresses and strains that occur as structural members are subjected to shearing, tensile, compressive and flexural stresses. Prerequisite: PHY 111, COS 100 or equivalent. Lec 4. Cr 4.

#### CET 212 Structural Design

Design of wood beams and columns and of steel beams, columns and tension members and reinforced concrete beams. Covers building code requirements for loads including dead, live, snow, wind and earthquake. Introduction to dynamics including single degree of freedom systems, resonance, damping and lumped mass modeling of buildings. Prerequisite: CET 211. Lec 3, Lab 2. Cr 4.

#### CET 220 Selected Topics in Civil Engineering Technology

Topics in Engineering Technology not regularly covered in other courses. Content is varied to suit individual needs. May be repeated for credit. Prerequisite: permission. Cr 1-4.

#### CET 222 Construction Materials

Continued study of the properties of materials used in civil engineering construction. Emphasis on soils including index properties, classification systems, moisture, drainage, frost action, and site investigations. Prerequisite: CET 121. Lec 2, Lab 2. Cr 3.

#### CET 226 Principles of Construction Estimating and Scheduling

Principles and application of construction cost estimating and construction scheduling (CPM). Prerequisite: CET 130. Lec 3. Cr 3.

#### CET 231 Construction Technology

Considers construction technology at the production management level including equipment utilization and costs, temporary structures, construction systems, formwork design and construction inspection. Prerequisite or corequisite: CET 212. Lec 3, Lab 2. Cr 3.

#### CET 232 Civil Works Technology

Topics related to civil engineering site work, highway engineering, drainage, heavy construction and public works including roadway design, construction, earthwork for heavy construction, hydraulics, hydrology, open channel flow, pipe flow sewers, utilities, and public works operations. Prerequisite: CET 102 or permission. Lec 2, Lab 3. Cr 3.

#### CET 240 Civil Management Technology

Office aspect of civil engineering management including basics of contract law, writing specifications for a contract and interpreting specifications for inspection, professional ethics, arbitration and the engineer as an expert witness, distinguishing relationships in partnerships and corporations. Lec 3. Cr 3.

#### CET 252 Surveying Communications

Topics include legal descriptions, surveying reports, layout plans, topographic mapping,

### Surveying Curriculum

First Semester		Second Semester	
CET 101 Elementary Surveying	4	CET 102 Advanced Surveying	4
COS 100 Introduction to Personal Computers	3	CET 121 Materials, Properties and Testing	4
GET 121 Technical Drawing	3	CET 252 Surveying Communications	3
MAT 142A Algebra and Trigonometry	3	MAT 164A Analytical Geometry and Introductory Calculus	3
PHY 111 General Physics I	4	PHY 112 General Physics II	4
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>18</b>
Third Semester		Fourth Semester	
CET 211 Structural Mechanics	4	CET 212 Structural Design	4
ENG 101A Critical Written Expression	3	CET 232 Civil Works Technology	3
MAT 246A Introductory Calculus	4	CET 240 Civil Management Technology	3
SVE 221 Legal Aspects of Land Surveying	3	SPE 101A Oral Communications	3
SVE 271 Introduction to Geographic Information Systems	3	SVE 321 Cadastral Systems Humanities/Social Science Elective	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>19</b>

TOTAL DEGREE HOURS REQUIRED FOR ASSOCIATE DEGREE: 71

### Construction Curriculum

First Semester		Second Semester	
CET 101 Elementary Surveying	4	CET 102 Advanced Surveying	4
COS 100 Introduction to Personal Computers	3	CET 121 Materials, Properties and Testing	4
GET 121 Technical Drawing	3	CET 130 Construction Drawing	3
MAT 142A Algebra and Trigonometry	3	MAT 164A Analytical Geometry and Introductory Calculus	3
PHY 111 General Physics I	4	PHY 112 General Physics II	4
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>18</b>
Third Semester		Fourth Semester	
CET 211 Structural Mechanics	4	CET 212 Structural Design	4
CET 222 Construction Materials	3	CET 231 Construction Technology	3
CET 226 Principles of Construction Estimating and Scheduling	3	CET 232 Civil Works Technology	3
ENG 101A Critical Written Expression	3	CET 240 Civil Management Technology	3
MAT 246A Introductory Calculus	4	SOC 101 Introduction to Sociology	3
<b>TOTAL HOURS</b>	<b>17</b>	SPE 101A Oral Communications	3
		<b>TOTAL HOURS</b>	<b>19</b>

TOTAL DEGREE HOURS REQUIRED FOR ASSOCIATE DEGREE: 71

boundary retracement plats, digitizing information, GIS/LIS, development design plans, highway plans, site plans and layout plans. Prerequisite: CET 102, GET 121. Lec 2, Lab 2. Cr 3.

#### CET 310 General Architectural Design Technology

A study of Owner-Designer-Builder relationships and their involvement and responsibilities during the various phases and activities associated with the evolution and construction of

major building projects. Prerequisites: CET 240, CET 226. Lec 3. Cr 3.

#### CET 320 Construction Methods and Equipment

General engineering principles are applied to problems related to heavy, highway, and foundation construction. Topics include excavation, embankments, support of excavation, dewatering, pile driving, heavy lifting, mass concreting. Prerequisites: CET 212, CET 222, CET 231, CET 232. Lec 3. Cr 3.



**CET 322 Computer Applications in Construction Management**

The use of programs for microcomputers, including database management, spreadsheet analysis, and project management. Prerequisite: CET 226, CET 320, COS 100. Lec 1, Lab 4. Cr 3.

**CET 394 Construction Management Technology Practice**

Cooperative work experience at full-time employment for at least a continuous 10 week period. Junior or senior standing in CMT program. Summers only. (Pass/Fail grade only). Cr 3.

**CET 452 Construction Documents and Administration**

An advanced study of technical documents such as drawings, specifications, contracts, documents, etc., and administrative procedures which govern the work of construction projects. Prerequisites: CET 240, CET 310. Lec 3. Cr 3.

**CET 454 Contractor's Business Practices**

A detailed study of contractor's methods for operating a construction firm at the project and headquarters levels. Topics include licensing, bonding, financing, financial reports, estimating, bidding, contracting, subcontracting, purchasing, cost and schedule controls, and billings. Prerequisites: BUA 201, CET 240, CET 322. Lec 3. Cr 3.

**CET 458 Management of Construction**

This is the capstone course for Construction Management Technology. Principles of management are applied at the project, activity, and task level to examine human and mechanical factors that affect productivity. Reports and case study analyses are used to illustrate principles. Prerequisites: BUA 331, CET 452, CET 454, ECO 121, ENG 317, SPC 257. Lec 3. Cr 3.

**CET 460 Advanced Construction Estimating**

A detailed study of the construction contractor's bid estimating process, including calculation of labor and equipment cost rates, crew cost rates and productivity, unit costs, and project and general overhead costs. Students prepare a complete bid estimate. Other topics include historical costs, cost indexing, processing and analysis of subcontractor quotations, and conceptual estimating. Prerequisite: CET 226. Lec 3. Cr 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. Prerequisite: junior or senior standing. Cr Ar.

**EET 111 Circuit Analysis I**

A non-calculus based introduction to elementary circuit analysis techniques as applied to d-c networks including the basic laws and theorems used in linear circuit analysis. Laboratory work stresses the proper use of d-c instruments. Corequisite: MAT142A. Lec 2, Rec 6, Lab 3. Cr 5.

**Construction Management Technology Curriculum**

The first four semesters consist of the Civil Engineering Technology Construction Track Curriculum.

**Bachelor of Science**

Fifth Semester		Sixth Semester	
BUA 201 Principles of Accounting I	3	BUA 331 Labor Management Relations	3
CET 310 General Architectural Design Technology	3	CET 322 Computer Applications in Construction Management	3
CET 320 Construction Methods and Equipment	3	ECO 121 Principles of Macroeconomics	3
MAT 215 Introduction to Statistics for Business and Economics	3	ENG 212 Intermediate Composition	3
Technical Elective	3	SPC 257 Business and Professional Communication	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>
Seventh Semester		Eighth Semester	
CET 452 Construction Documents and Administration	3	CET 458 Management of Construction	3
CET 454 Contractor's Business Practices	3	GES 106 Geology for Engineers	4
ENG 317 Technical Writing	3	GET 484 Engineering Economics	3
PSY 100 General Psychology	3	PAA 220 Introduction to Public Policy	3
Technical Elective	3	Humanities/Social Science Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>16</b>

**TOTAL DEGREE HOURS REQUIRED FOR BACHELOR'S DEGREE: 132**

**STUDENT MUST SEE ADVISOR FOR APPROVAL OF ALL ELECTIVES** Lists of approved Humanities and Technical Electives are available in 221 East Annex.

**EET 112 Circuit Analysis II**

Continuation of EET 111. A non-calculus introduction to a-c circuits, including the study of reactive components and the application of phasor analysis to singlephase and polyphase a-c circuits in the steady state. Prerequisite: EET 111. Corequisite: MAT164A. Lec 3, Rec 3, Lab 3. Cr 5.

**EET 200 Electrical Engineering Technology Seminar**

Exploration of topics important to the career development of EET students, such as career opportunities, structure and organization of industry, and professional responsibilities. Prerequisite: sophomore standing in the EET program. (Pass/Fail Grade Only). Lec 1. Cr 1.

**EET 241 Linear Electronics I**

Topics include: principles of operation of semiconductor diodes, transistors, and FETs, applications to rectifier and filter circuits, d-c analysis and design of transistor and FET amplifiers, a-c analysis and design of transistor amplifiers. Prerequisite: EET 112. Lec 3, Lab 3. Cr 4.

**EET 242 Linear Electronics II**

A continuation of EET 241, including application. Covers amplifier frequency analysis, power amplifiers, PNP devices, linear integrated circuits, voltage regulators, feedback and oscillators. Prerequisite: EET 241. Lec 3, Lab 3. Cr 4.

**EET 271 Digital Electronics I**

A study of logical design and analysis using Boolean algebra, Karnaugh maps and Quine-McCluskey procedures as applied to combinational logic circuits. Introduces elementary concepts of sequential logic circuit analysis and synthesis. Lec 3, Lab 3. Cr 4.

**EET 274 Introduction to Microcomputers**

Introduction to the programming of the microcomputer in machine and assembly language. The basic architecture of the microcomputer is introduced, including microprocessors, registers, control units, memory and I/O. Prerequisite: COS 100. Corequisite: COS 220 or COS 215. Lec 3, Lab 3. Cr 4.

**EET 282 Electronic Communications**

Fundamentals of communications electronics circuits and systems, emphasizing modulation and detection, transmitters and receivers, transmission lines, multiplexing, pulse systems, and data communications. Prerequisite: EET 241, MAT246A. Lec 3, Lab 3. Cr 4.

**EET 312 Linear Systems I**

A rigorous treatment of waveform analysis, voltage-current relationships of circuit components, the basic time domain circuit, circuit analysis by Laplace transforms, and system considerations. Prerequisites: EET 112, MAT 368A. Lec 3. Cr 3.



**EET 315 Electrical Circuits**

Electrical concepts; steady-state analysis of DC and AC circuits; first-order transients. Prerequisite: PHY 112, MAT164A. MET juniors or permission. Lec 3. Cr 4.

**EET 321 Electrical Machinery**

Theory, performance characteristics and basic operational control of DC and AC machines, including basic theory and application of power transformers. Introduction to per-phase and per-unit analysis. Prerequisite: EET 112. Corequisite: MAT 368A. Rec 3, Lab 3. Cr 4.

**EET 322 Power Systems I**

Examines control of AC and DC motors including programmable controllers, industrial solid state electronics, including theory and application of four layer devices, and transducers used in control devices. Covers design of open loop control systems as well as three phase circuit analysis and analysis of power system networks by matrix algebra. Introduction to symmetric components. Prerequisite: EET 321. Lec 3, Lab/Rec 3. Cr 4.

**EET 330 Electrical Applications**

Applications of interest to students in the mechanical field, such as electrical measurements and instrumentation, motors and generators and their control, feedback control systems, and programmable logic controllers. MET juniors or permission. Prerequisite: EET 315. Lec 3, Lab 3. Cr 4.

**EET 341 Analog Integrated Circuits**

Operational amplifiers and their characteristics and applications emphasized. Voltage regulators, active filters, A to D converters, phase-locked loops, multipliers and timers are also covered. Prerequisite: EET 242. Lec 3, Lab 3. Cr 4.

**EET 372 Digital Electronics II**

Theory and application of digital electronics with emphasis on sequential circuit analysis and synthesis and asynchronous and synchronous circuits. Circuits encountered in computer and other digital applications introduced. Prerequisite: EET 271. Lec 3, Lab 3. Cr 4.

**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. Prerequisite: Junior standing and permission. (Pass/Fail grade only). Cr 3.

**EET 423 Power Systems II**

Covers electric power systems, transmission lines, circuit constants, per-unit values, fault analysis, stability studies, principles of load flow control. Prerequisite: EET 322. Lec 3. Cr 3.

**EET 425 Linear Systems II**

Introduction to servomechanism theory and practical design, system performance and comparison. Prerequisite: EET 312. Lec 3. Cr 3.

**Electrical Engineering Technology Curriculum**

First Semester		Second Semester	
COS 100 Introduction to Personal Computers	3	EET 112 Circuit Analysis II	5
EET 111 Circuit Analysis I	5	GET 121 Technical Drawing	3
ENG 101A Critical Written Expression	3	MAT 164A Analytical Geometry and Introductory Calculus	3
MAT 142A Algebra and Trigonometry	3	PHY 112 General Physics II	4
PHY 111 General Physics I	4	SPE 101A Oral Communications	3
<b>TOTAL HOURS</b>	<b>18</b>	<b>TOTAL HOURS</b>	<b>18</b>
Third Semester		Fourth Semester	
COS 215 Introduction to Computing Using FORTRAN	3	EET 200 Electrical Engineering Technology Seminar	1
COS 220 Introduction to Computer Science I	(3)	EET 242 Linear Electronics II	4
EET 241 Linear Electronics I	4	EET 274 Introduction to Microcomputers	4
EET 271 Digital Electronics I	4	EET 282 Electronic Communications	4
ENG 230A Business, Professional and Technical Writing	3	Humanities/Social Science Elective	3
MAT 246A Introductory Calculus	4	<b>TOTAL HOURS</b>	<b>16</b>
<b>TOTAL HOURS</b>	<b>18</b>		
<b>TOTAL DEGREE HOURS REQUIRED FOR ASSOCIATE DEGREE: 70</b>			
Fifth Semester		Sixth Semester	
EET 321 Electrical Machinery	4	EET 312 Linear Systems I	3
EET 341 Analog Integrated Circuits	4	EET 322 Power Systems I	4
EET 372 Digital Electronics II	4	EET 475 Microcomputer Applications	4
MAT 368 Ordinary Differential Equations	3	MAT 369 Applied Statistics for Engineering Technology	3
Free Elective	3	Humanities/Social Science Elective	3
<b>TOTAL HOURS</b>	<b>18</b>	<b>TOTAL HOURS</b>	<b>17</b>
Seventh Semester		Eighth Semester	
EET 423 Power Systems II	3	GET 484 Engineering Economics	3
EET 425 Linear Systems II	3	Technical Elective	3
MET 233 Thermal Science	3	Technical Elective	3
Humanities/Social Science Elective	3	Humanities/Social Science Elective	3
Science/Math Elective	3	Humanities/Social Science Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL CREDIT HOURS REQUIRED FOR BSEET DEGREE: 135</b>			

*STUDENTS MUST SEE ADVISOR FOR APPROVAL OF ALL ELECTIVES.* Lists of approved electives are available in 221 East Annex.

**EET 475 Microcomputer Applications**

A continuation of EET 274. Emphasis on the application of the microcomputer to problems in engineering technology including A/D and D/A conversion, interfacing, and the problems encountered in writing supervisory programs. Prerequisites: EET 274 and EET 372. Lec 3, Lab 3. Cr 4.

**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. Prerequisite: permission. Cr 1-4.

**GET 121 Technical Drawing**

An introduction to graphic symbols and skills applied to engineering drawings. Topics in-



clude: lettering, geometric construction, multi-view drawing, sections, graphs, dimensioning, and pictorial drawing. Lec 2, Lab 2. Cr 3.

#### GET 126 Machine Drawing

Preparation of complete working drawings of a project for MET 211. Topics include: pictorial drawings, descriptive geometry, introduction to CADD, design process, dimensioning, tolerancing, fasteners, details, and assembly drawings. Prerequisite: GET 121. Lec and Lab 4. Cr 3.

#### GET 351 Computer-Aided Design and Drafting I

Introduction to commercial CADD systems, especially microcomputer graphics hardware and software. Application of CADD software to create graphic designs and solve graphic problems. Use of a turnkey CADD system. Prerequisite: GET 121. Lec 2, Lab 2. Cr 3.

#### GET 484 Engineering Economics

A study of economic applications in engineering and industrial organizations including capitalization and amortization, planning techniques, time value of money, cost analysis, and computer modeling. Prerequisite: senior standing in SET or permission. Lec 3. Cr 3.

#### GET 485 Technology Management Practice

Theory and application of management principles as practiced by technical managers in industrial or institutional organizations. Emphasis on behavioral and quantitative techniques, network analysis, operations control, and social responsibility. Prerequisite: Senior standing in SET or permission. Lec 3. Cr 3.

#### CHY 111 General Chemistry I

Topics include: atomic and molecular structure, states and properties of matter, stoichiometry, solutions, thermochemistry, and periodic relationships. Elementary physics and high school chemistry recommended but not required. Prerequisites: High school algebra and trigonometry or MAT 122. Lec 3, Lab 3. Cr 4.

#### MAT 142A Algebra and Trigonometry

Topics include factoring and fractions, exponents and radicals, linear, quadratic, and fractional equations and inequalities, graphs and functions, linear, quadratic, rational, higher degree and trigonometric functions and solutions to triangles. Prerequisite: Engineering Technology students. Cr 3.

#### MAT 164A Analytical Geometry and Introductory Calculus

Topics include trigonometric identities and equations, inverse trigonometric functions, exponential and logarithmic function, matrix algebra, determinants, progression, elements of analytic geometry including conic sections, polar coordinates, and introductory calculus including derivative and its applications. Prerequisite: MAT 142A. Cr 3.

#### MAT 246A Introductory Calculus

Introduces fundamental concepts and applications of the derivative, as well as integration and its applications, derivatives of transcendental

Mechanical Engineering Technology Curriculum			
First Semester		Second Semester	
COS 100 Introduction to Personal Computers	3	GET 126 Machine Drawing	3
ENG 101A Critical Written Expression	3	MAT 164A Analytical Geometry and Introductory Calculus	3
GET 121 Technical Drawing	3	MET 107 Machine Tool Laboratory I	3
MAT 142A Algebra and Trigonometry	3	MET 150 Statics	3
PHY 111 General Physics I	4	PHY 112 General Physics	4
<b>TOTAL HOURS</b>	<b>16</b>	SPE 101A Oral Communications	3
		<b>TOTAL HOURS</b>	<b>19</b>
Third Semester		Fourth Semester	
INT 211 Machine Tool Laboratory II and Welding	2	EET 498 Selected Topics in MET - Circuits and Applications	4
MAT 246A Introductory Calculus	4	MET 212 Machine Tool Laboratory III & Introduction to CAM	2
MET 217 Dynamics	3	MET 234 Mechanical Technology and Laboratory I	2
MET 219 Strength of Materials	3	MET 236 Thermal Applications	3
MET 233 Thermal Science	3	MET 261 Design I	3
MET 270 Manufacturing Technology	3	Humanities/Social Science Elective	3
<b>TOTAL HOURS</b>	<b>18</b>	<b>TOTAL HOURS</b>	<b>17</b>
<b>TOTAL CREDIT HOURS REQUIRED FOR ASSOCIATE DEGREE: 70</b>			
Fifth Semester		Sixth Semester	
CHY 111 General Chemistry	4	MAT 368A Ordinary Differential Equations	3
ENG 317 Technical Writing	3	MET 325 Fluid Flow Technology	3
MET 335 Mechanical Technology Laboratory II	2	MET 357 Kinematics of Mechanisms	3
MET 355 Engineering Materials	3	Humanities/Social Science Elective	3
Technical Elective	3	Technical Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>
Seventh Semester		Eighth Semester	
GET 484 Engineering Economics	3	MET 463 Design III	3
MET 462 Design II	4	Humanities/Social Science Elective	3
MET 471 Mechanical Technology Laboratory III	3	Humanities/Social Science Elective	3
Humanities/Social Science Elective	3	Technical Elective	3
Technical Elective	3	Free Elective	3
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL CREDIT HOURS REQUIRED FOR BACHELOR'S DEGREE: 131</b>			
<i>STUDENTS MUST SEE ADVISOR FOR APPROVAL OF ALL ELECTIVES. Lists of approved electives are available in 221 East Annex.</i>			

functions and a variety of integration techniques. Prerequisite: MAT 164A. Cr 4.

**MAT 368A Ordinary Differential Equations**  
An introduction to ordinary differential equations and their applications. A brief introduction to partial differential equations. Prerequisite: MAT 246A. Rec 3. Cr 3.

#### MAT 369A 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, qu



ity control, random processes and Monte Carlo methods discussed. Also covers inferences concerning means, variance, and proportions. Prerequisite: MAT 246A or its equivalent. Cr 3.

**MET 107 Machine Tool Laboratory I**  
Theory and application of fundamental metal moving processes and basic metrology and tool nomenclature. (MET majors only). Rec 1, Lab 4. Cr 3.

**MET 109 Machine Shop and Welding**  
Fundamental bench work and light machine work using drill presses, lathes, milling machines, shapers and surface grinders. Lab 4. Cr 2.

**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. Prerequisites: MAT142A, PHY 111, and GET 21. Rec 3. Cr 3.

**MET 212 Machine Tool Laboratory III and Introduction to CAM**  
Completion and evaluation of prototype assembly. Introduction to computer aided manufacturing. Prerequisites: INT 211. Lab 3. Cr 2.

**MET 217 Dynamics**  
A study of kinematics and kinetics of particles and rigid bodies, including work and energy, impulse and momentum. Prerequisite: MET 150 or CET 211 and MAT164A. Cr 3.

**MET 219 Strength of Materials**  
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. Prerequisite: MET 150. Corequisite: MAT 246A. Rec 3. Cr 3.

**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. Prerequisite: permission. Cr 1-3.

**MET 233 Thermal Science**  
A study of elementary thermodynamics including engineering calculations relative to heat, power, work and mechanical and electrical energy. Prerequisite: PHY 112. Rec 3. Cr 3.

**MET 234 Mechanical Technology Laboratory I**  
Experimental application of solid and fluid mechanics, and thermodynamics. Covers calibration of laboratory instruments. Prerequisite: MET 233 and MET 219. Rec 1, Lab 2. 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. Prerequisite: MET 233. Rec 3. Cr 3.

**MET 261 Design I**  
A continuation of MET 219 including theories of failure, factors of safety, and design of mechanical components including design calculations for shafts, couplings, bearings, gears, belts, clutches, brakes, springs, and bolted joints. Prerequisite: MET 219. Rec 3. 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. Prerequisites: MET 107, MET 150 and sophomore standing. Rec 3. Cr 3.

**MET 318 Statics and Strength of Materials**  
Covers basic principles of statics and their application in strength of materials; force systems, equilibrium, trusses, and friction; stresses and deformations in axially loaded members, beams, circular shafts and columns. Prerequisite: PHY 111 and PHY 112, Junior/Senior standing in B/EET or permission. Rec 3. Cr 3.

**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. Prerequisite: permission. Cr 1-3.

**MET 325 Fluid Flow Technology**  
Examines fluid statics, dynamics and energy as well as flow measuring devices, fluid components and systems. Prerequisite: MAT 246A, MET 217, MET 236. Rec 3. Cr 3.

**MET 335 Mechanical Technology Laboratory II**  
An introduction to instrumentation, data analysis, and laboratory techniques. Applications to heat power, mechanical processes, and fluid mechanics. Prerequisite: MET 234. Rec 1, Lab 2. Cr 2.

**MET 339 Power Plant Technology**  
Heat power systems including steam, internal combustion engines, turbines, pumps, compressors, basic design features, power station technology and economics. Prerequisite: MET 236. Rec 3. Cr 3.

**MET 340 Heat Transfer**  
A study of energy transfer by conduction, convection, and radiation including one-and-two-dimensional steady state conduction processes in solids by use of exact solutions, shape factors, and finite differences includes use of charts for certain one-dimensional transients, electric network method for radiation analysis, experimental correlations for convection problems, steady state heat exchanger performance. Prerequisite: MAT246A and MET 233, MET 236. Rec 3. Cr 3.

**MET 355 Engineering Materials**  
The study of the composition and behavior of materials used in engineering. Materials covered include metals, plastics, wood, ceramics, and concrete. The laboratory demonstrates the effect of heat treatment on the mechanical

properties of steels. Corequisite: CHY 111. Prerequisites: MET 219, MET 234, MET major and junior standing. Rec 2, Lab 2. Cr 3.

**MET 357 Kinematics of Mechanisms**  
The study of motion, instant centers and linkages in mechanisms, cams, gears, and gear trains. Prerequisites: MET 217, MET 261. Rec 3. Cr 3.

**MET 360 Statistical Quality Control**  
The basics of statistical quality control for variables and attributes. Includes process capability, control charts, sampling plans, reliability and quality costs. In the laboratory actual parts are measured and the appropriate statistical studies and charts are made. Visits to local plants are made to witness actual production results. Prerequisites: MAT246A, MET 212, MET 270. Rec 2, Lab 2. 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. Prerequisite: MET 236. Rec 3. 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. Prerequisite: Junior or Senior standing. (Pass/Fail only). Cr 3.

**MET 462 Design II**  
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. Prerequisite: MET 261 and senior standing. Rec 3, Comp 2. Cr 4.

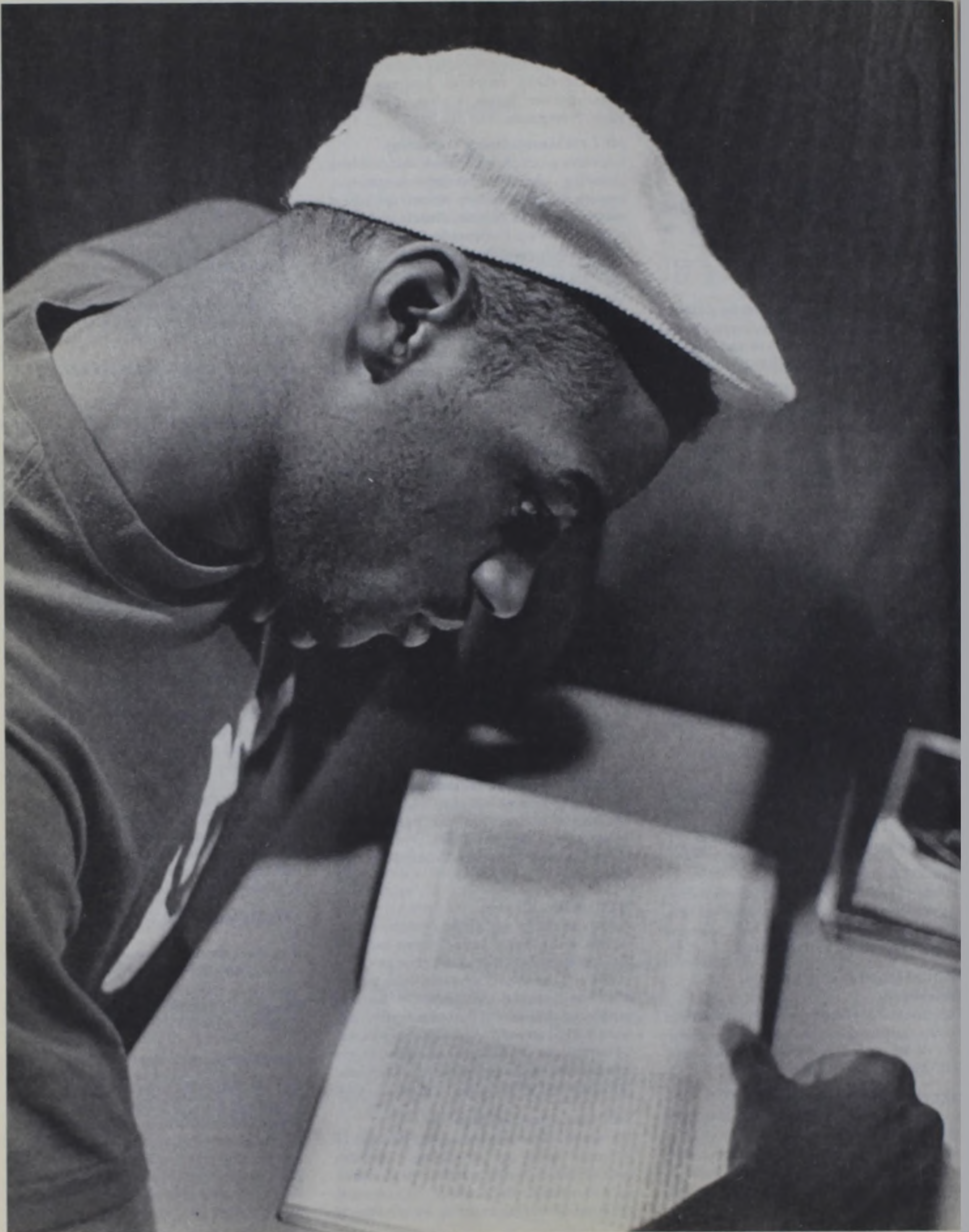
**MET 463 Design III**  
Continuation of MET 462 including drive components, welded connections, lubrication, bearings, gearing, miscellaneous machine elements and engineering materials. Prerequisite: MET 462. Rec 3. Cr 3.

**MET 471 Mechanical Technology Laboratory III**  
A project-oriented laboratory course in which the students solve technical problems similar to those encountered by technologists in industry. Prerequisite: MET 335 and senior standing. Rec 1, Lab 3. Cr 3.

#### Interdisciplinary Course

**INT 211 (BRE, MET) Machine Tool Laboratory II and Welding**  
Design and manufacture of prototype assembly. Covers advanced metrology, welding principles and practice including AC and DC stick welding, Oxy-fuel cutting and welding, GTA/GMA with iron, steel and aluminum. Prerequisite: MET 107, GET 126. Lab 4. Cr 2.







# College of Forest Resources

Bruce Wiersma, *Dean*

Katherine L. Weber, *Assistant Dean*

The mission of the College of Forest Resources is to provide education, conduct research, and apply other public services in forest engineering; forest management; forest biology; parks, recreation and tourism; wildlife; and wood science and technology in an academic unit with a proven and continuing reputation of superior performance. The College of Forest Resources provides a wide range of professional opportunities related to the management and utilization of renewable natural resources. Maine's forest resource is the foundation of the state's economy. One reason for the existence of the College is to insure a continuous flow of well-educated professionals and technicians to manage this important resource.

The forest resources programs are a combination of basic sciences and mathematics, humanities and communication, and required professional courses. The programs in forestry, forest engineering, forest management technology, recreation and park management, wood technology, and wildlife management are accredited or certified by their respective professional associations. The programs require supervised summer field sessions and/or experience.

The College of Forest Resources is divided into three departments: Forest Biology, Forest Management and Wildlife. Faculty in these departments teach both graduate and undergraduate courses and serve as academic advisors.

The Department of Forest Management offers programs leading to Bachelor of Science degrees in Forestry, Forest Engineering, Recreation and Park Management, and Wood Technology, as well as graduate degrees in Forestry and Resource Utilization.

The Department of Forest Biology offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees. Graduate education and research are available in the area of forest ecology, forest genetics, woody plant physiology, forest entomology, forest pathology, biology of wood decay and protection, and environmental physiology/morphology. Forest Biology faculty teach in the undergraduate Forestry and Wood Technology programs. The Department of Wildlife offers Bachelor, Master of Science and Doctoral Degrees in Wildlife Management.

The College has a well-developed, student-oriented counseling system. Each student has a faculty advisor who assists in program plan-

ning and career development. The goals of the student are paramount in these relationships.

## Degrees and Specializations

### Bachelor of Science

#### *In Forestry.*

Concentrations in Forest Biology, Forest Management, Forest Recreation, Timber Utilization, Forestry Business Administration (cooperative with the College of Business Administration) or through the use of minors in other disciplines.

#### *In Forest Engineering.*

Cooperative with the College of Engineering and the College of Applied Sciences and Agriculture.

#### *In Recreation and Park Management.*

Concentrations in Management, Interpretation and Tourism.

#### *In Wildlife Management.*

#### *In Wood Technology.*

### Associate of Science

#### *In Forest Management Technology*

(No new students admitted after Fall 1990)

## Admission Requirements

### Four-Year Degree Program

English	4 units
Algebra	2 units
Plane Geometry	1 unit
Trigonometry*	1/2 unit
(Required for Forest Engineering)	
Laboratory Sciences	2 units
(one must be biology, the other chemistry or physics)	
History	
OR	
Social Science	1 unit
Academic Electives	5 units
Recommended:	
Trigonometry*	1/2 unit
Computer Science	1 unit
Fine Arts	1 unit
<b>TOTAL</b>	<b>15 + 2 1/2 units</b>

### Two-Year Degree Programs

English	4 units
Algebra	2 units
Plane Geometry	1 unit

Laboratory Sciences	2 units
(one must be biology)	
History OR	
Social Science	1 unit
Electives	5 1/2 units
<b>TOTAL</b>	<b>15 1/2 units</b>

Students who plan to continue in a four-year degree program must first complete the two-year degree program with a grade point average of at least 2.5 and must satisfy the entrance requirements of the desired four-year program.

## Graduation Requirements

### Bachelor of Science Degree

Candidates Completion of course work required in the various programs in the College of Forest Resources leads to a Bachelor of Science degree. Students in Forest Engineering complete 141 credits and those in Forestry and Wood Technology must complete 136 credit hours of course work, including three to six credits during summer sessions. Wildlife Management students must complete 132 credit hours including two field courses, and the Recreation and Park Management degree requires 130 credit hours. In addition, each student must achieve a grade point average of at least 2.0 and receive a passing grade or waiver of all required courses in the program of study.

### Associate of Science Degree Candidates

For the Associate of Science degree, students must satisfactorily complete a prescribed technical curriculum with 63 credit hours earned at an accumulated grade point average of at least 2.0.

## The Honors Program

College Honors Secretary: Alan S. White

First Year Students and Sophomores of marked academic ability enrolled in all colleges are invited to apply for admission to the Honors Program. The work of the first and sophomore years, under the direction of staff drawn from all colleges of the University, provides the stimulus and guidance which should enable a superior student to begin building a balanced view of the liberal arts and sciences and to lay a foundation for more specialized work to come. The program stimulates originality, intellectual curiosity, and resourcefulness, and demands a large measure of self-reliance. The Honors Pro-



gram culminates in a written project during the senior year that treats some special area within the student's major field. Students work under the supervision of a tutor, whom they meet in

conference at regular intervals for informal discussion and advice. HON 101, 102 and HON 301, 302 may be used to meet up to nine hours of the elective humanities and social science re-

quirements of the College of Forest Resources and HON 498, 499 meet the ENG 101, 317 requirement. (For additional information see index under "Honors Programs".)





## Forest Engineering

Professors Ashley (Emeritus), Brann, Corcoran, Hoffman (Emeritus), Riley, Smith  
Associate Professors Christensen, Hedstrom, Soule

The forest engineering curriculum, a joint administrative responsibility of the Bio-Resource Engineering Department and the Department of Forest Management, combines study of basic physical sciences, mathematics, engineering, and forestry to provide students with the in-depth education necessary in a career emphasizing the design, planning, and management of tree harvesting systems, logging equipment, and environmental engineering in general.

Forest engineering is engineering in a natural environment. Forest engineers are involved in reforestation methods, systems for wood production and harvesting, handling and transportation, forest road systems, design of improvised bridges, soil-water control, and conservation and recreational development.

A unique feature of the forest engineering curriculum is that it provides the academic background necessary for full association with both professional engineering and forestry societies. Founded upon intensive study in the physical and natural sciences, the professional subject matter contained in the program is directed toward off-campus as well as on-campus study. The realities encountered in the use of mechanized logging equipment in a natural environment are recognized as the inherent constraints imposed by the interaction of technology, biology, and social order.

In addition to basic engineering and forestry courses, four specific areas of forest engineering are dealt with: forest machinery, soil and water control, forest roads and structures, and logging systems planning.

Graduates may find employment as forest engineers with companies producing forest machinery and equipment, with pulp and paper and lumber firms, and with federal and state agencies. Positions are open in research and development work, or in direct wood production and processing fields. Opportunities are nationwide in this area.

### Forest Engineering Curriculum

The curriculum in forest engineering is a joint offering of the Colleges of Engineering and Science, Applied Sciences and Agriculture, and Forest Resources. It is accredited by the Society of American Foresters and the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The curriculum requires completion of 141 degree hours (including six degree hours in Forestry Field Practice) at an accumulative degree point average of not less than 2.0.

Specimen Curriculum			
First Year			
First Semester		Second Semester	
BRE 220 Principles of Mechanization	3	BRE 255 Materials in Bio-Resource Engineering	3
FTY 105 Introduction to Forest Measurements	3	BRE 257 Computer Applications in Agricultural and Forest Engineering	3
MAT 126 Analytic Geometry and Calculus	4	OR	
CHY 113 Chemical Principles I	4	COS 220 Introduction to Computer Science	(3)
Communications Elective	3	MAT 127 Analytic Geometry and Calculus	4
<b>TOTAL HOURS</b>	<b>17</b>	PHY 121 Physics for Engineers and Physical Scientists I	4
		FTY 204 Statistical Inferences in Forest Resources	3
		<b>TOTAL HOURS</b>	<b>17</b>

The curriculum for the first year is shown in the box, above. The balance of the curriculum is made up of courses from five areas, as follows:

#### Basic Sciences and Math

CHY 113 Chemical Principles I	4
PHY 121 Physics for Engineers and Physical Scientists I	4
PHY 122 Physics for Engineers and Physical Scientists II	4
MAT 126 Analytic Geometry and Calculus	4
MAT 127 Analytic Geometry and Calculus	4
MAT 228 Analytic Geometry and Calculus	4
MAT 258 Differential Equations/Linear Algebra	4
FTY 204 Statistical Inference in Forest Resources	3
BRE 257 Computer Applications in Agricultural and Forest Engineering	3
OR	
COS 220 Introduction to Computer Science Elective*	(3)
<b>TOTAL HOURS</b>	<b>41</b>

#### Basic Engineering

BRE 281 Plane Surveying	1
OR	
*Recommended Bio-Earth Science electives include: PSE 140/140L Soil Science, BOT 101 Plant Biology, BOT 233 Dendrology, INT 256 Forest Protection	

SVE 111 Plane Surveying	(4)
MEE 150 Applied Mechanics: Statics	3
MEE 230 Thermodynamics	3
MEE 251 Strength of Materials	3
MEE 270 Applied Mechanics: Dynamics	3
MEE 360 Fluid Mechanics	3
OR	
CIE 350 Hydraulics	(4)
BRE 268 Computer Aided Drafting and Design	3
<b>TOTAL HOURS</b>	<b>19</b>
<b>Forest Engineering</b>	
FOE 206 Photogrammetry and Remote Sensing	3
FOE 453 Harvesting of Forest Crops	2
BRE 220 Principles of Mechanization	3
BRE 255 Materials in Bio-Resource Engineering	3
BRE 465 Soil and Water Engineering	3
BRE 462 Power Transmission and Control	3
FOE 471 Production Analysis in Forestry	2
FOE 472 Planning and Control of Forestry Operations	2
FOE 473 Forest Roads and Structures	3
BRE 460 Power and Machinery	3
BRE 491 Design Project I	1
BRE 492 Design Project II	2
BRE 493 Design Project III	1
<b>TOTAL HOURS</b>	<b>31</b>



<b>Forestry</b>					
FTY 105 Introduction to Forest Measurements	3	FTY 407 Forest Ecology	3	<b>Humanities and Social Sciences</b>	
FTY 255 Forest Inventory and Growth	3	FTY 408 Silviculture	2	Economics	
FTY 241 Field Practice in Forest Management	3	FTY 409 Forest Ecology and Silviculture Field Laboratory	2	Electives	
FTY 441 Advanced Field Practice in Forest Management	3	FTY 446 Forest Policy and Planning	3	<b>TOTAL HOURS</b>	
		FTY 470 Forest Management	3		
		FTY 450 Forest Resources Valuation	3	<b>TOTAL CREDIT HOURS REQUIRED FOR GRADUATION: 135 + 6 (May Term)</b>	
		<b>TOTAL HOURS</b>	<u>28</u>		





## Forest Management Technology

Professor Kimball, Coordinator

Forest industries, federal and state resource agencies, consulting forestry and landscape management firms indicate a need for highly trained forest technicians on a continuing basis. Most positions are salaried and many are supervisory in nature. Duties may include timber cruising and marking, administration of timber sales and recreation areas, or assisting in forest management and research. Much of the work is in attractive outdoor surroundings.

The curriculum stresses communications, data collection and data processing skills as well as technical forestry training. Three credits of practical field training are included. The faculty are experienced field foresters with a deep commitment to teaching and individual student advising. **NO COURSES IN FOREST MANAGEMENT TECHNOLOGY WILL BE OFFERED AFTER JUNE 1, 1992**

### Forest Management Technology Curriculum

#### Communications and Mathematics

ENG 101A Critical Written Expression 3

SPE 101A Oral Communications 3  
 ENG 230A Business, Professional and Technical Writing 3  
 MAT 141A Elementary Algebra and Trigonometry 3  
**TOTAL HOURS: 12**

#### Technical Forestry

FMT 108A Silviculture and Harvesting 3  
 FMT 101A Multiple Use and Management of Forests 2  
 FMT 206A Aerial Photo Interpretation 3  
 FMT 105A Forest Measurements 4  
 FMT 204A Wood Products Utilization 3  
 FMT 106A Forest Ecology and Dendrology 4  
 FMT 210A Urban Forestry and Arboriculture 2  
 FMT 211A Forest Protection 2  
 FMT 209A Forest Management Seminar 1  
 FMT 201A Field Measurements and Inventory 2

FMT 203A Forest Resources Field Trip 1  
 FMT 212A Forest Laws and Regulations 2  
**TOTAL HOURS: 29**

#### Supporting Subject Matter

BRE 268 Computer Aided Drafting and Design 3  
 BRE 281 Elementary Plane Surveying 1  
 BOT 101 Introductory Botany 4  
 BRE 116A Forest Machinery Systems 3  
 LNM 150A Fundamentals of Forest Soils 3  
 Technical Electives 6  
**TOTAL HOURS 20**

#### Other

Liberal Studies Electives 3

**TOTAL HOURS REQUIRED TO GRADUATE: 63**





## Forestry

### Department of Forest Management

Professor Corcoran (Chair)

Professors Ashley (Emeritus) Brann, Field, Hale (Emeritus), Hoffman (Emeritus), Shottafer

Associate Professors Kimball, Newby, Robbins, Sader, Seymour, Shepard

Assistant Professor Forster, Rice

Instructor Morin

Faculty Associates Blumenstock, Coffman, Irland, Lilley, Philp, Solomon, Vicary, Wellman

### Department of Forest Biology

Professor Greenwood (Chair)

Professors Brown, Jagels, Wiersma

Associate Professors Carter, Goodell, Livingston, Ostrofsky, White

Assistant Professors Murdoch

Faculty Associates Blum, Frank, Grimble, Saviello

### Professional Forestry Curricula

#### Forestry Core Plus a Concentration

Students may choose the general forestry curriculum (with a minor area of study), or may select from five curriculum concentrations: (a) forest management, (b) timber utilization, (c) forest biology, (d) forest recreation and (e) forest business administration. Each of these concentrations leads to a Bachelor of Science in Forestry degree. Graduates qualify for membership in the Society of American Foresters, for civil service positions with public agencies, and for employment with forest industries and other private forestry enterprises.

Forestry is, by nature, interdisciplinary, and these curriculum concentrations provide even greater assurance of a well-rounded education by requiring course work in both the sciences and humanities and by offering opportunities for student to elect of courses other than those required.

Field and work experiences are essential to forestry training. Students are advised to obtain forestry-related summer employment, and are required to attend a three-week summer camp following both the first-year and junior years.

#### Forestry Core

All students in *forestry* must complete the general forestry core curriculum. In addition, they must complete a 18-25 credit concentration, or an approved 18-credit minor plus 7 credits of technical electives.

BOT Plant Biology Elective	4
BOT 233 Dendrology	3
CHY/PHY Chemistry/Physics Electives	12
PSE 150 Forest Soil Science	3
ENG 101 College Composition	3
ENG Writing Elective	3
SPC Speech Elective	3
MAT 122 Algebra and Trigonometry, Pre-Calculus (2)	4

1. CHY 112 required in Forest Biology Concentration.

2. May enter MAT requirement directly by testing.

MAT 151 Calculus for Life Sciences I	4
ECO Economics Elective	3
COS Computer Science Elective	3
FOE 206 Photogrammetry & Remote Sensing	3
FOE 453 Harvesting of Forest Crops	2
FTY 101/102 Introduction to Forest Resources I, II	3
FTY 105 Introduction to Forest Measurements	3
MAT 232 Principles of Statistical Inference	3
FTY 208 Surveying and Mapping Requirement	3
FTY 241 Field Practice in Forest Management	3
FTY 255 Forest Inventory and Growth	3
FTY 441 Advanced Field Practice in Forest Management	3
FTY 407 Forest Ecology	3
FTY 408 Silviculture	2
FTY 409 Forest Ecology and Silviculture Field Lab	2
INT 256 Forest Protection	4
WTY 212 Wood Technology I	4
FTY 444 Forestry Economics	3
FTY 446 Forest Policy and Planning	3
FTY 470 Forest Management	3
FTY 470L Forest Management Lab	1
FTY 450 Forest Resource Valuation	3
Humanities/Social Sciences Electives	9
Free Electives	3-10
Concentration Hours	18-25
Total Hours	136

#### Concentrations

<b>Forest Management Concentration</b>	
FTY 410 Artificial Regeneration	3
FTY 457 Forest Watershed Management	3
FOE 206 Photogrammetry and Remote Sensing	3

FOE 471 Production Analysis in Forestry	2
FOE 472 Planning and Control of Forestry Operations	2
GES/PSE Geology/Plant and Soils Elective	3
RPM 352 Forest Recreation Management	3
WLM 320 Introduction to Wildlife Conservation	2
WLM 420 Forest Wildlife Management	1
<b>TOTAL HOURS</b>	<b>22</b>

#### Timber Utilization Concentration

BUA 201 Principles of Accounting I	3
FOE 471 Production Analysis in Forestry	2
WTY 314 Primary Wood Processes	4
WTY 315 Process Analysis in Forest Utilization	3
WTY 416 Wood Anatomy	3
WTY 425 Wood Technology II	3
Forest Resources Tech. Electives	3
<b>TOTAL HOURS</b>	<b>24</b>

#### Forest Biology Concentration

Forest Biology Concentration (18 Credits) is to be chosen from among the following groups of courses. Choose a minimum of 3 credits from each of at least 3 different groups:

<i>Applied Forest Ecology</i>	
FTY 410 Artificial Regeneration	3
FTY 457 Watershed Management	3
FTY 510 Forest Tree Improvement	3
FTY 532 Forest Influences	2
WLM 320 Introduction to Wildlife Conservation	2
WLM 420 Forest Wildlife Management	1
WLM 480 International Conservation	1-2
<i>Forest Protection</i>	
FTY 556 Disease and Stress in Forest Ecosystems	3



NT 443 Forest Insect Ecology	3
NT 449 Economic Entomology	3
NT 450 Agricultural Pest Ecology	3
NT 480 Pesticides and the Environment	3
SE 403 Principles of Weed Control	3
<i>Plant Physiology, Anatomy and Genetics</i>	
TY 519 Environmental Influences on Woody Plant Structure	3
TY 520 Developmental Physiology of Woody Plants	3
TY 416 Wood Anatomy	3
TY 515 Research Methods in Wood Anatomy	3
OT 435 Plant Anatomy	4
OT 445 Plant Genetics	3
OT 452 Plant Physiology	3
OT 453 Plant Physiology Laboratory	1
PSE 410 Plant Propagation	3
BCH 221 Biochemistry	3
CHY 251 Organic Chemistry	3
<i>The Physical Environment</i>	
GES 101 Aspects of the Natural Environment	4
PSE 248 Soil Organic Matter and Fertility	4
PSE 400 Bioclimatology	3
PSE 440 Soil Fertility	3
PSE 442 Soil Taxonomy	3
<b>TOTAL HOURS</b>	<b>18</b>

<b>Forest Recreation Concentration</b>	
The following courses are required of all students in the Forest Recreation Concentration:	
BRE 230 Park Service & Maintenance (SP)	3
RPM 352 Forest Recreation Mgt. (Fall)	3
RPM 452 Environmental Interpretation I: Principles (Sp)	3
PSE 429 Park Planning & Design (Fall)	3
<b>CREDITS</b>	<b>12</b>
<b>DIRECTED ELECTIVES -- (Select four)</b>	
RPM 300 Global Wilderness Survival (Fall)	3
RPM 355 Visitor Behavior & Management (Sp)	3
RPM 453 Environmental Interpretation II: Methods	3
RPM 454 Cultural Resource Management (Sp)	3
RPM 470 Principles of Tourism (Sp)	3
RPM 471 Commercial Recreation (Fall)	3
RPM 480 Wilderness & Wild River Management (Sp)	3
<b>TOTAL HOURS</b>	<b>24</b>
<b>Forest Business Administration Concentration</b>	
Professor Field, Coordinator	
Forest Business Administration is a five-year program offered jointly by the Colleges of For-	

est Resources and Business Administration. The undergraduate portion of the curriculum (which may be taken independently) leads to a Bachelor of Science in Forestry with a minor in business administration. The fifth year of the program (a prerequisite for which is successful completion of the GMAT examination) leads to a Master of Business Administration degree from the College of Business Administration. Graduates of this program are especially well-suited for employment with forest industries and private forestry enterprises, and equally well-suited for the public sector.

FBA majors must complete the same basic core requirements as other forestry majors. The program requirement's beyond the core courses are as follows:

BUA 201 Principles of Accounting I	3
BUA 202 Principles of Accounting II	3
BUA 220 The Legal Environment of Business	3
BUA 325 Principles of Management and Organization	3
BUA 335 Business Information Systems	3
BUA 350 Business Finance	3
BUA 370 Marketing	3
FOE 471 Production Analysis in Forestry	2
<b>TOTAL HOURS</b>	<b>23</b>





## Recreation and Park Management

Professor Newby

Assistant Professor Tynon

The Bachelor of Science program in Recreation and Park Management (RPM) is coordinated by the Department of Forest Management in the College of Forest Resources. The RPM curriculum offers students professional education in the management and administration of recreation park resources, and tourism. Program objectives include the development and application of skills associated with operational, administrative and managerial positions in the recreation, park management, environmental interpretation and tourism fields.

Rapidly changing social phenomena associated with leisure time, energy problems, population distributions, socioeconomic changes, and land use are creating a favorable demand for personnel trained in the management of recreation and park resources. Employment opportunities are expected to maintain a modest but steady increase over the next several years, especially in the tourism field.

In this baccalaureate degree program, students are required to take a basic core of courses in the physical, biological, and social sciences as well as in the humanities. Additional technical and professional courses in the area of specialization will be required to fulfill the requirements for a B.S. degree in Recreation and Park Management.

### Recreation and Park Management Curriculum

#### Mathematics and Physical Sciences

MAT 113 Mathematics for Business and Economics	3
COS Computer Science Elective	3
<b>TOTAL HOURS</b>	<b>6</b>
Biological Sciences	
BIO 100 Basic Biology	4
BIO 203 Field Natural History of Maine	3
BOT 233 Dendrology	4
OR	
BOT 464 Taxonomy of Vascular Plants	(4)
OR	
PSE 122 Woody Landscape Plants	(3)
WLM 200 Ecology	3
<b>TOTAL HOURS</b>	<b>14(13)</b>
Earth Science	
GES 101 Aspects of the Natural Environment I	3
PSE 150 Forest Soil Science	3
OR	
PSE 140 Soil Science	(3)
<b>TOTAL HOURS</b>	<b>6</b>

#### Social Sciences and Humanities

ARE 148 Principles of Agricultural Economics	3
BUA 201 Principles of Accounting I	3
BUA 325 Principles of Management and Organization	3
POS 100 American Government	3 OR
POS 103 State and Local Government	(3)
PAA 200 Introduction to Public Management and Bureaucracy	3
SOC 101 Introduction to Sociology	3 OR
INT 224 Sociology of Rural Life	(3)
Electives ( <i>recommended</i> ) (select one:)	3
ANT 101 Introduction to Anthropology	
HTY 477 History of the Treatment of the American Environment	
PSY 100 General Psychology	
PSY 330 Social Psychology	
<b>TOTAL HOURS</b>	<b>21</b>

#### Communications

ENG 101 College Composition	3
SPC 103 Fundamentals of Public Communication	3
Electives (select one:)	3
ENG 317 Advanced Professional Exposition	
SPC 245 Small Group Communication	
SPC 257 Business and Professional Communication	
<b>TOTAL HOURS</b>	<b>9</b>

#### Professional Preparation

BRE 230 Park Service and Maintenance	3
ARE 371 Introduction to Natural Resource Economics and Policy	3
RPM 225 Readings in Outdoor Recreation	2
FTY 349 Principles of Forest Management	3
RPM 352 Forest Recreation Management	3
RPM 452 Environmental Interpretation I: Principles	3
RPM 454 Cultural Resource Management	3
RPM 470 Principles of Tourism	3
PSE 429 Park Planning and Design	3
WLM 320 Introduction to Wildlife Conservation	2
WLM 420 Forest Wildlife Management	1

#### HPR Electives (select two):

HPR 250 First Aid and Emergency Care	
HPR 310 Outdoor Preparedness	
HPR 361 Organization and Administration of Physical Education and Recreation	
HPR 271 History and Philosophy of Physical Education and Recreation	
HPR 385 Leadership in Physical Education and Recreation	
<b>TOTAL HOURS</b>	<b>4</b>

#### Areas of Concentration

(select one:)

##### Management

ARE 474 Land Use Planning	3
BUA 220 The Legal Environment of Business	3
RPM 355 Visitor Behavior and Management	3
RPM 471 Commercial Recreation	3
RPM 480 Wilderness and Wild and Scenic River Management	3
Electives (select four):	12
BUA 350 Business Finance	(3)
BUA 370 Marketing	(3)
BUA 372 Advertising	(3)
BUA 374 Sales Management	(3)
PAA 340 Public Budgeting and Financial Administration	(3)
PAA 350 Administration of Public Personnel	(3)
POS 358 Public Opinion	(3)
Free Electives	14(13)

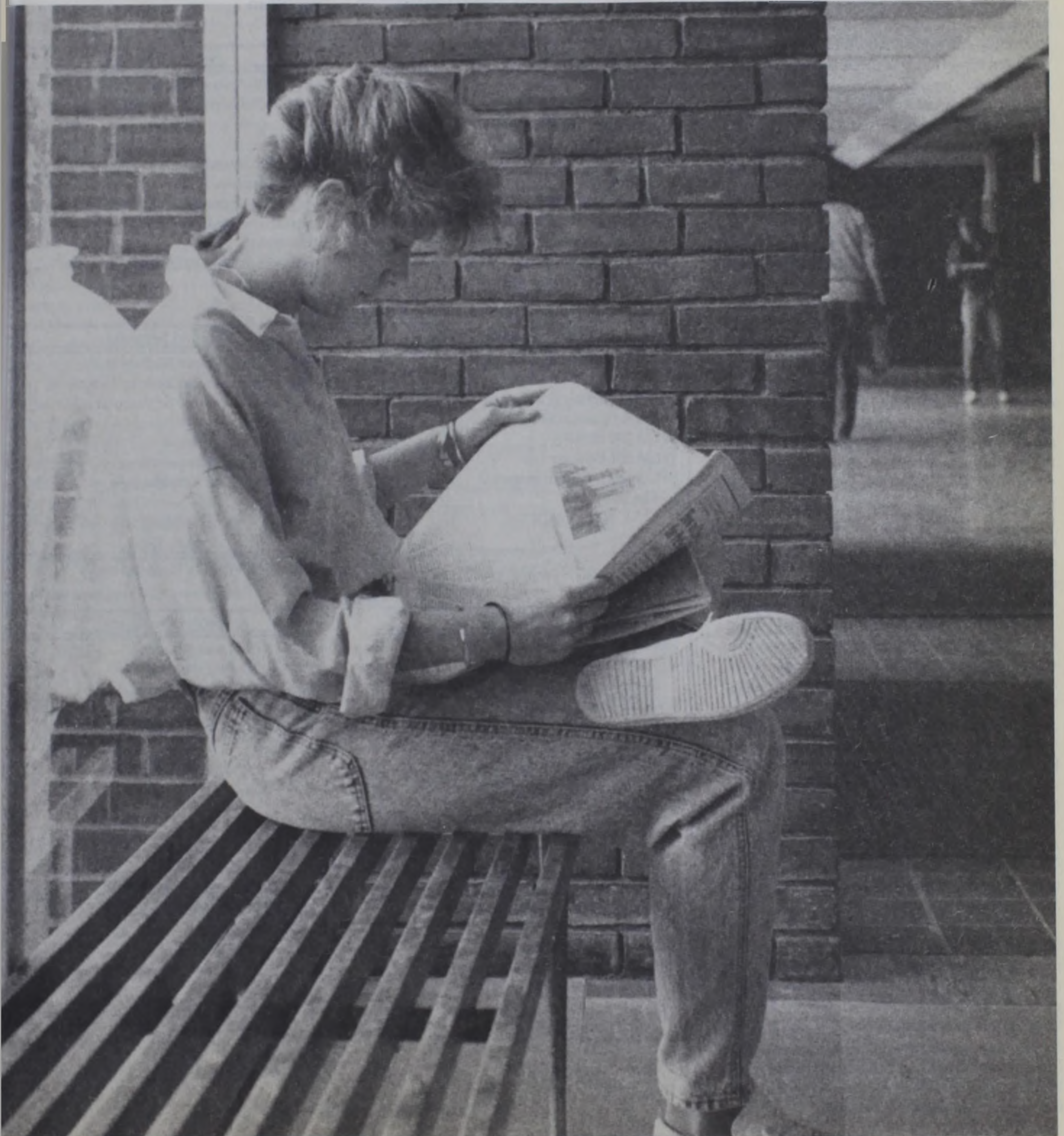
##### Interpretation

ANT 102 Introduction to Anthropology II	3
ANT 217 Introduction to Archaeology	3(4)
ANT 425 Oral History and Folklore: Fieldwork Training	4
BOT 201 Plant Biology	3
CHY 111 General Chemistry I	4
ENG 241 American Literature Survey: Beginnings Through Romanticism	3
ENT 226 Introductory Entomology	4
RPM 453 Environment Interpretation II: Methods	3
ZOL 204 Animal Biology	4
Electives (select three):	10(9)
AST 109 Introduction to Astronomy	(3)
INM 433 Instructional Media	(3)



C 216 Introduction to Photojournalism	(3)	BUA 330 Personnel Management and Industrial Relations	3	RPM 480 Wilderness and Wild and Scenic River Management	3
E 270 Oceanography Today	(3)	BUA 370 Marketing	3	Free Electives	8(7)
ism		BUA 372 Advertising	3		
E 474 Land Use Planning	3	PSE 120 Herbaceous Land Plants	3		
A 325 Principles of Management and Organization	3	PSY 100 General Psychology	3		
A 326 Dynamics of Organization and Behavior	3	RPM 355 Visitor Behavior and Management	3		
		RPM 471 Commercial Recreation	3		

MINIMUM HOURS REQUIRED FOR GRADUATION: 130





## Wildlife Management

Professor Owen (Chairperson)

Professors Gilbert, Hunter, Krohn, O'Connor, Sherburne

Assistant Professors Harrison, Servello

Faculty Associates Corr, Crawford, Dressler, Elowe, Hutchinson, Larouche, Longcore, Matula, Melvin, Wheelwright

Maine offers diverse opportunities to study wildlife in a variety of natural environments ranging from the coast with its sea birds, marine mammals, and eagles, to the more mountainous northern boreal forest occupied by moose, loons and marten. The goal of the wildlife program is to offer an education with emphasis on basic sciences and principles of natural resource management so students can develop responsible citizenship and a sound basis for individual employment as a professional wildlife biologist. Students are exposed to wildlife issues in national parks, wildlife refuges, state management areas, and small and large tracts of privately-owned land representing a diversity of ecological systems.

All students receiving a bachelor of science degree in wildlife management meet the education requirements established by The Wildlife Society and are eligible for professional certification. In addition, students also will meet the civil service requirements for federal and state positions. The curriculum is designed to permit students to emphasize one of several specialties in wildlife management or wildlife biology. Students must use at least 15 hours of free electives to study an area of concentration that is professionally related (e.g. fisheries, computer science, forestry, communications, honors, law enforcement, or teaching). Courses in these areas may be used to obtain an official minor. Also, majors must take at least two field courses.

The faculty stresses personal advising and career planning. Internships and cooperative education opportunities are available with state, federal, and private organizations and efforts are made to provide professional experience throughout the program. Students must have one approved summer professional job or internship to complete their degree. Students also are encouraged to take advantage of several exchange programs with other universities during their junior year. Student organizations such as the University of Maine Student Chapter of The Wildlife Society provide chances to work together on career-related projects and are also a focal point for social activities.

A very active wildlife graduate program, offering both M.S. and Ph.D. degrees, enables undergraduates to interact with graduate students from schools across the country. Many graduate students are affiliated with the Maine Cooperative Fish and Wildlife Research Unit, a cooperative program with the University, the Maine Department of Inland Fisheries and Wildlife, the U.S. Fish and Wildlife Service, and the Wildlife Management Institute.

Specimen Curriculum			
First Year			
First Semester		Second Semester	
BIO 100 Basic Biology	4	ZOL 204 Animal Biology	4
MAT 122 Algebra and Trigonometry, Pre-Calculus	4	MAT 151 Calculus for Life Science	4
OR		OR	
MAT 151 Calculus for the Life Sciences I	4	Elective	4
ENG 101 English Composition	3	COS 100 Introduction to Personal Computers	3
WLM 320 Introduction to Wildlife Conservation	2	WLM 100 Introduction to Wildlife Social Science Elective	3
History/Government Elective	3	Electives	4
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>15</b>
Sophomore Year			
First Semester		Second Semester	
ZOL 329 Vertebrate Biology	3	ZOL 330 Vertebrate Biology II	3
ZOL 331 Vertebrate Biology Lab	1	ZOL 332 Vertebrate Biology Lab	1
FTY 204 Statistical Inference in Forest Resources		BOT 464 Taxonomy of Vascular Plants	4
WLM 200 Ecology	3	ARE 148 Principles of Agricultural Economics	3
WLM 201 Ecology Lab	2	Literature/Fine Arts Elective	3
SPC Speech Communication Elective	3	Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>17</b>
May Term			
		WLM 250 Wildlife Field Survey	3
Junior Year			
First Semester		Second Semester	
FTY 408 Silviculture	2	WLM 410 Management of Wildlife Populations	4
FTY 409 Forest Ecology and Silviculture Field Laboratory	2	ENG 317 Advanced Professional Exposition	3
ENT 226 Introductory Entomology		CHY 112 General Chemistry II	4
OR		Electives	6
ZOL 353 Invertebrate Zoology	4	<b>TOTAL HOURS</b>	<b>17</b>
CHY 111 General Chemistry I	4		
Electives	4		
<b>TOTAL HOURS</b>	<b>16</b>		
Senior Year			
First Semester		Second Semester	
WLM 450 Wildlife Habitat Relationships	4	WLM 470 Wildlife Policy and Administration	3
ZOL 470 Fishery Biology	3	PSS 140 Soil Science	3
ARE 371 Introduction to Resource Economics and Policy	3	Communications Elective	3
Electives	7	Electives	8
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>17</b>
		Concentration Electives	15
		Free Electives	15
		Field Course	1-3
<b>TOTAL REQUIRED CREDIT HOURS</b>		<b>132</b>	



## Wood Technology

Faculty of the Forest Products Laboratory:  
 Professors Hale (Emeritus), Jagels, Shottafer  
 Associate Professor Goodell  
 Assistant Professor Rice

The Wood Science and Technology curriculum combines study of the basic physical sciences, mathematics, forestry, the properties and basic structural components of wood, and the conservation and distribution of wood-based products. The curriculum provides students with the education and training necessary for a career with wood products manufacturers and marketers, a variety of enterprises concerned with the use of forest products, and both public and private research and development organizations. In addition to a central core of professional courses in wood science and forestry, students are required to choose a professional emphasis in such areas as the sciences, engineering, economics and business management. The off-campus training phase of this program provides for approved employment experience followed by a comprehensive report as an alternative to Summer Session courses FTY 241/441.

The program leads to a Bachelor of Science in Wood Technology. This is not a professional forestry degree; however, the program is subject to accreditation by the Society of Wood Science and Technology in cooperation with and under the auspices of the Society of American Foresters.

### Wood Technology Curriculum

#### Basic Sciences and Mathematics (1)

BIO 100 Basic Biology 4  
 OR

BOT 201/202 Plant Biology (4) 8  
 CHY 111/112 General Chemistry 8  
 PHY 111/112 General Physics 8  
 MAT 151/152 Calculus for Life Sciences I/II 8  
 BOT 233 Dendrology 3  
 BCH 221 Organic Chemistry 3  
**TOTAL HOURS 34**

#### Wood Science and Technology (2)

##### Material Properties and Characteristics:

WTY 212 Wood Technology I 4  
 WTY 425 Wood Technology II 3  
 WTY 416 Wood Anatomy 3

##### Wood Products and Processes:

WTY 314 Primary Wood Processes 4  
 WTY 315 Process Analysis in Forest Utilization 3  
 WTY 317 Wood Drying and Preservation 3  
 WTY 429 Research Methods in Wood Technology 3  
 WTY 396 Field Experience 3  
 OR  
 FTY 241/441 Field Practice (6) 6  
**TOTAL HOURS 26**

#### Professional Requirements (3)\*

FTY 101/FTY 102 Introduction to Forest Resources and Introduction to Forest Resources II 3

FTY 105 Introduction to Forest Measurements 3  
 MAT 232 Principles of Statistical Inference 3  
 FTY 407 Forest Ecology 3  
 FTY 444 Forestry Economics 3  
 FOE 471 Production Analysis in Forestry 2  
 BUA 201 Principles of Accounting I 3  
 INT 256 Forest Protection 4  
**TOTAL HOURS 24**

#### General Education and Electives (4)\*

COS Computer Programming Requirement 3  
 ENG 101 College Composition 3  
 ENG Writing Elective 3  
 ECO Principles of Economics 3  
 SPC Public Speaking Elective 3  
 Humanities Elective Requirement 6  
 Electives 31  
**TOTAL HOURS 52**

**TOTAL HOURS REQUIRED TO GRADUATE: 136**

\*To conform to SWST requirements, an area of professional emphasis of 18 credit hours must be developed from Sections (3) and (4). Certain course substitutes are permitted with advisor's administrative approval.



## Courses in Forest Management Technology

### FMT 101A Multiple Use and Management of Forests

An introduction to forest technology stressing the role of forest technicians in managing forests for renewable supplies of wood, water, wildlife, recreation and range. Lec 2. Cr 2.

### FMT 105A Forest Measurements

Methods of estimating the cubic volume of forest trees and stands and the volumes of useful products in logs, bolts and standing trees. Determination of growth rate as a basis for management practices. Sampling procedures. Field practice in measuring logs, trees and plots. Rec 2, Lab 4. Cr 4.

### FMT 106A Forest Ecology and Dendrology

An introduction to the taxonomy and ecology of temperate forest trees and ecosystems with emphasis on those systems of importance to New England and the Maritimes for the sustained production of clean water, wildlife habitat and wood products. Lec 3, Lab 4. Cr 4.

### FMT 108A Silviculture and Harvesting

An introduction to the vocabulary, principles and practice of silviculture and forest harvesting with emphasis on northeastern forests. Field laboratories provide a chance to implement prescriptions while learning basic harvesting skills. Prerequisite: FMT106A. Lec 2, Lab 4. Cr 3.

### FMT 196A Placement Training

Provides "on-the-job" training in the field related to program of study. Work is to be under supervision of employer and appropriate department in the College of Forest Resources. Prerequisite: C average. (Pass/Fail Grade Only). Cr Ar.

### FMT 201A Field Measurements and Inventory

Surveys of boundary and compartment lines, field practice in inventory methods, calculations of inventory data, gathering growth data. Prerequisite: FMT 105A, FMT 106A. Cr 2.

### FMT 203A Forest Resources Field Trip

A one-week field trip following the second semester of the program. It includes visits to publicly and privately owned forest lands, illustrating multiple-use management. Prerequisite: FMT 105A, FMT 106A. Cr 1.

### FMT 204A Wood Products Utilization

A survey of the major forest products industries to give the student an understanding of how the products of the forest are utilized and marketed. Effect of wood quality requirements on forest management. Inspection trips to local wood-using plants. Prerequisite: FMT105A, FMT106A. Rec 2, Lab 3. Cr 3.

### FMT 206A Aerial Photo Interpretation

Use of aerial photography in connection with forest inventory techniques, locating and mapping forest areas resources, and improvements.

Prerequisite: FMT201A, FMT203A. Rec 2, Lab 3. Cr 3.

### FMT 209A Forest Management Seminar

A capstone course for fourth semester forest technicians covering the inventory, organization and multiple-use management of forest properties. Elementary financial analysis and the rudiments of supervision are introduced. The changing social and legal context of forest management in the northeast is emphasized. A semester-long independent field project culminates in both a technical report and an illustrated oral presentation. Prerequisites: FMT 105A, FMT 108A, FMT 201A and FMT 206A. Rec 2. Cr 1.

### FMT 210A Urban Forestry and Arboriculture

An introduction to the culture and management of trees in urban environments with special emphasis on practical applications. Topics will include: urban vegetation and ecosystems, plant selection, planting, diagnosing disease and insect-related problems, pruning and preventative maintenance, tree valuation, ordinances and laws, tree surveys, and safety programs. Laboratory exercises will include field application of lecture material. Lec 2, Lab 2. Cr 2.

### FMT 211A Forest Protection

A broad survey of forest protection in the northeast designed for first year Forest Management Technology students and others interested in natural resource conservation. Subjects introduced are wildland fire management, forest entomology, forest pathology (including environmental pollution issues), weed science, and integrated pest management. (IPM). Rec 2. Cr 2.

### FMT 212A Forest Laws and Regulations

An examination of forest policies, laws, and regulations that influence, and at times limit, the management of forest resources; the regulatory agencies established at federal and state levels to implement these laws and regulations. Cr 2.

## Courses in Forest Engineering

### FOE 206 Photogrammetry and Remote Sensing

Vertical and horizontal measurements from air photos and topographic maps. Construction of planimetric map, interpretation and mapping of forest types, introduction to non-photographic remote sensing systems. Cr 3.

### FOE 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.

### FOE 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. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

### FOE 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.

### FOE 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.

### FOE 413 Utilization Trip

One-week field trip to New England and adjacent Canadian provinces to inspect and study timber harvesting operations and wood utilization installations. Cr 1.

### FOE 453 Harvesting of Forest Crops

Harvesting methods in the various regions of the United States and Canada, with special emphasis on the Northeast. Discussion on organization, costs, equipment, and trends. Prerequisite: MAT 126 or MAT 151 or permission. Rec 2. Cr 2.

### FOE 467 Forest Power

Heat engine and electric power units for mobile and stationary application; mechanical and hydraulic power transmission; interactions between cross country vehicles, implements, and the ground; application of new energy sources to agricultural and forest power needs. Prerequisite: MEE 230. Rec 2, Lab 3. Cr 3.

### FOE 471 Production Analysis in Forestry

Concepts and procedures used in the evaluation of timber production and forest product manufacturing. Organization, work measurement, inventory control, capital budgeting, cost control, network analysis and schematic models. Seniors, graduate students, or consent of instructor. Prerequisites: MAT 126 or MAT 151 and BRE 257 or COS elective. Rec 2. Cr 2.

### FOE 472 Planning and Control of Forestry Operations

Applications of scientific methods to management decision problems of forestry operations. Mathematical programming, markov processes, waiting-line analysis, sequencing, simulation, and competitive strategies. Seniors, graduate students, or consent of instructor. Prerequisites: MAT 126 or MAT 151 and BRE 257 or COS elective. Rec 2. Cr 2.

### FOE 473 Forest Roads and Structures

Design, construction, and maintenance of improvised road systems and bridges; road-vehicle interactions; design and construction of light buildings for forest and recreational use. Prerequisite: PHY 121, MAT 127 and MEE 251 or permission. Lec 2, Lab 3. Cr 3.



**ME 474 Forest Machinery**

Design and use of forest machinery; power requirements, selection, management and engineering aspects of machinery systems design. Design procedure; human factors in machinery design; product liability. Prerequisite: MEE 251 or MEE 252. Rec 2, Lab 2. Cr 3.

**Courses in Forestry****FOR 460 Seminar**

Reviews of literature, measurement and analysis of specific problems in forest and wildlife resources. Seniors in Forest Resources. Prerequisite: WLM 450 or FTY 449. Rec 4. Cr 2.

**FTY 102 Introduction to Forest Resources**

A writing-intensive seminar intended to enhance communications skills while introducing students to current issues affecting the forestry profession. Lec 2. Cr 2.

**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 200 Introduction to Forest Resources**

Same content as FTY 101 except no lecture. Orientation is given. Transfer students only. No first-year students. Lab 3. Cr 1.

**FTY 204 Statistical Inference in Forest Resources**

Elementary statistical background and sampling procedures based on statistics in forestry and wildlife. Use of scientific calculators and introduction to digital computers. Prerequisite: MAT 122. Rec 2, Lab 3. 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. Prerequisite: Algebra and trigonometry. Concurrent with FTY 225 Lab. Lab 1. 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. The course reinforces basic skills in forest mensuration; stresses the multi-dimensional nature of forest resources and introduces the disciplines of forest protection, forest recreation, forest products, forest ecology and silviculture. Field work includes an in-depth training in forest harvesting

techniques, green card fire training and field trips on selected forestry topics. All activities are conducted in Acadia National Park and surrounding area. Prerequisites: First-year student. Cr 3.

**FTY 255 Forest Inventory and Growth**

Principles and exploration in detail of approaches to inventory and growth of forest resources. Prerequisite: FTY 105, FTY 204 and FTY 208 (concurrently or previously). 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 forestry, including the historical development of forestry in Europe and the U.S., basics of forest biology, multiple-use forest resources management, the production of wood products, and elements of forest economics and policy. Open without prerequisite to the University community, except for majors in programs leading to a B.S. in Forestry or Forest Engineering. Rec 3. 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. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

**FTY 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.

**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 a faculty member for academic credit for the learning involved. May be repeated. (Pass/Fail Grade Only). Cr Ar.

**FTY 407 Forest Ecology**

Biological principles and environmental factors governing the natural establishment and development of forest trees and stands. Prerequisite: BOT 233 or BOT 464; FTY 241 or permission; concurrent enrollment in FTY 409 or permission. Lec 4, Rec 1. Cr 3.

**FTY 408 Silviculture**

Theory and practice of controlling the composition, growth, quality and regeneration of forest stands. Prerequisite: FTY 407. Corequisite: FTY 407 or FTY 409. Lec 4, Rec 1. Cr 2.

**FTY 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. Prerequisites: Concurrent enrollment in FTY 408; WLM 200 or concurrent enrollment in FTY 407. Cr 2.

**FTY 410 Artificial Regeneration**

The planting, care, and selection of stock in nursery and field plantings. Seed collecting and processing. Mechanical planting and field techniques. One-day field trip required. Prerequisite: FTY 241. Rec 2, Lab 3. Cr 3.

**FTY 430 Urban Forest Management**

Introduces the culture, management and importance of trees in urban environments. Special emphasis on the interactions between vegetation and human resources. Topics include: urban vegetation and ecosystems; plant selection, care and maintenance; diagnosing disease and insect-related problems; pruning and preventative maintenance; tree valuation; safety; modification of urban environments; and ordinances and law. Lec 2, Lab 2. Cr 3.

**FTY 441 Advanced Field Practice in Forest Management**

Three-week intensive field training program using and expanding upon skills and concepts needed for professional integrated management of productive woodlands. The course serves as a drawing upon practical skills and theories of forestry to plan and execute a forest management plan. Other field experience will include field trips to selected utilization plants, forest properties and red card fire training. All activities are conducted in Acadia National Park and surrounding area. Prerequisite: Junior or senior class standing and FTY 407, FTY 408 and FOE 453. Cr 3.

**FTY 444 Forestry Economics**

Forest resources of U.S. and the world and prospects of meeting increased demand for forest products. Economic factors in forest production and use of economic analysis in making forest management decisions. Prerequisite: ECO 110 or permission. Rec 3. Cr 3.

**FTY 446 Forest Policy and Administration**

Formation and implementation of national, state and private forest policies in the United States and selected foreign countries. Administration of private, state and national forestry enterprises. Technical and ethical considerations of strategic forest resources planning. Lec 3, Lab 2. Cr 4.

**FTY 455 Remote Sensing and Computer-Assisted Image Processing**

Advanced remote sensing concepts are presented including fundamentals of multispectral



remote sensing, characteristics of satellite multi-spectral scanners, digital image processing and applications of geographic information in natural resources management. The laboratory exercises in the second half of the semester allow students to perform digital image processing on Landsat imagery using a personal computer software package. Lec 2, Lab 1. 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 150, FTY 407. Cr 3.

**FTY 465 Woodlot Management**  
Preparation of a management plan for an actual parcel of forest land. Exercise designed to accompany FTY 470, which must be taken concurrently or have been taken previously. Cr 1.

**FTY 470 Timber Management and Valuation**  
Forest-level timber production regulation and harvest scheduling; fundamentals of financial analysis, evaluation of timber resources for acquisition, taxation, management, and disposal. Legal environment of timber management. Prerequisites: FTY 408. Lec 3, Lab 2. Cr 4.

**FTY 480 Applied Geographic Information Systems**  
An introduction to the methods and processes for the application of geographic information system to natural resource management. Emphasis is placed on project planning and hands-on experience in system operation. Prerequisites: FTY 208 or FOE 206, SVE 111 and permission of instructor. Lec 2, Lab 1. Cr 3.

**FTY 508 The Industrial Spruce-Fir Ecosystem**  
Biological and socioeconomic issues related to the ecology and management of Maine's spruce-fir resource. Lec 2. Four 1-2 day field trips. Cr 4.

**FTY 509 Advanced Silviculture (Seminar)**  
Applied silvicultural practices and results of current silvicultural research in important forest types of the United States. Prerequisite: FTY 408. Rec 2. Cr 2.

**FTY 510 Forest Tree Improvement**  
Investigates the distribution of genetic variation in forest tree populations. The principles and practices of individual tree selection, progeny testing, seed orchard establishment, inter-species hybridization, provenance testing, and the introduction of exotic species are examined. Prerequisites: FTY 408, FTY 410 or permission. Lec 3. Cr 3.

**FTY 519 Environmental Influences on Woody Plant Structure**  
Tree morphology and structure reflect evolutionary, recent historical and current environmental influences. Understanding the nature of these influences, how they operate, and the cytological and structural consequences for

the living tree provide the biologist with tools needed to manipulate or conserve the forest resource. Prerequisite: Plant Anatomy or Wood Anatomy or permission of instructor. Offered alternate years. Cr 3.

**FTY 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. Prerequisite: BOT 434 or 454 or permission. Offered alternate years (odd). Lec 2, Rec 1. Cr 3.

**FTY 521 Research Methods in Forest Resources**  
Prerequisite: Permission. Cr 3.

**FTY 526 Image Processing for Natural Resource Monitoring**  
Geo-based digital image processing on a micro-computer. Environmental monitoring case studies resulting in resource inventory maps and tabular outputs for decision making. Prerequisites: FOE 206, FTY 455 or permission. Lec 2, Lab 1. Cr 3.

**FTY 532 Forest Influences**  
Effects of forest vegetation on climate, soil water, stream flow, erosion and soil productivity. Prerequisite: FTY 407 and PSE 150. Cr 2.

**FTY 535 Forest Vegetation Management with Herbicides**  
Ecological, technological and sociological issues related to the use of herbicides in forest management. Cr 3.

**FTY 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. Prerequisites: prior instruction in silviculture/forest ecology and forest biometry, or permission. Lec 2, Lab 1. Cr 3.

**FTY 540 Timber Procurement/Marketing**  
Introduction to the theory and practice of procuring raw material to supply the forest products industry. Procurement examined from the perspective of the wood user as well as the reverse process, marketing by sellers. Prerequisites: FOE 453 and FTY 450 or equivalent. 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 547 Advanced Biometry**  
Sampling methods and the principles of regression analysis as applied to forest resources and the biological sciences. Prerequisite: FTY 205 and MAT 337 or permission. Rec 3. Cr 3.

**FTY 549 Wood Supply Analysis**  
An applications-oriented review of forest dynamics (growth, mortality, harvesting, management) in the context of predicting and analyzing wood supply. Student projects and seminars provide experience with microcomputer models used in the Maine and eastern Canada. Prerequisite: FTY 470 or equivalent. Lec 2, Lab 1. Cr 3.

**FTY 550 Advanced Forest Finance**  
Application of principles of advanced valuation and investment analysis to the practice of forestry. Special emphasis on both complex short-term financial decisions and the very-long-term decisions that are peculiar to forestry investments. Evaluation, forecasting, probabilistic analysis, strategic planning. Both theory and case studies. Prerequisite: FTY 450 or equivalent. Cr 3.

**FTY 556 Diseases and Stress in Forest Ecosystems**  
Principles and concepts of forest pathology emphasizing natural forests and modern practices in forest management. Prerequisite: INT 256 or BOT 457 or permission. Cr 3.

**FTY 580 Utilization and Management of Timber**  
An introduction to management, harvest, and conversion aspects of tropical woods. Prerequisite: Senior or graduate standing; or by special permission of the instructor. Cr 2.

## Courses in Recreation and Park Management

**RPM 225 Readings in Outdoor Recreation**  
Selected authors and literature will be studied and discussed to familiarize RPM majors with the breadth and complexity of the field. No prerequisites. Rec 2. Cr 2.

**RPM 300 Global Wilderness Survival**  
An ecologically oriented course in techniques for coping with outdoor emergencies in environments found throughout the world. A strong emphasis will be given to the psychological aspects of stress management under emergency conditions. The content will be especially useful for those whose vocations, travel or leisure take them into the outdoors. Topics will include: the psychology of stress and survival; animal food procurement and preparation; edible, toxic and useful plants; temperate forest and mountain areas; arctic and high mountain areas; desert and tropic environments; marine and aquatic environments. Prerequisite: None. Required Field Trip. Cr 3.

**RPM 345 Special Problems**  
Original investigation in Natural Resources, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.



**RPM 352 Forest Recreation Management**

Methods of evaluation, planning and development of wildlands for recreation. Importance, problems and trends. Public and private programs and policies. Rec 3. Cr 3.

**RPM 355 Visitor Behavior and Management**

Study of outdoor recreation user behavior as it affects the planning, design and management of outdoor recreation opportunities. Emphasis on social/psychological principles which alter behavior and satisfaction in recreation experiences. Rec. 3. Cr 3.

**RPM 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, integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

**RPM 395 Internship**

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.

**RPM 396 Field Experience**

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.

**RPM 452 Environmental Interpretation I: Principles**

An overview of the field of environmental interpretation with special emphasis on the principles inherent in all effective presentations and exhibits. Topics will include: origins of interpretation, interpretive planning, conducted walks and tours, living history interpretation, interpretive publications, self-guided activities, urban interpretation, cultural resource interpretation, collections, museums, marine interpretation, sky interpretation and photography. Principles of interpretive supervision and evaluation will also be discussed. Cr 3.

**RPM 453 Environmental Interpretation II: Methods**

A course intended to follow RPM 452, Environmental Interpretation I: Principles, focusing on methods of interpretation. Class projects permit students to gain experience in: the development of interpretive master plans and prospecti, presenting illustrated talks, designing and writing interpretive publications, writing and narrating message repeater tapes and the design of interpretive facilities, exhibits and trails. Prerequisite: RPM 452. Cr 3.

**RPM 454 Cultural Resource Management**

Study of social and legislative mandate to preserve the nation's cultural heritage. Emphasis on the total management of cultural resources through study of existing management systems. Prerequisite: RPM 352, RPM 353 and RPM 453. Rec 3. Cr 3.

**RPM 470 Principles of Tourism**

An introductory overview of the field of tourism. Topics will include the organization of tourism nationally and internationally, commercial recreation, motel and hotel operations, travel agencies, tour companies and other industry segments, supply and forecasting demand, research, current growth factors in the tourism industry, types of tourist destinations and tourist motivation and sociology. Emphasis will be given to the economic costs and benefits of tourism at local, regional, state and national levels. Cr 3.

**RPM 471 Commercial Recreation**

Development of a basic understanding of the knowledge, skills, and values associated with successful management of commercial recreation organizations and services. Emphasis on conceptual, theoretical and practical application principles necessary to establish and operate a commercial recreation business. Rec. 3. Cr 3.

**RPM 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. Cr 3.

**RPM 540 Cultural History Interpretation**

Theory and practice of interpreting cultural history in park, recreation sites and museums. Topics include visitor centers, on-site areas, living history re-enactment, research, libraries, archives, special collections, cemetery interpretation, site reconstruction and stabilization. Prerequisites: RPM 452, RPM 453 or permission. Cr 3.

**RPM 554 Forest Recreation Planning**

Measuring, analyzing, and forecasting recreational use of forest lands. Concepts of planning, and their application to forest recreation management problems. Prerequisite: RPM 352 or permission. Cr 3.

**Courses in Wildlife Management****WLM 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. Lec 1. Cr 1.

**WLM 200 Ecology**

The relationships between living organisms and their environment. The ecosystem, ecologi-

cal factors, succession, community distribution, populations and the role of ecology in natural resources. Resource majors only. No first-year students. Prerequisite: BIO 100. Rec 3. Cr 3.

**WLM 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. Prerequisite: An ecology lecture course (may be taken concurrently). Cr 2.

**WLM 250 Wildlife Field Survey**

Three 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. Wildlife Majors Only. Prerequisites: WLM 100, WLM 200, WLM 201, ZOL 330. Cr 3.

**WLM 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. Cr 3.

**WLM 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.

**WLM 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. Cr 1.

**WLM 320 Introduction to Wildlife Conservation**

Basic principles of wildlife ecology and conservation are illustrated with examples from Maine and around the world. Cr 2.

**WLM 330 Wildlife Law Enforcement**

A survey of wildlife law enforcement including fish and wildlife laws, search and seizure, court room procedure, rules of evidence, and policy development. Cr 2.

**WLM 410 Management of Wildlife Populations**

Characteristics of wildlife populations and principles for protection and manipulation of populations as part of a wildlife management program. Prerequisites: WLM 210, WLM 250. Rec 3, Lab 3. Cr 4.

**WLM 415 Behavioral Ecology**

Ecology and evolution of major animal behaviors including social systems, mate selection, parental care, foraging, and predator avoidance. Introduction to behavioral modeling, principally optimization and game theory. Cr 3.



**WLM 420 Forest Wildlife Management**

Managing forest ecosystems for wildlife, especially as it pertains to maintaining natural diversity. Prerequisites: WLM 200 or WLM 320; FTY 407 recommended. Cr 1.

**WLM 430 Cooperative Education**

Cooperative education in wildlife involves a work experience related to the student's academic program. It involves two or more academic terms of work experience, either full-time alternating with on-campus classwork, or part-time while taking a part-time class load on campus of approximately equal significance. (Pass/Fail Grade Only). Cr Ar.

**WLM 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.

**WLM 440 Undergraduate Wildlife Seminar**

Current topics of interest will be explored in a seminar format. Wildlife majors or permission. Cr Ar.

**WLM 450 Wildlife-Habitat Relationships**

A study of the interrelationships among wildlife species and their habitats stressing application to resource planning and management. Prerequisites: WLM 250 and WLM 410. Rec 3, Lab 2. Cr 4.

**WLM 460 Wildlife Management Plan**

Preparation of a wildlife management plan. Corequisite: WLM 450. Rec 1. Cr 1.

**WLM 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. Prerequisites: WLM 450. Rec 3. Cr 3.

**WLM 480 International Conservation**

Loss of biological diversity, human overpopulation, desertification, sustainable forestry and agriculture, and similar topics will be covered in an examination of the biological, political, social and economic basis of international conservation. Prerequisite: Junior Standing. Cr 1-2.

**WLM 490 Special Problems**

Original investigation in wildlife work, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.

**WLM 510 Wildlife Population Dynamics**

Mechanics of wildlife population regulation theories and their application in management. Single and multiple species models. Lec 2, Rec 2. (Alternate Years). Cr 3.

**WLM 515 Ecological Modeling in Wildlife Studies**

Computer modeling techniques in the ecological sciences and their applicability to wildlife studies. Prerequisite: Permission. Lec 2, Rec 1. Cr 3.

**WLM 520 Resource Issues on Public and Private Lands**

Resource concerns for managers of public and private lands, and integration of wildlife management with forestry and recreation. Numerous field trips. Prerequisite: WLM 420, WLM 450, WLM 470 or permission. Alternate years. Cr 2.

**WLM 540 Conservation Biology**

Theory and attributes of species endangerment: habitat alteration; exploitation; genetic, demographic and environmental stochasticity; synthesis for conservation of biological diversity. Prerequisite: Permission. Cr 2.

**WLM 541 Conservation Biology Lab**

Simulation modeling exercises of population viability: founder size; demographic and environmental stochasticity; genetics; exploitation. Prerequisite: Permission. Cr 1.

**WLM 555 Landscape Ecology and Conservation**

Ecological aspects of landscape structure, development, and dynamics and their implications for natural resource management, especially maintenance of biological diversity. Cr 3.

**WLM 565 Predator Ecology and Management**

Factors influencing population density and management of carnivorous mammals including: habitat selection, spatial requirements, reproductive performance, population assessment, interspecific relationships, social organization, predator-prey dynamics, legal and jurisdictional responsibilities, and socio-political issues. Prerequisite: Permission. Cr 3.

**WLM 570 Wildlife Nutrition**

The nutritional ecology of wildlife species, with emphasis on specific nutritional requirements, means of nutrient acquisition, and management applications of such knowledge. Prerequisites: ANV 455 or permission. Lec 3, Lab 1. (Alternate Years). Cr 4.

**WLM 580 Evaluation of Wildlife Populations**

Estimation and interpretation of abundance, mortality, fecundity, dispersal, spatial pattern, and numerical trends in wildlife populations. Prerequisites: One course each in statistics and ecology. Lec 2, Rec 2. (Alternate Years). Cr 3.

**WLM 590 Evaluation of Wildlife Habitats**

Theory and practice of evaluating wildlife habitats, including carrying capacity, measuring habitat quality and quantity, and related topics. Critical review of methodologies currently in use. Prerequisite: WLM 450 or permission. Alternate years. Cr 2.

**Courses in Wood Technology****WTY 212 Wood Technology I**

The structure, nature and practical use of wood with regard to environmental, physical and chemical influences. Laboratories in wood properties and gross identification. Lec 3, Lab 3. Cr 4.

**WTY 314 Primary Wood Processes**

Introduction to the conversion processes involved with the principal primary forest products, such as lumber, pulp, veneer, and derived products. Characteristic properties of typical products; effect of raw material on processing technology. Lec 3, Lab 3. Cr 4.

**WTY 315 Process Analysis in Forest Utilization**

Processing control and development problems and review of current methods of analysis and solution. Application of process design, systems analysis and materials technology in the industrial situation. Prerequisite: WTY 314 or permission. Lec 2, Rec 1. Cr 3.

**WTY 317 Wood Drying and Preservation**

Movement of liquids in wood; causes of deterioration; preservatives. Methods of drying wood products; planning, construction and operation of commercial facilities. Rec 2, Lab 3. Cr 3.

**WTY 345 Special Problems**

Original investigation in wood science and technology, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.

**WTY 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. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

**WTY 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.

**WTY 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 Products students only. Cr Ar.

**WTY 416 Wood Anatomy**

Structural characteristics of wood and wood fibers, and the use of these features to identify



species, determine wood and paper properties and assess wood quality; Prerequisite: WTY 212 or BOT 435 or permission. Lec 2, Lab 4. Cr 3.

#### WTY 425 Wood Technology II

The mechanical properties of wood and wood composites and their use in structural applications. The relationship of mechanical and physical properties to basic processing techniques. Prerequisite: WTY 212 or permission. Rec 2, Lab 4. Cr 3.

#### WTY 429 Research Methods in Wood Technology

Advanced methods of evaluating wood, wood composites, and related materials. Introduction to techniques and concepts of evaluation design. Review of pertinent laboratory equipment and its applications. Prerequisite: FTY 204, WTY 212. Rec 1, Lab 4. Cr 3.

#### WTY 515 Research Techniques in Wood Anatomy

Preparation of woody tissue for microscopic examination and recording, including microtechniques and photomicrographic methods. Introduction to electron microscopy and interpretation of wood ultrastructure. Prerequisites:

WTY 416 or permission. Lec 2, Lab 4. (4 credits with project). Cr 3-4.

#### WTY 530 Wood Physics

Study and evaluation of non-mechanical physical properties of wood; response to liquids, vibrational stimulation, heat, electricity and ionizing radiation. Prerequisite: understanding of basic physics, wood anatomy or permission. Lec 2, Lab 2. Cr 4.

#### Interdisciplinary Courses

##### INT 256 (ENT, FTY, PBP) Forest Protection

Principles of forest protection involving disease, insects and fire with emphasis on understanding the identification, ecology, and control of tree pests. Prerequisites: Plant Biology Elective, BOT 233 or BOT 464. Lec 3, Lab 1. Cr 4.

##### INT 323 (BIO, NRC, PBP, PSE, WLM, ZOL)

##### 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 socio-economic and political matrix in which conser-

vation problems must be solved. Prerequisite: BIO 100. Cr 3.

##### INT 375 (FOR, OCE, PBP, WLM, ZOL) Field Studies in Ecology

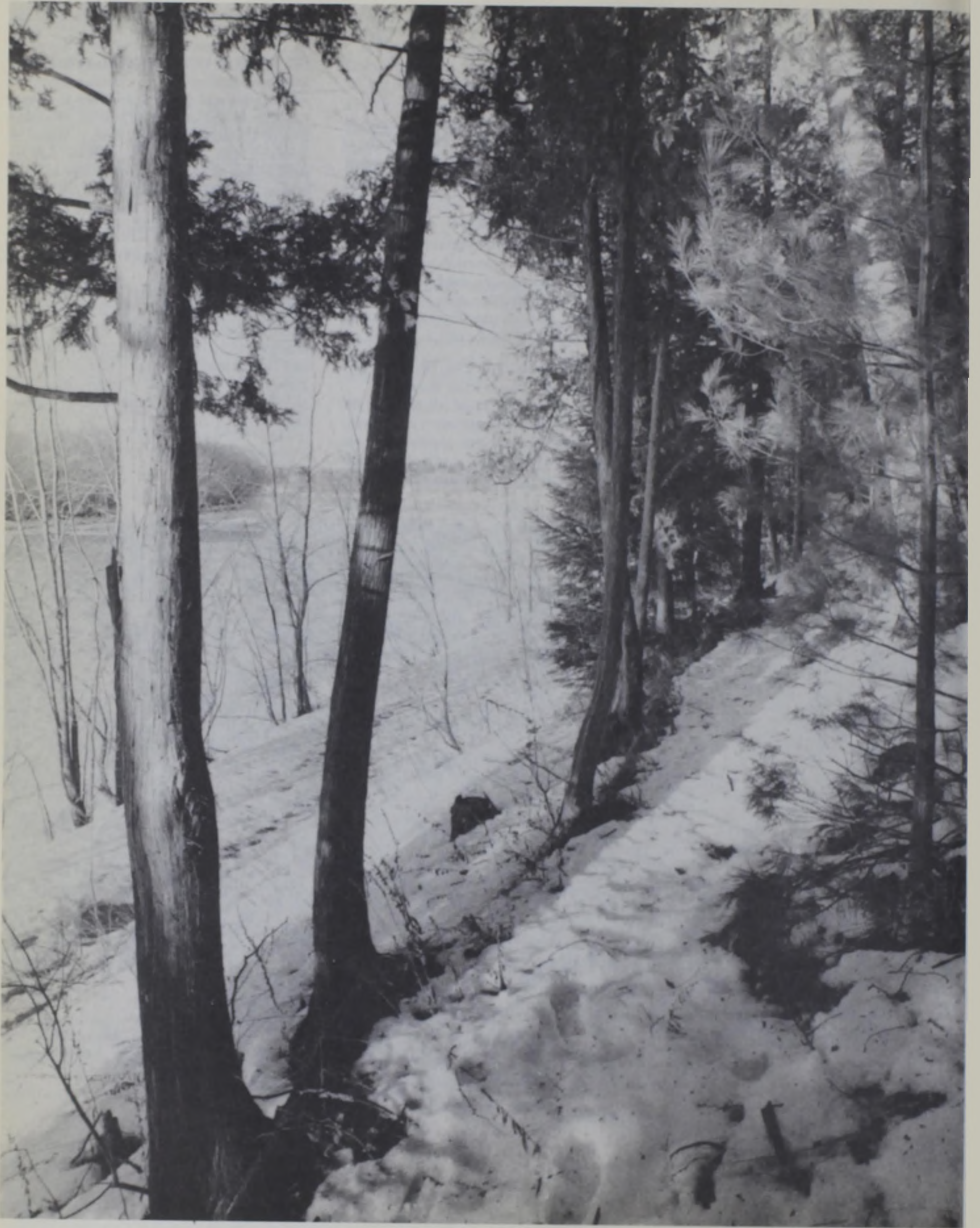
An intensive ecology field trip of one to several weeks to an area of ecologic interest scheduled during Christmas, midyear, spring recess or summer. Field and living conditions may be rigorous and/or primitive. Prerequisite: a course in ecology. Other preparation and/or recommended prerequisites announced for each trip. Credit depends upon specific trip. Cr Ar.

##### INT 525 (FMT, FOE, FTY, ZOL) 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. Prerequisites: Senior or graduate status or permission. Lec 1. Cr 1 or 2.









# College of Sciences

Dagmar Cronn, *Dean*

## General Information

The University of Maine College of Sciences is the academic home for faculty and students studying the basic natural and physical sciences, plus those studying mathematics and computer science, which undergrid so much of modern science in all disciplines. The college consists of nine academic departments offering 14 baccalaureate major programs, the Master of Science in 13 disciplines, the Master of Professional Studies in two disciplines, and the Doctor of Philosophy in nine disciplines in addition to individualized Ph.D. programs.

The College of Sciences represents the largest assemblage of scientific expertise in Maine, with over 150 faculty. The physical facilities include teaching and research laboratories in 10 different buildings, plus some of the most sophisticated research equipment available anywhere. In addition to its undergraduate programs, which are its first priority, the college also places strong emphasis on graduate education and research. Each year millions of dollars of research support flow into Maine and the University through projects conducted by the faculty of the College of Sciences. These funds, which are granted by a variety of private and federal foundations to support research on important scientific problems, are of direct benefit to students. First, they often help to support graduate and undergraduate students; and second, they help to assure that University laboratories have the best, most sophisticated equipment. This is important to undergraduates, who thus have opportunities to contribute towards important research objectives and to work in state-of-the-art laboratories. The best place to learn science is where science is actively being pursued through research.

## The Student Body

The approximately 800 undergraduates in the College of Sciences offer plenty of positive challenge and support to the student who is serious about science and wants to achieve his or her best. In addition to those preparing specifically for scientific and technical careers, the student body includes many who have chosen the sciences as the best path to begin preparation for careers in medicine or one of the allied health professions. Moreover, many students planning careers in education elect to major in their intended discipline while using elective credits to meet certification requirements for professional courses in education.

## Degree Requirements

The College of Sciences offers both the Bachelor of Arts and the Bachelor of Science degrees. In many disciplines students have the option of selecting either degree. In other disciplines historical tradition within the University results in either the B.A. degree (Clinical Laboratory Science, Geological Sciences, Mathematics) or the B.S. degree (Molecular & Cellular Biology). Generalized requirements for the B.A. degree, which are the same for all disciplines offering the B.A., are detailed elsewhere in the catalog. The specific requirements of each major program, whether B.A. or B.S., are detailed under the Academic Programs section for the College of Sciences, which follows this section on general information.

Students entering the College of Sciences may designate an intended major upon entry, or they may choose to remain officially undecided. Students must declare a major no later than the end of the sophomore year. In general, however, most students benefit from designating a major upon entry or by the beginning of the sophomore year. Designating an intended major helps to focus course selection and academic advising, but in no way does it restrict later freedom of choice: students are free to change their designated major at any time.

## Entrance Requirements

Formal entrance requirements for the College of Sciences are the same as those for admission to the University as a whole, and are described elsewhere in this catalog. However, beyond these formal requirements, the faculty of the College of Sciences informally offer the following recommendations: 1) take four years of Mathematics. Mathematics is important in all aspects of science, and failure to maintain mathematical skills during the senior year often results in poor performance and curriculum delays at the University; 2) take at least three years of high school science; 3) take at least two years of a single foreign language; 4) take every opportunity, both in formal classes and outside them, to develop excellent writing and speaking skills.

## Baccalaureate Programs

The following degrees are offered in the College of Sciences. (B.A. = Bachelor of Arts; B.S. = Bachelor of Science; M.A. = Master of Arts; M.S. = Master of Science; M.P.S. = Master of Professional Studies; Ph.D. = Doctor of Philoso-

phy). All degrees are designated in the discipline (e.g. Bachelor of Science in Biochemistry) except as noted.

Biochemistry: B.A., B.S., M.S.,

M.P.S., Ph.D. (in Biochemistry & Molecular Biology and in Biological Sciences)

Biology: B.A., B.S.

Botany: B.A., B.S., M.S. (in Plant Biology and Pathology), Ph.D.

Chemistry: B.A., B.S., M.S., Ph.D.

Computer Science: B.A., B.S., M.S.

Geological Sciences: B.A., M.S., Ph.D.

Mathematics: B.A., M.A.

Medical Technology: B.A. (in Clinical Laboratory), M.S.

Microbiology: B.A., B.S., M.S., M.P.S., Ph.D. (in Microbiology and in Biological Sciences)

Molecular and Cellular Biology: B.S.

Oceanography: M.S., Ph.D.

Physics and Astronomy: B.A., B.S. (in Engineering Physics),

M.S., M.S. (in Engineering Physics), Ph.D.

Zoology: B.A., B.S., Ph.D.

The B.A. and B.S. degrees in Biology are administered through an interdepartmental arrangement between the Departments of Biochemistry, Microbiology & Molecular Biology; Plant Biology and Pathology; and Department of Zoology. The B.S. degree in Molecular and Cellular Biology is administered by the Department of Biochemistry, Microbiology & Molecular Biology. The Department of Zoology administers the Bachelor of Arts in Clinical Laboratory Sciences and Master of Science in Medical Technology.

Most students have found the sciences to be the appropriate major area of study in preparation for medical school. The Biological/ Chemical Sciences offer the best preparation for the allied health professions and for medical research.

Other special programs are described in the section of the catalog describing the B.A. degree and its requirements.

## Introductory Course

### SCS 100 Majoring in the 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. First-year students only. (Pass/Fail Grade Only). Cr 1.



## Biochemistry (B.S.)

Professor Nicholson (Chairperson)

Professor Blake

Associate Professors Croall, Hutchinson, R. Roxby, Vayda

Instructor Jacobs

### General

The B.S. in Biochemistry is offered by the Department of Biochemistry, Microbiology and Molecular Biology. The discipline is concerned with the study of living systems at the cellular and molecular levels and is therefore fundamental to all of the life sciences. In addition to the traditional concerns with the structure of biomolecules and the understanding of metabolism, the field has come to encompass molecular biology, molecular genetics, and many areas of biotechnology. It forms a major component of modern medical research and practice, bioengineering and of contemporary agricultural research.

The program of study leading to the bachelor of science degree is designed to prepare students for entry-level positions in industry, research, education, and for post-graduate programs in biological sciences and medicine. To qualify for the degree, a minimum of 120 hours, distributed as outlined below, must be completed with an accumulative grade point average of 2.0 or higher.

### Curriculum in Biochemistry

#### Biochemistry

BCH 451 Principles of Biochemistry	4
BCH 460 Advanced Biochemistry	3
BCH 463 Introduction to Biochemical Laboratory Methods	2
BCH 464 Advanced Biochemical Laboratory Methods	4
BCH 491 Biochemical Research I	6
BCH 467 Physical Biochemistry OR	4
CHY 372 Physical Chemistry II	(4)
<b>TOTAL HOURS</b>	<b>23</b>

#### Biological and Physical Sciences

BIO 100 Basic Biology	4
ZOL 204 Animal Biology OR	4
BOT 201 Plant Biology	(3)
MCB 300/301 General Microbiology/Laboratory	5
CHY 111/112 General Chemistry I/II	8
CHY 251/252 Organic Chemistry Lecture I/II	6
CHY 253/254 Organic Chemistry Laboratory I/II	4
PHY 111/112 General Physics I/II	8
<b>TOTAL HOURS</b>	<b>39(38)</b>

#### Mathematics

MAT 122 Algebra and Trigonometry, Pre-Calculus	4
MAT 126 Analytic Geometry and Calculus	4
MAT 127 Analytic Geometry and Calculus	4
<b>TOTAL HOURS</b>	<b>12</b>

#### Communications

Writing	3
Speaking	3
BCH 471/472 Seminar	2
<b>TOTAL HOURS</b>	<b>8</b>

#### Humanities and Social Sciences

<b>TOTAL HOURS</b>	<b>15</b>
SCS 100 Majoring in the Sciences Electives	1 22

MINIMUM HOURS REQUIRED FOR  
GRADUATION: 120

### Courses in Biochemistry

#### BCH 207 Fundamentals of Chemistry

Reviews the essentials of inorganic chemistry and studies the types and reactions of organic compounds. Prerequisite: one year of high school chemistry. Lec 3, Lab 2. Cr 4.

#### BCH 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. Prerequisite: BCH 207 or the equivalent. Lec 3, Lab 2. Cr 4.

#### BCH 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. Prerequisites: CHY 111 and CHY 112. Cr 3.

#### BCH 221L Laboratory in Organic Chemistry

Laboratory exercises illustrating the principles presented in BCH 221. Lab 2. Cr 1.

#### BCH 310 Introductory Molecular Biology

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. Prerequisite: BIO 100. Lec 3. Cr 3.

#### BCH 322 Biochemistry

A study of the properties of proteins and enzymes, nucleic acids, carbohydrates, and lipids, metabolism and energy production, replication and protein synthesis. Prerequisite: BCH 221. Lec 3. Cr 3.

#### BCH 322L Introductory Biochemistry Laboratory

Laboratory exercises illustrating the principles presented in BCH 322. Lab 2. Cr 1.

#### BCH 394 Cooperative Education in Biochemistry

A regular program of approved work experience for which academic credit is given, alternated with academic coursework. Students are provided opportunities to integrate theory with practice, to gain practical work experience, and to develop future placement opportunities. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

#### BCH 396 Field Experience in Biochemistry

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, and gain practical experience in a job related to their professional career goals. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

#### BCH 451 Principles of Biochemistry

Biological, chemical and physical characteristics of essential precursor molecules for metabolic pathways, energy production, cofactors, storage polymers, nucleic acid and proteins. Prerequisite: CHY 252 or permission. Lec 4. Cr 4.

#### BCH 460 Advanced Biochemistry

A continuation of BCH 451, with emphasis on elements of molecular biology and similar topics. May include discussions of cellular control mechanisms, virus structure, enzyme kinetics. Prerequisite: BCH 451 or permission. Lec 3. Cr 3.

#### BCH 463 Introduction to Biochemical Laboratory Methods.

Studies of PH, buffers, carbohydrate structure and peptide sequencing methods. Prerequisite: BCH 451 or instructors permission. Lab 4. Cr 2.

#### BCH 464 Advanced Biochemical Laboratory Methods

The application of chromatographic, electrophoretic, spectrophotometric and other techniques to the study of enzymes, mitochondria



and nucleic acids. Prerequisite: BCH 451 and BCH 463 or equivalents. Cr 4.

**BCH 467 Physical Biochemistry**  
Study of the fundamental laws, theories and concepts of physical chemistry with emphasis on those aspects having relevance to biology. Prerequisite: BCH 451 or equivalent, MAT 126, IAT 127. Lec 3, Lab 3. Cr 3.

**BCH 467L Physical Biochemistry Lab**  
Laboratory exercises illustrating the principles presented in BCH 467. Cr 1.

**BCH 471 Seminar (1st semester)**  
Preparation and presentation of papers dealing with current research in the field of biochemistry. Cr 1.

**BCH 472 Seminar (2nd semester)**  
Preparation and presentation of papers dealing with current research in the field of biochemistry. Cr 1.

**BCH 481 Radiation Biology**  
A survey of the various types of radiation, their detection and the effect of radiation on macromolecules and living organisms including survival, mutagenesis, and repair of radiation damage. Prerequisites: PHY 121, PHY 122 or equivalent, CHY 252 or BCH 221 or equivalent and permission. Cr 2.

**BCH 483 Laboratory in Radiation Biology**  
Techniques and practices of radioisotope methodology. Emphasis on timely applications, such as liquid scintillation counting techniques, and on biological systems and safety practices. Accompanies BCH 481 but may be taken separately. Prerequisites: PHY 121, 122 or equivalent; BCH 460 or equivalent and permission. Cr 2.

**BCH 488 Seminar in Computer Applications in the Biochemical Sciences**  
Students prepare written reports on computer techniques as applied to biochemical research and give formal talks on this material before an audience of classmates and faculty. Prerequisites: BCH 451, BCH 460, COS 220 or equivalents or permission. Cr 1.

**BCH 491 Biochemical Research I**  
Problems in biological chemistry and molecular biology. A comprehensive report is required. Seniors and graduate students only. Cr Ar.

**BCH 492 Biochemical Research II**  
Problems in biological and molecular biology. A comprehensive report is required. Seniors and graduate students only. Cr Ar.

**BCH 500 Nucleic Acids**  
Biological, chemical and physical properties and structure-function relationships of nucleic acids. Prerequisites: BCH 460. Cr 3.

**BCH 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. Prerequisites: BCH 460, BCH 464 or equivalent. Cr 4.

**BCH 520 Carbohydrates and Lipids**  
The chemistry and metabolism of carbohydrates and lipids and of conjugate compounds such as glycoproteins and glycolipids. Prerequisite: BCH 451 or permission. Cr 3.

**BCH 525 Proteins and Enzymes**  
Emphasis is on contemporary principles of protein structure and interactions, enzymes and

catalysis, and membrane function. Prerequisite: BCH 460 or permission. Rec 3. Cr 3.

**BCH 530 Regulation of Growth in Eukaryotes**  
A study of genetic and cellular mechanisms which regulate growth in eukaryotic systems including normal growth and cancer, the interactions of growth factors and receptors, and oncogenes. Prerequisite: BCH 460 or permission. Cr 3.

**BCH 542 Biochemical Mechanisms**  
A study of metabolic regulatory mechanisms including cooperativity and feedback control, induction, repression and control of protein synthesis as well as regulation of membrane transport and energy metabolism. Prerequisite: BCH 467 or equivalent and BCH 451 or equivalent, or permission. Cr 3.

**BCH 545 Plant Molecular Biology**  
Current research topics in plant molecular biology. Molecular techniques used to address regulatory mechanisms of plant gene expression. Prerequisite: BCH 451, BCH 460, BCH 310, BCH 510 or permission. Cr 3.

**BCH 550 Special Topics in Molecular Biology**  
Includes lectures/seminars on the structure, regulation and evolution of genetic elements, viruses, and cell-surface glycoproteins. Prerequisites: BCH 500 or BCH 460 and permission. May be repeated for credit. Cr Ar.

**BCH 572 Graduate Seminar** Cr Ar.





## Biology (B.S., B.A.)

The programs in biology are offered cooperatively by the Departments of Plant Biology, Zoology, and Biochemistry, Microbiology and Molecular Biology. The programs are coordinated by a faculty member selected from one of the participating departments.

The Biology Programs permit a student to gain a broad background in the biological sciences. The curricula offer several program choices leading to career opportunities at the baccalaureate level as naturalists, for example, as well as in the fields of high school teaching, ecology, and laboratory science. The curricula are also ideal for students wishing a broad biological education as preparation for graduate study, which can lead to careers in government, industry, and in teaching and research at the University level. Other students choose biology to prepare for admission to professional schools of medicine, dentistry, optometry and pharmacy or to prepare for other areas of advanced study, such as Marine Biology. Biology also is an excellent choice for students seeking a liberal education with a concentration in science.

### Curriculum in Biology

Asterisks (\*\*\*) mark differences between B.S. and B.A. requirements.

#### Biological Sciences

##### Specific Requirements

BIO 100 Basic Biology	4
BOT 201/202 Plant Biology	4
OR	
BOT 203 The Plant Kingdom	(4)
ENT 226 Introductory Entomology	4
MCB 300 General Microbiology	3
MCB 305 General Microbiology Laboratory	2
ZOL 204 Animal Biology	4
BOT 445 Plant Genetics	3
OR	
ZOL 462 Principles of Genetics	(3)
ZOL 465 Evolution	3
BCH 322/322L Introductory Biochemistry/Laboratory	4
OR	
BCH 451/463 Principles of Biochemistry/Introduction to Biochemical Laboratory Methods	(6)
INT 319 General Ecology	3

#### Group Requirements

##### Taxonomy

Students choose one from among the following:	
BOT 464 Taxonomy of Vascular Plants	4
BOT 473 Biology of Algae	4
ENT 440 Insect Biology and Taxonomy	4

ENT 453 Biology and Taxonomy of Advanced Orders	4
MCB 410 Determinative Bacteriology	4
ZOL 329/331 Vertebrate Biology I/Laboratory	5
ZOL 353 Invertebrate Zoology	4
ZOL 458/459 Animal Parasitology/Laboratory	4
<i>Physiology</i>	
Students choose one from among the following:	
BOT 452/453 Plant Physiology/Laboratory	4
MCB 430 Bacterial Physiology	4
ZOL 377/378 Animal Physiology/Laboratory	5
ZOL 480 Cell Biology	4
<i>Anatomy</i> Students choose one from among the following:	
BOT 435 Plant Anatomy	4
ZOL 333 Comparative Anatomy	4
ZOL 336 Developmental Biology	4
TOTAL HOURS	46(53)

#### Other Sciences

##### Mathematics

MAT 126 Analytic Geometry and Calculus	4
OR	
MAT 151 Calculus for the Life Sciences I	(4)
(Many students will need MAT 122, Algebra and Trigonometry, as preparation)	
TOTAL HOURS	4

##### Chemistry/Biochemistry

CHY 111/112 General Chemistry I/II	8
And one of the following options:	
Option 1:	
BCH 221/221L Organic Chemistry	
AND	
BCH 322/322L Biochemistry	8
Option 2:	
CHY 251/253 Organic Chemistry	
AND	
BCH 322/322L Biochemistry	9
Option 3:	
CHY 251/253 Organic Chemistry I	
Lecture/Laboratory	
AND	
CHY 252/254 Organic Chemistry II	
Lecture/Laboratory	
AND	
BCH 451 Principles of Biochemistry	14
TOTAL HOURS	16-22

##### Physics

PHY 111/112 General Physics I/II	8
TOTAL HOURS	8

#### Other Areas

##### Communications (\*\*\*)

ENG 101 College Composition	3
SPC 103 Fundamentals of Public Communication	3
TOTAL HOURS	6

##### Humanities and Social Sciences (\*\*\*)

Students must select a total of 15 credit hours of courses in the humanities and/or social sciences.

TOTAL HOURS	15
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##### Free Electives (\*\*\*)

Students in the B.S. program who wish to do so may use their free electives to take additional courses in biology, or to complete a minor or special option.

TOTAL HOURS	19-28
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TOTAL HOURS REQUIRED FOR GRADUATION: 120

### Bachelor of Arts in Biology

Students may earn the B.A. in biology by completing the curriculum outlined above, and by substituting the requirements of the Bachelor of Arts degree for the sections marked above(\*\*\*). B.A. candidates in biology must also maintain a G.P.A. at 2.0 in courses required in the major, demonstrate intermediate-level proficiency in a foreign language and pass a junior-year writing proficiency exam (see ZOL 400 for aid in meeting the writing requirement). See the description of the B.A. degree elsewhere in this bulletin for a detailed explanation of requirements and options.

### Courses in Biology

The biology (BIO) course designator is used for a small number of interdisciplinary courses in the biological sciences. Extensive other offerings in the biological sciences can be found under Biochemistry, Plant Biology, Microbiology and Zoology.

#### BIO 100 Basic Biology

An introduction to fundamental principles of structure and function in living systems, both plants and animals. Open to students of all colleges. Credit cannot be earned for both BIO 100 and ZOL 101. Lec 3, Lab 2. Cr 4.

#### BIO 203 Field Natural History of Maine

The plant and animal life and physical features of aquatic, wetland, and terrestrial ecosystems in Maine, observed in a series of afternoon field trips and two all-day Saturday trips. Lec 1, Field 4. Cr 3.

#### BIO 260 Interactions Between Humans and Their Environment

Considers human population growth, natural resources, population and degradation of the



osphere. Environmental problems are examined in the light of ecological ideas and principles. No first-year students. Lec 3. Cr 3.

**BIO 394 Cooperative Education in Biology**  
A regular program of approved work experience for which academic credit is given, alternated with academic coursework. Students are provided opportunities to integrate theory with practice, to gain practical work experience, and to develop future placement opportunities. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

**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 op-

portunity to gain practical experience in a job related to their professional career goals. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

**BIO 468 Limnology**  
The ecology of inland waters, with emphasis on the physical, chemical and biological characteristics of lakes. Prerequisite: ZOL 204 and BOT 203, CHY 112; INT 319 recommended. Lec 3. Cr 3.

**BIO 469 Limnology Lab and Field**  
Laboratory and field studies emphasizing chemistry and biology of lakes. Saturday field trips. Prerequisite: BIO 468 or concurrent. Lab 4. Cr 2.

**BIO 470 Wetland and Aquatic Biology**  
A multidisciplinary study of wetlands and shallow water aquatic systems, covering major life forms and their environments. Field, lecture and laboratory work. Prerequisites: BIO 100; one semester each of botany and zoology. Cr 4.

#### Interdisciplinary Course

**INT 323 (BIO, NRC, PBP, PSE, WLM, ZOL)**  
**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. Prerequisite: BIO 100. Cr 3.





## Botany (B.S., B.A.)

Associate Professor Gelinas (Chairperson)

Professors Cronan, Davis, Homola, Jacobson, Manzer, Schwintzer, Tjepkema, Vadas

Associate Professors Brawley, Campbell, Davison, Neubauer, Tavantzis

Assistant Professors Jellison, Lambert

Cooperating Professors Greenwood, Jagles, Langille

Faculty Associates Leach, Ostrofsky

Emeritus Professors Cooper, McCrum, Richards, Campana

The B.S. in Botany is designed to provide a rigorous background in the fundamental aspects of plant biology while allowing considerable flexibility in planning the direction of specialization for student majors. The department offers particularly strong programs of study in ecology and systematics, plant pathology, plant physiology, and aquatic biology which range in approach from the molecular and cellular levels to systematic and ecological studies on freshwater, marine, and terrestrial ecosystems.

The program of study leading to the B.S. is designed to prepare students for entry-level research positions (e.g., Plant Biotechnology) in government and industry. It also provides opportunities for teaching at various levels and for post-graduate study in the biological sciences.

One of the special aspects of the program for students is the strong interaction with individual faculty members. Students are exposed first-hand to the professional and research activities of members of the faculty. This leads to more informal discussions of classic and modern approaches to plant biology useful in planning for professional and career development.

### Curriculum in Botany

#### Botany and Biology

##### Specific Requirements

BIO 100 Basic Biology	4
BOT 203 The Plant Kingdom	4
BOT 435 Plant Anatomy	4
BOT 445 Plant Genetics	3
BOT 452/453 Plant Physiology and Laboratory	4
BOT 481 Seminar	2
BCH 322/322L Biochemistry Lecture/Laboratory	4
OR	
BCH 451 Principles of Biochemistry	(4)
AND	
BCH 463 Introduction to Biochemical Laboratory Methods	(2)
INT 319 General Ecology	3
<b>TOTAL HOURS</b>	<b>28-30</b>

#### General Requirements

In addition to the courses listed above, students must complete an additional 16 credits in courses chosen from the following list, with eight credits being Botany (BOT) courses. Students are encouraged to make a selection that includes some field experience. Courses other

than those on this list may be substituted with the approval of the student's advisor.

BOT 233 Dendrology	4
BOT 391/392 Problems in Botany I/II	2
BOT 450 Botanical Microtechnique	4
BOT 457 Plant Pathology	4
BOT 458 Bryology	3
BOT 464 Taxonomy of Vascular Plants	4
BOT 473 Biology of Algae	4
BOT 475 Algal Growth and Seaweed Mariculture	3
BOT 530 Biology of the Fungi	3
AND	
BOT 531 Fungal Biology Laboratory	1
BIO 203 Field Natural History of Maine	3
BIO 468 Limnology	3
BIO 469 Limnology Lab and Field	2
BIO 470 Wetland and Aquatic Biology	4
BCH 310 Introductory Molecular Biology	3
BCH 451 Principles of Biochemistry	4
BCH 463 Introduction to Biochemical Laboratory Methods	2
BCH 464 Advanced Biochemical Laboratory Methods	4
ENT 226 Introductory Entomology	4
OR	
ENT 227 Introductory Entomology for Foresters	(3)
GES 101 Aspects of the Natural Environment I	4
MCB 300/305 General Microbiology/Laboratory	5
OCE 370 Introduction to Oceanography	3
PSE 140 Soil Science	3
ZOL 204 Animal Biology	4
ZOL 213 An Introduction to Marine Science	3
ZOL 353 Invertebrate Zoology	4
ZOL 465 Evolution	3
ZOL 472 Aquatic Food Webs	2
INT 375 Field Studies in Ecology	Arr.
<b>TOTAL HOURS</b>	<b>16</b>

#### Other Sciences

##### Chemistry

CHY 111/112 General Chemistry I/II	8
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OR	
CHY 113/114 Chemical Principles I/II	(8)
BCH 221/221L Organic Chemistry/Laboratory	4
OR	
CHY 251/253 Organic Chemistry I Lecture/Laboratory	(5)
AND	
CHY 252/254 Organic Chemistry II Lecture/Laboratory	(5)
<b>TOTAL HOURS</b>	<b>12-18</b>

##### Physics

PHY 111/112 General Physics I/II	8
<b>TOTAL HOURS</b>	<b>8</b>

##### Mathematics\*

MAT 151 Calculus for the Life Sciences I	4
OR	
MAT 126 Analytic Geometry and Calculus	(4)
<b>TOTAL HOURS</b>	<b>3-4</b>

##### Communications

ENG 101 College Composition	3
SPC 103 Fundamentals of Public Communication	3
<b>TOTAL HOURS</b>	<b>6</b>

##### Humanities and Social Sciences

Students choose from a wide variety of courses in art, music, literature, history, psychology, foreign languages, anthropology, political science, sociology, philosophy, economics, and dance among others.

<b>TOTAL HOURS</b>	<b>15</b>
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##### SCS 100 Majoring in the Sciences

**Free Electives**  
Free electives may be chosen from any of those courses at the University of Maine offered primarily for students pursuing bachelor's or advanced degrees.

<b>TOTAL HOURS</b>	<b>31-24</b>
<b>MINIMUM HOURS REQUIRED FOR GRADUATION: 120</b>	

\*For students planning a research career and/or graduate school program, a calculus course and a statistics course are strongly recommended.



The following courses are suggested for specialization in various areas of plant biology. With appropriate qualifications and permission, students may also take additional courses (numbered 500-599) in these specialized areas.

**Plant Biotechnology**

BOT 457 Plant Pathology	4
BCH 310 Introduction Molecular Biology	3
BCH 451 Principles of Biochemistry	4
BCH 463 Introduction to Biochemical Laboratory Methods	2
BCH 464 Advanced Biochemical Laboratory Methods	4
ICB 300/305 General Microbiology/Laboratory	5
HY 251/253 Organic Chemistry I Lecture/Laboratory	5
OR	
HY 252/254 Organic Chemistry II Lecture/Laboratory	5
MAT 232 Principles of Statistical Inference	(3)

**Ecology**

BOT 464 Taxonomy of Vascular Plants	4
OR	
ZOL 465 Evolution	(3)
BIO 203 Field Natural History of Maine	3
BIO 468 Limnology	3
BIO 470 Wetland and Aquatic Biology	4
ENT 226 Introductory Entomology	4
OR	
ENT 227 Introductory Entomology for Foresters	(3)
OCE 370 Introduction to Oceanography	3
PSE 140 Soil Science	3
AND/OR	
GES 101 Aspects of the Natural Environment I	(4)
ZOL 204 Animal Biology	4
MAT 151 Calculus for the Life Sciences I	4
OR	
MAT 126 Analytic Geometry and Calculus	(4)
BIO 451 Biometry	3
OR	
MAT 232 Principles of Statistical Inference	(3)
INT 375 Field Studies in Ecology	Arr.

**Marine Biology**

BOT 473 Biology of Algae	4
BOT 475 Algal Growth and Seaweed Mariculture	3
OCE 370 Introduction to Oceanography	3
ZOL 204 Animal Biology	4
ZOL 213 An Introduction to Marine Science	3
ZOL 353 Invertebrate Zoology	4

ZOL 472 Aquatic Food Webs	2
MAT 151 Calculus for the Life Sciences I	4
OR	
MAT 126 Analytic Geometry and Calculus	(4)
BIO 451 Biometry	3
OR	
MAT 232 Principles of Statistical Inference	(3)

**Plant Pathology**

BOT 457 Plant Pathology	4
BOT 464 Taxonomy of Vascular Plants	4
BOT 530 Biology of the Fungi	3
AND	
BOT 531 Fungal Biology Laboratory	1
BCH 451 Principles of Biochemistry	4
BCH 463 Introduction to Biochemical Lab Methods	2
BCH 464 Advanced Biochemical Lab Methods	4
ENT 226 Introductory Entomology	4
OR	
ENT 227 Introduction to Entomology for Foresters	(3)
MCB 300/305 General Microbiology/Laboratory	5
PSE 140 Soil Science	3
MAT 232 Principles of Statistical Inference	3

**Plant Physiology**

BCH 451 Principles of Biochemistry	4
BCH 463 Introduction to Biochemical Laboratory Methods	2
BCH 464 Advanced Biochemical Laboratory Methods	4
MCB 300/305 General Microbiology/Laboratory	5
CHY 251/253 Organic Chemistry I Lecture/Laboratory	5
AND	
CHY 252/254 Organic Chemistry II Lecture/Laboratory	5

**Systematics and Evolution**

BOT 464 Taxonomy of Vascular Plants	4
BIO 203 Field Natural History of Maine	3
OR	
BIO 470 Wetland and Aquatic Biology	(4)
ENT 226 Introductory Entomology	4
OR	
ENT 227 Introductory Entomology for Foresters	(3)
GES 101 Aspects of the Natural Environment I	4
ZOL 465 Evolution	3
MAT 232 Principles of Statistical Inference	(3)
Two or more of the following:	
BOT 233 Dendrology	4
BOT 458 Bryology	3

BOT 473 Biology of Algae	4
BOT 523 Evolutionary Biology of Plants	3
BOT 530 Biology of the Fungi	3
AND	
BOT 531 Fungal Biology Laboratory	1

**Courses in Botany****BOT 101 Introductory Botany**

The structure and life processes of seed plants, their propagation, breeding, classification, and relation to their environment. Lec 3, Lab 2.

Cr 4.

**BOT 201 Plant Biology**

An introduction to seed plants emphasizing structure and physiology, as well as their relationship to the ecology of plants. Prerequisite: BIO 100. Lec 3.

Cr 3.

**BOT 202 Plant Biology Laboratory**

Laboratory exercises designed to accompany BOT 201. Prerequisite: BOT 201 or concurrently. Lab 2.

Cr 1.

**BOT 203 The Plant Kingdom**

The morphology, reproduction, ecology and phylogenetic significance of the major classes of the plant kingdom. Open to students of all colleges. Prerequisite: BIO 100 or equivalent. Lec 3, Lab 2.

Cr 4.

**BOT 233 Dendrology**

Identification and natural history of trees and native shrubs of North America. Prerequisite: BIO 100. Lec 2, Lab 3.

Cr 3.

**BOT 251 Plants and Society**

The impact of plants on the economic and social welfare of society. Topics include: food, fiber, spice and medicinal plants, international conservation, ethnobotany, aquaculture, plant diseases and plant biotechnology. Prerequisite: BIO 100 or permission.

Cr 3.

**BOT 391 Problems in Botany I**

Sophomore Tutorial designed to acquaint students with different aspects of plant biology.

Cr Ar.

**BOT 392 Problems in Botany II**

Sophomore Tutorial designed to acquaint students with different aspects of plant biology.

Cr Ar.

**BOT 394 Cooperative Education in Botany**

A regular program of approved work experience for which academic credit is given, alternated with academic coursework. Students are provided opportunities to integrate theory with practice, to gain practical work experience, and to develop future placement opportunities. Prerequisite: junior standing and permission. (Pass/Fail Grade Only).

Cr 1-16.

**BOT 420 Ecology Laboratory and Field Course**

Combines field studies of natural ecosystems and laboratory experimentation to illustrate ecological principles and to provide technical



experience in ecology. Saturday field trips. Prerequisites: INT 319 and a course in statistics (may be concurrent). Lab and field 6. Cr 3.

#### **BOT 435 Plant Anatomy**

The origin, development and structure of tissue systems of vegetative and reproductive organs of vascular plants. Prerequisite: BIO 100. Lec 2, Rec 1, Lab 2. Cr 4.

#### **BOT 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. Prerequisite: BIO 100 or equivalent. Lec 3. Cr 3.

#### **BOT 450 Botanical Microtechnique**

Methods of killing, embedding, sectioning, and staining plant material and techniques of studying and recording microscopic preparation. Prerequisite: BOT 203 or ZOL 204. Lec 2, Lab 4. Cr 4.

#### **BOT 452 Plant Physiology**

Physiological processes in plants, with emphasis on water relations, mineral nutrition and physiological ecology. Prerequisite: BIO 100 and one year of chemistry; BOT 201 recommended. Lec 3. Cr 3.

#### **BOT 453 Plant Physiology Laboratory**

Laboratory study of the physiological function of plants. Prerequisite or corequisite: BOT 452. Lab 2. Cr 1.

#### **BOT 457 Plant Pathology**

Principles of plant disease. Open to juniors and seniors. Prerequisite: BIO 100. Lec 3, Lab 2. Cr 4.

#### **BOT 458 Bryology**

Identification and classification of liverworts and mosses. Prerequisite: BOT 203 or an equivalent with permission. Lec 1, Rec 1, Lab 2. Cr 3.

#### **BOT 464 Taxonomy of Vascular Plants**

Identification and evolutionary biology of flowering plants. Prerequisite: BIO 100. Lec 2, Rec 1, Lab 2. Cr 4.

#### **BOT 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. Prerequisites: BIO 100 and BOT 203 or permission. Lec 2, Lab 4. Cr 4.

#### **BOT 475 Algal Growth and Seaweed Mariculture**

An introduction to growth and culture processes in micro and macroalgae. Basic aspects of nutrition are stressed including culture media, nutrient requirements, physical factors, and nutrient cycling. Emphasis on given to growth, biomass and productivity. Laboratory exercises emphasize "hands on" experience in isolating, growing and calculating yields of micro and macro algae. Two Saturday field trips. Prereq-

uisites: BIO 100, 1 yr Biology and 1 yr Chemistry. Lec 2, Lab 1. Cr 3.

#### **BOT 481 Seminar**

Literature reviews of topics selected from current botanical research. Lec 1. Cr 1.

#### **BOT 496 Field Experience in Botany**

Students work as field botanists pursuant to an authorized activity or research project. Cr Ar.

#### **BOT 501 Physiology of Aquatic Macrophytes**

Physiology of fresh water and marine aquatic macrophytes, including photosynthesis, osmoacclimation and carbon metabolism, growth regulation, translocation, nitrogen metabolism, and response to water motion. Prerequisite: BOT 452 or permission. Cr 3.

#### **BOT 523 Evolutionary Biology of Plants**

Theories of evolution, genetic and molecular aspects of evolution, speciation, and reproductive biology, with special emphasis on flowering plants. Cr 2.

#### **BOT 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 basic Ecology course or permission. Cr 3.

#### **BOT 531 Fungal Biology Laboratory**

An optional laboratory to accompany BOT 530. Corequisite: BIO 530. Lab 2. Cr 1.

#### **BOT 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, CO<sub>2</sub> and O<sub>2</sub> in plants. Adaptations to a variety of stresses including high and low temperature, low moisture and low N and P will be discussed. Prerequisite: INT 319 or equivalent plus BOT 452 or permission. (Open to graduate students and advanced undergraduates). Lec 3. Cr 3.

#### **BOT 550 Biogeochemistry of Terrestrial Ecosystems**

Biogeochemical patterns and processes in forest ecosystems. Comparative data from the ecological literature 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. Prerequisite: permission plus INT 319 and one year of college chemistry. (Open to advanced undergraduate and graduate students). Lec 3. Cr 3.

#### **BOT 557 Advanced Topics in Plant Virology**

Topics in plant virology related to virus structure, replication, genetics and plant cell-virus interactions at the molecular level. May be repeated for credit. Cr 1-3.

#### **BOT 564 Photosynthesis**

The physiology and biochemistry of photosynthesis including chloroplast structure, chlorophyll synthesis, photolysis of water, electron transport, photophosphorylation, path of carbon in photosynthesis, C<sub>3</sub>, C<sub>4</sub>, C<sub>3</sub>-C<sub>4</sub> intermediates, CAM, photorespiration and plant productivity. Prerequisite: BOT 452, or permission. Cr 3.

#### **BOT 567 Plant Disease Epidemiology**

This course provides an analysis of plant-pathogen interactions at the population level, and thus offers the scientific and conceptual bases for plant disease management. The study of epidemiology serves two purposes. The scientific aspect yields understanding of the behavior of plant pathogens in time and space, and the practical aspect uses that understanding to regulate disease. Lec 3. Cr 3.

#### **BOT 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 disturbance in landscape development, paleoecological perspectives, plant population ecology. Prerequisite: INT 319 or equivalent, one year calculus. Lec 2, Lab 4, plus two field trips. Cr 4.

#### **BOT 581 Seminar**

Techniques, procedures and results in botanical literature. Cr 1.

#### **BOT 599 Lake Ecology and Productivity**

Offered periodically. Cr 3.

### **Courses in Biology**

#### **BIO 100 Basic Biology**

An introduction to fundamental principles of structure and function in living systems, both plants and animals. Open to students of all colleges. Credit cannot be earned for both BIO 100 and ZOL 101. Lec 3, Lab 2. Cr 4.

#### **BIO 203 Field Natural History of Maine**

The plant and animal life and physical features of aquatic, wetland, and terrestrial ecosystems in Maine, observed in a series of afternoon field trips and two all-day Saturday trips. Lec 1, Field 4. Cr 3.

#### **BIO 468 Limnology**

The ecology of inland waters, with emphasis on the physical, chemical and biological characteristics of lakes. Prerequisite: ZOL 204 and BOT 203, CHY 112; INT 319 recommended. Lec 3. Cr 3.

#### **BIO 469 Limnology Lab and Field**

Laboratory and field studies emphasizing chemistry and biology of lakes. Saturday field trips. Prerequisite: BIO 468 or concurrent. Lab 4. Cr 2.

#### **BIO 470 Wetland and Aquatic Biology**

A multidisciplinary study of wetlands and shallow water aquatic systems, covering major life



ms and their environments. Field, lecture and laboratory work. Prerequisites: BIO 100; one semester each of botany and zoology. Cr 4.

#### Interdisciplinary Courses

**INT 219 (PBP, ZOL) 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. Prerequisite: BIO 100. Lec 3. Cr 3.

**INT 256 (ENT, FTY, PBP) Forest Protection**  
Principles of forest protection involving disease, insects and fire with emphasis on understanding the identification, ecology, and control of tree pests. Prerequisites: Plant Biology Elective, BOT 233 or BOT 464. Lec 3, Lab 1. Cr 4.

**INT 319 (PBP, ZOL) General Ecology**  
Ecological principles for the science major including environmental factors, population biology, community ecology and ecosystem energetics. Prerequisites: one year of college chemistry, one year of college biological science. Lec 3. Cr 3.

**INT 323 (BIO, NRC, PBP, PSE, WLM, ZOL) 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. Prerequisite: BIO 100. Cr 3.

#### **INT 375 (FOR, OCE, PBP, WLM, ZOL) Field Studies in Ecology**

An intensive ecology field trip of one to several weeks to an area of ecologic interest scheduled during Christmas, midyear, spring recess or summer. Field and living conditions may be rigorous and/or primitive. Prerequisite: a course in ecology. Other preparation and/or recommended prerequisites announced for each trip. Credit depends upon specific trip. Cr Ar.

#### **INT 450 (ENT, PBP, PSE) Agricultural Pest Ecology**

An examination of the intrinsic and extrinsic principles of weed, plant disease, and insect pest interrelationships. Emphasis on integrated pest management strategies and crop ecosystem models. Prerequisites: An introductory course in two of the three pest sciences-PSE 403, BOT 457, or ENT 326, ENT 328, INT 256 or permission. Lec 3. Cr 3.

#### **INT 500 (ANT, GES, PBP, PSE) 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 539 (ANT, PBP, QUS) Ice Ages and Humankind**

Introduction to the physical, biological, and human environments of the Quaternary Period with emphasis on the paleoecology and prehistoric archaeology of the past 20,000 years. Special attention to productive research approaches in the various fields of Quaternary

studies, and to important recent advances. Prerequisite: introductory courses in geology, ecology, and anthropology and/or permission. Lec 3. Cr 3.

**INT 545 (PBP) Late Quaternary Paleoecology**  
Ecology of the recent geologic past; effects of changing environments on the distribution, migrations and extinctions of marine, inland aquatic and terrestrial biota. Historical view of organism interaction, including role of people. Laboratory and field studies emphasize late- and postglacial changes, and include analyses of the pollen and other microfossil content of Maine lake sediments. Prerequisite: permission; a course in ecology and a year of college chemistry. Two all-day field trips. Lec 2, Lab and Rec 5. Cr 4.

**INT 555 (ENT, PBP) Pest-Plant Interactions**  
Physiological and genetic systems involved in pathogenesis, insect feeding, and host plant resistance, including plant breeding practices and strategies for disease and insect control. Prerequisite: genetics and biochemistry or permission. Cr 3.

#### **INT 563 (OCE, PBP, ZOL) 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. Prerequisite: a course in ecology. Lec 2, Rec 1. Cr 3.





## Chemistry (B.S., B.A.)

Professor Bentley (Chairperson)

Professors Dunlap, Fort, Goodfriend, Green, Patterson, Rasaiah

Associate Professors Amar, Dwyer, Georgitis (Emeritus), Jensen, Russ, Wolfhagen (Emeritus)

Assistant Professors A. Bruce, M. Bruce, Cole, Smith

The Department of Chemistry offers programs of study leading to the degrees of Bachelor of Arts and Bachelor of Science in Chemistry in the College of Sciences.

Because a knowledge of chemistry is fundamental to success in so many fields, the chemistry curriculum affords an unusual opportunity for a wide choice of electives so that the chemistry major may adapt his or her program to individual interests and needs. A brochure describing a number of such individualized programs, such as technical writing, industrial management, computer applications, or medical school preparation, is available in the Department office, 288 Aubert Hall.

A curriculum leading to American Chemical Society certification, such as the specimen below, prepares the student for employment in the chemical industry or for graduate or professional school. The prospective chemistry major should discuss his or her educational goals with a Departmental advisor as early as possible, so as to incorporate requisite courses at their appropriate places in the curriculum.

In addition to the courses in the curriculum below, B.A. students will need to complete a set of social science and humanities electives specified by the Faculty Assembly and B.S. candidates will satisfy requirements as specified by the College of Sciences.

### Cooperative Work Experience

A program is available which allows students to accept opportunities for temporary employment provided by cooperating industries. The student may work during the summer or part of one summer and either the following or immediately preceding semester. Credit will be allowed for this work under course numbers CHY 394 and CHY 594. This will be a supervised and paid professional experience.

### Five-Year Combined B.S.—M.S. Program

Selected students may apply for this option, which permits completion of both the B.S. and the M.S. degrees in five years. Work completed as part of the Honors Program may be included. Application should be made by letter to the Department early in the junior year.

### Graduate Work in Chemistry

The Department of Chemistry offers a program of study and research leading to the M.S. and Ph.D. degrees. The general requirements of

### Specimen Curriculum

Courses are arranged in the recommended sequence. See departmental advisors for variations.

First Year			
First Semester		Second Semester	
CHY 113 Chemical Principles I	4	CHY 114 Chemical Principles II	4
OR		OR	
CHY 111 General Chemistry I	(4)	CHY 112 General Chemistry II	(4)
ENG 101 College Composition	3	COS 215 Introduction to Computing using FORTRAN	3
MAT 126 Analytic Geometry and Calculus	4	MAT 127 Analytic Geometry and Calculus	4
PHY 121 Physics for Engineers and Physical Scientists I	4	PHY 122 Physics for Engineers and Physical Scientists II	4
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>14</b>
Sophomore Year			
First Semester		Second Semester	
CHY 242 Principles of Quantitative Analysis	4	CHY 252 Organic Chemistry Lecture II	3
CHY 251 Organic Chemistry Lecture I	3	CHY 254 Organic Chemistry Laboratory II	2
CHY 253 Organic Chemistry Laboratory I	2	CHY 393 Undergraduate Seminar in Chemistry	1
MAT 228 Analytic Geometry and Calculus	4	MAT 258 Differential Equations	4
Other	3	SPC 103 Fundamentals of Public Communication	3
<b>TOTAL HOURS</b>	<b>16</b>	Other	3-6
		<b>TOTAL HOURS</b>	<b>15-18</b>
Junior Year			
First Semester		Second Semester	
CHY 371 Physical Chemistry I	4	CHY 372 Physical Chemistry II	4
CHY 373 Physical Chemistry Laboratory I	2	CHY 374 Physical Chemistry Laboratory II	2
CHY 385 Chemical Literature	2	CHY 453 Intermediate Organic Chemistry Laboratory	3
GER 101 Elementary German I**	4	CHY 393 Undergraduate Seminar in Chemistry	1
Other	3-6	GER 102 Elementary German II**	4
<b>TOTAL HOURS</b>	<b>15-18</b>	Other	3
		<b>TOTAL HOURS</b>	<b>16</b>
Senior Year			
First Semester		Second Semester	
CHY 461 Advanced Inorganic Chemistry	3	CHY 393 Undergraduate Seminar in Chemistry	1
GER 203 Intermediate German I**	4	CHY 443 Instrumental Analysis	4
Other	9-12	CHY 462 Advanced Inorganic Chemistry	3
<b>TOTAL HOURS</b>	<b>15-18</b>	GER 207 Readings in Scientific German**	3
		Other	5-8
		<b>TOTAL HOURS</b>	<b>15-18</b>

\*Any other Programming Course may be substituted for COS 215.

\*\*Not required for certification, but strongly recommended.



the programs are described in the Graduate School catalog.

### Chemistry Major Requirements

A chemistry major must take a minimum of 16 credit hours of chemistry courses: CHY 111/114 or CHY 111/112; CHY 242; CHY 252; CHY 253; CHY 371/372; CHY 373; CHY 461/462; either CHY 443 or CHY 254 and CHY 374; and CHY 393 three times. Additional requirements are: 12 credit hours of mathematics: MAT 126, MAT 127 and MAT 228; eight credit hours of physics: PHY 111/112, or PHY 112/122; three credit hours of speech communication: SPC 103; a college composition course: ENG 101 or equivalent; a literature course: (ENG 122 or ENG 123 is recommended); a course in computer programming. At least one year of study of a major foreign language (French, German, or Russian) is strongly recommended if the student plans to enter graduate school.

### Courses in Chemistry

#### CHY 111 General Chemistry I

Topics include: atomic and molecular structure, states and properties of matter, stoichiometry, solutions, thermochemistry, and periodic relationships. Elementary physics and high school chemistry recommended but not required. Prerequisites: High school algebra and trigonometry or MAT 122. Lec 3, Lab 3. Cr 4.

#### CHY 112 General Chemistry II

Continuation of CHY 111. Topics include: chemical equilibria, reaction rates, acids and bases and descriptive chemistry of the elements. Provides a foundation for further study in chemistry, and physical or biological sciences. Prerequisites: CHY 111 or CHY 113. Lec 3, Lab 3. Cr 4.

#### CHY 113 Chemical Principles I

Topics include: atomic and molecular structure, stoichiometry, states and properties of matter, periodic relationships, acids and bases, thermochemistry and chemical kinetics. Mathematical aptitude for handling quantitative applications necessary. Lec 3, Lab 3. Cr 4.

#### CHY 114 Chemical Principles II

Continuation of CHY 113. Analytical chemistry, chemical equilibrium, organic chemistry, inorganic chemistry, and chemical thermodynamics are presented. Mathematical aptitude for handling quantitative applications is necessary. Prerequisites: CHY 113 or permission. Lec 3, Lab 3. Cr 4.

#### CHY 240 Quantitative Analysis

Introduces the fundamental principles of gravimetric and volumetric analysis. Prerequisite: CHY 112 or CHY 114. Lec 2, Lab 6. Cr 4.

#### CHY 242 Principles of Quantitative Analysis

Quantitative analysis offered at a more advanced level than CHY 240. Prerequisite: CHY 113, CHY 114 or permission. Lec 2, Lab 6. Cr 4.

#### CHY 251 Organic Chemistry I

An introduction to the chemistry of carbon compounds. Prerequisite: CHY 112 or CHY 114. Lec 3, Rec 1. Cr 3.

#### CHY 252 Organic Chemistry II

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

#### CHY 253 Organic Chemistry Laboratory I

An introduction to the separation, synthesis and analysis of organic compounds in the laboratory. Prerequisite: CHY 251 (previously or concurrently). Lab 4. Cr 2.

#### CHY 254 Organic Chemistry Laboratory II

A continuation of CHY 253. Prerequisite: CHY 253 and CHY 252 (previously or concurrently). Lab 4. Cr 2.

#### CHY 371 Physical Chemistry I

Applications of classical thermodynamics to the study of chemical and electrochemical systems. Prerequisite: CHY 112 or CHY 114, PHY 112 or PHY 122, MAT 228 or equivalent. Lec 4. Cr 4.

#### CHY 372 Physical Chemistry II

Applications of statistical thermodynamics, quantum mechanics and principles of reaction kinetics to the study of chemical systems. Prerequisite: CHY 371. Lec 4. Cr 4.

#### CHY 373 Physical Chemistry Laboratory I

Properties of gases, thermochemistry and phase equilibria. Introduces high vacuum techniques and emphasizes research oriented methodology and attitudes. Prerequisite: CHY 371 (previously or concurrently). Lab 4. Cr 2.

#### CHY 374 Physical Chemistry Laboratory II

Aqueous solution equilibria, electrochemistry, reaction kinetics, and spectroscopy. Prerequisite: CHY 372 (previously or concurrently) or CHY 240 or permission. Lab 4. Cr 2.

#### CHY 385 Chemical Literature

A study of methods for searching chemical literature. Prerequisite: CHY 252. Lec 2. Cr 2.

#### CHY 393 Undergraduate Seminar in Chemistry

Discussion of developments in chemistry and the chemical profession. Oral presentations and written papers required. Required of all chemistry majors in sophomore, junior and senior years. Prerequisite: CHY 112 or CHY 114. Cr 1.

#### 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. Prerequisites: junior or senior standing with a good academic record, permission. (Pass/Fail Grade Only). Cr 1-9.

#### CHY 399 Undergraduate Thesis

Written report of an original investigation carried out in the library and laboratory. Prerequisite: senior standing, departmental permission. Cr 1-3.

#### CHY 443 Instrumental Analysis

Emphasis on instrumental methods. Prerequisite: CHY 240 and CHY 372. Lec 2, Lab 6. Cr 4.

#### CHY 453 Intermediate Organic Chemistry Laboratory

Qualitative organic analysis by chemical and instrumental methods. Prerequisite: CHY 252; CHY 254. Lec 1, Lab 4. Cr 3.

#### CHY 455 Introductory Wood Chemistry

Emphases on the chemical and physical properties of cellulose, hemicelluloses, lignin, and extractives. Prerequisite: CHY 252 or permission. Lec 3. Cr 3.

#### CHY 456 Insect Chemical Ecology

A study of the molecular bases of insect communication with emphasis on insect-plant interactions, chemical defense, reproductive communication and sociochemicals. Prerequisite: CHY 252 or BCH 322. Cr 3.

#### CHY 461 Advanced Inorganic Chemistry I

Advanced theoretical and descriptive inorganic chemistry emphasizing periodic relationships. Corequisite CHY 373 or equivalent. Lec 3. Cr 3.

#### CHY 462 Organometallic Chemistry

An introductory course for advanced undergraduate chemistry majors 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. Prerequisite: CHY 252; Corequisite or Prerequisite: CHY 372. Lec 3, Lab 3. Cr 4.

#### CHY 540 Modern Techniques in Chromatography

Theory and applications of chromatographic separations including a discussion of current literature. Prerequisites: CHY 240, CHY 252 or equivalent. Cr 3.

#### CHY 541 Topics in Advanced Analytical Chemistry

Lec 3. Cr 3.

#### CHY 543 Advanced Instrumental Analysis

New developments in theory and methods of instrumental analysis. Discussion of current literature. Topics include: spectroscopy, electroanalytical methods, principles of electronics. Prerequisite: permission. Cr 3.

#### CHY 551 Topics in Advanced Organic Chemistry

Recent advances in stereochemistry, 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. Prerequisite: CHY 252. Lab 8. Cr 4.

**CHY 554 Advanced Synthesis Laboratory**

Advanced laboratory techniques as applied to types of syntheses not encountered in elementary organic chemistry courses. Prerequisite: CHY 252. Lab 6. Cr 3.

**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 and CHY 575. Offered on sufficient demand. 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. 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. Prerequisites: 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. Prerequisites: CHY 252 and CHY 372 or equivalents. Lec 3, Lab 3. Cr 3-4.

**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, Raman and other scattering techniques. The use of spectroscopy to study molecular dy-

namics emphasized. Prerequisite: CHY 575 or permission. Cr 3.

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

**CHY 576 Intermediate Physical Chemistry II**  
Introduction to classical mechanics, thermodynamics and statistical thermodynamics with application to simple chemical systems. Cr 3.

**CHY 577 Chemical Thermodynamics**  
A study of the laws of thermodynamics as applied to chemical problems. Offered on sufficient demand. Prerequisite: CHY 372. Cr 3.

**CHY 581 Topics in Advanced Wood Chemistry**

Recent advances in wood biosynthesis and biochemistry; lignin, carbohydrate, pulping, and bleaching chemistry. Prerequisite: CHY 252 or permission. Cr 3.

**CHY 583 Advanced Wood Chemistry**

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

**Interdisciplinary Course****INT 398 (CHE, CHY, ELE) Undergraduate Research Participation**

Research topics chosen by students in consultation with faculty members in the College of Engineering. Students submit a final report describing their research and present an oral seminar. Cr 1-3.





## Computer Science (B.A., B.S.)

Associate Professor Byther (Chairperson)  
 Professors Markowsky, Northam  
 Associate Professors Dube, Ferguson  
 Assistant Professors Kadin, Kopec, Latour  
 Instructor Shea

The computer science major is designed to prepare students to be effective computer professionals and for graduate studies. Students must complete course work in computer science and a concentration area. Students who already have a bachelor's degree need not complete a concentration. Concentration areas include business (pre-MBA program), economics, electrical engineering or mathematics. The concentrations help prepare students for work or graduate school, and are a key component of the program.

A minimum of 36 hours in computer science is required, including COS 220 and COS 221 with a grade of "C" or better, COS 230, COS 250, COS 301, COS 310 OR COS 315, COS 331, and COS 350. Furthermore, at least 12 additional hours of COS courses are required from COS 305, COS 335, COS 398 or any computer science course numbered 400 or higher.

At least 18 hours of required computer science courses numbered 300 or above must be taken at Orono. All courses taken elsewhere for the degree must be approved in advance by the department.

### Concentrations

**Business concentration (pre-MBA) student must take:** COS 100, COS 211, COS 310, ECO 120, ECO 121, BUA 201, BUA 202, BUA 220, BUA 250, BUA 337, BUA 350, BUA 370. COS 100 and COS 211 do not count toward the 36 credits of computer science required for the bachelor's degree. COS 310 does count toward the required 36 credits. The business concentration satisfies the course requirements for admission to most MBA programs. Successful completion of these requirements and meeting the other admission requirements of an MBA program allows the student to earn both a B.A. in Computer Science and an MBA in five years. An **economics concentration student must take:** ECO 120/121, BUA 201, ECO 420, BUA 350, ECO 421, ECO 485

and at least four of the following:

ECO 433, ECO 437, ECO 438, ECO 439, ECO 444, ECO 453, ECO 470, ECO 471, ECO 475, ECO 480  
 An **electrical engineering concentration student must take:** PHY 121/122, MAT 126/127, MAT 128, ELE 171, ELE 172, ELE 210, ELE 224, ELE 271

and either:

ELE 475 or another ELE course in microcomputer application engineering  
 A mathematics

### Model Curriculum for B.A. in Computer Science

First Year			
First Semester		Second Semester	
SCS 100 Majoring in the Sciences	1	COS 220 Introduction to Computer Sciences I	3
COS 100* Introduction to Personal Computer	3	ECO 121 Principles of Macroeconomics	3
ECO 120 Principles of Microeconomics	3	MAT 127** Analytic Geometry and Calculus	4
MAT 126 Analytic Geometry and Calculus	4	ENG 101 College Composition	3
ENG 101 College Composition	3	OR	
OR		SPC 102 Fundamentals of Interpersonal Communication	3
SPC 102 Fundamentals of Interpersonal Communications	3	Elective	3
Elective	3	<b>TOTAL HOURS</b>	<b>16</b>
<b>TOTAL HOURS</b>	<b>17</b>		
Sophomore Year			
First Semester		Second Semester	
COS 221 Introduction to Computer Science	3	COS 250 Discrete Structures	3
MAT 228*** Analytic Geometry and Calculus	4	COS 230 Computer Architecture and Assembly Languages	3
OR		MAT 434*** Introduction to Statistics	4
MAT 215*** Introduction to Statistics for Business and Economics	3	Concentration/Electives	6
Concentration/Electives	9	<b>TOTAL HOURS</b>	<b>16</b>
<b>TOTAL HOURS</b>	<b>15-16</b>		
Junior Year			
First Semester		Second Semester	
COS 301 Programming Languages	3	COS 310*** Systems Analysis With Business Applications	4
COS 331 Operating Systems Concentration	3	OR	
Electives	6	COS 315*** Systems Analysis With Scientific Applications	4
<b>TOTAL HOURS</b>	<b>15</b>	COS 350 Data Structures and Algorithms	3
		Concentration	6
		Elective	3
		<b>TOTAL HOURS</b>	<b>16</b>
Senior Year			
First Semester		Second Semester	
COS Electives	6	COS Electives	6
Concentration	6	Concentration	6
Elective	3	Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>

\*Recommended for students not familiar with personal computers. Credit does not apply to the major.

\*\*MAT 162- Business Concentration students may elect to take MAT 162.

\*\*\*Depending on concentration



concentration student must take: MAT 126/127, MAT 228, MAT 262, MAT 434 and at least four courses from three different categories:

*Differential Equations:* MAT 259, MAT 453 OR MAT 459 (one only), MAT 454;

*Statistics:* MAT 437 or MAT 439 (one only), MAT 438, MAT 435;

*Operations Research:* MAT 455, MAT 456;

*Numerical Analysis:* MAT 487;

*Simulation:* MAT 457, MAT 458;

*Pure Mathematics:* MAT 425, MAT 463;

*Discrete Mathematics:* MAT 481, MAT 488.

In addition to the courses in computer science and the concentration area, each major must complete SPC 102, ECO 120/121, ENG 317 with a grade of "C" or better, MAT 126 with a grade of "C" or better, MAT 127 or MAT 162 with a grade of "C" or better, MAT 215 or MAT 434.

### Degree Requirements for B.S. in Computer Science

This degree complements the B.A. in Computer Science degree with a degree which requires its recipients to demonstrate more scientific and technical expertise while allowing the student more freedom in meeting general education requirements. All requirements of the College of Sciences must be met.

#### Computer Science Courses

COS 220 Introduction to Computer Sciences I	3
COS 221 Introduction to Computer Science	3
COS 230 Computer Architecture and Assembly Languages	3
COS 250 Discrete Structures	3
COS 301 Programming Languages	3
COS 315* Systems Analysis with Scientific Application	4
COS 331 Operating Systems	3
COS 335 Computer Organization and Architecture	3
COS 350 Data Structures and Algorithms	3
COS 490 Computers and Society	3
COS Elective courses	12
Total Hours	43

#### Mathematics Courses

MAT 126 Analytic Geometry and Calculus	4
MAT 127 Analytic Geometry and Calculus	4
MAT 228 Analytic Geometry and Calculus	4
MAT 262 Linear Algebra	4
MAT 434 Introduction to Statistics	4
Total Hours	20

#### Other Required courses

ELE 171 Microcomputer Architecture and Application	4
ELE 172 Logic Systems	4

ENG 101 College Composition	3
ENG 317 Technical Writing	3
PHY 121 Physics for Engineering and Physics Scientists I	4
PHY 122 Physics for Engineering and Physics Scientists II	4
SPC 102 Fundamentals of Interpersonal Communications	3
Total Hours	25
Total Hours Required	120

#### Requirements on electives

Courses meeting the following requirements will be chosen with the an academic advisor.

Two courses emphasizing quantitative methods	6-8
24 Additional hours in areas chosen for the Arts and Humanities or the Social and Behavioral Sciences	24

### Master of Science Degree Program

The Department of Computer Science offers a Master of Science degree. For details see the graduate catalog.

### Courses in Computer Science

#### COS 100 Introduction to Personal Computers

Topics include: types, care and maintenance of equipment, types of programs, introduction to DOS (disk operating systems), programming using BASIC, word processing, use of a spreadsheet. Prepares students to operate a personal computer with a minimum of outside help. Credit does not count towards the major. 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 202 Programming in C

An introduction to the C language for those with programming experience in another language. Does not count for credit in the major. Prerequisite: COS 221 or equivalent. Cr 1.

#### 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 210 Introduction to Computing Using COBOL

Programming logic and techniques using COBOL, including introductory hardware concepts. Students are assigned programs from various areas of application. Credit does not count towards the major. Cr 3.

#### COS 211 Principles of Data Processing

Presents basic concepts in data processing using a microcomputer database system and a mainframe statistical analysis system. Students are assigned programs from various areas of application. Credit does not count toward the 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 major. Degree credit will not be given for both COS 215 and COS 220. Cr 3.

#### COS 220 Introduction to Computer Science I

Stresses programming logic and techniques with a brief introduction to hardware concepts. Students are assigned programs emphasizing numerical algorithms for implementation in a higher level language. 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 250 Discrete Structures

Introduction to discrete structures used in various areas of computer science. Topics include logic, sets, relations, functions, cardinality, enumeration, and computability. Prerequisites: COS 221, MAT 127 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: COS 220. Cr 1-3.

#### COS 301 Programming Languages

Formal description of programming language 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. Prerequisite: COS 250. Cr 3.

#### COS 305 Numerical Methods with FORTRAN

Introduces the use of numerical methods for solving engineering and science problems, and the development and management of large programs on a mainframe operating environment.



ing FORTRAN 77. Topics include rounding errors, locating roots of equations, matrix mathematics, simultaneous linear equations, numerical differentiation, and curve fitting. Prerequisite: One semester of programming experience in FORTRAN or a comparable language such as Pascal. Cr 3.

#### **COS 310 Systems Analysis With Business Applications**

Provides the knowledge and tools necessary to analyze problems of information gathering and processing, and to develop logical and physical designs in a business setting. Problems in this course will be done using the COBOL language. Prerequisite: COS 331, COS 203 or equivalent. Credit will not be given for both COS 310 and COS 315). Cr 3.

#### **COS 315 Systems Analysis With Scientific Applications**

Provides the knowledge and tools necessary to analyze problems of information gathering and processing, and develops logical and physical designs in scientific applications. Problems are presented using the FORTRAN language. Prerequisite: COS 301. (Credit will not be given for both COS 310 and COS 315). Cr 3.

#### **COS 331 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 400 or permission. 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 331. 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 management is discussed. Prerequisite: COS 301. 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, compiler design issues, symbol tables, storage allocation, code generation and machine-independent code improvement. Programming projects illustrate various concepts. Prerequisites: COS 350. Cr 3.

#### **COS 410 Computing Management**

Introduces diverse executive and administrative techniques useful in making managerial decisions in a computing environment and their interrelations. Prerequisite: COS 310 or COS 315. Cr 3.

#### **COS 411 The Use of Statistical Packages**

Introduces programs available for statistical analysis of data and the problems inherent in computer usage. The proper use and relative merits of both mainframe and microcomputer programs are discussed. Not acceptable for credit towards a Computer Science major. Prerequisite: At least one course in statistics. Cr 3.

#### **COS 440 Computer Networks**

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 331. Cr 3.

#### **COS 460 Interactive Computer Graphics**

Topics include graphic I/O 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 215 or COS 220 or equivalent, MAT 126 and junior standing. Cr 3.

#### **COS 461 Advanced Computer Graphics**

Topics include three dimensional transformations, hidden line and surface algorithms, color and raster graphics. Prerequisites: COS 460, MAT 126. 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 principle Artificial Intelligence programming language. Prerequisites: 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 and Society**

Consideration of the human and social consequences of technological development and application of computers from the perspectives of the computer customer, the computer specialist, and the public. Prerequisite: COS 221 and junior standing. Cr 3.

#### **COS 492 Computer Related Law**

Acquaints students with the basic legal concepts encountered by computer professionals. Includes practice in the analysis of judicial opinions dealing with computer-related issues and introduces legal research. Students analyze fact situations to identify legal problems and the means of addressing these problems. Prerequisite: COS 230. Cr 3.

#### **COS 495 Field Experience**

A pre-planned work experience of ten to twelve weeks in a commercial environment, with faculty supervision. Normally a paid work experience. Prerequisite: completion of junior year and permission. (Pass/Fail Grade Only). Cr 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. Prerequisite: 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. Prerequisite: permission. Cr 3.

#### **COS 515 Topics in Scientific Computation**

Selected advanced topics from scientific computation. Course content selected by instructor. May be repeated for credit with departmental permission. 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. Prerequisites: COS 350 and COS 331. Cr 3.

#### **COS 521 Topics in Software Engineering**

May be repeated. Prerequisite: permission. Cr 3.

#### **COS 550 Theoretical Computer Science I**

A survey of automata theory, formal languages, undecidability and computational complexity. Prerequisites: COS 301 and COS 250. Cr 3.

#### **COS 551 Topics in Theoretical Computer Science**

May be repeated. Prerequisite: permission. 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. Prerequisite: permission. 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.



## Geological Sciences (B.A.)

Professor Hall (Chairperson),

Professors Borns, Chernosky, Decker, Denton, Guidotti, Hughes, T. Kellogg, Mayer, Norton, Schnitker

Associate Professors Belknap, Fink, Lux

Assistant Professor Evans, Hubbard, Prentice

Research Professors Grew, D. Kellogg, Yates

Emeritus Professor Osberg

Adjunct Professor J. Kelley

Faculty Associates Anderson, Hussey, Stanley, Stuckenrath, Thompson

Instructor A. Kelley

The geological sciences are concerned with the physical and chemical characteristics of minerals and rocks, with their occurrence, arrangement, and surface expression, and with the history of the Earth and its inhabitants. The curriculum provides for a basic understanding of the geological sciences and is sufficiently flexible to allow students with interests in geochemistry, geophysics, paleontology, and oceanography to pursue additional courses in appropriate ancillary sciences.

A geology major is prepared to enter directly into industry or survey work, or to enter graduate school in geology. In addition, if ZOL 204, CHY 251/252, and CHY 253/254 are taken, the requirements for medical or dental schools are met.

The requirements for the major include: GES 101 or 106; GES 102, GES 311, GES 312, GES 314, GES 315, GES 416, GES 455, three elective geology courses, MAT 126/127, MAT 232, CHE 111/112 or 113/114, PHY 111/112 or 121/122, and COS 215 or COS 220. An approved summer field camp is required between the junior and senior years. For students contemplating graduate work in geology, mathematics through MAT 228 and attainment of proficiency in French, German, or Russian is recommended.

The specimen curriculum is somewhat flexible and may be altered for individuals with previous geological training. Special interdisciplinary programs may be arranged after consultation with the departmental undergraduate advisor.

### Courses in Geological Sciences

#### GES 101 Aspects of the Natural Environment I

A study of earth materials and processes, including the structure of matter, formation of igneous rocks, radioactive age-dating, chemical and mechanical destruction of rocks, formation of sedimentary rocks, evolution of mountain belts, and formation of metamorphic rocks. Laboratory work includes a consideration of earth materials in preparation for three compulsory one-day weekend field trips. Lec 3, Rec, Lab and field trips. Cr 4.

### Geology Specimen Curriculum

First Year			
First Semester		Second Semester	
GES 101 Aspects of the Natural Environment	4	GES 102 Aspects of the Natural Environment	4
CHY 113 Chemical Principles	4	CHY 114 Chemical Principles	4
OR		OR	
CHY 111 General Chemistry I	(4)	CHY 112 General Chemistry II	(4)
ENG 101 College Composition (if necessary)	3	MAT 232 Principles of Statistical Inference	3
OR		Elective	4
Elective	(3)		15
Elective (or MAT 126)	4		
SCS 100 Majoring in the Sciences	1		
	16		
Sophomore Year			
First Semester		Second Semester	
GES 311 Mineralogy	4	GES 312 Introduction to Petrology	4
PHY 111 General Physics I	4	PHY 112 General Physics II	4
OR		OR	
PHY 121 Physics for Engineers and Physical Scientists I	(4)	PHY 122 Physics for Engineers and Physical Scientists II	(4)
MAT 126 Analytical Geometry and Calculus	4	MAT 127 Calculus	4
Elective	3	Elective	3
	15		15
Junior Year			
First Semester		Second Semester	
GES 315 Principles of Stratigraphy	3	GES 314 Invertebrate Paleontology	3
GES 455 Optical Mineralogy	4	GES Elective	3 or 4
COS 215 Introduction to Computing Using FORTRAN	3	Elective	4
OR		Elective	4
COS 220 Introduction to Computer Science	(3)		14 or 16
Elective	3 or 4		
Elective	3 or 4		
	16 or 18		
Senior Year			
First Semester		Second Semester	
GES 416 Introduction to Structural Geology	4	GES Elective	4
GES Elective	4	Elective	4
Elective	4	Elective	4
Elective	3 or 4	Elective	3 or 4
	15 or 16		15 or 16



**GES 102 Aspects of the Natural Environment II**

The structure and composition of the interior of the earth and mountain building processes including the origin and use of paleomagnetic data, the continental drift question, the origin and evolution of the atmosphere, the hydrosphere and life, and mechanisms and patterns of biological evolution. Consideration of human society and its use of the environment. Laboratory work includes preparation for two compulsory field trips in April and May. Prerequisite: GES 101 or GES 106. Lec 3, Rec, Lab and field trips.

Cr 4.

**GES 106 Geology for Engineers**

Provides a physical geology basis for civil engineering applications. Emphasis is topics related to physical properties and behavior of artificial and crustal materials. Lec 3, Lab 2.

Cr 4.

**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 105 or GES 106 or permission of instructor.

Cr 3.

**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 or 2.

**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 224 Geology of the National Parks**

A brief summary of the geologic framework of the North American continent followed by presentation of geologic features of selected National Parks representing all major geologic provinces of conterminous United States. Prerequisites: GES 101 or GES 106.

Cr 3.

**GES 255 Non Honors Senior Thesis**

Cr 3.

**GES 311 Mineralogy**

Introduction to crystallography and the crystal chemistry of minerals. Identification of the common minerals by their physical properties. Prerequisite: CHY 113, CHY 114 or CHY 111, CHY 112. Lec 3, Lab 4.

Cr 4.

**GES 312 Introduction to Petrology**

Introduction to modes of occurrence, textures, and classification of igneous and metamorphic rocks. Simple chemical concepts of rock systems. Prerequisite: GES 101, GES 102, GES 311. Lec 3, Lab 3.

Cr 4.

**GES 314 Invertebrate Paleontology**

Description and classification of the important phyla of fossil invertebrates and a survey of their use in biostratigraphic, evolutionary, paleoeco-

logic, and other studies. One or more day or weekend field trips. Prerequisite: GES 101. Lec 2, Lab 4.

Cr 3.

**GES 315 Principles of Stratigraphy**

Basic concepts and techniques of stratigraphy and sedimentation. Several day and weekend field trips. Prerequisite: GES 102, GES 105 or GES 106, MAT 232 or permission. Lec 2, Lab 3.

Cr 4.

**GES 324 Geology of North America**

Covers the geologic development of selected regions of North America which illustrate the theories and principles of continental evolution. Prerequisite: GES 101, GES 105 or GES 106, GES 102. Lec 3.

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 explained as they apply to specific geologic situations. Prerequisite: GES 312, GES 416 or permission. Lec 4.

Cr 4.

**GES 416 Introduction to Structural Geology**

Principles of structural geology, with emphasis on the integration of field observations and theory. Three weekend field trips. Prerequisite: GES 312, PHY 111, PHY 112 or PHY 121, PHY 122, MAT 126. Lec 2, Lab 3.

Cr 4.

**GES 455 Optical Mineralogy-Petrography**

Application of the polarizing microscope in determining the optical properties of non-opaque minerals in crushed-grain mounts and in thin sections. Study of textural and mineralogical relationships in igneous, sedimentary, and metamorphic rocks. Prerequisite: GES 311, PHY 111, PHY 112 or PHY 121, PHY 122. Lec 2, Lab 6.

Cr 4.

**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. Prerequisites: CHY 113, CHY 114, MAT 126.

Cr 3.

**GES 522 Chemical Sedimentology**

The origin of major chemical sediment types including evaporites, carbonates, iron and manganese formations, ferromanganese nodules, phosphates, and volcanic exhalative deposits. Diagenesis of sediments and halmyrolysis of deep sea deposits. Prerequisites: GES 521 and GES 315 or permission.

Cr 2.

**GES 523 Physical Geochemistry**

Introduction to thermodynamics and application to petrology. Emphasis on geologically relevant heterogeneous equilibria at elevated pressure and temperature. Mathematical methods beyond introductory calculus are introduced. Prerequisite: CHY 113, 114, MAT 127, GES 455 or permission.

Cr 3.

**GES 524 Aqueous Terrestrial Geochemistry**

A survey of earth surface or near surface processes involving chemical reactions between rocks and water. Topics include soil genesis, supergene enrichment, nutrient cycling, ground water evolution, and river and lake chemistry and cycles. Prerequisites: GES 521 or OCE 520.

Cr 2.

**GES 526 Experimental Petrology**

An introduction to high temperature-pressure research and its application to the study of geologically relevant heterogeneous equilibria. Research techniques discussed and demonstrated. Emphasis on the evaluation and interpretation of experimental results. Prerequisite: GES 523, may be taken concurrently.

Cr 3.

**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 and geochronology. Prerequisites: GES 312 or permission.

Cr 3.

**GES 528 Geochronology**

Studies emphasizing theory, interpretation and techniques of dating rocks and minerals using naturally occurring radionuclides. Prerequisites: GES 527 or permission.

Cr 3.

**GES 532 Sedimentology**

Origin and characteristics of the major sedimentary rock types and their use in environmental, paleogeographic and tectonic interpretation. Laboratory use of thin sections and hand specimens. Prerequisite: GES 315. Lec 2, Lab 3.

Cr 3.

**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. Prerequisites: GES 315 or permission. Lec 3, Lab 2.

Cr 4.

**GES 535 Methods in Sedimentology**

An introduction to field, laboratory and numerical methods commonly used in sedimentology. Field samples are evaluated in the laboratory, and interpreted using quantitative methods. Prerequisite: GES 315, MAT 228 or permission. Lec 3, Lab 3.

Cr 4.

**GES 538 Geology of Continental Margins**

A study of 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 OCE 560 or permission. Lec 3, Lab 2. Cr 4.

#### GES 541 Glacial Geology

Topics include glaciers and their deposits, flow dynamics of glaciers, mechanics of erosion, transportation and deposition, development of soils, isotopic and sedimentologic techniques in stratigraphy, chronology, and reconstruction of paleoglacial events from glacial deposits. Required field trips. Prerequisite: GES 101, 102, MAT 126. Lec 2, Lab 2. Cr 3.

#### 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. Prerequisite: GES 541 or permission. Lec 2, Lab 2. 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 week-end field trip. Prerequisite: GES 541 or permission. Lec 2. Cr 3.

#### GES 545 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 ice sheet dynamics, interpretation of glacial erosion and deposition. Prerequisites: MAT 127, COS 210 or 220 or permission. Lec 3, Lab 3. Cr 4.

#### GES 546 Marine Paleoclimatology

Paleoclimatic and paleoceanographic interpretations of marine sediment sequences. Emphasis on Late Quaternary stratigraphy, regional and global paleoclimates, correlation of the marine record with terrestrial studies, and the recent advances of the CLIMAP program. Prerequisite: GES 314, GES 315 and OCE 568. Lec 2, Rec 1. Cr 3.

#### GES 551 Geology of the New England Appalachians

A synthetic treatment of the stratigraphy, structural geology, and igneous and metamorphic petrology of the Appalachian fold-thrust belt in New England. Treats the geographical and temporal extent of the Taconic, Acadian, and Alleghenian events, and develops a tectonic synthesis for the orogen. Prerequisites: Permission. Lec 3. Cr 3.

#### GES 553 Coastal Geomorphology

Covers classification methods, mapping procedures and techniques for the study of coastal landforms and interpretation of their origin and development. Dynamic processes that affect coastal environments including regional geology, climate, weather, tides, sea level, waves,

storms, coastal currents, ice and crustal movements. Emphasis on field studies of beach forms, processes and sedimentation on Maine beaches. Several field trips. Prerequisite: OCE 370, GES 101, GES 102 and permission. Cr 3.

#### GES 559 Seminar in Mountain Building Processes

Covers various topics in orogenesis. Specific topics vary. May be repeated for credit. Prerequisites: GES 416, GES 578 or permission. Cr 2.

#### GES 565 Micropaleontology

Study of major groups of microfossils, their biology, morphology, taxonomy and their use in ecologic and stratigraphic interpretation. Prerequisite: GES 314 or ZOL 353, GES 101, GES 102. Rec 3, Lab 2. Cr 4.

#### GES 567 Actinopaleontology

Study of living and fossil organisms and relationships to their sedimentary environment. Four full-weekend field investigations at the Darling Center. Prerequisite: GES 101, GES 102, GES 314 or ZOL 453. (This course is identical with OCE 567). Cr 2.

#### GES 569 Biostratigraphy of Foraminifers and Diatoms

The study of planktonic foraminifers and Neogene diatoms, their morphology, taxonomy and evolution and the use of these planktonic organisms for the recognition and division of the last 100 million years of geologic time in marine deposits. Must be taken concurrently with GES 570 and/or GES 571. Prerequisite: GES 114 or GES 566 or permission. Cr 1.

#### GES 570 Foraminiferal Biostratigraphy Laboratory

Covers sample preparation techniques, practice of foraminiferal taxonomy, age determination of samples representing different ages and provenances. Cr 1.

#### GES 571 Diatom Stratigraphy Laboratory

Covers sample preparation techniques, practice of diatom taxonomy, age determination of samples representing different ages and provenances. Cr 1.

#### GES 574 Phase Relationships in Petrologic Systems

Consideration of the physico-chemical basis for the construction and interpretation of phase diagrams. Application to mineral and rock systems are emphasized. Prerequisites: Physical chemistry or GES 523. Lec 3, Lab 2. Cr 4.

#### GES 576 Igneous Petrology

Investigation of the origin of silicate melts and the processes which lead to their evolution and eventual crystallization. Thin sections which exemplify the textural and mineralogical diversity of common igneous rocks will be examined. Prerequisite: GES 455. 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. Prerequisite: GES 455. Lec 3, Lab 4. 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. Prerequisites: GES 101 or GES 106; MAT 127. Cr 3.

#### GES 581 Introduction to Geophysics

Introduction to geophysical studies of the Earth's crust, mantle and core. Gravity, magnetism, seismology and geothermal studies are emphasized. The methods of mathematical physics used in a problem solving approach to indirect studies of the Earth's interior. Prerequisites: GES 101, GES 102, PHY 112 or PHY 122, MAT 228, MAT 259, PHY 238, MAT 453, COS 210 (FORTRAN) desirable. Permission. Lec 3. Cr 3.

#### GES 582 Advanced Topics in Geophysics

Advanced treatments of geo-thermal, gravity, or seismological studies of the earth. Specific topics vary. May be repeated for credit. Prerequisite: GES 581, MAT 452, MAT 454, PHY 238 or PHY 462, PHY 475, or permission. Cr 3.

#### GES 583 Advanced Structural Geology

Examines the determination of strain in rocks and the relationship of strain to fold features. Prerequisites: GES 416, MAT 228. Lec 3. Cr 3.

#### GES 585 Tectonophysics

Application of Newtonian principles to obtain compatibility and equilibrium equations. Derivation of a constitutive equation for rock deformation using tensor theory. Development of a Geological Equation of State to thermal convection in the earth's mantle. Application of the Geological Equation of State to crustal tectonic processes. Prerequisites: MAT 228 or permission. MAT 259 recommended. Cr 3.

#### GES 584 Coupled Transport in Hydrogeologic Environments

Theory of groundwater flow and its role in heat and mass transport in sedimentary basins. Emphasis on coupled flow in geologic processes such as sediment diagenesis, petroleum migration, flow of ore-forming brines, and transport through fracture rock. Prerequisites: GES 580 or CIE 456; MAT 259. Cr 3.

#### GES 586 Structure and Tectonics of the Earth

Evaluation of petrologic and tectonic models related to the origin and evolution of ocean basins. Prerequisite: GES 416, OCE 560 and permission. Cr 3.

#### GES 589 Numerical Methods in Geology

Integrated approach to statistical and numerical methods in geological, geophysical and ge-



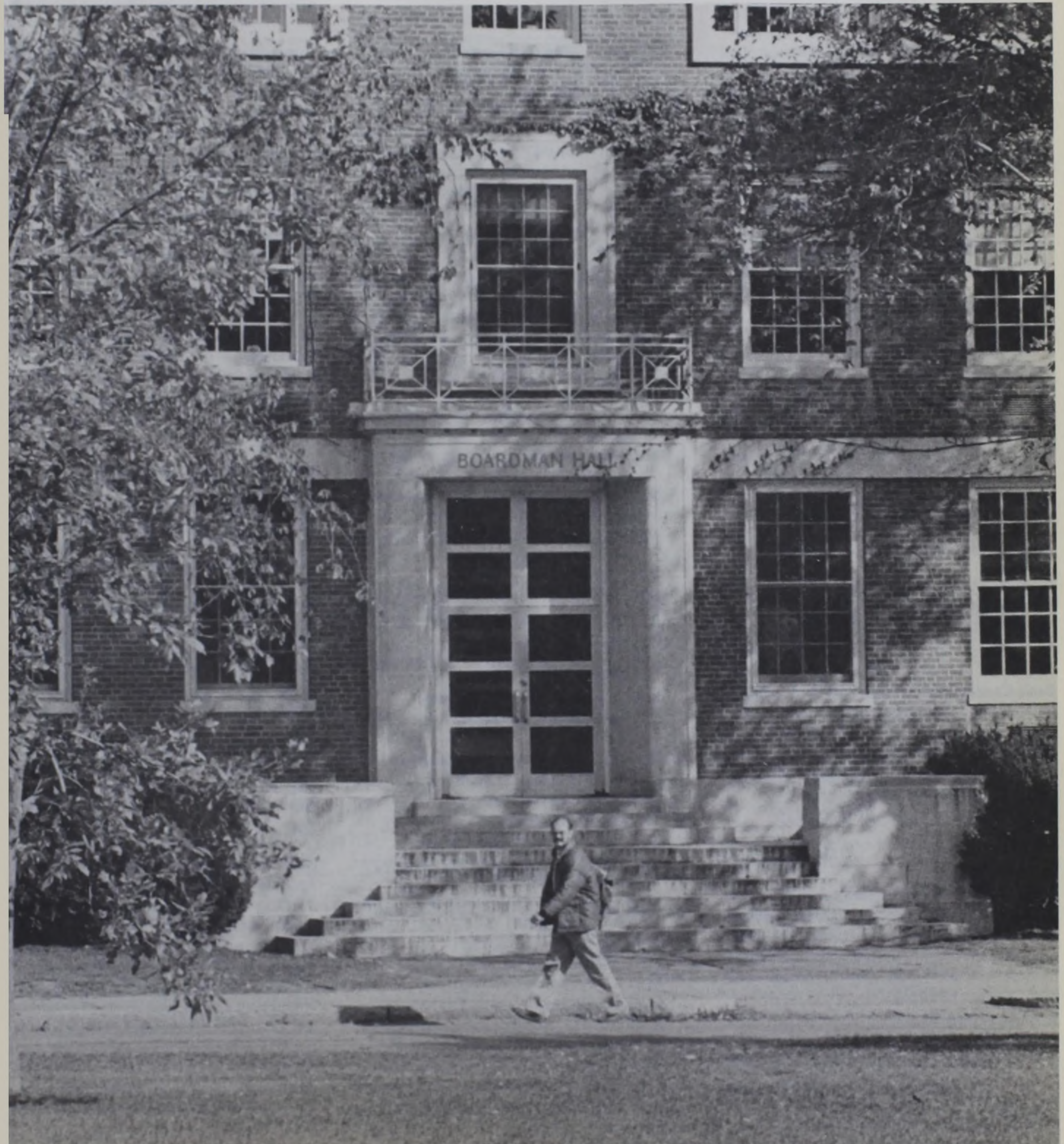
Chemical studies and research. Computer programming of exercises required. Prerequisite: permission. Cr 3.

riod. One weekend field trip may be required. May be repeated for credit. Prerequisite: permission. Cr Ar.

**Interdisciplinary Course**

**ANT 500 (ANT, GES, PBP, PSE) Seminar in Quaternary Studies**

Selected areas of study - physical, biological and anthropological - related to the Quaternary Pe-





## Mathematics (B.A.)

Professor Murphy (Chairperson)

Professors Balakrishnan, Beard, Bresinsky, Dodge, Farlow, Feichtinger, P. Gupta, R. Gupta, Mairhuber, Pogorzelski, Puri, Wohlgemuth

Associate Professors Bray, Franzosa, Geiger, Halteman, Hannula, Locke, Slavin, Snyder, Soule, Stearns

Assistant Professors Curtis, Ozluk; Lecturers Van Steenberghe, Kurtz, Hsu

### Course Requirements for the Mathematics Major

Required courses for the mathematics major are divided into core courses presenting the basic ideas of mathematics and courses in an area of concentration.

#### Basic Core Courses: First and Sophomore Years

MAT 123 Enriched Calculus and Analytic Geometry I

or

MAT 126 Analytic Geometry and Calculus

MAT 124 Enriched Calculus and Analytic Geometry II

or

MAT 127 Analytic Geometry and Calculus

MAT 225 Enriched Calculus and Analytic Geometry III

or

MAT 228 Analytic Geometry and Calculus

MAT 261 Introduction to Abstract Mathematics

MAT 262 Linear Algebra

COS 220 Introduction to Computer Science I

19 Math Hours

#### Basic Core Courses: Junior and Senior Years

MAT 259 Differential Equations

or

MAT 481 Discrete Mathematics

MAT 434 Introduction to Statistics

MAT 425 Advanced Calculus I

MAT 463 Introduction to Abstract Algebra I

13/14 Math Hours

#### Mathematics Area Concentration

At least three mathematics courses will be taken from one of the areas of concentration below. Starred courses are required within each area. Students planning graduate work should take MAT 426 and MAT 464.

##### A. Pure Mathematics

MAT 426 Advanced Calculus II\*

MAT 452 Introduction to Complex Variables

MAT 464 Introduction to Abstract Algebra II\*

MAT 465 Theory of Numbers

MAT 471 Differential Geometry

MAT 474 Projective Geometry

MAT 475 Higher Geometry I

##### B. Continuous Applied Mathematics

MAT 452 Introduction to Complex Variables

MAT 453 Partial Differential Equations I\*

MAT 454 Partial Differential Equations II

MAT 459 Methods of Applied Mathematics I

MAT 471 Differential Geometry

MAT 487 Numerical Analysis\*

In addition to three of the above four mathematics courses, PHY 121, Physics for Engineers and Physical Scientists I and PHY 122, Physics for Engineers and Physical Scientists II must be taken for the Continuous Applied Mathematics Option.

##### C. Discrete Applied Mathematics

MAT 455 Introduction to Operations Research I\*

MAT 456 Introduction to Operations Research II

MAT 457 Introduction to Mathematical Modeling

MAT 481 Discrete Mathematics (If not taken to satisfy core requirement)

MAT 488 Graph Theory

MAT 554 Topics in Discrete Optimization

MAT 557 Mathematical Programming I

##### D. Statistics

MAT 435 Introduction to Mathematical Statistics\*

MAT 436 Nonparametric Statistics

MAT 439 Regression and Analysis of Variance\*

MAT 531 Mathematical Statistics I

MAT 532 Mathematical Statistics II

MAT 533 Stochastic Systems

##### E. Mathematics Education

MAT 305 Mathematics for Teachers\*

MAT 445 History of Mathematics—Before the 17th Century OR

MAT 446 History of Mathematics—The 17th Century and After

MAT 465 Theory of Numbers

MAT 372 Complex Numbers OR

MAT 474 Projective Geometry OR

MAT 475 Higher Geometry I

MAT 505 Selected Topics in Mathematics for High School Teachers of Mathematics

##### F. Optional Three courses generally numbered 400 or above, which provide a mathematical concentration approved in advance by the Department chairperson.

#### Concentration Area Outside of Mathematics

In addition to the core and area of concentration coursework in mathematics, each mathematics major must complete an 18 hour concentration or two 12 hour concentrations of approved courses in an area outside of mathematics. The outside concentration should be in an area where mathematics can be applied or which provides a combination which enhances employment prospects.

#### Courses in Mathematics

**MAT 105 Elements of College Mathematics I**  
Introduction to significant structures and theorems. Suitable for non-science majors. Specific topics vary but may include logic, number theory and foundations of computer science.

Cr 3.

#### MAT 106 Elements of College Mathematics II

A continuation of MAT 105. Prerequisite: MAT 105 or permission.

Cr 3.

#### MAT 107 The Structure of Arithmetic I

A development of the real number system from the sub-system of natural numbers through integers, rational numbers, and real numbers including properties of numbers, relations, operations and details of numeration systems. Primarily for the elementary school teacher. May not be taken for B.A. degree credit.

Cr 3.

#### MAT 108 The Structure of Arithmetic II

A continuation of MAT 107. Introduction to geometry, probability and statistics. May not be taken for B.A. degree credit. Prerequisite: MAT 107.

Cr 3.

#### MAT 111 Precalculus Algebra

An introduction to college algebra, emphasizing an understanding of the fundamental functions of college algebra and the basic geometric concepts useful in constructing and using the graphs of those functions effectively. Prerequisite: two units of high school algebra and one unit of high school geometry. Admission depends upon performance on a departmental qualifying examination given during summer orientation and the first week of classes. Note: no more than four total credits will be awarded for successful completion of both MAT 111 and MAT 122.

Cr 3.



**MAT 114 Calculus for Business and Economics**

Introduction to differential and integral calculus with applications to business and economics. A recent grade of C or better in MAT 111 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 graph theory. Prerequisite: A grade of C or better in MAT 114. Cr 3.

**MAT 122 Algebra and Trigonometry, Pre-Calculus**

An introduction to college algebra and transcendental functions including logarithmic and trigonometric functions and their inverses applicable to further work in mathematics, particularly calculus. Prerequisite: two units of high school algebra and one unit of high school geometry (knowledge should be current), admission depends upon successful performance on a departmental qualifying examination given during summer orientation and the first week of classes. Cr 4.

**MAT 123 Enriched Calculus and Analytic Geometry I**

Covers essentially the same topics as MAT 126, but theoretical concepts receive greater stress, and problems of greater depth and scope are considered. Prerequisite: high school mathematics through trigonometry or the equivalent of MAT 122, with a grade of C or better. Admission depends upon successful performance on a departmental qualifying examination given during summer orientation and the first week of classes. Cr 4.

**MAT 124 Enriched Calculus and Analytic Geometry II**

Covers essentially the same topics as MAT 127, but theoretical concepts receive greater stress, and problems of greater depth and scope are considered. Prerequisite: A grade of C or better in MAT 123 or MAT 126. Cr 4.

**MAT 126 Analytic Geometry and Calculus I**

Equations and graphs, differentiation and integration, applications. Prerequisite: a grade of C or better in MAT 122, or successful performance on departmental qualifying examination given during summer orientation and the first week of classes. Cr 4.

**MAT 127 Analytic Geometry and Calculus II**

Covers differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions as well as applications, infinite series. Prerequisite: A grade of C or better in MAT 126 or MAT 123. Cr 4.

**MAT 151 Calculus for the Life Sciences I**

An introduction to differential and integral calculus and its applications to the life sciences.

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 152 Calculus for the Life Sciences II**

A continuation of MAT 151 including integration techniques, first order differential equations, Taylor polynomials, vectors, functions of several variables, and double integrals. Prerequisite: A grade of C or better in MAT 151. Cr 4.

**MAT 162 Matrices and Linear Programming**

Introduces elementary concepts in linear algebra and linear programming to computer science majors with business concentration. Prerequisite: MAT 126 or permission. Cr 3.

**MAT 2\_0 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 209 Informal Geometry**

Covers sets, points, lines, planes, and other configurations of one, two, and three dimensional geometry as well as congruences, measurement and constructions. Primarily for the elementary school teacher. May not be taken for B.A. degree credit. Prerequisite: MAT 108 or permission. Cr 3.

**MAT 210 Basic Algebra**

An introductory treatment of mathematical operations, including procedures for solving simple equations and inequalities. Emphasis on problem-solving. Primarily for the elementary school teacher. May not be taken for B.A. degree credit. Prerequisite: MAT 108 or permission. Cr 3.

**MAT 215 Introduction to Statistics for Business and Economics**

Concepts of probability and statistics emphasizing applications in business and economics. Includes sampling, estimation, testing. Prerequisite: A grade of C or better in MAT 115. Cr 3.

**MAT 225 Enriched Calculus and Analytic Geometry III**

Covers essentially the same topics as in MAT 228 but theoretical concepts receive greater stress, and problems of greater depth and scope are considered. Prerequisite: MAT 124 or MAT 127. Cr 4.

**MAT 228 Analytic Geometry and Calculus III**

Covers vector algebra, geometry and calculus, multivariable differential and integral calculus, applications. Prerequisite: A grade of C or better in MAT 127 or MAT 124. Cr 4.

**MAT 229 First-year Student/Sophomore Mathematics Seminar**

A discussion of topics not covered in the usual calculus course, such as application of calculus to various physical and social sciences and other branches of mathematics. Material will include the publications of the UMAP Project.

May be repeated for credit. Prerequisite: MAT 126 or MAT 123. Cr 1.

**MAT 232 Principles of Statistical Inference**

An introductory course including data description, sampling variability, estimation, hypothesis testing and regression. Cr 3.

**MAT 241 Mathematical Logic**

Includes sentential calculi, deduction theorem and completeness theorem. Prerequisite: One year of college mathematics. Cr 3.

**MAT 242 Analytic Thinking**

Develops logical reasoning, a facility in algebraic computations and insights into problems through geometric interpretation. Objective is to overcome mathematics apprehensions while increasing quantitative thinking abilities. Cr 3.

**MAT 258 Introduction to Differential Equations and Linear Algebra**

An introduction to elementary linear algebra and ordinary differential equations including applications. Prerequisite: A grade of C or better in MAT 228. (Not open to students who have already taken MAT 262 or MAT 259). Cr 4.

**MAT 259 Differential Equations**

An introduction to ordinary differential equations including applications. Prerequisite: A grade of C or better in MAT 127 or MAT 124. Cr 4.

**MAT 261 Introduction to Abstract Mathematics**

Topics include elementary set theory, number theory and mathematical induction, relations and functions, sequences and limits. Develops the ability to write mathematical proofs in preparation for courses like advanced calculus and abstract algebra. Prerequisite: MAT 127 or permission. Cr 3.

**MAT 262 Linear Algebra**

An introduction to theory and applications of vector spaces and linear transformations. Prerequisite: MAT 228 or MAT 225. Cr 4.

**MAT 3\_0 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 305 Mathematics for Teachers**

A modern, critical approach to selected issues and problems in mathematics and their relation to methods of teaching mathematics. Prerequisite: MAT 228. Cr 3.

**MAT 329 Junior-Senior Mathematics Seminar**

Develops problem-solving skills and enriches the background of mathematics majors. Emphasis on problem-solving in various areas of mathematics, with material taken from problem books, competitions, and mathematical periodicals. May be repeated for credit. Prerequisite: MAT 127 or MAT 124 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 372 Complex Numbers**

The basic properties of the complex numbers and their applications to algebra, geometry, trigonometry, and vector forces. Especially appropriate for mathematics and science teachers. Prerequisite: MAT 127 or MAT 124 or one year college mathematics and permission. Cr 3.

#### **MAT 4\_0 Selected Topics in Mathematics**

Advanced 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 425 Advanced Calculus I**

Study of the major ideas of real-variable theory. Emphasis on limits, continuity and differentiability. Prerequisite: MAT 228 or 225; MAT 262 is also helpful. Cr 3.

#### **MAT 426 Advanced Calculus II**

A continuation of MAT 425. 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 or MAT 225. Cr 4.

#### **MAT 435 Introduction to Mathematical Statistics**

Topics include moment generating functions, distributions 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 438 Design of Experiments**

Continuation of MAT 437, with consideration of nonorthogonal designs in analysis of variance, and an introduction to other widely applicable experimental design techniques. Prerequisite: MAT 437. Cr 3.

#### **MAT 439 Regression and Analysis of Variance**

Topics include the multivariate normal distribution, quadratic forms and projections, least squares estimation, hypothesis testing and confidence regions. Application to linear regression and analysis of variance models using matrix algebra. Prerequisite: MAT 434. Cr 3.

#### **MAT 445 History of Mathematics-Before the 17th Century**

Basic developments in mathematics from its origins up to the 17th century. Cr 3.

#### **MAT 446 History of Mathematics-The 17th Century and After**

Basic developments in mathematics from the invention of analytic geometry up to our times. Prerequisite: MAT 227 or MAT 224 or permission. Cr 3.

#### **MAT 447 Foundations of Mathematics I**

Includes fundamental concepts and methods of mathematics and viewpoints on the foundation of mathematics. Prerequisite: MAT 228 or permission. Cr 3.

#### **MAT 448 Foundations of Mathematics II**

A continuation of MAT 447. Prerequisite: MAT 228 or permission. Cr 3.

#### **MAT 452 Introduction to Complex Variables**

An introduction to functions of complex variables including differentiation, integration, series, mappings and applications. Prerequisite: MAT 228 or MAT 225. 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. Cr 3.

#### **MAT 454 Partial Differential Equations II**

A continuation of MAT 453. Prerequisite: MAT 453. Cr 3.

#### **MAT 455 Introduction to Operations Research I**

Introduction to linear programming, including various algorithms, transportation and assignment problems, duality. Covers network and game theory. Emphasis on modelling problems arising in business and industry. Prerequisite: COS 210 or equivalent. Cr 3.

#### **MAT 456 Introduction to Operations Research II**

A continuation of MAT 455. Prerequisite: MAT 455. 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. Prerequisite: MAT 215 or MAT 127 or MAT 124. Cr 3.

#### **MAT 458 Seminar in Mathematical Modeling**

Students report on models in their own disciplines. Prerequisite: MAT 457. Cr 1.

#### **MAT 459 Methods of Applied Mathematics I**

Intensive study of methods for solving problems in the physical sciences including vector and tensor analysis, series solution of differential equations near singular points, linear algebra

and determinants. Prerequisite: MAT 259 or permission. Cr 3.

#### **MAT 463 Introduction to Abstract Algebra I**

Abstract algebraic structures including groups, rings, ideals, integral domains and fields. Prerequisite: MAT 262. Cr 3.

#### **MAT 464 Introduction to Abstract Algebra II**

A continuation of MAT 463, with emphasis on properties of rings and fields. Prerequisite: MAT 463. Cr 3.

#### **MAT 465 Theory of Numbers**

Elementary properties of integers including divisibility, uniqueness of prime factorization. Prerequisite: One year of college mathematics. Cr 3.

#### **MAT 471 Differential Geometry**

Applications of calculus to the study of space curves and surfaces. Prerequisite: MAT 228 or MAT 225. Cr 3.

#### **MAT 474 Projective Geometry**

Covers incidence axioms, duality, perspectivities, and projectivities, Desargues' Theorem, Pappus' Theorem, Fundamental Theorem, coordinatization, finite geometries. Prerequisite: MAT 262. Cr 3.

#### **MAT 475 Higher Geometry I**

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 MAT 225 or permission. Cr 3.

#### **MAT 476 Higher Geometry II**

A continuation of MAT 475. Prerequisite: MAT 475. Cr 3.

#### **MAT 481 Discrete Mathematics**

Introduces algebraic structures such as formal languages and finite state machines to mathematics and computer science majors. Prerequisite: MAT 261. Cr 3.

#### **MAT 487 Numerical Analysis**

Covers computational methods for electronic computers. Includes exercises on the IBM 370 for interpolation, simultaneous linear algebraic equations, non-linear and polynomial equations, numerical integration, ordinary and partial differential equations. Prerequisite: MAT 228 or MAT 225 and COS 220. Cr 3.

#### **MAT 488 Graph Theory**

A general survey including Eulerian and Hamiltonian lines, factors, colorings of graphs, embedding of graphs in surfaces, room squares and various decomposition problems. Prerequisite: MAT 228 or MAT 225. Cr 3.

#### **MAT 5\_0 Advanced Topics in Mathematics**

Advanced 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 505 Selected Topics in Mathematics for High School Teachers of Mathematics**  
Topics in mathematics with relevance to programs in the secondary schools. Restricted to secondary school teachers or supervisors. Cr 3.

**MAT 523 Functions of a Real Variable I**  
Topics include construction of Lebesgue measure and Lebesgue integral on the line, 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**  
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. Prerequisites: 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 modelling problems encountered in business and industry. Prerequisite: MAT 434. Cr 3.

**MAT 554 Topics in Discrete Optimization**  
An introduction to the theory and algorithms of discrete optimization, centered around considerations of computational complexity. Prerequisite: MAT 262 or MAT 455. Cr 3.

**MAT 557 Mathematical Programming I**  
Study of linear, nonlinear, and integer programming. Topics include simplex and dual simplex algorithms, duality and complementary slackness, post optimality analysis, convexity, constrained optimizations, optimality conditions, constraint qualifications, convex programming. Wolfe dual, quadratic programming, enumerative, cutting plane and partitioning methods, location problems, etc. Prerequisites: MAT 262 and either MAT 425 or MAT 456. Cr 3.

**MAT 558 Mathematical Programming II**  
A continuation of MAT 557 with emphasis on linear and dynamic programming. Prerequisite: MAT 557. Cr 3.

**MAT 559 Methods of Applied Mathematics II**  
Continuation of MAT 459. Emphasis on complex variables, including conformal mapping and transform analysis, Sturm-Liouville theory, var-

iation calculus, stability, theory and asymptotics. Prerequisite: MAT 459 or permission. Cr 3.

**MAT 563 Abstract Algebra I**  
A study of basic structure theorems for groups, rings, fields and modules. Prerequisites: Two courses from among MAT 262, MAT 463 and MAT 464. Cr 3.

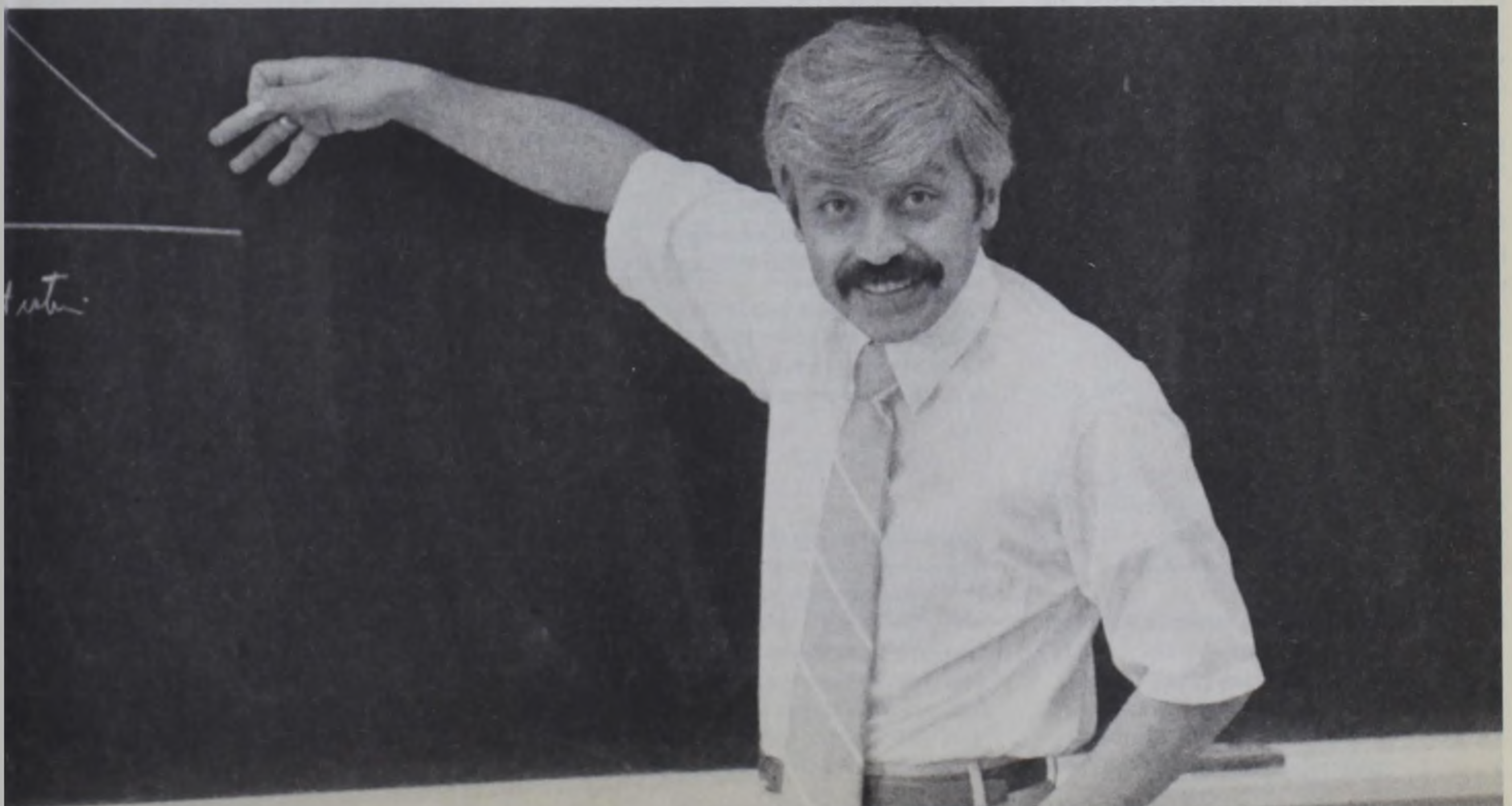
**MAT 564 Abstract Algebra II**  
A continuation of MAT 563. Prerequisite: MAT 563. Cr 3.

**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 587 Methods of Numerical Analysis**  
Solution of non-linear algebraic systems, ordinary and partial differential equations, stability, convergence and consistency analysis. Prerequisite: MAT 487 or equivalent. 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.





## Clinical Laboratory Sciences ( B.A.)

The B.A. in Clinical Laboratory Sciences is offered by the faculty of the Department of Zoology. Students may major in Medical Technology or Cytotechnology. Dr. Bonnie Wood is coordinator for the Medical Technology/Cytotechnology Programs.

Medical technology prepares students to assume positions in the laboratory/diagnostic sector of the health professions industry. Students interested in the medical technology program must enroll as pre-medical technology students and apply for formal admission to the medical technology program upon completion of three semesters of study. Admission is not automatic and depends upon academic performance and aptitude for the field. Medical technology students are on campus for three years, and spend the senior year in a twelve-month Medical Center practicum. The University of Maine is affiliated with the Eastern Maine Medical Center in Bangor and the Maine Medical Center in Portland. Juniors in the Medical Technology program apply directly to the Medical Center program for the practicum. A student must have a G.P.A. of 2.5 overall and 2.5 in the sciences to be considered for admission to the Medical Center programs. The Medical Centers reserve the right to refuse admission to students who in their judgement would not be satisfactory. Upon completion of the practicum, students are eligible to take the certifying examination administered by the American Society of Clinical Pathology.

Cytotechnology is a specialty area in clinical laboratory medicine involving the microscopic evaluation of human cells for the detection of changes indicative of various diseases, precancerous conditions and cancer.

Cytotechnologists are employed in clinical pathology laboratories and reference laboratories.

The University of Maine is affiliated with the Medical Center Hospital of Burlington, Burlington, Vermont. Students interested in the cytotechnology program must enroll as pre-cy-

totechnology students and apply for formal admission to the Program upon completion of three (3) semesters of study. Admission is not automatic and depends upon academic performance and aptitude for the field. Cytotechnology students are on campus for three (3) academic years, and spend the senior year in a twelve-month medical center practicum. A student must have a G.P.A. of 2.7 overall and a GPA of 2.7 in the sciences, to be considered by the Medical Center Hospital of Burlington. Upon completion of the practicum, students take the certifying examination administered by the American Society of Clinical Pathology.

### Sample Curriculum for Medical Technology and Cytotechnology

Courses are required by *both*

#### First Year - Medical Technology/Cytotechnology

MAT 122 Algebra and Trigonometry, Pre-Calculus

OR

MAT 126 Analytic Geometry and Calculus

OR

MAT 151 Calculus for the Life Sciences I

BIO 100 Basic Biology

ZOL 208 Anatomy and Physiology

CHY 111/112 General Chemistry I and II

OR

CHY 113/114 Chemical Principles I and II

ENG 101 College Composition

ZOL 207 Orientation in Medical Technology

#### Sophomore Year - Medical Technology/Cytotechnology

BCH 221 Organic Chemistry

BCH 322/322L Biochemistry

MCB 300 General Microbiology

MCB 305 General Microbiology Laboratory

ZOL 305 Medical Parasitology

ZOL 336\* Developmental Biology

#### Junior Year - Medical Technology

MCB 420 Pathogenic Bacteriology and Serology

MCB 440 Introductory Immunology

ZOL 421 Introduction to Clinical Laboratory Methods

ZOL 427 Methods in Quantitative Biology

ZOL 451 Histology

ZOL 480 Cell Biology

ZOL 489 Introduction to Human Pathology

#### Junior Year - Cytotechnology

MAT 232 Introduction to Statistical Inference

ZOL 451 Histology

ZOL 480 Cell Biology

ZOL 489 Introduction to Human Pathology

And one elective from the following suggested courses:

MCB 420 Pathogenic Microbiology

MCB 480 Immunology

ZOL 438 Morphogenesis and Differentiation

ZOL 462 Genetics

**Senior Year Practicum - Medical Technology**  
(Eastern Maine Medical Center or Maine Medical Center)

ZOL 422 Clinical Hematology

ZOL 423 Clinical Microbiology

ZOL 424 Clinical Immunohematology

ZOL 425 Clinical Chemistry

ZOL 426 Clinical Microscopy

**Senior Year Practicum - Cytotechnology**

(Medical Center Hospital of Burlington, Burlington, Vermont)

\*Cytotechnology curriculum only.



## Microbiology (B.S.)

Professor Nicholson (Chairperson)

Professors Bain, Gershman, Singer

Associate Professors DeSiervo, Jerkofsky, King, Moody

Research Assistant Professor Findlay.

### Cooperating Faculty:

Professor Slabyj (Food Science), Associate Professors Tavantzis (Plant, Soil and Environmental Sciences), Zilbilske (Plant Biology and Pathology)

Assistant Professors Schroeder (Food Science), Jellison (Plant Botany and Pathology)

### Affiliated Cooperating Faculty:

Jackson Laboratory, Bar Harbor-E. Leither, L. Schultz

Colby College-F. Fekete

University of Southern Maine and Foundation for Blood Research- N. Ng

The B.S. in Microbiology is offered by the faculty of the Department of Biochemistry, Microbiology and Molecular Biology. In 1991, the program of study for the B.S. degree in Microbiology was one of only 20 out of 200 such programs in the United States certified by the American Society for Microbiology (ASM) as meeting requirements established by the society for a comprehensive undergraduate curriculum. The ASM is the largest single biological professional society in the world. No discipline in the biological sciences in recent times has become as prominent in the public eye as microbiology, the science involved with microscopic forms of life such as bacteria and viruses and the immune response to these microorganisms. Exciting discoveries involving microorganisms have important and far reaching implications for biotechnology, molecular biology, medicine, public health, and the environment. For example, microorganisms are the models in fundamental research in genetics and molecular biology; AIDS and other important diseases present new and exciting challenges for microbiologists working in health related fields; and advances in recombinant DNA technology and immunology have revolutionized science and thrust microbiology into the center of the rapidly expanding arena of biotechnology.

The B.S. program is designed to provide the student with a broad background in the biological and physical sciences and in depth understanding of bacteriology, pathogenic microbiology, virology, immunology, cell culture, and molecular and microbial genetics. The Department has active graduate and research programs in many different areas of microbiology, molecular biology and immunology, thereby providing opportunities for undergraduate students to engage in independent study and research projects with individual faculty. Sufficient flexibility in the curriculum allows the student to select from a variety of elective courses in the sciences, the arts, and humanities. The acquisition of a liberal education is strongly recommended by the faculty of the Department.

Rewarding career opportunities for microbiologists are exceptionally numerous and varied. Microbiology is at the core of the rapidly expanding fields of biotechnology, molecular biology, and allied health professions. Microbiologists work in: government and hospital clinical and research laboratories, pharmaceutical and chemical industries, environmental research laboratories, colleges and universities, and a variety of existing as well as emerging genetic engineering and biotechnology industries.

The undergraduate degree program in Microbiology provides an excellent preparation for advanced, graduate study in a variety of important fields of science in addition to microbiology such as molecular and cellular biology, biochemistry, medicine, epidemiology and public health, and environmental studies.

### Facilities

The facilities for teaching and research are located predominantly in the recently constructed (1987) addition to Hitchner Hall. This building contains one of the newest and most modern facilities in New England for teaching and research in microbiology, including specialized equipment and laboratories for teaching virology, pathogenic microbiology, immunology, animal cell culture, and molecular biology.

Close proximity to research laboratories within the Department enables students to participate in independent study and undergraduate research projects using state-of-the-art equipment and methods in microbiology and molecular biology.

### Health Professions

A major in microbiology is one of the best preparations for further study in medicine, dentistry, osteopathy, optometry, podiatry, veterinary medicine, and other health related fields. Students interested in these careers should register in their first year with the Health Professions Career Committee which provides information and assistance in selecting appropriate supporting courses and the application process.

## Degree Requirements

Requirements for a B.S. degree are satisfactory completion of at least 120 degree hours at an accumulated grade point average of not less than 2.0 overall and in courses in the major, in a course of study that conforms to the following curriculum.

### Curriculum in Microbiology

<b>Microbiology</b>	
MCB 300 General Microbiology	3
MCB 305 General Microbiology Laboratory	2
MCB 410 Determinative Bacteriology	4
MCB 420 Pathogenic Bacteriology and Serology	4
MCB 430 Bacterial Physiology	4
MCB 450 Virology	4
MCB 440 Introductory Immunology	4
MCB 490 Introductory Microbial Genetics	3
MCB 480 Seminar	2
OR	
MCB 480 Seminar and MCB 487 Independent Study	2
<b>TOTAL HOURS</b>	<b>30</b>

### Physical Sciences

CHY 111/112 General Chemistry I/II	8
PHY 111/112 General Physics I/II	8
CHY 240 Quantitative Analysis	4
<b>TOTAL HOURS</b>	<b>20</b>

### Biological Science

BIO 100 Basic Biology	4
ZOL 204 Animal Biology	4
<b>TOTAL HOURS</b>	<b>8</b>

### Organic Chemistry and Biochemistry

CHY 251/253 Organic Chemistry I Lecture/Laboratory	5
CHY 252/254 Organic Chemistry II Lecture/Laboratory	5
BCH 451 Principles of Biochemistry	4



BCH 463 Introduction to Biochemical Laboratory Methods	2
<b>TOTAL HOURS</b>	<b>16</b>

**Mathematics**

MAT 126 Analytic Geometry and Calculus	4
MAT 232 Principles of Statistical Inferences	3

COS 220 Introduction to Computer Science I	3
<b>TOTAL HOURS</b>	<b>10</b>

**Communication**

ENG 101 College Composition	3
ENG 212 Intermediate Composition	3
SPC 103 Fundamentals of Public Communication	3

**Humanities and Social Sciences**

Electives	15
<b>TOTAL HOURS</b>	<b>15</b>
SCS 100 Majoring in the Sciences	1
Free Electives	12
Science electives from approved list	6

**MINIMUM HOURS REQUIRED FOR GRADUATION: 120**

**Molecular and Cellular Biology (B.S.)**

The Bachelor of Science in Molecular and Cellular Biology is an interdisciplinary program offered by the Department of Biochemistry, Microbiology and Molecular Biology.

The ability to understand and especially to manipulate biological processes at the subcellular and molecular genetic level provides the basis for a unique technology which is having enormous impact on all fields of biology, including basic research, medicine, agriculture and environmental and evolutionary studies. The curriculum is designed to give ambitious students the a rigorous, basic background in chemistry, physics and mathematics and to provide the knowledge of and practical experience with systems and technology for carrying out such manipulations. At the same time, there is sufficient flexibility to allow people with interests in any particular area of the biological sciences to develop knowledge of that field in parallel with their study of molecular and cellular biology. This program is appropriate for students wishing to enter the developing biotechnology industries or to continue in graduate programs in any of a wide variety of biological or medical fields.

**Curriculum in Molecular and Cellular Biology****Molecular Biology and Biochemistry**

BCH 310 Introductory Molecular Biology	3
BCH 451 Principles of Biochemistry	4
BCH 460 Advanced Biochemistry	3
BCH 463 Introduction to Biochemical Laboratory Methods	2
BCH 464 Advanced Biochemical Laboratory Methods	4
BCH 500 Molecular Biology	3
BCH 510 Laboratory in Molecular Biology	4
Molecular Biology Seminar	3
<b>TOTAL HOURS</b>	<b>26</b>

**Physical Chemistry**

(Choose one)	
BCH 467 Physical Biochemistry	(4)
CHY 371 Physical Chemistry I	(4)
PHY 447 Biophysics	3
<b>TOTAL HOURS</b>	<b>3 (4)</b>

**Cell Biology**

(Choose one)	
MCB 430 Bacterial Physiology	4
ZOL 480 Cell Biology	(4)
<b>TOTAL HOURS</b>	<b>4</b>

**Genetics**

(Choose one)	
MCB 490 Introduction to Microbial Genetics	3
BOT 445 Plant Genetics	(3)
ZOL 462 Principles of Genetics	(4)
<b>TOTAL HOURS</b>	<b>3 (4)</b>

**Program Electives**

Courses are selected from the following list:

<b>Physiology</b>	
BOT 452 Plant Physiology	3
BOT 453 Plant Physiology Laboratory	1
BOT 454 Intermediate Plant Physiology	4
MCB 430 Bacterial Physiology	4
ZOL 377 Animal Physiology	4
ZOL 480 Cell Biology	4

**Techniques**

BCH 481 Radiation Biology	2
BCH 483 Laboratory in Radiation Biology	2
COS 220 Introduction to Computer Science I	3
COS 460 Interactive Computer Graphics	3

**Biochemistry**

BCH 525 Proteins and Enzymes	3
BCH 542 Biochemical Mechanisms	3
BCH 488 Seminar in Computer	

**Applications in the Biochemical Sciences****Other Areas**

BOT 557 Plant Virology	4
MCB 440 Introductory Immunology	3
MCB 540 Advanced Immunology	3
ZOL 465 Evolution	3
ZOL 436 Biological Ultrastructure	3
MCB 450 Virology	4
MCB 550 Advanced Topics in Animal Virology	3
<b>TOTAL HOURS</b>	<b>16</b>

**Supporting Sciences and Mathematics**

BIO 100 Basic Biology	4
BOT 201 Plant Biology	4
OR	
ZOL 204 Animal Biology	(4)
MCB 300 General Microbiology	3
MCB 305 General Microbiology Laboratory	2
CHY 111/112 General Chemistry I/II	8
CHY 251/252 Organic Chemistry Lecture I/II	6
CHY 253/254 Organic Chemistry Laboratory I/II	4
PHY 111/112 General Physics I/II	8
MAT 126/127 Analytic Geometry and Calculus	8
<b>TOTAL HOURS</b>	<b>47</b>

**Communications**

ENG 101 College Composition	3
SPC 103 Fundamentals of Public Communication	3
<b>TOTAL HOURS</b>	<b>6</b>

**Humanities and Social Sciences**

Students choose courses from a wide variety of offerings.	
<b>TOTAL HOURS</b>	<b>15</b>
SCS 100 Majoring in the Sciences	1
<b>MINIMUM HOURS REQUIRED FOR GRADUATION: 120</b>	



## Courses in Microbiology

- MCB 230 Public Health Microbiology**  
General consideration of the microbiological factors affecting public health including general principles of epidemiology, epidemiological methods, and the transmission and control of infectious diseases and cancer. Lec 2. Cr 2.
- MCB 300 General Microbiology**  
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. Cr 3.
- MCB 301 Elementary Microbiology Laboratory**  
A laboratory and demonstration course covering microscopy, cultivation, biochemical activities and control of microorganisms. Prerequisite or corequisite: MCB 300. Cr 1.
- MCB 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. Prerequisite or corequisite: MCB 300. Lab 4. Cr 2.
- MCB 394 Cooperative Education in Microbiology**  
A regular program of approved work experience for which academic credit is given, alternated with academic coursework. Students are provided opportunities to integrate theory with practice, to gain practical work experience, and to develop future placement opportunities. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.
- MCB 396 Field Experience in Microbiology**  
An approved program of work experience which contributes to the academic major and for which academic credit is given. Students work part time or full time for a semester to gain practical experience in a job related to their professional career goals. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.
- MCB 400 Our Microbial World**  
Basic principles of microbiology and their application to agriculture, industry, sanitation, public health and disease. Offered through Continuing Education only. Rec 3. Cr 3.
- MCB 410 Determinative Bacteriology**  
Morphological, cultural and physiological characteristics of important bacterial groups. Includes isolation and classification of organisms in our environment. Prerequisite: MCB 300, MCB 301. Lec 2, Lab 4. Cr 4.
- MCB 420 Pathogenic Microbiology and Serology**  
Characterization of the production of disease by microorganisms in the human host. Prerequisite: MCB 300, MCB 305. Lec 3. Cr 3.
- MCB 421 Pathogenic Microbiology and Serology Laboratory**  
Procedures used in the clinical diagnostic laboratory to identify the causative agent of human infectious diseases. Corequisite: MCB 420 Lab 2. Cr 1.
- MCB 430 Bacterial Physiology**  
The properties and behavior of bacteria with respect to their chemical and physical requirements for life and reproduction. Prerequisite: MCB 300, BCH 322. Lec 2, Lab 4. Cr 4.
- MCB 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 to antigens and antibodies and the lymphocytes involved. Prerequisite: Organic Chemistry. Lec 3. Cr 3.
- MCB 450 Virology**  
Introduction to the study of viruses, emphasizing their nature, methods of cultivation, mode of transmission, genetics and mechanisms of pathogenicity. Prerequisite: MCB 420 or permission. Lec 2, Lab 4. Cr 4.
- MCB 460 Microbial Biotechnology**  
An analysis of established and new technologies in applied biology with emphasis on the role of microbes and microbiological techniques. Topics include strain development, fermentation, examples of processes used to produce commercial products, and medical applications. Prerequisite: MCB 300, organic chemistry or permission. Lec 2. Cr 2.
- MCB 480 Seminar**  
Preparation and presentation of papers dealing with current research and developments in the field of bacteriology. Cr 1.
- MCB 490 Introductory Microbial Genetics**  
An introduction to the genetics of yeasts, molds, bacteria, and bacteriophages. Model systems examined will include *Saccharomyces*, *Neurospora*, *E. coli* and its bacteriophages, and additional Gram-positive and Gram-negative bacteria. Covers gene mutations, genetic mapping, plasmids and transposons, mechanisms of genetic exchange, recombination, and gene regulation will be discussed. Prerequisite: MCB 300 or permission. Cr 3.
- MCB 497 Independent Study**  
A laboratory and conference for students desiring to pursue some particular line of investigation. Prerequisite: permission. Cr Ar.
- MCB 510 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. Prerequisites: MCB 300 or INT 319 or permission. Lec 3. Cr 3.
- MCB 515 Marine Bacteriology**  
Study of properties and distribution of bacteria in the marine environment with emphasis on their role in the cycle of elements in the sea. Parallels with aquatic and soil microbiology drawn. Prerequisite: general microbiology and general chemistry. Lec 3. Cr 3.
- MCB 520 Fish Diseases**  
Introduction to microbial diseases of finfish. Emphasis on pathology, host immunity and the specific viral, bacterial, and mycotic pathogens of cultural and wild fish and techniques for their identification. Prerequisite: MCB 300, 301 or permission. Lec 2, Rec 1, Lab 4. Cr 4.
- MCB 530 Cell Culture**  
Study of cell culture techniques and basic cell biology including methods of growing tissue cells from various sources and the practical applications. Prerequisite: MCB 301 or INT 256. Lec 2, Lab 4. Cr 4.
- MCB 540 Advanced Immunology**  
Selected topics in immunology including regulation autoimmune disease, immunogenetics, and immunodeficiencies. Emphasis on topics of current significance. Prerequisite: MCB 300, BCH 322, and MCB 440 or permission. Cr 3.
- MCB 541 Immunology Laboratory**  
A laboratory course to familiarize the student with diagnostic and experimental techniques for the characterization of antigens, antibodies, and antigen-antibody reactions. Prerequisite or corequisite: MCB 540. Lab 4. Cr 2.
- MCB 550 Advanced Topics in Animal Virology**  
In depth consideration of selected topics in animal virology related to viral structure, virus cell interactions, virus replication, and viral oncogenesis. Emphasis on topics of current significance. Prerequisite: MCB 450 or permission. Lec 3. Cr 3.
- MCB 560 Molecular Genetics**  
An advanced consideration of reviews and primary literature covering the molecular and genetic mechanisms underlying the topics discussed in MCB 490. Prerequisites: CHY 252, CHY 254, MCB 490 or equivalents, or permission. Cr 3.
- MCB 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.



## Oceanography

Professors Mayer, McCleave, Schnitker

Associate Professors Fink, McAlice, Pettigrew, Steneck, Watling;

### Cooperating Faculty:

Professors Hidu (Animal, Veterinary and Aquatic Sciences), Pearce (Civil Engineering), Shick (Zoology), Vadas (Plant Biology and Pathology)

Associate Professors Belknap (Geological Sciences), Kelley (Geological Sciences), King (Biochemistry, Microbiology and Molecular Biology)

Assistant Professors Davison (Plant Biology and Pathology), Panchang (Civil Engineering), Prentice (Geological Sciences)

### Adjunct Faculty:

Assistant Professor Sahl (Maine Maritime Academy)

The Department of Oceanography has administrative offices in Winthrop Libby Hall, on the Orono campus. As well, research facilities are located on the Orono campus and at the Ira C. Darling Center (100 miles south on the Darling Center River estuary).

Oceanography is an interdisciplinary science concerned with the study of the water column, the bottom and margins of the sea, the inhabitants of the sea, and the interactions among these. Training in oceanography is usually begun at the graduate level, after a student has obtained a degree in one or more basic sciences. Students wishing to prepare for graduate work in oceanography should take at least a year of physics (PHY 121, 122), chemistry (CHY 113, 114), geology (GES 101, 102) and biology (BIO 101, BOT 203, or ZOL 204), and mathematics through calculus (MAT 228). An understanding of statistics and computer science is helpful, as is additional work in any of the above subject areas.

The department offers courses leading to M.S. and Ph.D. degrees. The program requirements are listed in the Graduate School Catalog.

Specific fields of research include planktonology, benthic ecology and biogeochemistry, fisheries oceanography, pollution, paleo-oceanography, sedimentology and coastal processes. Many of the graduate courses are available to interested and qualified undergraduate students.

Persons trained in oceanography may find careers in business, education, industry, federal and state agencies, and research institutions as biological, chemical, geological, or physical oceanographers.

### Courses in Oceanography

#### OCE 270 Oceanography Today

An introduction to oceanography research with emphasis on Coastal Maine and the Gulf of Maine. **Cr 3.**

#### OCE 370 Introduction to Oceanography

Basic concepts in physical, geological, chemical, and biological oceanography. Prerequisite: one

introductory level University science course or permission. **Cr 3.**

#### OCE 501 (OCE, ZOL) Biological Oceanography

Marine organisms and their interrelationships with chemical, geological and physical aspects of their environments. Prerequisites: ZOL 204, INT 319 or equivalent, or permission. **Cr 3.**

#### OCE 514 Ecology of Marine Sediments

A multi-disciplinary examination of factors controlling ecological processes in marine sediments. Emphasis on recent research integrating biological, geological, and chemical aspects of marine sedimentary environments. Prerequisite: permission. **Cr 3.**

#### OCE 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, OCE 501 or equivalent. Lec 3, Lab 2. **Cr 4.**

#### OCE 518 Marine Zooplankton

Biology and ecology of marine zooplankton (particularly of the Gulf of Maine), with emphasis on population dynamics, distributions and trophic relationships. Prerequisite: MAT 126, OCE 501 or equivalent. Lec 3, Lab 2. **Cr 4.**

#### OCE 520 Chemical Oceanography

Distribution and cycling of elements in the marine system with emphasis on geochemical and biochemical interactions. Prerequisite: CHY 113, CHY 114. **Cr 3.**

#### OCE 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: OCE 520. **Cr 3.**

#### OCE 541 (OCE, 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 123 or permission. **Cr 3.**

#### OCE 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 studied. Emphasis is on species of commercial or recreational importance. Prerequisite: OCE 501 or OCE 541 or ZOL 532. Lec 2, Rec 1. **Cr 3.**

#### OCE 560 (OCE, GES) 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. Prerequisite: GES 101, GES 102 and permission. Rec 3. **Cr 3.**

#### OCE 567 Actinopaleontology

Study of living and fossil organisms and relationships to their sedimentary environment. Four full-weekend field investigations at the Darling Center. Prerequisite: GES 101, GES 102, GES 314 or ZOL 353. (Course is identical with GES 567). **Cr 2.**

#### OCE 568 Deep Sea Stratigraphy and Paleooceanography

A study of the geologic history of the ocean basins, the oceanic circulation and the climate of the past as recorded in deep sea sediments. Prerequisite: GES 101, GES 102 and permission. Courses in general biology and oceanography are strongly recommended. **Cr 3.**

### Interdisciplinary Courses

#### INT 375 (FOR, OCE, PBP, WLM, ZOL) Field Studies in Ecology

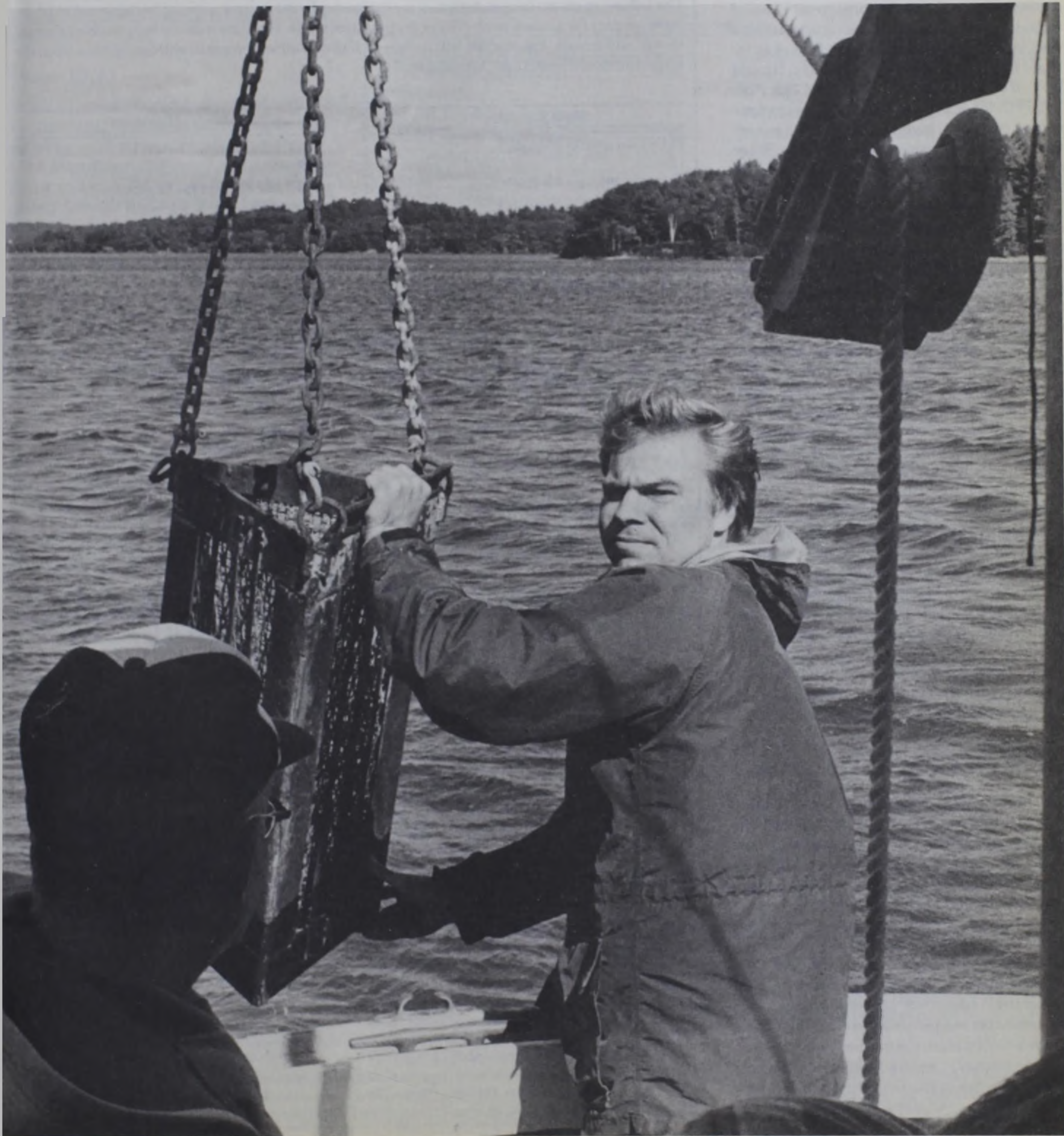
An intensive ecology field trip of one to several weeks to an area of ecologic interest scheduled during Christmas, midyear, spring recess or summer. Field and living conditions may be rigorous and/or primitive. Prerequisite: a course in ecology. Other preparation and/or recommended prerequisites announced for each trip. Credit depends upon specific trip. **Cr Ar.**



**INT 510 (OCE) 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. Prerequisite: ZOL 353 or equivalent. Lec 2, Lab 6. Cr 5.

**INT 563 (OCE, PBP, ZOL) 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 commu-

nity structure and organization. Prerequisite: a course in ecology. Lec 2, Rec 1. Cr 3.





## Physics (B.A.)

Professor Smith (Chairperson)

Professors Brownstein, Camp, Carr, Comins, Csavinszky, Grunze, Hess, Kleban, Krueger, Morrow, Tarr, Unertl

Associate Professors Harmon, Mountcastle

Assistant Professors Batuski, Lad, McClymer, McKay

Lecturer Clark

The B.A. degree in physics requires a minimum of 35 credit hours in physics, 16 credit hours in mathematics, and six additional credit hours of approved science, engineering, or mathematics electives. The 35 credit hours in physics must include PHY 121 and PHY 122 (or PHY 111 and PHY 112), PHY 229, PHY 230, PHY 236, PHY 238, PHY 488, and PHY 489. It must also include at least two credit hours of 400 level laboratory course work in physics, and at least four 300 or 400 level courses chosen from AST 451, AST 452, INT 454, PHY 447, PHY 451, PHY 454, PHY 455, PHY 462, PHY 463, PHY 470, PHY 472, PHY 475, and PHY 480. (In order to accommodate pre-medical students and others with special course requirements, one or two of these 300 or 400 level physics courses may be replaced by 400 level courses from other sciences, with the permission of the major advisor. Note, however, that the 35 credit hour requirement in *physics* must still be met.) The 16 credit hours in mathematics must include MAT 126, MAT 127, MAT 228, and MAT 258 or their equivalents. The following courses may *not* be used to satisfy the 35 credit hour requirement in physics: PHY 103 and AST 114. Also, either AST 109 or AST 215, but not both, may be used.

The faculty of the Department of Physics and Astronomy strongly recommends that all candidates for the B.A. degree in Physics complete at least one year of a foreign language at a college or university. Students preparing to attend graduate school in physics should complete the intermediate level of French, German, or Russian.

The following courses of the more descriptive variety are open to all students and have no prerequisite: AST 109, PHY 103, PHY 110.

### Physics and Cooperative Education

Students in good standing enrolled in the Physics curriculum who are completing their second year of undergraduate work have available the option of working for their degree within a Cooperative Education Program. Cooperative Education is the integration of practical work experience, obtained through specific periods of employment in industry, business, or government, into the on-campus classroom and laboratory course curriculum. A student in the Cooperative Education program works as a paid employee in a professional environment at a job selected by mutual agreement with the student, the employer, and the Cooperative Education coordinator of the Department of Physics and Astronomy. Academic credit is received

### Specimen Curricula in Physics

The following curriculum is designed for the student who desires a strong background in physics to prepare for a career in physics or for graduate study. There are many other possible arrangements, and usually the student will design an individualized program with an advisor from the Department of Physics and Astronomy.

First Year			
First Semester		Second Semester	
PHY 111 General Physics I	4	PHY 112 General Physics II	4
OR		OR	
PHY 121 Physics for Engineers and Physical Scientists I	4	PHY 122 Physics for Engineers and Physical Scientists II	4
MAT 126 Analytic Geometry and Calculus	4	MAT 127 Analytic Geometry and Calculus	4
Electives**	6	Electives	6
SCS 100 Majoring in the Sciences	1		14
	15		
Sophomore Year			
First Semester		Second Semester	
PHY 229 Physical Measurements Laboratory I	2	PHY 238 Mechanics	3
PHY 236 Introductory Modern Physics	3	PHY 230 Physical Measurements Laboratory II	2
MAT 228 Analytic Geometry and Calculus	4	CHY 114 Chemical Principles II*	4
CHY 113 Chemical Principles I*	4	Elective	3
Electives	3		16
	16		
Junior Year			
First Semester		Second Semester	
PHY 441 Electricity and Magnetism I	3	PHY 455 Electricity and Magnetism II	3
PHY 441 Physical Electronics Laboratory	2	PHY 472 Geometrical and Fourier Optics	3
MAT 453 Partial Differential Equations I	3	PHY 442 Modern Experimental Physics	2
Electives	6	MAT 454 Partial Differential Equations II	3
	14	Elective	3
			14
Senior Year			
First Semester		Second Semester	
PHY 469 Quantum and Atomic Physics	3	PHY 488 Physics Seminar I	1
PHY 488 Physics Seminar I	1	Physics Elective	3
Physics elective	3	Electives	12
Electives	9		16
	16		

\*Taken in the beginning, sophomore, or junior year.

\*\*The student must include among elective courses those courses needed satisfy the distribution requirements for the B.A. degree in of the College of Sciences.

A student preparing for graduate work in physics is advised to take some or all of the following electives in his or her junior and or senior year; PHY 462, Physical Thermodynamics; PHY 463, Statistical Mechanics; PHY 480, Physics of Materials; PHY 470, Nuclear Physics; as well as additional courses in mathematics.



ough enrollment in PHY 495 Engineering Physics Practice or PHY 496, Field Experience Physics.

### Engineering Physics (B.S., offered jointly with the College of Engineering)

The B.S. in Engineering Physics is offered jointly by the faculty of the Department of Physics and Astronomy and the College of Engineering. Consult the listings for the College of Engineering elsewhere in this catalog for details of the curriculum.

### Physics (B.S.)

The B.S. degree in Physics is also offered by the Department of Physics and Astronomy through the College of Sciences.

The Department of Physics and Astronomy offers a minor in Physics and a minor in Astronomy. Consult the Department Chairperson for detail.

### Graduate Work in Physics

The degrees of Master of Science and Doctor of Philosophy are offered in Physics. The Department also offers the degree of Master of Science in Engineering Physics. See section on Graduate Study for detailed requirements. Also consult the Graduate School catalog.

### Courses in Physics and Astronomy

#### PHY 103 Descriptive Physics

A non-mathematical introduction to basic physical principles for the non-science student. Designed to develop an appreciation for the concepts and applications of physics. May be taken without PHY 104. Lec with dem 3. Cr 3.

#### PHY 104 Descriptive Physics Laboratory

Laboratory exercises to accompany PHY 103. Corequisite: PHY 103. Lab 2. Cr 1.

#### PHY 109 Climatology

An introduction to general climatology, treating the elements of climate classification and the modifications to the atmosphere resulting from human activities. An elementary scientific discussion of the problems of energy conversion and their relation to environmental pollution. Rec 3. Cr 3.

#### PHY 110 Meteorology

A descriptive course treating the physics involved in the weather, including radiation balance, atmospheric motion, precipitation processes, circular storms, air pollution, and the polar front model. Rec 3. Cr 3.

#### PHY 111 General Physics I

An introduction to the principles of mechanics, matter, energy, heat, sound. Designed for science majors as well as premedical and pre-dental students. No calculus. A working knowledge of algebra and trigonometry is required. Lec with dem 2, Rec 1, Problem Workshop 1, Lab 2. Cr 4.

### Specimen Curricula, continued

The following specimen curriculum is designed for those students who desire a degree in physics, but who wish greater breadth in background in other areas of science, such as biological, geological, chemical, or environmental sciences. The program outlined below enables a student to begin a major in physics during the sophomore year.

#### First Year

In each semester of the First year, 15 hours of elective courses can be taken from areas other than Physics. The student should include among the elective courses those needed to satisfy the distribution requirements for the B.A. degree in the College of Sciences.

#### Sophomore Year

First Semester		Second Semester	
PHY 111 General Physics I	4	PHY 112 General Physics II	4
SPTAB2 = OR		SPTAB2 = OR	
PHY 121 Physics for Engineers and Physical Scientists I	(4)	PHY 122 Physics for Engineers and Physical Scientists II	(4)
MAT 126 Analytic Geometry and Calculus	4	MAT 127 Analytic Geometry and Calculus	4
Electives	9	Electives	9
	<u>17</u>		<u>17</u>

#### Junior Year

First Semester		Second Semester	
PHY 229 Physical Measurements Laboratory I	2	PHY 238 Mechanics	3
PHY 236 Introductory Modern Physics	3	PHY 230 Physical Measurements Laboratory II	2
MAT 228 Analytic Geometry and Calculus	4	PHY 472 Geometrical and Fourier Optics	3
Electives	6	MAT 258 Introduction to Differential Equations and Linear Algebra	4
	<u>15</u>	Elective	3
			<u>15</u>

#### Senior Year

First Semester		Second Semester	
PHY 441 Electricity and Magnetism I	3	PHY 455 Electricity and Magnetism II	3
PHY 441 Physical Electronics Laboratory	2	PHY 442 Modern Experimental Physics	2
PHY 488 Physics Seminar I	1	PHY 489 Physics Seminar II	1
Physics elective	3	Physics elective	3
Electives	6	Electives	6
	<u>15</u>		<u>15</u>

#### PHY 112 General Physics II

A continuation of PHY 111. Introducing electricity, magnetism, light, and atomic, nuclear, and quantum physics. Prerequisite: PHY 111. Lec with dem 2, Rec 1, Problem Workshop 1, Lab 2. 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, acoustics, and thermodynamics. Corequisite: MAT 126. Lec with dem 2, Rec 1, Problem Workshop 1, Lab 2. Cr 4.

#### PHY 122 Physics for Engineers and Physical Scientists II

A continuation of PHY 121 including electricity, magnetism, and optics. Prerequisites: PHY 121,

MAT 126. Lec with dem 2, Rec 1, Problem Workshop 1, Lab 2. Cr 4.

#### PHY 229 Physical Measurements Laboratory I

Experiments primarily in mechanics and modern physics. Normally taken with PHY 236. Prerequisite: PHY 112 or PHY 122, MAT 127. Lab 2. Cr 2.

#### PHY 230 Physical Measurements Laboratory II

Considers primarily of physical measurement techniques. Normally taken with PHY 238. Prerequisites: PHY 112 or PHY 122, MAT 127. Lab 2. Cr 2.

#### PHY 236 Introductory Modern Physics

The basic principles of relativity, quantum theory, atomic structure, nuclear structure, and



some aspects of molecular, solid state, and elementary particle physics. Prerequisite: PHY 112 or PHY 122, MAT 127, Lec 3. Cr 4.

#### PHY 238 Mechanics

A detailed treatment of Newtonian mechanics including PHY 121. 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. Prerequisites: PHY 111 or PHY 121. Corequisite: MAT 259, Lec 2, Comp 2. 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. Lab 4. Cr 2.

#### PHY 442 Modern Experimental Physics

Experiments selected from various topics in physics including x-ray diffraction, microwaves, the photoelectric effect, Hall effect, etc. Students develop their own experimental methods. Normally taken by junior physics and engineering physics majors. 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 function, solution thermodynamics of macromolecules, transport phenomena, helix-coil transitions, calorimetry, physical techniques used in macromolecular structure determination such as X-ray diffraction, magnetic resonance and optical spectroscopy. Prerequisites: PHY 112 or PHY 122, MAT 126, CHY 113 or permission. Cr 3.

#### PHY 451 Advanced Meteorology

Selected topics in cloud microphysics, radiation processes, and their application to the atmosphere including details of atmospheric motion. Prerequisite: PHY 112 or PHY 122. Corequisite: MAT 453, Rec 3. Cr 3.

#### 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. Prerequisites: PHY 112 or PHY 122, MAT 259, Rec 3. 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. Prerequisite: PHY 454, Rec 3. Cr 3.

#### PHY 462 Physical Thermodynamics

A theoretical study of the structure and concepts of thermodynamics including the thermodynamic description of the properties of matter. Normally taken as a junior or senior elective by students in the sciences or engineer-

ing. Prerequisite: PHY 111 or PHY 121, MAT 259, Rec 3. Cr 3.

#### 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. Prerequisites: PHY 236, MAT 259, Rec 3. Cr 3.

#### PHY 469 Quantum and Atomic Physics

Introductory quantum mechanics applied to simple atoms and molecules. Covers radiation, Schrodinger theory. Normally taken by senior physics majors. Prerequisites: PHY 236, MAT 453 or permission. Rec 3. Cr 3.

#### PHY 470 Nuclear Physics

Properties of the nucleus, nuclear reactions, radioactive decay, nuclear models, nuclear reactors and nuclear health physics. Prerequisite: PHY 236; Corequisite: MAT 453 or permission. May be taken without the laboratory, PHY 471, Rec 2. Cr 2.

#### PHY 471 Nuclear Physics Laboratory

Laboratory exercises to accompany PHY 470. Corequisite: PHY 470 or permission. Lab 2. 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. Prerequisite: PHY 112 or PHY 122; Corequisite: MAT 259, Rec 3. Cr 3.

#### PHY 473 Modern Optics Laboratory

Laboratory exercises to accompany PHY 472, Geometrical and Fourier Optics. Corequisite: PHY 472 or permission of instructor. Lab 2-4. Cr 1-2.

#### PHY 475 Methods of Mathematical Physics

Examples from continuum mechanics, electricity and magnetism, heat flow and diffusion. Suitable for seniors and graduate students. Prerequisite: MAT 453 or permission. Rec 3. 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. Prerequisites: PHY 236, PHY 455, MAT 259, Rec 3. Cr 3.

#### PHY 481 Project Laboratory in Physics I

Students develop original ideas and design and construct novel apparatus under the guidance and approval of a faculty member. Open to senior physics and engineering physics majors, and others by permission. Lab 6. Cr 3.

#### PHY 482 Project Laboratory in Physics II

Completion of the project begun in PHY 481. Prerequisite: PHY 481, Lab 6. 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. 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 months duration. Prior approval of department chairperson is required. Prerequisite: Sophomore standing in Engineering Physics. Completion of 16 hours of 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: completion of 16 hours of 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 electrostatic fields of charge distributions, dielectric materials, boundary value problems, relativistic treatment of the electric and magnetic fields of moving charges, Maxwell's equations, reflection, refraction, and polarization. Prerequisite: PHY 455 or equivalent. 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. 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.

Cr Ar.

#### PHY 512 Statistical Mechanics

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. Corequisite: PHY 463. Cr 3.

#### PHY 513 Physical Measurement and Data Analysis With Microcomputers

Covers microcomputer architecture, analog and digital data collection, A/D and D/A converters, data manipulation and display, synchronization, timing and triggers. Prerequisite: PHY 441 or permission. Lec 2, Lab 2. Cr 3.

#### PHY 574 Methods of Theoretical Physics I

Covers infinite series, infinite products, matrices, coordinate systems, theory of differential equations, special functions, applications from physics. Prerequisite: permission. 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, calculus of variations, tensor analysis, elements of group theory, Green's functions theory. Prerequisite: PHY 475 or PHY 574 or equivalent. Cr 3.

#### 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.

### Courses in Astronomy

#### 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. Lec 3. Cr 3.

#### AST 110 Introduction to Astronomy Laboratory

Laboratory and observational exercises to accompany AST 109. Corequisite: AST 109. Lab 2. Cr 1.

#### AST 114 Navigation

Covers piloting, dead reckoning, and celestial navigation. A working knowledge of trigonometry is required. 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. Prerequisites: MAT 127, PHY 112 or PHY 122, or permission. Lec 3. Cr 3.

#### AST 216 General Astronomy II

A continuation of AST 215 treating stars, galaxies, quasars, and cosmology. Prerequisite: MAT 127, PHY 122 or permission of instructor. Lec 3. Cr 3.

#### AST 451 Astrophysics I

Application of the principles of physics to the study of cosmogony, stellar evolution and dynamics, interstellar processes, the formation and evolution of galaxies, and cosmology. Prerequisite: PHY 236, PHY 238, PHY 455, MAT 453 or permission. Rec 3. Cr 1-3.

#### AST 452 Astrophysics II

A continuation of AST 451. Prerequisite: AST 451. Cr 1-3.

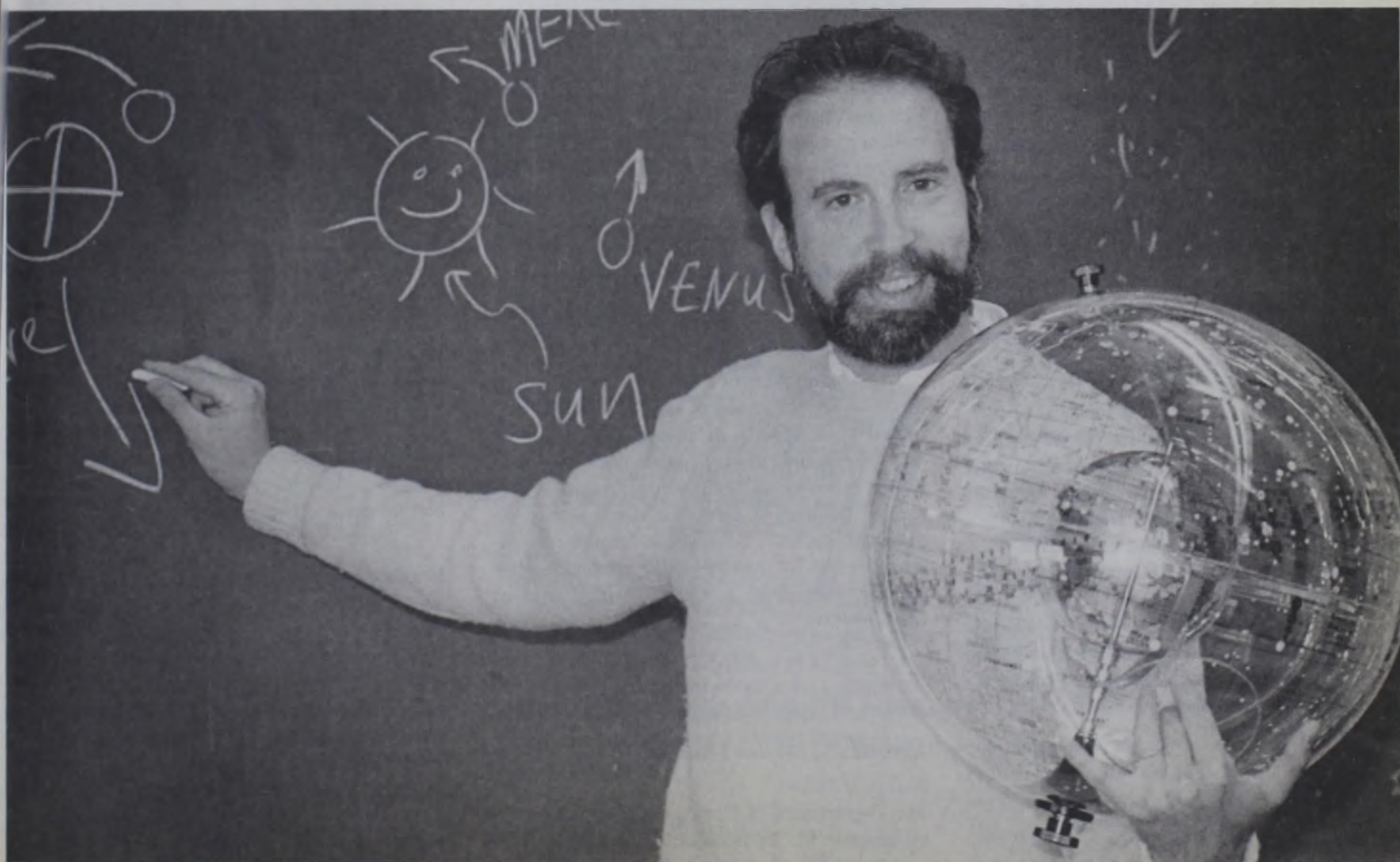
#### AST 598 Special Topics in Theoretical or Experimental Astrophysics

Prerequisite: departmental permission. Cr Ar.

### Interdisciplinary Course

#### INT 454 (ELE, PHY) Optical Communications

A study of theory of optical dielectric waveguides including light propagation, attenuation, pulse broadening, and mode coupling in fiber-optic waveguides. Includes coupling components, semi-conductor light sources and detectors, modulation and switching of light, repeaters for fiber-optic systems, optical integrated circuits and optical communication systems. Prerequisite: permission. Lec 3. 1 Design Cr. Cr 3.





## Zoology (B.A. & B.S.)

## Biology (B.A.)

Professors Allen, Dearborn, DeWitt, Gilmartin, Haines, Kornfield, C. Major, Ringo, Roberts, Shick, Sidell, M. Tyler, S. Tyler, Valteau, Wood

Cooperating Professor Wilson

Associate Professors Dowse, Glanz, Kass, Moring

Research Professor Revelante

Assistant Research Professor Hunter

Instructors B. Cook

Cooperating Faculty:

Vadas (Department of Plant Biology and Pathology)

Affiliated Cooperating Faculty:

Bigelow Laboratory, Boothbay Harbor: Professors Townsend, Yentsch

Mt. Allison University: Professor Driedzic

National Fisheries Contaminant Center (NFCRC): Professor Haines

Department of Marine Resources, Boothbay Harbor: Professors Langton, Shumway, Stevenson

University of Maine at Presque Isle: Professor Gelder

Jackson Laboratory, Bar Harbor: Professors Bailey, Barker, Birkenmeier, Eicher, Mobraaten

Dahl-Chase Pathology Associates, Bangor: Lecturers Bryant, Dahl, Gross, Kaiser, Malvesta, Wlodarski

Eastern Maine Medical Center, Bangor: Lecturers Beauregard, LaMarche, McGlauflin

Maine Medical Center, Portland: Lecturers Corriveau, Pusch

The Department of Zoology offers work leading to the degrees of Bachelor of Arts in Biology and a Bachelor of Arts and Bachelor of Science in Zoology, Master of Science in Zoology, and Doctor of Philosophy. It also administers the program leading to the degree of Bachelor of Arts in Medical Technology and Master of Science in Medical Technology.

### Facilities and Affiliations

The Department of Zoology occupies all of Murray Hall, a structure of approximately 60,000 square feet of floor space, which provides well-equipped teaching and research laboratories.

#### Special Facilities

The electron microscope facility houses a scanning and two transmission electron microscopes, EDS microanalytical equipment, a GE 250KVP x-ray machine, and a Packard liquid scintillation counter. A microtechnique facility for standard histological procedures, an ultrastructure preparation laboratory, and several aquatic laboratories supplied with well water are available for teaching and research. Darkrooms for photography and autoradiography are available, as is a 10-100 KVP X-ray facility for whole specimen radiography. Preserved fish, bird and mammal collections are maintained for teaching and research purposes. Small boats are available for use on lakes, rivers and estuaries.

#### Affiliations

The department maintains a cooperative graduate program (Mammalian Genetics) with the

Jackson Laboratory, Bar Harbor. The Ira C. Darling Center in Walpole, a branch of the University, provides facilities for marine-oriented studies. The Maine Cooperative Fish and Wildlife Research Unit provides opportunities for training and research in fishery science. It is operated under a cooperative agreement among the University of Maine, the U. S. Fish and Wildlife Service and the Maine Department of Inland Fisheries and Wildlife. Fishery unit staff members are on the departmental faculty. The Department houses the National Fisheries Contaminant Research Center, a field station of the U. S. Fish and Wildlife Service, which conducts research on aquatic pollutants. Cooperative research and educational programs are underway with members of the staff at Huntsman Marine Science Center, St. Andrews, New Brunswick, Canada, and the Mt. Desert Island Biological Laboratory, Salisbury Cove, Maine.

The Curriculum in Zoology offers a varied program for the study of animal biology. This includes all aspects of animal life: anatomy, physiology, embryology, heredity, ecology, evolution, behavior and cell biology. A curriculum can be tailored to meet the needs of the individual student. Each major student is assigned a faculty member as an academic advisor, emphasizing a close faculty/student relationship.

### Areas of Specialization

#### Aquatic and Marine Sciences:

##### *Biology of Fishes*

The Department of Zoology is internationally recognized for its research on the biology of

fishes. Research emphases in this area include fish evolution and genetics, fisheries management, aquatic food webs, fish physiology, behavior of migratory fishes, and systematics of various fish groups. Zoology majors interested in fish biology may supplement their basic program with advanced courses in each of these areas. This option of the zoology major provides a strong background for research and management jobs at private, state, and federal levels, and for continued graduate-level research.

#### *Marine Biology*

Marine Science is a primary area of emphasis on the UM campus, and the Department of Zoology includes a large proportion of the University's faculty in marine-oriented biological research. Undergraduate zoology majors with marine interests may take both basic and advanced courses in ecology, fish biology, invertebrate zoology, and physiology. The zoology major with emphasis in marine biology offers excellent preparation for employment in marine research, education, and administration in marine industries and aquaculture, and for further graduate study and research.

#### *Ecology and Field Biology*

The Department of Zoology offers a wide variety of courses for undergraduate majors with ecological interests. In addition to basic courses in ecology, parasitology, behavior, evolution, invertebrate zoology, and vertebrate biology, more advanced courses are available in physiological, population, and community ecology, aspects of the biology of birds, mammals, fishes and various invertebrate groups, and on aquatic food webs.



**Genetics and Evolutionary Biology**

The Department offers basic undergraduate courses in general and human genetics and evolution and more advanced courses in selected aspects of genetics such as population biology and mammalian genetics. Students with interests in these areas may have the opportunity to interact with researchers in genetics at the Jackson Laboratory.

**Cell Biology**

Zoology majors with interest in cellular biology may take structural courses such as histology, biological ultrastructure, microtechnique, and electron microscopy, and process-oriented courses in cell biology, morphogenesis, and development. Such a curriculum emphasis prepares the student for further cellular research at the graduate level or for technical positions in biomedical research.

**Anatomy and Physiology**

The zoology curriculum offers a diversity of courses in organismic biology, including comparative anatomy, developmental biology, morphogenesis and differentiation, animal physiology, comparative physiology, neurobiology, pharmacology, and endocrinology. Specialized courses in fish physiology, physiological ecology, and experimental endocrinology are also available to advanced students. These courses are taken by students preparing for careers in biological or medical research and the health professions.

**Health Professions**

A zoology major may prepare for further study in medicine, dentistry, osteopathy, optometry, podiatry, veterinary medicine, and other health-related fields. Courses useful in preparing the professional include comparative anatomy, developmental biology, morphogenesis and differentiation, animal physiology, biological ultrastructure, histology, principles of genetics, neurobiology, experimental endocrinology, cell biology, and various advanced courses in genetics, physiology and electron microscopy.

**Requirements for the Zoology Major**

The following courses are required for the B. A. in Zoology:

BIO 100 Basic Biology  
 ZOL 204 Animal Biology  
 CHY 111/112 General Chemistry I and II  
 OR  
 CHY 113/114 Chemical Principles I and II  
 CHY 251 Organic Chemistry Lecture I  
 CHY 253 Organic Chemistry Laboratory I  
 AND  
 CHY 252 Organic Chemistry Lecture II  
 CHY 254 Organic Chemistry Laboratory II  
 OR  
 BCH 221 Organic Chemistry AND

BCH 322 Biochemistry  
 MAT 126 Analytic Geometry and Calculus

OR  
 MAT 151 Calculus for the Life Sciences  
 Mat 127\* Analytic Geometry and Calculus

OR  
 Mat 152\* Calculus for the Life Sciences II  
 PHY 111/112 General Physics I and II

OR  
 PHY 121/122\* Physics for the Engineers and Physical Scientists I and II

Foreign language one year at the intermediate level. (Required for the B.A. degree only)

In addition to the above, twenty-two (22) hours of Zoology courses are required, including at least one from each of the following categories. Associated laboratories are required. Evolution may be used to satisfy *only one area requirement*.

- A. Category I  
 ZOL 329/ZOL 331 Vertebrate Biology I and Lab I  
 ZOL 330/ZOL 332 Vertebrate Biology II and Lab II  
 ZOL 333 Comparative Anatomy  
 ZOL 336 Developmental Biology  
 ZOL 353 Invertebrate Zoology  
 ZOL 458 Animal Parasitology
- B. Category II  
 ZOL 462 Principles of Genetics  
 ZOL 465 Evolution
- C. Category III  
 ZOL 377/ZOL 378 Animal Physiology and Animal Physiology Lab  
 ZOL 480 Cell Biology  
 ZOL 485 Comparative Animal Physiology
- D. Category IV  
 INT 319 General Ecology  
 ZOL 465 Evolution

Additional hours to fulfill the 22-hour requirement may be chosen from Zoology courses at the 300-, 400-, or 500-level. Neither ZOL 303 (Pathophysiology), nor ZOL 404 (Pharmacology) may be used to fulfill this requirement.

Department of Zoology majors must pass a *Junior English Proficiency Examination*, which is offered in the Fall semester. This requirement is not satisfied by ENG 101. Writing Experience and Writing Intensive courses are offered to help majors (and non-majors) meet the writing requirements for the B.A. degree. (See description of ZOL 400 - Zoology Writing Intensive below).

A minimum of 12 hours of Zoology courses must be taken in residence. Students must have a G.P.A. of 2.0 or better in Zoology courses, including BIO 100 and ZOL 204, and a 2.0 or better in all science requirements for the major. Students can count only six credit hours of research problems (ZOL or Honors) toward the requirements for the major.

\*(Required for B.S. degree only)

**Sample Curricula**

The following schedules are typical of programs in the four areas indicated. They are not necessarily complete, and individual schedules may vary considerably from the basic outlines shown.

**Pre-Professional (including pre-medical, pre-dental, pre-optometry, pre-vet)***First Year*

Foreign Language  
 (REQUIRED FOR THE B.A DEGREE ONLY)  
 MAT 126 Analytic Geometry and Calculus

CHY 111/112 General Chemistry I and II  
 OR

CHY 113/114 Chemical Principles I and II  
 BIO 100 Basic Biology  
 ZOL 204 Animal Biology  
 ENG 101 College Composition  
 SCS 100 Majoring in the Sciences

*Sophomore Year*

ZOL 333 Comparative Anatomy  
 ZOL 336 Developmental Biology  
 CHY 251 Organic Chemistry Lecture I  
 CHY 253 Organic Chemistry Laboratory I  
 CHY 252 Organic Chemistry Lecture II  
 CHY 254 Organic Chemistry Laboratory II  
 Electives

*Junior Year*

ZOL 377 Animal Physiology  
 ZOL 378 Animal Physiology Laboratory  
 OR  
 ZOL 480 Cell Biology  
 OR  
 ZOL 485 Comparative Animal Physiology  
 ZOL 462 Principles of Genetics  
 PHY 111/112 General Physics I and II  
 INT 319 General Ecology  
 OR  
 ZOL 465 Evolution Zoology Electives

*Senior Year*

ZOL 451 Histology Zoology Electives

**Environmental/Ecology/Marine***First Year*

Foreign Language  
 MAT 126 Analytic Geometry and Calculus

CHY 111/112 General Chemistry I and II  
 OR

CHY 113/114 Chemical Principles I and II  
 BIO 100 Basic Biology  
 ZOL 204 Animal Biology  
 ENG 101 College Composition

*Sophomore Year*

ZOL 329 Vertebrate Biology I  
 ZOL 331 Vertebrate Biology Laboratory I  
 ZOL 330 Vertebrate Biology II



ZOL 332 Vertebrate Biology Laboratory II  
 BCH 221 Organic Chemistry  
 BCH 322 Biochemistry  
 INT 319 General Ecology  
 Electives

*Junior Year*

ZOL 377 Animal Physiology  
 ZOL 378 Animal Physiology Laboratory  
 OR  
 ZOL 480 Cell Biology  
 OR  
 ZOL 485 Comparative Animal Physiology  
 ZOL 462 Principles of Genetics  
 OR  
 ZOL 465 Evolution  
 PHY 111/112 General Physics I and II  
 INT 319 General Ecology  
 ZOL 353 Invertebrate Zoology  
 Electives

*Senior Year*

ZOL 433 Mammalogy  
 OR  
 ZOL 434 Avian Biology and Ecology  
 OR  
 ZOL 471 Fishery Biology Laboratory  
 OR  
 ZOL 472 Aquatic Food Webs

### Requirements for the Biology Major

The Department of Zoology requires the following courses for the B.A. in Biology:

**Basic Science**

BIO 100 Basic Biology  
 ZOL 204 Animal Biology  
 BOT 203 Plant Kingdom  
 OR  
 BOT 201/202 Plant Biology/Laboratory  
 INT 319 General Ecology  
 MCB 300/305 General Microbiology/Laboratory  
 ENT 226 Introductory Entomology  
 PHY 111/112 General Physics/Laboratory  
 MAT 126 Analytical Geometry and Calculus  
 OR  
 MAT 151 Calculus for the Life Sciences

**Basic Chemistry**

CHY 111/112 General Chemistry/Laboratory  
 OR  
 CHY 113/114 Chemical Principles/Laboratory

**Organic and Biological Chemistry**

BCH 221/221L Organic Chemistry/Laboratory  
 AND

BCH 322/322L Biochemistry/Laboratory  
 OR  
 CHY 251/253 Organic Chemistry/Laboratory and BCH 322/332L Biochemistry/Laboratory  
 OR  
 CHY 251/253:CHY 252/254 Organic Chemistry I-II/Laboratory and BCH 451 Principles of Biochemistry

**Genetics/Evolution**

ZOL 462 Genetics and  
 ZOL 465 Evolution

**Group Electives (4 credit hours in each of the following groups)**

*Physiology*

ZOL 377/378 Animal Physiology/Laboratory  
 ZOL 480 Cell Biology  
 ZOL 485 Comparative Animal Physiology  
 BOT 452/453 Plant Physiology/Laboratory

*Anatomy*

ZOL 333 Comparative Anatomy  
 ZOL 336 Developmental Biology  
 BOT 435 Plant Anatomy

*Taxonomy*

ZOL 329/331 Vertebrate Biology  
 ZOL 353 Invertebrate Zoology  
 ZOL 458 Animal Parasitology  
 MCB 410 Determinative Bacteriology  
 BOT 459 General Mycology  
 BOT 464 Taxonomy of Vascular Plants  
 BOT 473 Biology of Algae  
 ENT 460 Insect Biology and Taxonomy  
 ENT 461 Insect Biology, Taxonomy and Systematics

A grade point average of 2.0 must be maintained in the courses above and any Zoology courses elected. A foreign language at the intermediate level must be completed. A junior-level English proficiency exam must be passed.

### Graduate Study in Zoology

The department of Zoology offers work leading to the degrees of Master of Science and Doctor of Philosophy, the general requirements of which are listed in the Graduate School Catalog.

A reading knowledge of an appropriate foreign language is a requirement for the Ph.D. degree. In the major field, all courses numbered 500 or over are given primarily for graduate credit. All courses numbered 400-499 may be taken for graduate credit, with prior approval of the student's advisory committee. Students

may be required to take, without graduate credit, certain undergraduate courses which they lack.

### Courses in Zoology

**ZOL 101 Principles of Biology**

A non-laboratory approach to such topics as ecology, evolution, genetics, and cell theory. Particular emphasis on application of biological principles to problems of modern society. Credit cannot be earned for both ZOL 101 and BIO 100. Lec 3. **Cr 3**

**ZOL 204 Animal Biology**

Introduces vertebrate and invertebrate structures and functions (emphasizing basic physiological principles), development, ecology, systematics, and evolution. Prerequisite: BIO 100. Lec 3, Lab 3. **Cr 4**

**ZOL 207 Orientation in Medical Technology**

An introduction to the profession of medical technology for second-semester pre-medical technology students. Required. (Pass/Fail Grade Only). Lec 1. **Cr 1**

**ZOL 208 Anatomy and Physiology**

Considers general principles of animal life with emphasis on the structure and functions of the human body. Prerequisite: BIO 100 or ZOL 101. Students completing ZOL 204 cannot take ZOL 208 for credit. Lec 3, Lab 2. **Cr 4**

**ZOL 213 An Introduction to Marine Science**

A non-laboratory introduction to the history of our interaction with the sea including marine organisms, characteristics of the marine environment, the exploitation and pollution of the sea. Prerequisite: BIO 100 highly recommended. **Cr 3**

**ZOL 296 Zoology Professional Experiences**

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**

**ZOL 303 Pathophysiology**

A study of the physiological, genetic and biochemical basis of disease. Prerequisite: ZOL 208. Zoology majors cannot receive major credit for this course. **Cr 3**

**ZOL 305 Medical Parasitology**

A study of the medically important parasites and their life cycles, as well as epidemiology and laboratory methods of diagnosis. Medical Technology students only. Lec 1, Lab 2. **Cr 3**

**ZOL 316 Drug Use and Abuse**

An introduction with emphasis on drugs of biological, medical, and social importance. Covers principles of administration, dose response curves, physiological and pharmacological actions, and toxicity. Prerequisite: BIO 100 or ZOL 204 or ZOL 208. Credit may be received for this course or ZOL 404, not for both. Lec 3. **Cr 3**



**ZOL 329 Vertebrate Biology I**  
Introduction to the classes of vertebrates, their characteristics, evolution, physiology, ecology, and behavior. Emphasis on adaptive strategies in the environment. Prerequisite: ZOL 204. Lec 3, Lab 3. Cr 3.

**ZOL 330 Vertebrate Biology II**  
Continuation of ZOL 329. Prerequisites: ZOL 329, ZOL 329. Lec 3. Cr 3.

**ZOL 331 Vertebrate Biology Laboratory I**  
Study of taxonomy of regional vertebrate fauna including structure and function of representatives of vertebrate classes and taxonomy of local vertebrates. Prerequisite: ZOL 329 or concurrently. Lab 2. Cr 1.

**ZOL 332 Vertebrate Biology Laboratory II**  
Continuation of ZOL 331 with topics in anatomy, physiology, and behavior. Prerequisite: ZOL 330 or concurrently. Lab 2. Cr 1.

**ZOL 333 Comparative Anatomy**  
The structure, origin and history of the vertebrate organ systems. Prerequisite: ZOL 204 or permission. Lec 2, Lab 4. Cr 4.

**ZOL 336 Developmental Biology**  
Considers the transformation of the fertilized egg into a new adult individual including the concepts of growth and development of organisms. Prerequisite: ZOL 204. Lec 2, Lab 4. Cr 4.

**ZOL 353 Invertebrate Zoology**  
The morphology, ecology, life histories and phylogenetic relationships of invertebrates exclusive of insects and parasites. Prerequisite: ZOL 204. Lec 3, Lab 3. Cr 4.

**ZOL 354 Biology of Behavior**  
Examines mechanisms of animal behavior, stressing how behavior adapts animals to their environments. Prerequisite: ZOL 204 or equivalent. Lec 3. Cr 3.

**ZOL 355 Biology of Behavior Laboratory**  
Prerequisite: ZOL 354 or concurrently. Lab 4. Cr 2.

**ZOL 361 Human Genetics**  
Fundamentals of human heredity including principles of inheritance, the nature of chromosomes, the structure and expression of genes, genetic disorders, and human evolution. Suitable for nonscience or science majors. Prerequisite: BIO 100 or equivalent. NOT TO FOLLOW ZOL 462. Lec 3. Cr 3.

**ZOL 377 Animal Physiology**  
Physiological processes in vertebrates with emphasis on the integration of organ systems. A pre-professional course for pre-medical, pre-dental, pre-graduate school, nutrition, and exercise physiology students. Prerequisites: ZOL 204 and one year of chemistry. Lec 3. Cr 3.

**ZOL 378 Animal Physiology Laboratory**  
Experimental analysis of physiological processes. Extensive animal surgery is involved. Pre-

requisites: ZOL 377 previously or concurrently and 1 year of chemistry. Lab 4. Cr 2.

**ZOL 387 Problems in Zoology I**  
Open to juniors and seniors who have special interest and qualifications in some branch of zoology. Prerequisite: departmental permission. Cr Ar.

**ZOL 388 Problems in Zoology II**  
Open to juniors and seniors who have special interest and qualifications in some branch of zoology. Prerequisite: departmental permission. Cr Ar.

**ZOL 400 Zoology Writing Intensive**  
Designed to supplement existing courses in Zoology. Additional writing will be required in conjunction with regular course work providing students with an intensive writing experience in their major discipline. Must be taken concurrently with a regular Zoology course. Prerequisite: permission. Cr 1.

**ZOL 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, HC 60, Box 102, Keene Neck Road, Medomak, Maine 04551. Do not apply directly to the University of Maine. (Summer course only.) Cr 1-2.

**ZOL 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. Prerequisites: A course in physiology (ZOL 208 or ZOL 377) and either two semesters of organic chemistry (CHY 251, CHY 252) or one semester of organic and one semester of biochemistry (BCH 207 and BCH 208 or BCH 221 & BCH 322). Credit may be received for this course or ZOL 404, not for both. Cr 3.

**ZOL 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 medical technology students. Prerequisite: ZOL 451, BCH 222, BCH 222 Lab or permission. Lec 3, Lab 3. Cr 4.

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

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

**ZOL 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.

**ZOL 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.

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

**ZOL 433 Mammalogy**  
Considers the characteristics, functional anatomy, behavior and ecology of mammals. Lectures, laboratory study and field trips. Prerequisite: ZOL 330 or permission. Lec 3, Lab 3. Cr 4.

**ZOL 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. Prerequisites: ZOL 330 and an ecology course or permission. Lec 3, Lab 3. Cr 4.

**ZOL 436 Biological Ultrastructure**  
The ultrastructure of cells, tissues, and organ systems. Prerequisite: ZOL 204. Lec 3. Cr 3.

**ZOL 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. Prerequisites: ZOL 336 or permission. Lec 3. Cr 3.

**ZOL 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. Prerequisites: 1 year chemistry, 1 year physics, 1 year biology. Lec 2. Cr 2.

**ZOL 443 Animal Microtechnique**  
Histological and histochemical techniques for the preparation of animal tissues and cells for microscopic study. Prerequisite: ZOL 204. Lec 1, Lab 4. Cr 3.

**ZOL 451 Histology**  
Microscopic anatomy of animal tissues. Prerequisites: ZOL 204 or ZOL 208 & junior standing or permission. Lec 2, Lab 4. Cr 4.

**ZOL 458 Animal Parasitology**  
The life histories, economic importance, methods of control, host necropsy, and the preparation of parasites. Prerequisite: ZOL 204, ZOL 453. Lec 2, Lab 3. Cr 4.



**ZOL 462 Principles of Genetics**

The nature of hereditary factors and the mechanisms by which they are transmitted and expressed. Prerequisite: BIO 100 and junior standing. Lec 3. Cr 3.

**ZOL 464 Genetics Laboratory**

Fundamental experiments illustrating genetic analysis, with emphasis on eukaryotes. Prerequisite: ZOL 462 (previously or concurrently). Lab 4. Cr 2.

**ZOL 465 Evolution**

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

**ZOL 470 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. Prerequisites: ZOL 329, INT 319 or WLM 200. Recommended: FOR 204 or MAT 232. Lec 3. Cr 3.

**ZOL 471 Fishery Biology Laboratory**

Includes field and laboratory exercises in techniques commonly employed in fishery biology, data interpretation and report preparation. Two Saturday field trips. Offered Fall semester in odd numbered years. Prerequisite: ZOL 470 (previously or concurrently). Lab 2. Cr 1.

**ZOL 472 Aquatic Foods Webs**

An introduction to primary and secondary production in rivers, lakes, estuaries, and oceans, comparing freshwater and marine systems, and contrasting terrestrial systems. Emphasis on habitat and ecosystem rather than cycling or modeling. Prerequisite: BIO 100, BOT 201 or ZOL 204 or permission. Cr 3.

**ZOL 474 Neurobiology**

Foundations on the organization and function of the nervous systems in various animals. The course will specifically address 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. Prerequisites: ZOL 204, PHY 112, CHY 112 or permission. Lec 3. Cr 3.

**ZOL 476 Biological Rhythms**

An introduction to the physiology of biological clocks in plants and animals. The nature of clock-controlled rhythms and their overt effects on behavior are described. Practical ways of avoiding complications of rhythms in research are delineated. The mathematical analysis of oscillations is covered, and possible clock mechanisms are discussed. Prerequisites: ZOL 204, calculus desirable. Lec 2. Cr 2.

**ZOL 479 Experimental Endocrinology**

A comprehensive survey of the vertebrate endocrine glands and their functional relationships with emphasis on experimental and comparative approaches. Prerequisite: ZOL 377 and Organic Chemistry. Lec 3, Lab 4. Cr 3.

**ZOL 480 Cell Biology**

Examines the fundamental cellular, subcellular and molecular characteristics of cells with emphasis on structure and function of organelle systems common to eukaryotic cells. Associated laboratory exercises employ techniques commonly utilized in cell biological research. Prerequisite: ZOL 204 or ZOL 208, Organic Chemistry or Biochemistry. Lec 3, Lab 2. Cr 4.

**ZOL 482 Morphology and Evolutionary Relationships of Fishes**

An introduction to the structure and classification of fishes emphasizing function. Structures involved in swimming, feeding, breathing, hearing, etc., are presented. The evolutionary relationships of the major fish groups are discussed in light of structural changes related to improved or new functions. Students are familiarized with the major groups of fishes and their general structure. Prerequisites: ZOL 204; ZOL 333 or ZOL 336 is recommended. Lec 3, Lab 2. Cr 4.

**ZOL 485 Comparative Animal Physiology**

A comparative approach to the functional adaptations of animals to diverse environments, with emphasis on underlying physiological and biochemical mechanisms. Prerequisite: ZOL 204, a year of chemistry and junior standing. Lec 3, Lab 2. Cr 4.

**ZOL 487 Problems in Zoology I-Field Ornithology**

Field studies in identification of land and water birds in a variety of habitats along the Maine coast. Topics include evolution, anatomy, bird banding, migration and ornithological research at the Todd Wildlife Sanctuary (Hog Island), other coastal islands and the mainland. For information and application, write directly to: National Audubon Society, Audubon Ecology Camp in Maine, HC 60, Box 102, Keene Neck Road, Medomak, Maine 04551. Do not apply directly to the University of Maine. (Summer course only). Cr 1.

**ZOL 489 Introduction to Human Pathology**

Covers general pathologic principles and how they relate to human disease states and deals with specific organ systems and the diseases affecting them. Primarily for medical technology students. Prerequisites: ZOL 451, MCB 300, MCB 301, MCB 420, or their equivalents or permission. Lec 3. Cr 3.

**ZOL 520 Larval Biology of Marine Invertebrates**

Covers life histories of free-living marine invertebrates (excluding protozoans), emphasis on development, behavior, and ecology of larval forms. Laboratory studies stress methods of procuring, handling, and culturing larvae for descriptive or experimental purposes. Numerous field trips required. Conducted at the Darling Center. (Summer course only). Prerequisite: ZOL 353 or equivalent. Lec 2, Lab 6. Cr 5.

**ZOL 521 Polar Ecology**

A study of interrelationships between organisms and their physical and biotic environ-

ment in high latitudes. Marine ecosystems emphasized. Prerequisite: ZOL 353 and INT 319 or equivalent or permission. Cr 1.

**ZOL 523 Taxonomy and Morphology of Crustacea**

A comprehensive review of crustacean taxonomy and morphology, including freshwater and marine, living and fossil forms. Emphasis on evolutionary history of the group. Laboratory study will emphasize local forms. Some field trips required. Prerequisite: ZOL 353, INT 510 or equivalent. Lec 3, Lab 3. Cr 4.

**ZOL 524 Population Biology**

Advanced topics in the ecology and genetics of species and populations including population genetics; population dynamics; population structure; selection, speciation. Prerequisites: INT 419 (or equivalent) and ZOL 462 or ZOL 465, or permission. Lec 2, Lab 2. Cr 3.

**ZOL 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. Prerequisites: INT 319 or equivalent. Lec 3. Cr 3.

**ZOL 526 Malacology**

Emphasis on structure and function of bivalves with laboratory studies using living, local fauna. Prerequisite: ZOL 353 or permission. Lec 2, Lab 2. Cr 3.

**ZOL 527 Higher Marine Vermiforms**

Characteristics, functional anatomy, taxonomy, behavior and ecology of marine annelids, sipunculids, pogonophorans, echiurids and priapulids. Lecture, lab study and field trips. Prerequisite: ZOL 353 or permission. Lec 2, Lab 2. Cr 3.

**ZOL 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. Prerequisites: ZOL 377 or equivalent, or permission. Lec 3. Cr 3.

**ZOL 531 Physiology of Fishes Laboratory**

Independent student projects involving field collection of fishes and laboratory analysis of their physiological function. Prerequisite: ZOL 530 (previously or concurrently) and permission. Lab 4. Cr 2.

**ZOL 532 Behavior and Ecology of Fishes**

Considers such topics as locomotion, sensory biology, migration, feeding, growth, reproduction and adaptation to habitats from a behavioral and ecological standpoint. Lectures laboratory study and field trips. Prerequisite: ZOL 330 or permission. Lec 2, Lab 4. Cr 4.

**ZOL 540 Seminar in Evolutionary Ecology**

Covers the theoretical and applied aspects of ecological and evolutionary principles. Prerequisites: permission. Cr Ar



**ZOL 541 Electron Microscopy Laboratory**  
Covers techniques of transmission and scanning electron microscopy, especially those applicable to biological sciences. Prerequisites: ZOL 441 (previously or concurrently), permission. Lab 6. Cr 3.

**ZOL 550 Genetics of Populations**  
Introduces the genetic structure of populations and the factors which affect the genetic composition of populations. Prerequisite: ZOL 462, MAT 126. Lec 3, Lab 2. Cr 4.

**ZOL 551 Biometry**  
Design and quantitative analysis of biological experiments, including practical applications of quantitative models and statistics. Lec 1, Lab 2. Cr 3.

**ZOL 553 Advanced Human Genetics and Metabolism**  
An examination of the development of human metabolic and physiologic functions with primary consideration of genetic mechanisms and regulatory events, including chromosomal and Mendelian inheritance, multi-factorial traits, and a comprehensive analysis of biochemical lesions involved in inherited metabolic disease. Prerequisite: ZOL 462, BCH 451, BIO 451 or equivalents. Cr 3.

**ZOL 554 Advanced Genetics**  
Advanced study of hereditary phenomena including current research in molecular, physiological and developmental genetics. Prerequisites: ZOL 462 or equivalent. Cr 3.

**ZOL 557 Fish Population Dynamics**  
Application of resource assessment theory and techniques with emphasis on estimating vital statistics and predicting maximum sustained yields for commercially exploited marine fish populations. Prerequisites: A course each in ecology, statistics and calculus. ZOL 470 or WLM 410 recommended. Cr 3.

**ZOL 560 Mammalian Genetics**  
An advanced study of classical and molecular mammalian genetics including tools of mammalian genetics, immunogenetics, cytogenetics, sex determination, gene structure, regulation of gene expression and DNA synthesis, genetic engineering. Taught by the staff of the Jackson Laboratory. Prerequisite: ZOL 462 or permission. Lec 3. Cr 3.

**ZOL 567 Invertebrate Functional Anatomy**  
Detailed studies of the functional anatomy and morphology of selected groups of invertebrates, including interpretation of sea floor photographs and scanning electron micrographs. Emphasis on structures of importance in the taxonomy, feeding and reproduction of cnidarians and echinoderms, and other groups. Prerequisite: ZOL 353 or equivalent. Lec 1, Lab 4. Cr 3.

**ZOL 570 Advanced Topics in Aquatic Biology**  
In-depth study of various aspects of freshwater or marine biology. Students select topic, prepare

critical papers and organize discussion. May be repeated for credit. Prerequisite: permission. Cr 2.

**ZOL 573 Fisheries Science**  
Exercises and training in applying scientific techniques and approaches to the study of fishes and fish populations. Particular emphasis on problem analysis, techniques, and ultimate management applications. Prerequisites: ZOL 470 and ZOL 471 or permission. Lec 2. Cr 2.

**ZOL 579 Endocrine Physiology Lab**  
A laboratory course introducing biological and chemical assay procedures. Prerequisites: ZOL 479, permission. Lab 4. Cr 2.

**ZOL 585 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. Prerequisites: ZOL 377, ZOL 480 or ZOL 485. Cr 3.

**ZOL 586 Physiological Ecology Laboratory**  
Independent student projects involving field observation and collection and laboratory analysis of animal responses to marine environmental factors. Prerequisite: ZOL 585 or (previously or concurrently) and permission. Lab 4. Cr 2.

**ZOL 587 Problems in Zoology I (Fall)**  
Students conduct individual research problems and research seminars. Emphasis on development of scientific skills. Prerequisite: permission. Cr 1-3.

**ZOL 588 Problems in Zoology II**  
Students conduct individual research problems and research seminars. Emphasis on development of scientific skills. Prerequisite: permission. Cr 1-3.

**ZOL 596 Zoology 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 Zoology. Prerequisite: graduate standing. May be repeated for credit up to a total of 6 credit hours. Cr 1-3.

#### Interdisciplinary Courses

**INT 219 (PBP, ZOL) 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. Prerequisite: BIO 100. Rec 3. Cr 3.

**INT 319 (PBP, ZOL) General Ecology**  
Ecological principles for the science major including environmental factors, population ecology, community ecology and ecosystem energetics. Prerequisites: one year of college chemistry, one year of college biological science. Lec 3. Cr 3.

**INT 323 (BIO, NRC, PBP, PSE, WLM, ZOL) 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. Prerequisite: BIO 100. Cr 3.

**INT 360 (ECO, ZOL) Economics and Biology of Marine Fisheries Management**  
Introduces biological and economic theory relevant to the management of common property fishery resources. Several marine species of commercial importance to New England used as case studies. Prerequisites: ECO 420, ZOL 204 or permission. Cr 3.

**INT 375 (FOR, OCE, PBP, WLM, ZOL) Field Studies in Ecology**  
An intensive ecology field trip of one to several weeks to an area of ecologic interest scheduled during Christmas, midyear, spring recess or summer. Field and living conditions may be rigorous and/or primitive. Prerequisite: a course in ecology. Other preparation and/or recommended prerequisites announced for each trip. Credit depends upon specific trip. Cr Ar.

**INT 420 (ZOL) Ecology Laboratory and Field Course**  
Ecosystems studies in the field illustrate ecologic principles and lab work provides technical experience. Saturday field trips. Prerequisites: INT 319 and a course in statistics (may be concurrent). Lab and field 6. Cr 3.

**INT 525 (FMT, FOE, FTY, ZOL) 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. Prerequisites: Senior or graduate status or permission. Lec 1. Cr 1 or 2.

**INT 552 (PSY, ZOL) Behavior Genetics**  
Genetic analysis of behavior in several organisms including *Drosophila*, genus of mouse and man. Current literature on behavioral mutants and polygenic behavior will be discussed in depth. Prerequisite: ZOL 462 and MAT 232 or equivalent. Lec 2, Rec 1. Cr 3.

**INT 563 (OCE, PBP, ZOL) 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. Prerequisite: a course in ecology. Lec 2, Rec 1. Cr 3.







# College of Social and Behavioral Sciences

Julia M. Watkins, *Dean*

Alan M. Rosenwasser, *Associate Dean*

Raymie E. McKerrow, *Coordinator of Student Academic Services*

## General Information

The College of Social and Behavioral Sciences is composed of disciplines that focus on understanding the effect of social and cultural forces on individuals and the world. A liberal arts education is seen as the foundation for developing this understanding.

A major goal of the College is to provide students with the ability to think independently, to analyze, and to achieve independent judgment. Social and behavioral sciences emphasize development of problem-solving methods within the context of strong academic skills. The College provides students with the intellectual breadth needed to understand the United States and the surrounding world, and with the skills necessary to think analytically and to communicate effectively.

Another major goal is to develop greater understanding and knowledge of social and behavioral events. The College encourages faculty and students to apply their knowledge and discoveries to issues faced by individuals, social institutions, and policymakers.

The College is composed of nine departments and the School of Nursing, which offer the following degrees:

Anthropology: B.A., Anthropology B.A., Inter-

national Affairs/Anthropology  
Economics: B.A., M.A., Economics B.A., International Affairs

Journalism and Mass Communication: B.A., Journalism B.A., Mass Communication

Political Science: B.A., Political Science B.A., International Affairs/Political Science

Psychology: B.A., M.A., PH.D, Psychology

Public Administration: B.A., Public Management; M.P.A. (Master of Public Administration)

Sociology: B.A., Sociology

Speech: B.A., M.A., Speech Communication (including communication disorders)

School of Nursing: B.S., Nursing

School of Social Work: B.A., Social Work; M.S.W. (Master of Social Work)

An individualized Ph.D. is available in several disciplines.

## School of Nursing

The baccalaureate program is designed to prepare a professional generalist practitioner of nursing who, through the nursing process, assists individuals, families and groups in various settings to achieve and maintain optimal health. Education for the practice of professional nurs-

ing demands a substantial knowledge of the social, behavioral and biological sciences as a theoretical basis.

## Degree Requirements

Requirements for the B.A. degree are noted in a separate section describing B.A. degree requirements at the University of Maine. Requirements for the B.S. in Nursing are described in the Nursing section of the catalog. Requirements for graduate degrees are detailed in the Graduate School Bulletin. Questions pertaining to programs or degree requirements in the College of Social and Behavioral Sciences should be directed to the appropriate Director or Department Chairperson.

## Entrance Requirements:

Requirements for admission to the College of Social and Behavioral Sciences, except for the School of Nursing, are the same as those for admission to the University. They are described in the Admissions section of this catalogue. The School of Nursing requirements are described in the Nursing section of the catalog.





## Anthropology

Professor Acheson (Chairperson)

Professors Faulkner, Ives, Sanger

Associate Professors Bonnicksen, Konrad, Munson, Roscoe

Assistant Professor Hornsby, Mahmood

Faculty Associate Sorg

Anthropology is the study of human cultures, societies, and behavior in all parts of the world throughout all periods of history. There are four sub-disciplines: archaeology, the study of historic and prehistoric cultures and civilizations; socio-cultural anthropology, which is concerned with current cultures of all degrees of complexity; physical anthropology, the biological aspects of the human species; and anthropological linguistics, which is concerned with the scientific study of language and its relationship to thought and society. In the past, anthropologists tended to study people in small, tribal societies. In recent decades, more attention has been given to peasantry and industrialized, urban societies and to applying anthropology to solving problems of these societies.

The Department of Anthropology focuses on archaeology and socio-cultural anthropology. Training in linguistics may be obtained through the linguistics course concentration. Courses in biological/physical anthropology also are offered from time to time. In addition, the Department offers courses in folklore, oral history, and geography, which are closely related to socio-cultural anthropology.

### Degree Programs

The Anthropology Department offers two majors leading to the following undergraduate degrees.

1. B.A. in Anthropology
2. B.A. in International Affairs in Anthropology

### Requirements for Anthropology Majors

A minimum of 36 hours of anthropology is required. In some cases, double majors may be able to apply six hours of collateral courses to the major. Majors must pass the following courses with at least a "C" grade:

ANT 215 Social Anthropology

ANT 217 Introduction to  
Archaeology

ANT 499 Current Issues in Modern  
Anthropology

and one of the following:

ANT 221 Introduction to Folklore

INT 410 Introduction to the Study  
of Linguistics

Because these courses are frequently prerequisite to advanced level courses, students

should take them as early in their program as possible. Note: ANT 215 can not be taken by senior majors and ANT 499 will normally be taken only by senior majors.

Advanced study in anthropology normally requires use of quantitative methods and foreign language competency. Consequently, courses in quantitative methods, such as statistics and computer science, are highly recommended, as is foreign language competency at the intermediate level.

The anthropology major emphasizes a broadly based undergraduate curriculum. In consultation with his or her advisor, the student should select courses to sample effectively the sub-disciplines of anthropology, and avoid overspecialization at the BA level. Several interdisciplinary course concentrations (see index) are very appropriate for the anthropology major. These include: Canadian Studies, Franco-American Studies, Geography, Latin American Studies, Linguistics, and Religious Studies.

### Requirements for the International Affairs Major in Anthropology

A minimum of 30 hours in anthropology is required for this major, together with a minimum of nine hours of appropriate courses in each of the following departments: History, Political Science, and Economics. In addition, the student must take six hours of a modern foreign language beyond the intermediate level. (See International Affairs in index.)

Students majoring in International Affairs in Anthropology must pass the following courses with at least a "C" grade: ANT 215, ANT 217, ANT 499. Students in this major normally will concentrate in social and cultural anthropology. Since the number of required courses is relatively high, International Affairs in Anthropology majors should plan their programs early in their college careers.

### Graduate Training in Archaeology

The Department of Anthropology cooperates with the Institute of Quaternary Studies and the Department of History to train graduate students in prehistoric and historic archaeology (see History and Quaternary Studies in index). Application is made through these cooperating departments (See also, Graduate School Catalog).

### Career Opportunities

Anthropology provides very broad training in the social sciences. Therefore, a background in anthropology is useful in any career in which an understanding of people or the societies in which they live is important. Due to the broad nature of the field, students trained in anthropology have followed a wide range of careers. In recent years, our majors have pursued advanced training in anthropology and folklore. They also have gone on to advanced training in law, social work, business, theology, library science, museum work, nursing, computer programming, clinical psychology, education, and the U.S. Air Force.

International Affairs in anthropology majors receive excellent preparation for careers in law, foreign service, international development, or business operating in the international arena.

Students with graduate degrees in archaeology have found employment with public agencies and private organizations concerned with cultural resource management.

### Special Resources and Programs

In addition to research and teaching laboratories, anthropology faculty members administer the Museum of Anthropology, the Northeast Archives of Folklore and Oral History, and the Center for the Study of First Americans. A number of faculty are jointly appointed with the Canadian-American Center and the Institute for Quaternary Studies.

Archaeology faculty members focus on historic and prehistoric North America. The cultural anthropologists have extensive field experience in the Middle East, Oceania, the Arctic, Latin America, India, and Europe as well as in North America.

The anthropology faculty offer field schools in historic and prehistoric archaeology, oral history and folklore, and geography. Students also are encouraged to participate in research programs in New England and the Maritime Provinces currently in progress. In recent years students have been hired to work on archaeology field and laboratory projects, in the Museum of Anthropology, in the Northeast Archives of Folklore and Oral History, and as interviewers and research assistants for projects in medical anthropology, marine resource management, and demographic studies.



## Courses in Anthropology

- ANT 101 Introduction to Anthropology I**  
Considers the development of human beings as a bio-cultural phenomenon with emphasis on human paleontology, race biology, human prehistory and the development of culture. Cr 3.
- ANT 102 Introduction to Anthropology II**  
Considers the study of human beings as a bio-cultural phenomenon. Emphasis on cultural anthropology with a cross-cultural approach to the nature of culture, social organization, marriage, family, religion, economics and culture change, etc. 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. Cr 3.
- ANT 215 Social Anthropology**  
The basic concepts and principles of modern social anthropology. An analysis of the principles of social structure and social organization among simple and complex societies through an examination of various forms of kinship, marriage, age groups, voluntary associations, networks and various levels of political, economic and religious organizations among selected societies around the world. Prepares students for more sophisticated courses in socio-cultural anthropology. Required for majors. Cr 3.
- ANT 217 Introduction to Archaeology**  
Introduces methods of archaeological research and techniques of excavation and analysis including the theoretical basis of methods and fundamental principles, application to specific case studies, interpretation of findings, the use of geological, biological, chemical and other tools in archaeological research includes a one-day compulsory field trip to visit local archaeological sites and weekly lab sessions. Lec 3, Lab 2. Required for majors. Cr 3 or 4.
- 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. Cr 3.
- ANT 302 Human Evolution**  
Presents the fossil evidence for human origins and evolution. Changes in morphology and behavior from our primate ancestry to the emergence of anatomically modern *Homo sapiens* are considered in the light of modern evolutionary theory and current ethnographic and ethnological models. Prerequisite: ANT 210 or permission. Cr 3.
- ANT 405 Nutritional Anthropology**  
An anthropological approach to the study of food preferences and eating patterns, as well as individual and population variability in nutrient requirements for different environments

and life stages. Emphasizes both biological and sociocultural aspects of such topics as obesity, lactose intolerance infant feeding practices, and food networks. Prerequisite: ANT 101 or ANT 102 or HNF 101 or permission. Cr 3.

**ANT 415 Advanced Social Anthropology**  
Designed for graduate or advanced undergraduate students in other departments who wish to gain knowledge of social anthropology rapidly. Students in ANT 415 will be required to attend ANT 215 lectures as well as Prerequisite: permission. Students who have been given credit for ANT 215 cannot obtain credit for ANT 415. Cr 4.

**ANT 422 Folklore of Maine and The Maritime Provinces**  
A survey of the genres of folklore found in the major linguistic traditions (English, French, Indian) of the Northeast, with emphasis on Maine. Special attention given to the occupational traditions of farming, fishing and lumbering. 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 Afro-American folksongs (ballads, blues, worksongs, ). No musical background or training required. Prerequisite: permission. 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 North American Indian groups. Prerequisite: permission, 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. Prerequisite: permission. Cr 4.

**ANT 433 Anthropology of Art**  
A general survey of anthropological approaches to the aesthetic and stylistic aspects of material culture. Considers systems of art and design in their social cultural contexts, including the cognitive basis of style, representation and meaning, and the structure of variation and style change. Emphasis on theoretical issues raised by the comparative study of the arts and crafts of tradition and acculturation. Prerequisite: ANT 101, ANT 102 or permission. Cr 3.

**ANT 437 Medical Anthropology**  
Examines health systems in western and non-western societies from ethnomedical and medical ecological perspectives with focus on social and cultural implications of health-related

beliefs and practices and their relationship to evolution, ecology and epidemiology. Prerequisite: ANT 102 or ANT 215 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 215 or permission. Cr 3.

**ANT 441 People and Cultures of the Pacific Islands**  
Topics include Pacific geography, the history and prehistory of the 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. Prerequisite: ANT 102 or ANT 215 or permission. Cr 3.

**ANT 442 Mediterranean Ethnology**  
Considers various anthropological approaches to the Mediterranean culture area with emphasis on persistence and change in social institutions characteristic of the rural or traditional segments of regional groupings around the Mediterranean. Prerequisite: ANT 102 or ANT 215 or permission. Cr 3.

**ANT 444 Maritime Ethnology**  
A general anthropological survey of human adaptation to maritime environments. Emphasis on theoretical issues raised by the comparative study of primitive, peasant and modern cultures that rely on the resources of the sea. Prerequisite: ANT 102 or ANT 215 or permission. Cr 3.

**ANT 450 Hunters and Food Gatherers**  
A survey of the vanishing people whose subsistence economy has remained at the hunting and gathering level. Focus on groups in all major geographical and cultural areas and their unique and common problems. Emphasis on environmental and cultural perspectives. Prerequisite: ANT 102 or ANT 215 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. Prerequisite: ANT 102 or ANT 215 or permission. 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, comparison of Mestizo and Indian communities, relations between folk societies and urban areas, current theory concerning Middle American



societies. Prerequisite: ANT 102 or ANT 215 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. Prerequisite: ANT 102 or ANT 215 or permission. Cr 3.

#### ANT 455 Peoples and Cultures of Sub-Saharan Africa

A study of contemporary societies and cultures south of the Sahara including a brief overview of African history and ecology. Focus on social, political, economic, and religious institutions in their traditional and contemporary contexts, impact of culture change, response to colonialism and nationalism, ethnicity and plural societies. Prerequisite: ANT 102 or ANT 215 or permission. Cr 3.

#### ANT 457 North American French Cultures and Societies

Examines contemporary French communities and cultures in New England, Canada, and Louisiana with emphasis on social, political, economic, and religious institutions includes application of current anthropological perspectives on ethnicity, social stratification, pluralism, and culture change. Prerequisites: ANT 102 or ANT 215 or permission. Cr 3.

#### ANT 460 Peoples and Cultures of the Circumpolar Area

The development of northern cultures in both the Old and the New Worlds traced from prehistoric times to the present including problems of economics, social structure, and cultural organization. Prerequisite: ANT 102 or ANT 215 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. 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. Prerequisites: 200 level course in anthropology or permission. MAT 232 recommended but not required. Cr 3.

#### ANT 463 Systems of Kinship and Descent

A study of the basic concepts of kinship and descent in small-scale and complex societies; ex-

amination 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. Prerequisite: ANT 102 or ANT 215 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. Prerequisite: ANT 102 or ANT 215 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. Prerequisite: ANT 102 or ANT 215 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. Prerequisite: ANT 102 or ANT 215 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 215 or permission. Cr 3.

#### ANT 468 Social Anthropology of Complex Societies

An examination of selected problems and theoretical approaches in the study of complex societies and civilizations. Includes village studies in Europe and North America; urbanization, modernization, studies in migration, and ethnicity in developing and developed countries. Prerequisite: ANT 102 or ANT 215 or permission. Cr 3.

#### ANT 469 Magic, Witchcraft and 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. Prerequisite: ANT 102 or ANT 215 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. Cr 3.

#### ANT 471 Old World Prehistory

Examines human prehistory in the eastern hemisphere from the beginnings of culture through the development of agriculture and urbanism. Studies the development and elaboration of human society as inferred from material remains. Prerequisite: ANT 217 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 217 or permission. Cr 3.

#### ANT 473 Historic Archaeology

A review of methods used in historic archaeology to investigate the spread of European culture to the New World, principally during colonial and early American periods. Covers excavation techniques, analytical methods and documentary research. Case studies taken principally from English and French colonial sites in Maine. Prepares students for field work in historic sites. Cr 3.

#### ANT 474 Analysis of Historic Artifacts

A laboratory course covering the identification, classification, and interpretation of artifacts from historic sites. Both hand crafted and mass produced materials 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 sites in Maine. Lec 3 Lab 2. Cr 4.

#### ANT 475 Paleoenvironmental 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. Prerequisite: ANT 217. 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. Prerequisite: permission. Offered Summers only. Cr 2-6.

#### ANT 478 Faunal Analytic Techniques in Archaeology

A laboratory course covering techniques for analysis and interpretation of osteological remains from archaeological sites. Prerequisite: ANT 217 or permission. Rec 2, Lab 2. Cr 3.



**ANT 479 Advanced Laboratory Techniques  
Archaeology**

Review of site sampling, and artifact classification necessary to the preparation of archaeological site reports. Prerequisite: ANT 217. Some field experience recommended. Rec 2, Lab 2.

Cr 3.

**ANT 481 Language and Culture**

Introduction to the writings of key figures in the field, exploring their broader implications in such areas as non-linguistic communication, semantics, linguistic relativity, structural anthropology, and general problems in cognitive anthropology. Prerequisite: ANT 102 and INT 100 or permission.

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 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 Ar.

**ANT 499 Current Issues in Modern  
Anthropology**

A seminar on the selected theorists whose work has had an enduring significance in the development of anthropology. Emphasis on key theoretical approaches behind contemporary work in anthropology, the place of anthropology in intellectual history, and the relationship between anthropology and the other social sciences. Prerequisite: ANT 215 or ANT 415 or permission.

Cr 3.

**ANT 570 Seminar in Northeastern North  
American Prehistory**

The prehistory of Northeastern North America viewed from an interdisciplinary perspective. Prerequisite: ANT 472 or equivalent and permission.

Cr 3.

**ANT 573 Advanced Methods in Historic  
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 Models in Archaeology**

A seminar considering current theoretical approaches to prehistoric archaeology. Prerequisite: ANT 472 or equivalent and permission.

Cr 3.

**ANT 597 Advanced Topics in Anthropology**

Advanced students study selected topics with a staff member. Prerequisite: Graduate student standing and advanced undergraduates by permission. Credits to be arranged with instructor. Departmental approval required.

Cr 1-3.

Geography

**GEO 201 Introduction to Human Geography**

Emphasis on principles of spatial analysis, land and resource use, regionalization. Settlement and environmental perception explained in historical, economic, political and behavioral terms.

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 214 Geography of Canada and the  
United States**

An integrative approach with emphasis on Canada-United States geographical relationships as expressed in physical context, settlement, economic development, urbanization, resource use, migration and cultural landscapes. Focus on borders and borderlands as areas of interaction and basis of understanding the geography of Canada and the United States.

Cr 3.

**GEO 215 Cultural Geography**

A survey of the impact of culture on the land. Focus on the distribution of people on the land, their movement, and the worlds they have passed through, from hunting and gathering environments to the agricultural landscape and the urban mosaic.

Cr 3.

**GEO 301 Historical Geography of North  
America**

The growth of the American economy studied in its spatial aspect as reflected by urban and rural settlement patterns. Particular attention given to three historical cross-sections; 1760, 1860, and 1910. Prerequisite: junior standing.

Cr 3.

**GEO 302 Geographical Perspectives on  
Atlantic Canada**

Particular attention given to immigration, ethnicity, the cultural landscape, economic growth, and urban and rural development. Prerequisite: Junior standing or permission.

Cr 3.

**GEO 350 The Geography of Canada**

The analysis of the physical and human elements and their part in producing the distributional patterns of present day Canada. Regional case studies focus on current problems and future potentialities.

Cr 3.

**Interdisciplinary Courses****INT 410 (ANT, ENG, FOL) 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 414 (ANT) Women in Society**

An interdisciplinary analysis of women's roles from anthropological-sociological, psychological and historical perspective including sex role formation and maintenance in Western industrial and more traditional societies. Considers changes in women's roles in the 19th and 20th centuries. Prerequisite: junior standing or permission. PSY 100 recommended.

Cr 3.

**INT 458 (ANT, ECO) Culture and Economic  
Change**

Considers the interface between cultural anthropology and economics, especially as these disciplines illuminate problems of economic change in the societies of the Third World. Prerequisite: ECO 120, ECO 121 and ANT 102 or ANT 215 or permission.

Cr 3.

**INT 480 (ANT, SOC, SPC) Sociolinguistics**

Examines relationships between language and society, emphasizing societal rules or norms that explain or constrain language behavior and the functions of language in human societies. Considers speech styles and dialects, languages in contact, bilingualism, and the language problems of developing nations. Prerequisite: INT 410 or permission.

Cr 3.

**INT 500 (ANT, GES, PBP, PSE) 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 501 (ANT, PSY, SPC) Discourse  
Analysis**

Sociological, linguistic, ethnographic, and cognitive sciences approaches to the study of discourse with emphasis on speech including narrative, conversation discourse in courtroom, classroom, and clinical settings. Prerequisite: INT 410 or permission.

Cr 3.

**INT 539 (ANT, PBP, QUS) Ice Ages and  
Humankind**

Introduction to the physical, biological, and human environments of the Quaternary Period with emphasis on the paleoecology and prehistoric archaeology of the past 20,000 years. Special attention to productive research approaches in the various fields of Quaternary studies, and to important recent advances. Prerequisite: introductory courses in geology, ecology, and anthropology and/or permission. Lec 3.

Cr 3.



## Economics

Professor Coupe (Chairperson)

Professors Burke, Clark, Devino (Dean, College of Business Administration), Duchesneau, Lutz, Morici

Associate Professors Breece, Townsend, Wihry

Assistant Professor Prash

The Department of Economics offers two degree programs: The Bachelor of Arts in Economics and the Bachelor of Arts in Economics/International Affairs.

### Bachelor of Arts in Economics

#### Departmental Requirements

To receive the Bachelor of Arts degree in Economics the student must satisfy all requirements of the College of Social and Behavioral Sciences, complete the economics core courses and 21 additional hours of courses in economics, and satisfy the math and statistics requirement. The grade-point average for courses in economics must be 2.0 or higher. Required economics courses consist of the following:

- A. Economics core courses: ECO 120, Principles of Microeconomics and ECO 121, Principles of Macroeconomics. Students taking ECO 120 and ECO 121 may not receive credit for INT 110. Only 6 hours may be earned for introductory courses. ECO 421 Intermediate Macroeconomics ECO 420 Intermediate Microeconomics ECO 421 and ECO 420 should be taken early in the student program of study.
- B. Twenty-one additional credit hours of courses in economics. ECO 435, History of Economic Thought, is recommended but not required.

The economics major must also complete a course in mathematics and a course in statistics. These may be selected from the following lists:

1. Mathematics: MAT 114, Calculus for Business and Economics, MAT 151, Calculus for the Life Sciences, MAT 126, Analytical Geometry and Calculus, MAT 122, Algebra and Trigonometry, Pre-Calculus, MAT 241, Mathematical Logic. Students considering graduate work in Economics are strongly recommended to take MAT 126.
2. Statistics: MAT 215, Introduction to Statistics for Business and Economics, MAT 232, Principles of Statistical Inference, MAT 434, Introduction to Statistics, BUA 201, Principles of Accounting I, is recommended but not required.

### The Economics Curriculum

The department offers courses at the introductory, intermediate, and graduate levels. In-

troductory courses are designed to respond to several needs. INT 110, Modern Economic Problems, is directed toward the student who wishes to have an overview of contemporary economics. The department also offers a two-semester sequence of introductory courses: ECO 120, Principles of Microeconomics, and ECO 121, Principles of Macroeconomics. ECO 120 and ECO 121 together satisfy the economics requirements of the College of Business Administration.

The variety of intermediate level courses offered by the department reflects the wide scope of contemporary economics. The department is particularly strong in three areas: Economic Policy, Contemporary Perspectives in Economics, and International Economics Affairs. The course listings below reflect this categorization.

The Department has established prerequisites for intermediate-level courses. Several courses require only that the student have completed ECO 120, Principles of Microeconomics, and ECO 121, Principles of Macroeconomics or the equivalent. Other courses have additional prerequisites. The prerequisite(s) for specific courses are indicated below.

Graduate-level courses are available to advanced undergraduate students with the permission of the instructor.

### Career Options for Economics Majors

The Bachelor of Arts in Economics is offered primarily as a degree in the liberal arts. The major offers students valuable preparation for a variety of career paths. Students may design their programs of study:

1. For immediate entry upon graduation into business, government, or other employment.
2. For graduate education leading to a business administration, law, or other professional degree.
3. For graduate work in economics or related disciplines.

Students are encouraged to work closely with their advisors on matters of career preparation.

### Bachelor of Arts in International Affairs/Economics

To receive the Bachelor of Arts degree in International Affairs/Economics, the student must

satisfy all the requirements of the College of Social and Behavioral Sciences and complete at least nine hours each in anthropology, history and political science from a list of courses with an international focus, take six hours of a modern foreign language beyond the intermediate level, and complete the following requirements:

- A. Economics Courses ECO 120, Principles of Microeconomics, and ECO 121, Principles of Macroeconomics, or the equivalent; ECO 420, Intermediate Microeconomics; ECO 421, Intermediate Macroeconomics; ECO 437, Comparative Economic Systems; ECO 438, Economic Development; ECO 439, International Trade and Commercial Policy; and two additional economics courses.
- B. Math and Statistics Requirements are the same as indicated for the economics major.

Additional information is presented under the International Affairs section.

### Courses in Economics

#### 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. 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. Cr 3.

#### ECO 413 The Economics of Southeast Asia

Survey of the current economic situation in the region and specific economic systems in Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Prerequisite: ECO 120 and ECO 121 or equivalent. 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. Utilization proposals examined and evaluated. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

#### ECO 428 Foundations of Economic Science

##### Method

Comparison of positive economics to more traditional theories of knowledge and science. Scientific nature of the Marginal and Keynesian Revolutions are covered. Economics and positive economics reviewed in light of recent developments in science and philosophy of science. Prerequisite: ECO 420 or ECO 435. Cr 3.

#### ECO 430 Humanistic Economics

Introduction to the nature and history of a body of economic thought that explicitly values human dignity and ecological sustainability. General prevailing socio-economic institutions, as well as a number of modern economic doctrines, will be re-examined in light of these two basic values. Specific topics to be discussed include: the wage system; economic cooperatives; international economic order; economic rationality and efficiency; economics imperialism; intergenerational discounting; sustainable development and Third World poverty. Prerequisite: ECO 420 or permission. Cr 3.

#### ECO 431 Contemporary Alternatives in Political Economy

Consideration of alternative contemporary theories of political economy. Alternative political economic paradigms such as the Chicago School, the Cambridge School, Neo-Marxian economics and Radical Political Economy. Prerequisite: ECO 420. Cr 3.

#### ECO 433 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. Prerequisite: ECO 420. Cr 3.

#### ECO 434 Economics of Labor Unions

Topics include: theory and history of labor movements, comparative labor movements, collective bargaining in the public and private sectors, development of public policy toward labor and industrial relations. Prerequisite: ECO 420. Cr 3.

#### ECO 435 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. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission. Cr 3.

#### ECO 436 Marxian Economics

A dynamic macro-analytical critique of the functioning of a capitalist society. Covers theo-

retical comparisons with orthodox economic theory and an introduction to American radicals (neo-Marxian) and their thought. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission. Cr 3.

#### ECO 437 Comparative Economic Systems

Examination, evaluation and comparison of socio-economic structures and operating principles of the major contemporary economic systems. Special emphasis on Western Europe, Japan, the Soviet Union, Hungary, Yugoslavia and China. The difference between Marxian and non-Marxian socialism will also be discussed. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

#### ECO 438 Economic Development

Theories and practices of interregional and international economic development. Emphasis on development problems of emerging nations. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

#### ECO 439 International Trade and Commercial Policy

Principles and practices of international trade and finance including current trends in the international economy and United States commercial policy. Prerequisite: ECO 421 or ECO 420. Cr 3.

#### ECO 440 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. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

#### ECO 444 Urban Economics

Considers patterns and processes, growth and structural change in urban areas. Covers the nature and causes of the contemporary crises of urbanized society as reflected in poverty, slum housing, crime, urban sprawl, traffic congestion, and the pollution of air, soil, and water. Economic analysis applied to public issues such as urban renewal, environmental control, urban housing, urban transportation, financing of urban public services. Prerequisite: ECO 420. Cr 3.

#### ECO 445 Regional Economics

Analysis of a region (country, state, county, city, etc.) as an economic unit including the economics of location, agglomeration, and interregional trade. Introduces cost benefit analysis, base studies, input-output tables, and regional accounts. Prerequisite: ECO 120 and ECO 121, or the equivalent with permission. Cr 3.

#### ECO 453 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 467 Health Care Economics

Description and evaluation of the structure and performance of the health care sector in the

United States. Topics include: the contribution of health care services to health status; description and evaluation of the health services sector including the markets for hospital and physicians' services, health insurance, medical education, and drugs; public policies for improving economic efficiency and maintaining access and quality of care in health services delivery systems; the role of the market and the role of government. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

#### ECO 468 Economics of Regulation

Examination of the institutions and economic issues related to public utility regulation in the United States. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

#### ECO 470 Topics in Economics

Includes readings, research, and discussions. Topics vary depending on faculty and student interests. Prerequisite: ECO 120 and ECO 121 and permission. Cr 1-3.

#### ECO 471 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. Prerequisite: ECO 420. Cr 3.

#### ECO 472 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 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. Prerequisite: ECO 420. Cr 3.

#### ECO 476 Economics of Technological Change

Explores the development of new products and processes and their impact on the United States economy. Covers economic and managerial studies of the research and development process, the nature of innovation, and the innovation diffusion process. National policies toward science and technology are analyzed. Prerequisite: ECO 120 and ECO 121 or equivalent with permission. Cr 3.

#### ECO 480 Introduction to Mathematical Economics

Mathematics used as a language in presenting concepts of economic theory. 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. Prerequisites: 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 economics 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. Prerequisite: ECO 120 and ECO 121 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 512 Alternative Economic Theories and Perspectives

Applies alternative schools of thought (e.g. Marxist, post-Keynesian, institutionalist) to theoretical and policy issues in contemporary microeconomics and macroeconomics. Prerequisites: ECO 420 and ECO 421 or permission.

Cr 3.

#### ECO 523 Advanced International Trade and Commercial Policy

Analysis of the determinants of international trade and specialization. Considers impact of trade on growth, income distribution and welfare as well as consequences of national policies upon trade. Introduction to international economic institutions and alternative theories of trade. Prerequisite: ECO 420 and 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. 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 of applications to public policy. Prerequisites: 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. Prerequisite: ECO 420 and permission.

Cr 3.

#### ECO 534 Advanced Industrial Organization

Analysis of structure, conduct and performance of firms in a market economy. Applies basic tools of theory to imperfectly competitive markets, including determinants of structure and performance, strategic competition, mergers and takeovers, entry conditions, technological change and empirical research. Prerequisite: ECO 420 and permission.

Cr 3.

#### ECO 535 Advanced Public Finance

Examines microeconomic principles of taxation and public expenditure. Prerequisite: ECO 420 and permission.

Cr 3.

#### ECO 550 Seminar in Economic Policy Analysis

Practical applications of theoretical and quantitative tools for the economic analysis of public policy. A review of the methodologies available for the economic analysis of public policy followed by selected applications to currently significant policy issues including income maintenance, health, education and training, housing and transportation. Specific topics vary. Prerequisite: permission.

Cr 3.

#### ECO 560 Seminar in Common Property Economics

Examines problems of common property as they occur in the management of fisheries and other renewable resources, pollution and environmental concerns and the exploitation of non-renewable resources. Prerequisite: permission.

Cr 3.

#### ECO 565 Research Seminar in Applied Economics

The application of economic techniques to current economic issues emphasizing applied research with appropriate analysis of issues and regular oral and written reports of the results. Prerequisite: permission.

Cr 3.

#### ECO 570 Advanced Topics in Alternative Economic Theory

An in-depth examination of one or two alternative approaches to economic theory and policy beyond the treatment in ECO 512. May include Marxian economics, institutional economics,

and post-Keynesian economics. With departmental permission, course may be repeated for credit. Prerequisite: 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 report(s) are required. Prerequisite: Prior approval of student's graduate committee.

Cr 3-4.

#### Interdisciplinary Courses

##### INT 110 (ARE, ECO) Modern Economic Problems

An introduction to the operation of modern economic systems. Topics might 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.

Cr 3.

##### INT 360 (ECO, ZOL) Economics and Biology of Marine Fisheries Management

Introduces biological and economic theory relevant to the management of common property fishery resources. Several marine species of commercial importance to New England used as case studies. Prerequisites: ECO 420, ZOL 204 or permission.

Cr 3.

##### INT 458 (ANT, ECO) Culture and Economic Change

Considers the interface between cultural anthropology and economics, especially as these disciplines illuminate problems of economic change in the societies of the Third World. Prerequisite: ECO 120, ECO 121 and ANT 102 or ANT 215 or permission.

Cr 3.

##### INT 514 (ARE, ECO) Microeconomic Theory

An examination of modern economic analysis with regard to the consumer, the firm and market structures. Prerequisite: permission.

Cr 3.

##### INT 530 (ARE, ECO) 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 multiequation models and forecasting. Prerequisite: ECO 485 or permission.

Cr 3.



## International Affairs

A student may major in International Affairs in anthropology, economics, foreign languages, history, or political science.

During the first two years, the student of International Affairs should take courses which help to fulfill the distribution requirements for the B.A. degree. Among such courses are ANT 105 Social Anthropology, ECO 120 Principles of Microeconomics and ECO 121 Principles of Macroeconomics, HTY 106 History of European Civilization II, or HTY 107/108 Asian Civilization, POS 100 American Government, and courses in a modern foreign language. Students should consult also with International Affairs advisors in the participating departments regarding other courses they might take. To enter the junior year of the International Affairs program a student must have earned a minimum grade point average of 2.0 or have received permission from the Committee on International Affairs.

### Basic Requirements

#### International Affairs in Anthropology

- A. At least thirty (30) hours in Anthropology, including ANT 215, ANT 217 and ANT 499. Other courses which might be taken:
  - ANT 441 People and Cultures of the Pacific Islands
  - ANT 442 Mediterranean Ethnology
  - ANT 453 People and Cultures of Mesoamerica
  - ANT 454 Cultures and Societies of the Middle East
  - ANT 455 Peoples and Cultures of Sub-Saharan Africa
  - ANT 461 Islamic Fundamentalism
  - ANT 464 Cultural Ecology
  - ANT 465 Political Anthropology
  - ANT 466 Economic Anthropology
  - ANT 467 Peasant Studies
  - ANT 468 Social Anthropology of Complex Societies
  - ANT 481 Language and Culture
  - ANT 491 Intercultural Understanding
  - INT 410 Introduction to the Study of Linguistics
  - INT 458 Culture and Economic Change
  - GEO 215 Cultural Geography
  - GEO 350 The Geography of Canada
- B. At least nine (9) hours each in economics, history, and political science from among the following courses:
  1. Economics
    - ECO 120 Principles of Microeconomics
    - ECO 121 Principles of Macroeconomics
    - ECO 413 The Economies of Southeast Asia
    - ECO 435 History of Economic Thought
    - ECO 436 Marxian Economics

- ECO 437 Comparative Economic Systems
  - ECO 438 Economic Development
  - ECO 439 International Trade and Commercial Policy
2. History
    - HTY 107/108 Asian Civilization
    - HTY 215/216 The World in the Twentieth Century
    - HTY 407 The Age of Revolution: 1789-1860
    - HTY 408 The Age of Liberalism: 1860-1919
    - HTY 409 Twentieth Century Europe: 1919-present
    - HTY 422 Modern France
    - HTY 424 History of Russia II
    - HTY 426 History of Germany II
    - HTY 429 History of Modern Italy
    - HTY 437 History of Modern Japan
    - HTY 441 History of Modern China
    - HTY 446 History of Modern Middle East (1800-present)
    - HTY 447 Latin America: Under the Conquerors
    - HTY 448 Latin America: Reform and Revolution
    - HTY 452 Topics in Latin American History
    - HTY 456 History of England II
    - HTY 460 Modern Canada
    - HTY 473/474 American Diplomatic History
  3. Political Science
    - POS 121/122 Current World Problems
    - POS 223/224 Political Geography
    - POS 241 Politics in Contemporary Societies
    - POS 243 Canadian Government and Politics
    - POS 252 United States-Canadian Relations
    - POS 335 Democratic Governments of Europe
    - POS 336 The Communist Government of the Soviet Union
    - POS 344 Public Policy in Canada
    - POS 373 International Relations
    - POS 374 United States Foreign Policy
    - POS 387 International Law
    - POS 388 World Order Through International Organization and Law
    - POS 456 Canadian Political Parties
    - POS 465 Governments of South Asia
    - POS 466 Governments of East Asia
    - POS 467 African Politics
    - POS 468 Contemporary Politics of Latin America
    - POS 475 National Security Analysis
    - POS 477 Politics of the Middle East
    - POS 478 Foreign Policy of the Soviet Union

- POS 531 Topics in Comparative Politics
  - POS 573 Problems in International Politics
  - POS 587 Problems in International Law
- C. At least one (1) year of a modern foreign language beyond the intermediate level.

#### International Affairs in Economics

- A. At least twenty-seven (27) hours in economics, one math course and one statistics course. The course requirements are:
  1. Economics
    - ECO 120 Principles of Microeconomics\*
    - ECO 121 Principles of Macroeconomics\*
    - ECO 420 Intermediate Microeconomics
    - ECO 421 Intermediate Macroeconomics
    - ECO 437 Comparative Economic Systems
    - ECO 438 Economic Development
    - ECO 439 International Trade and Commercial Policy
 and two additional 400 level economics courses.
  2. Math: one math course from the following: MAT 114, Calculus for Business and Economics, MAT 122 Algebra and Trigonometry, MAT 126, Analytical Geometry and Calculus, MAT 151, Calculus for the Life Sciences I, MAT 241, Mathematical Logic. MAT 126 is recommended for students considering graduate work in economics.
  3. Statistics: one course from the following: MAT 215, Introduction to Statistics for Business and Economics, MAT 232, Principles of Statistical Inference, MAT 434, Introduction to Statistics.
- B. At least nine (9) hours each in anthropology, history, and political science from among the following courses or from among others with an international focus:
  1. Anthropology. (See Anthropology listing under International Affairs in Anthropology, A., above).
  2. History. (See History listing under International Affairs in Anthropology, B.2., above).
  3. Political Science. (See Political Science listing under International Affairs in Anthropology, B.3., above).
- C. At least one (1) year of a modern foreign language beyond the intermediate level.

#### International Affairs in Foreign Languages

- A. Twenty-four (24) hours above the introductory level in one modern foreign language.
- B. At least nine (9) hours each in anthropology, economics, history, and political science from among the following courses or from among others with an international focus:



1. Anthropology. (see Anthropology listing under International Affairs in Anthropology, A., above.)
  2. Economics. (see Economics listing under International Affairs in Anthropology, B.1., above.)
  3. History. (see History listing under International Affairs in Anthropology, B.2., above.)
  4. Political Science. (See Political Science listing under International Affairs in Anthropology, B.3., above.)
- C. Additional electives relating to international affairs arranged in consultation with major advisor. Highly recommended: a course in contemporary civilization and geography of the culture whose language is being studied.

#### International Affairs in History

- A. At least twenty-seven (27) hours in history. Among such courses may be those listed under International Affairs in Anthropology, B.2., History.

- B. At least nine (9) hours each in anthropology, economics, and political science from among the following courses or from among others with an international focus:
1. Anthropology. (see Anthropology listing under International Affairs in Anthropology, A., above.)
  2. Economics. (see Economics listing under International Affairs in Anthropology, B.1., above.)
  3. Political Science. (See Political Science listing under International Affairs in Anthropology, B.3., above.)
- C. At least one (1) year of a modern foreign language beyond the intermediate level.

#### International Affairs in Political Science

- A. At least twenty-four (24) hours in political science in addition to POS 100. Among such courses may be those listed under International Affairs in Anthropology, B.3., above.
- B. At least nine (9) hours each in anthropology,

economics, and history or among the following courses or from among others with an international focus:

1. Anthropology. (see Anthropology listing under International Affairs in Anthropology, A., above.)
  2. Economics. (see Economics listing under International Affairs in Anthropology, B.1., above.)
  3. History. (See History listing under International Affairs in Anthropology, B.2., above.)
- C. At least one (1) year of a modern foreign language beyond the intermediate level.

Details of programs covering the last two years of study in each discipline may be obtained from the participating departments or from James F. Horan, Coordinator, Committee on International Affairs, 13B North Stevens Hall.





## Journalism and Mass Communication

Associate Professor Bullion (Chairperson)  
 Professor Hamilton (Emeritus)  
 Associate Professors Craig, Guesman  
 Assistant Professor Olmstead

The Department of Journalism and Mass Communication has a solid tradition of preparing students for leadership roles in print and broadcast news, advertising and other mass media careers in Maine and nationwide. The Journalism and Mass Communication major offers students strong oral and written expression skills, a firm grasp of public affairs and a broad foundation in the liberal arts regardless of students' ultimate career plans. The major also prepares students for graduate studies in related communication fields, law and the humanities and the social sciences. (Preparation for master of business administration studies is possible for students electing the business option—see below). Full-time JMC faculty members are established scholars who draw on extensive media experience and ongoing contacts with media organizations. Part-time faculty take time out from careers in news, advertising and broadcasting to share their state-of-the-art knowledge with students.

The department maintains productive relations with media enterprises in the state and beyond, and faculty support the development of scholastic journalism and mass communication studies in Maine primary and secondary schools.

### Career Opportunities

Modern mass communication is the "nervous system" of society, and this reality is reflected by the demand for media practitioners in business, government, education and other fields. JMC graduates are recruited by media organizations in Maine and elsewhere, and the department routinely receives inquiries from prospective employers. An active internship program encourages students to become acquainted with media organizations and thus have demonstrable work experience, professional contacts and an understanding of the industries before they enter the job market.

### Admission

First and Second-year students are encouraged to sample introductory JMC courses and get involved with student organizations associated with the major to explore the field and decide if they want to pursue a Journalism and Mass Communication degree.

The program offers advertising, broadcast journalism, and news-editorial sequences leading to a bachelor of arts degree in journalism.

The majors offered in the department are limited-admission programs. This means that students wishing to major in the department must apply for admission and that selection is made based on past academic performance. Acceptance into a departmental sequence is not guaranteed. Students in the final semester of their sophomore year and those wishing to transfer from other departments or institutions should consult the department for application instructions well in advance of the date they wish to begin classes. Requirements for the declaration of a major in the department are:

1. Completion of at least 53 credits of undergraduate coursework.
2. Completion of JMC 100 with a minimum of a "C minus"
3. An overall grade point average of at least 2.5.

Students not meeting the above criteria will generally not be allowed to declare a major in the department. Occasionally, however, especially talented students or those with other exceptional circumstances may be admitted with a lower grade point average. Students who feel they fall into such a category may petition the department for a waiver of the grade point average requirement by submitting a written request to the department chair. Such requests should include compelling evidence documenting the special circumstances. Students transferring from other institutions may be admitted as majors before taking JMC 100, provided they satisfactorily meet all other admission criteria. In such cases, JMC 100 must be completed as soon as possible after admission.

Prospective majors are expected to have basic typing and word processing skills.

### General Skills and Education Requirements

The department emphasizes a broad liberal arts curriculum. In keeping with national accreditation standards, students are required to complete approximately 75% of degree coursework outside the department including the following curriculum of general education and skills courses. A minimum grade of "C minus" is required in courses taken to fulfill the department's general education and skills requirements.

#### General Education

*History: 6 credits*

Required: Any one of the following sequences:  
 HTY 103/104 United States History

HTY 105/106 History of European Civilization  
 HTY 107/108 East Asian Civilization

*Behavioral Science: 6 credits*

Required:

PSY 100 General Psychology

Required: Any one of the following:

SOC 101 Introduction to Sociology

ANT 101 Introduction to Anthropology

ANT 102 Introduction to Anthropology II

*Political Science: 6 credits*

Required:

POS 100 American Government

Plus: one other POS course

*Economics: 6 credits*

Required:

ECO 120 Principles of Microeconomics

ECO 121 Principles of Macroeconomics

*Arts and Humanities: 12 credits*

Required:

1 survey level course in Philosophy

1 survey level course in Literature

2 additional Philosophy or Literature courses above the survey level

*Science and Mathematics: 11 credits minimum*

Required:

MAT 232 Principles of Statistical Inference

OR

MAT 215 Introduction to Statistics for Business and Economics

1 science course with associated laboratory

1 additional course in science or math

*Computer Skills: 3 credits minimum*

Required:

COS 100 Introduction to Personal Computers (or another COS course with departmental permission)

*Speech Communication: 3 credits*

Required: Any ONE of the following

SPC 102 Fundamentals of Interpersonal Communication

SPC 103 Fundamentals of Public Communication

SPC 106 Oral Communication of Literature

*Foreign Language:*

Required:

Intermediate Proficiency



## Professional Course Requirements

To satisfy the requirements for the bachelor of arts degree, students must complete a minimum of 24 credits of JMC courses within the framework of one of the three sequences. A maximum of 33 credits of JMC courses can be applied to the 120 needed for graduation (except for up to three credits earned in a second internship JMC 495 and up to three credits earned in JMC 145).

Students may also pursue a second major in another department. To double major, all requirements for both majors must be met. Double majors should consult advisors in both departments on a regular basis.

For students transferring equivalent courses from other colleges, a minimum of 12 credits of JMC courses must be taken for the degree, regardless of the number of equivalent courses accepted in transfer. The chair and faculty of the department will determine the equivalency (if any) of transfer courses in the discipline. All majors must demonstrate intermediate proficiency in a foreign language before graduation, and must also satisfy the degree requirements of the College of Social and Behavioral Sciences.

Some departmental courses require the completion of one or more prerequisite courses. Some of these prerequisites must be completed with a grade of "B" or higher, and the remainder must be completed with a grade of "C minus" or higher before subsequent coursework is taken (see course listings for details).

A minimum grade of "C minus" is required in all courses submitted to satisfy department requirements.

### Advertising Sequence: Required Courses

JMC 100 Introduction to Mass Communication	3
JMC 250 Introduction to Advertising	3
JMC 251 Media Operation and Management	3
JMC 355 Advertising Copywriting and Layout	3
JMC 356 Advertising Media	3
JMC 357 Retail Advertising	3
OR	
JMC 358 Advanced Copywriting	(3)
JMC 459 Advertising Campaigns	3
JMC 375 Mass Media Law and Ethics	3
ENG 317 Technical Writing	3
OR	
Approved upper level writing course	
	<hr/> 27

### Broadcast Journalism Sequence: Required Courses

JMC 100 Introduction to Mass Communication	3
JMC 233 Broadcast Reporting and Newsgathering	3
JMC 237 Newswriting and Reporting I	3

JMC 241 Audio Production Techniques	3
JMC 342 Video Production Techniques	3
JMC 375 Mass Media Law and Ethics	3
JMC 433 Electronic News Laboratory	3
JMC 489 Seminar: Media Ethics and Issues	3
	<hr/> 24

### News Editorial Sequence: Required Courses

JMC 100 Introduction to Mass Communication	3
JMC 211 History of American Journalism	3
JMC 237 Newswriting and Reporting I	3
JMC 332 Public Affairs Reporting	3
JMC 238 Newswriting and Reporting II	3
JMC 375 Mass Media Law and Ethics	3
JMC 330 Copy Editing	3
JMC 434 or JMC 435 or an approved JMC elective	3
JMC 489 Seminar: Media Ethics and Issues	3
	<hr/> 27

The student should also consider the many electives offered in the department to round out the program.

## Business Option and Pre-MBA Program

The department, in cooperation with the College of Business Administration, offers majors the opportunity to combine a core of business courses with their journalism degree program. Students who complete this option will be well-prepared to enter media careers where business and management skills are essential. Additionally, students completing Business Option courses may, upon graduation, apply for entrance to the University of Maine's Master of Business Administration degree program. If accepted, the student will be able to complete the MBA with approximately one calendar year of additional coursework.

### Business Option Courses

The following courses are required for completion of the Business Option:

BUA 201 Principles of Accounting I
BUA 202 Principles of Accounting II
BUA 220 The Legal Environment of Business
BUA 325 Principles of Management and Organization
BUA 350 Business Finance
BUA 370 Marketing
COS 211 Principles of Data Processing
MAT 113 Mathematics for Business

and Economics I
MAT 114 Mathematics for Business and Economics II
MAT 215 Introduction to Statistics for Business and Economics

Students who declare the Business Option early in their degree program can complete these courses within the 120 credits required for graduation. Courses taken to fulfill the Business Option also fulfill departmental math, statistics and elective requirements.

### Business Option Admission Requirements

To declare the Business Option, students must meet the following requirements:

1. Be at least a sophomore with an intention of majoring in one of the Department of Journalism and Mass Communication's three degree sequences.
2. Have at least a 2.5 overall grade point average. (This GPA must be maintained when enrolled in the Business Option).
3. Declare the Business Option by completing the appropriate application form and submitting it to the department office.

## Internships

Internships offering the student professional experience for academic credit are available from all areas of Maine and New England's mass communications media. The location of the Orono campus, just 10 miles from Bangor affords many opportunities to work with the city's daily newspaper, *The Bangor Daily News* with weekly newspapers, or with the several commercial radio and television stations in the area.

Internships are available to declared JMC majors who have at least a 2.5 overall grade point average with at least a 2.5 in JMC courses. Students wishing to participate in the internship program should contact the department office for guidelines.

## Facilities

Newswriting and editing courses are taught in a personal computer lab. A student-operated FM radio station, WMEB, gives students hands-on experience in planning and producing radio news and entertainment. The WMEB facilities also serve as a laboratory for audio production and broadcast news courses.

University-operated television production studios are used by video production and television news courses. The department operates a video-editing lab and loans students a wide range of electronic news gathering equipment for group and individual projects.

Students may also gain realistic experience on the staff of the *The Maine Campus*, a Monday-Wednesday-Friday student newspaper that serves the University community. Positions are available in reporting, editing, advertising sales, production and business management.



The University of Maine System also operates the non-commercial Maine Public Broadcasting Network (MPBN), an affiliate of the Public Broadcasting Service (PBS) and of National Public Radio (NPR). MPBN operates a statewide system of radio and television transmitters and its network headquarters and major radio facility are located on the Bangor campus, some eight miles south of Orono. MPBN studios are often used for department production courses and MPBN staff frequently serve as adjunct faculty or guest lecturers. The department also serves as the headquarters for the Maine Press Association.

### Courses in Journalism

#### JMC 100 Introduction to Mass Communication

Introduces the structure and operation of mass media and the social, political and economic implications of their activities. Open to all first and second year students. Cr 3.

#### JMC 145 WMEB Laboratory

Practical experience in assigned duties with the student radio station, WMEB-FM. May be repeated up to 3 credits. Cr 1.

#### JMC 211 History of American Journalism

Examines the newspaper's role in American history and the development of modern mass communications. Cr 3.

#### JMC 212 Survey of Telecommunication

Survey of broadcast and non-broadcast communications services as they function in the United States including history, industrial structure, systems of content and dissemination, and social, political and technological influences. Cr 3.

#### JMC 214 The Foreign Media

Survey of media systems around the world and the role of mass media in political, social, economic and cultural development. Cr 3.

#### JMC 216 Introduction to Photojournalism

Presents photography as an effective medium of communications. Includes classroom and darkroom instruction in basic principles of processing, composition, and the uses of photography in various media. Cr 3.

#### JMC 233 Broadcast Reporting and Newsgathering

Develops news gathering and reporting skills for radio with emphasis on newswriting and producing reports and newscasts for the campus radio station. Prerequisite: JMC 237 and JMC 241 with 'C-' or higher. Cr 3.

#### JMC 236 Introduction to Writing for the Electronic Media

Develops basic writing skills for the broadcast media. Includes exercises in commercial and public service copywriting, continuities and promotion, newswriting, editorial copy and short features. Cr 3.

#### JMC 237 Newswriting and Reporting I

Provides intensive practice in newswriting with emphasis on accuracy, style, judgment and responsibility. Prerequisite: ENG 101 with a 'C-' or higher. Cr 3.

#### JMC 238 Newswriting and Reporting II

A continuation of JMC 237 involving coverage of actual preparation of news events and articles for publication. Prerequisite: JMC 237 with C- or higher. Cr 3.

#### JMC 241 Audio Production Techniques

Explores the creative application of audio techniques to radio and television. Prerequisite: JMC 236 or JMC 237 with 'C-' or higher. Cr 3.

#### JMC 250 Introduction to Advertising

Examines social and economic roles of advertising including rate structure, agency practices, effective use of media. Advertising principles analyzed and discussed from the media point of view. Cr 3.

#### JMC 251 Media Operation and Management

Basic principles and methods of operation and management applied to the mass media with emphasis on circulation, advertising, business, and editorial operations. Cr 3.

#### JMC 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: JMC 233 or JMC 238 with "C-" or higher; declared JMC Majors or permission. Cr 3.

#### JMC 332 Public Affairs Reporting

Students cover stories in surrounding communities and write for publication. Emphasis on local and state government. Prerequisite: JMC 238 with 'C-' or higher. Cr 3.

#### JMC 342 Video Production Techniques

Design, production and direction of television and video presentations concentrating on creative uses of television and video techniques. Prerequisite: JMC 241 with 'C-' or higher declared JMC majors or permission. Cr 3.

#### JMC 355 Advertising Copywriting and Layout

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. Prerequisite: JMC 250 with 'C-' or higher; declared JMC majors. Cr 3.

#### JMC 356 Advertising Media

Covers problems and procedures of the advertising industry as they pertain to media selection, support, promotion, research, organization, and consumer understanding. Prerequisite: JMC 250 or BUA 370 with 'C-' or higher; declared JMC majors. Cr 3.

#### JMC 357 Retail Advertising

Provides theory and practice in the problems and forms of retail advertising. Prerequisite:

JMC 355 with 'C-' or higher; declared JMC majors. Cr 3.

#### JMC 358 Advanced Copywriting

Print media, including direct mail, will be emphasized. Explores visualization techniques, product analysis, questions of taste, stereotypes, and the impact of typography on words. Prerequisite: JMC 355 with grade of 'B' or higher; declared JMC majors or permission. Cr 3.

#### JMC 370 Telecommunication Law and Policy

Explores the relationship between station operation and governmental policy and regulation with emphasis on the licensee's public service responsibilities as established by legislative and judicial precedents. Prerequisite: JMC 212; declared JMC majors or permission. Cr 3.

#### JMC 375 Mass Media Law and Ethics

Topics include libel, privacy, contempt, copyright, obscenity, censorship, prejudicial pre-trial publicity. Prerequisite: JMC 100 with 'C-' or higher; declared JMC Majors or permission. Cr 3.

#### JMC 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: JMC 212 with 'C-' or higher; declared JMC majors or permission. Cr 3.

#### JMC 398 Topics in Journalism and Broadcasting

Topics not regularly covered in other courses. Content varies to suit current needs. May be repeated for credit. Prerequisite: JMC 238 with C- or higher; declared JMC majors. Cr 1-3.

#### JMC 410 Newspaper Design

An advanced course in the theory and practice of newspaper design. Prerequisite: 9 credits of journalism. Cr 3.

#### JMC 433 Electronic News Laboratory

An advanced course in radio field reporting and newscast production for the campus radio station. Includes an introduction to television reporting. Prerequisite: JMC 233 and JMC 241 or equivalent; declared JMC Majors or permission. Cr 3.

#### JMC 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. Prerequisite: at least 12 hours of Journalism, including JMC 332. Cr 3.

#### JMC 435 Feature Writing

Develops style and proficiency in writing non-fiction newspaper and magazine articles. Prerequisite: JMC 332 or permission. Cr 3.

#### JMC 436 Advanced Writing for the Electronic Media

Experience in the design of original dramatic scripts, adaptations and documentaries for



radio and television. Students develop of one script project for the entire semester, from initial idea through finished script. Prerequisite: JMC 236. Cr 3.

**JMC 440 Electronic Media Production Laboratory**

Provides the opportunity to work on the planning, creation and execution of sophisticated audio or video projects. Prerequisite: JMC 241, JMC 342. Cr 3.

**JMC 442 Advanced Video Production Techniques**

Emphasis on fixed studio television production. Develops creative and organizational skills, as

well as leadership and responsibility. Prerequisite: JMC 342 with C- or higher. Cr 3.

**JMC 459 Advertising Campaigns**

Emphasis on practical and theoretical aspects of marketing and promotional strategy, creative effort, media selection, and advertising research. Prerequisite: JMC 355 & JMC 356 with 'C-' or higher; declared JMC majors. Cr 3.

**JMC 489 Seminar - Media Ethics and Issues**

An advanced level course requiring extensive reading, discussion and research on the mass media and ethics, politics, economics and society. Prerequisite: Senior JMC majors or permission. Cr 3.

**JMC 495 Internship**

Internships must receive prior departmental approval. Interns may earn from 1 to 3 credit hours per internship with 1 credit hour awarded for each 50 hours of work. Prerequisite: Declared majors only with permission. Cr 1-3.

**JMC 497 Problems in Telecommunication**

Special topics and problems in Broadcasting and Cable, including criticism and analysis. Prerequisite: permission. Cr 3.





## Political Science

Professor Hayes (Chairperson)  
 Professors Collins, Horan, K. Palmer  
 Associate Professors M. Palmer, Warhola  
 Assistant Professors Bakhtiari, Cody, Moen.

Students may major in Political Science or in International Affairs (Political Science) and obtain Pre-Law advising.

### Specific Requirements for Majors

#### Political Science

- I. Entrance Requirements**
1. Must have a 2.25 GPA in order to declare a POS major.
- II. Basic Requirements**
1. A minimum of 36 hours of credit in courses designated "POS" with a grade of "C" or better.
  2. POS 100, American Government.
  3. A minimum grade point average of 2.50 in Political Science Department courses (Graduating Class of 1993).
- III. Sub-Field Requirements** All majors are required to satisfy the following sub-field distribution requirements:
- A. United States Politics (6 credit hours)**
- POS 233 Urban Politics
  - POS 356 Political Parties
  - POS 358 Public Opinion
  - POS 359 Problems of American Government
  - POS 360 The States and the Federal System
  - POS 361 The American Legislative Process
  - POS 362 Maine Government and Politics
  - POS 382 Introduction to Law
  - POS 383 Constitutional Law
  - POS 384 Constitutional Law: Civil Liberties
  - POS 462 Executive Leadership in American Politics
  - POS 549 Seminar in American Politics
  - POS 583 American Constitutional Development I
  - POS 584 American Constitutional Development II
- Three credit hours of an internship or field experience course related to United States Politics may be used toward satisfying this sub-field requirement. 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 departmental major.
- B. International Relations (6 credit hours)**
- POS 223 Political Geography
  - POS 224 Applied Political Geography

- POS 252 United States-Canadian Relations
  - POS 373 International Relations
  - POS 374 U.S. Foreign Policy
  - POS 387 International Law
  - POS 388 World Order Through International Organization and Law
  - POS 475 National Security Analysis
  - POS 477 Politics of the Middle East
  - POS 478 Foreign Policy of the Soviet Union
  - POS 485 Theory and Methodology of International Relations
  - POS 573 Problems in International Politics
  - POS 587 Problems in International Law
- Three credit hours of an internship or field experience course related to International Relations may be used toward satisfying this sub-field requirement.
- C. Comparative Politics (6 credit hours)**
- POS 241 Politics in Contemporary Societies
  - POS 243 Canadian Government and Politics
  - POS 335 Democratic Governments of Europe
  - POS 336 The Communist Government of the Soviet Union
  - POS 344 Public Policy in Canada
  - POS 456 Canadian Political Parties
  - POS 465 Governments of South Asia
  - POS 466 Governments of East Asia
  - POS 467 African Politics
  - POS 468 Contemporary Politics of Latin America
  - POS 531 Topics in Comparative Politics
  - POS 537 The Evolution and Development of Canadian Government and Politics
- D. Political Theory (3 credit hours)**
- POS 212 Introduction to Political Theory
  - POS 389 Classical Political Thought
  - POS 390 Modern Political Thought
  - POS 391 Late Modern Political Thought
  - POS 480 Scope of Political Science
  - POS 392 American Political Ideas
  - POS 589 Topics in the History of Political Philosophy
  - POS 594 Topics in Political Theory
  - POS 595 Methods of Political Science

#### III. Related Area Requirement

Fifteen hours from at least two related fields, as follows: Anthropology, Computer Science, Economics, Foreign Language (intermediate and beyond), Journalism and Mass Communication, History, Modern Society,

Philosophy, Psychology, Public Administration, Sociology. At least 9 hours must be taken at the 200-level or above.

### International Affairs

Under this major, a student will study 27 credit hours in political science, three of which will be POS 100, American Government, and 24 of which will be courses related to international politics. In addition, the student must take nine hours of courses related to international matters in the Departments of Anthropology, Economics, and History, and six hours of a modern foreign language beyond the intermediate level. International Affairs in the Index.)

### Courses in Political Science

#### 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. **Cr 3.**

#### POS 103 State and Local Government

Examines the structure and functions of sub-national government in the United States with attention to legal structures, political processes, and relations among governments. First and second year students only. **Cr 3.**

#### POS 110 An Introduction to Politics

A study of the scientific development of political science including such key concepts as power, influence and authority and the relationship of politics to such contemporary problems as racism, poverty, threats to the environment, and international conflict. First and second year students only. **Cr 3.**

#### POS 121 Current World Problems: The United States and Soviet Union

A study of contemporary international politics focusing on the factors that determine the foreign policies of the United States and the Soviet Union and including a review of their respective policies from World War II to the present. **Cr 3.**

#### POS 122 Current World Problems: Contemporary Foreign Policies

Focus on contemporary international political problems of the United Kingdom, France, Germany, and the Middle East, China, and Japan. **Cr 3.**



**POS 212 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*. Cr 3.

**POS 223 Political Geography**

A study of the geographic and demographic factors that condition national foreign policy and international politics. Cr 3.

**POS 224 Applied Political Geography**

Applies geopolitical analysis to the foreign policies of states in various regions of the world. Prerequisite: POS 223. Cr 3.

**POS 233 Urban Politics**

Topics include: political behavior of local parties and interest groups, city councils, urban executives and the bureaucracy, intergovernmental relations, governmental alternatives, urban environment. Prerequisite: POS 100. Cr 3.

**POS 241 Politics in Contemporary Societies**

Introduces comparative politics in the three "worlds" of modern societies: advanced industrialized mass democracies, the communist world and the developing, or world. Major themes are comparative historical experiences, modernization, comparative governmental institutions, political parties and interest groups, and the policy process in different systems. Attention to the problems of establishing and maintaining democratic order. Cr 3.

**POS 243 Canadian Government and Politics**

Provides an 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. Cr 3.

**POS 252 United States-Canadian Relations**

Focus on issues of current controversy affecting Maine and New England. May include acid rain, fishing rights, free or freer trade, North American security agreements, and growing relations between states and provinces. Cr 3.

**POS 335 Democratic Governments of Europe**

Covers the political traditions, parties, governmental structures, and special political problems of Great Britain, France and West Germany. Prerequisite: POS 100, junior or senior standing. Cr 3.

**POS 336 The Communist Government of the Soviet Union**

Examines the political traditions of prerevolutionary Russia, the basic principles of Marxism-Leninism, and the contemporary communist party, state, economy, and society of the Soviet Union. Prerequisite: POS 100, junior or senior standing. Cr 3.

**POS 344 Public Policy in Canada**

An analysis of policy making structures with emphasis on the Prime Minister, the Prime Min-

ister'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. Prerequisite: Six hours of political science. Cr 3.

**POS 356 Political Parties**

Explores the development and present organization and operation of the American party system including the nature and function of major and minor parties, sectionalism, nominating systems, presidential and congressional elections, the electorate, financial groups. Prerequisite: junior standing and POS 100. Cr 3.

**POS 358 Public Opinion**

The role of public opinion in American democracy including definition and measurement, sociological and psychological influences, mass media, linkage to government. Prerequisite: junior standing and POS 100. Cr 3.

**POS 359 Problems of American Government**

Includes case studies in such areas as federalism, the nature of the presidency, congressional organization, civil rights and liberties, the role of the judiciary, and foreign affairs. Prerequisite: POS 100; juniors and seniors only. Cr 3.

**POS 360 The States and the Federal System**

An examination of political practices and policies of the American states, with special attention to their role in the evolving federal system. Includes case studies in such areas as national/state/local relations, the office of governor, law making, administrative organization, the nature of the judiciary, and selected state policies. Prerequisite: 6 hours of political science. Cr 3.

**POS 361 The American Legislative Process**

Treatment of the legislative process in Congress with attention given to the external environment of legislative bodies and to their internal decision-making structures. Consideration of recent reform in legislative practices. Prerequisite: POS 100. Cr 3.

**POS 362 Maine Government and Politics**

Emphasis on the changes in institutions and policies of the last two decades. Includes case studies in such areas as Maine's role in the federal system, legislative and judicial reforms, executive branch reorganization, and social and environmental policies. Prerequisite: Junior or Senior standing. Cr 3.

**POS 373 International Relations**

Topics include: the international system of states, the impact of nationalism, the restraints imposed on the unilateral actions of governments as well as the possibility of peace resulting from war, disarmament, functionalism, and diplomacy. Prerequisite: Junior standing and 6 hours of Political Science. Cr 3.

**POS 374 U.S. Foreign Policy**

The formulation and implementation of United States foreign policy including analysis of con-

ceptual framework for study, structures and processes, factors shaping, alternative strategies, and problems. Prerequisite: 6 hours of Political Science. Cr 3.

**POS 382 Introduction to Law**

Considers the nature and functions of law in the modern world and law as part of the study of society. Not a technical course in law. Prerequisite: Not open to first year students. Cr 3.

**POS 383 Constitutional Law**

A study of the political development of the Constitution through Supreme Court decisions. Cases in judicial, legislative and executive power and federalism considered. Prerequisite: POS 100; junior or senior standing. Cr 3.

**POS 384 Constitutional Law: Civil Liberties**

A study of the social and economic development of the Constitution through Supreme Court decisions. Cases in civil liberties, Bill of Rights and Fourteenth Amendment considered. Prerequisite: POS 100; junior or senior standing. Cr 3.

**POS 387 International Law**

Includes the territory and jurisdiction of states, the law of treaties, recognition of states and governments, the law of the sea, and the law of war. Prerequisite: 6 hours of Political Science or permission. Cr 3.

**POS 388 World Order Through International Organization and Law**

A problem-solving approach with emphasis on promoting human rights and economic development and on limiting violence and environmental pollution. Prerequisite: 6 hours of Political Science or permission. Cr 3.

**POS 389 Classical Political Thought**

A survey of ancient and medieval political philosophy through detailed study of selected writings of Plato, Xenophon, Aristotle, Thucydides, and Aquinas. Prerequisite: POS 212 or permission or senior standing. Cr 3.

**POS 390 Modern Political Thought**

A survey of modern political philosophy from the Renaissance to the Enlightenment through detailed study of selected writings of Machiavelli, Bacon, Hobbes, Locke, Montesquieu, and Rousseau. Prerequisite: POS 212 or junior or senior standing. Cr 3.

**POS 391 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. Prerequisite: POS 212 or junior or senior standing. Cr 3.

**POS 392 American Political Ideas**

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. Prerequisite: junior or senior standing or permission. Cr 3.



**POS 395 Congressional Internship**

First-hand study of the national legislative process and the function of the legislator. The student will be assigned to the staff of a congressman or senator in Washington, D.C., from early February to late June. Readings and reports are required in addition to the staff work. Open to juniors and seniors on a competitive basis. Rules announced publicly each fall semester. Students may not receive more than 6 credit hours within the department. **Cr 6 or 9.**

**POS 398 Topics in Political Science**

Specific topics vary depending on faculty and student interest. Open to Junior and Senior departmental majors. **Cr 3.**

**POS 456 Canadian Political Parties**

An examination of the historical development and present structure and function of Canadian political parties. Emphasis on the influence of liberalism, geography, ethnicity and personal-upon the Party in the electorate and the political system. Discussion of the role of party in a parliamentary system. Prerequisite: 6 hours political science. **Cr 3.**

**POS 462 Executive Leadership in American Politics**

Focuses on theories of leadership and examines political behavior of American presidents, governors, and/or local executives. Emphasis on problems, historical changes, styles, and performances of individual political executives. Prerequisite: POS 100. **Cr 3.**

**POS 465 Governments of South Asia**

Examines the governments, politics and common problems of emergent nations in South and Southeast Asia. Prerequisite: 6 hours of Political Science. **Cr 3.**

**POS 466 Governments of East Asia**

A study of the contemporary political systems of China and Japan. Prerequisite: 6 hours of Political Science. **Cr 3.**

**POS 467 African Politics**

Analysis of the transition from colonialism to independence in selected countries of Sub-Saharan Africa. Discussion of nation-building, the one-party system, military intervention in politics, and neo-colonialism. Prerequisite: 6 hours of Political Science. **Cr 3.**

**POS 468 Contemporary Politics of Latin America**

Concentration on "political styles", the contemporary struggle between tradition and revolu-

tion, political elites, economic and political problems. Prerequisite: 6 hours of Political Science. **Cr 3.**

**POS 475 National Security Analysis**

An examination of national and international factors affecting the survival and security of international political units. Emphasis on components and use of military power, arms control, cause and resolution of conflict, negotiation and decision-making processes and structures. Prerequisite: junior or senior standing. **Cr 3.**

**POS 477 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: junior standing or permission. **Cr 3.**

**POS 478 Foreign Policy of the Soviet Union**

Covers historical background and development of Soviet foreign policy, Soviet relations with the West and with the developing world, Soviet relations with other communist countries. Prerequisite: POS 373 or permission. **Cr 3.**

**POS 480 Scope of Political Science**

Topics include power and society, basic descriptive political theory and the role of political institutions. Prerequisite: senior Political Science majors or permission. **Cr 3.**

**POS 485 Theory and Methodology of International Relations**

Traditional and current theories of international politics and the application of such theories to specific situations. Emphasis on such approaches as systems analysis, game theory, decision-making, simulation, and the development of theoretical models. Prerequisite: POS 373 or permission. **Cr 3.**

**POS 493 State Government Internship I**

Professional experience in a department or agency of state government. Reports and readings required. Available under the Maine State Government Internship Program enacted. Summer Session only. 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 departmental major. **Cr 3 or 6.**

**POS 496 International Affairs Internship**

Study during the summer in a government agency, an international organization, or a business with overseas operations. Readings, reports, and on-the-job training required. Open to junior or senior International Affairs majors. Students may not receive more than 6 credit hours for internships within the department. **Cr Ar.**

**POS 505 Political Man and His Milieu** **Cr 3.****POS 506 State Politics in the United States** **Cr 3.****POS 507 Local and Regional Government and Politics** **Cr 3.****POS 531 Topics in Comparative Politics** **Cr 3.****POS 537 The Evolution and Development of Canadian Government and Politics** **Cr 3.****POS 549 Seminar in American Politics** **Cr 3.****POS 573 Problems in International Politics** **Cr 3.****POS 583 American Constitutional Development I** **Cr 3.****POS 584 American Constitutional Development II** **Cr 3.****POS 587 Problems in International Law** **Cr 3.****POS 589 Topics in the History of Political Philosophy** **Cr 3.****POS 594 Topics in Political Theory** **Cr 3.****POS 595 Methods of Political Science** **Cr 3.****POS 597 Seminar I** **Cr 3.****POS 598 Seminar II** **Cr 3.****Interdisciplinary Course****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. Prerequisite: junior or senior standing. **Cr Ar.**



## Psychology

Associate Professor Kulberg (Chairperson)

Professors M. Elias, Farthing, Garvey, Gold, Martindale, Pliskoff, Ryckman, Stone, Stubbs

Associate Professors Frey, Gershman, Hayes, Lenney, Rosenwasser, Smith, Thorpe

Assistant Professors Hecker, Laursen, Sigmon

Director of Psychological Service Center Hecker

Cooperating Professor Brown

Cooperating Associate Professors Homann, Hirshfield, Rosen

Clinical Associate Professors Hess, Keefe

Clinical Associates Ackley, Elliott, LeBlanc, Pierce, Rogers, Sattin, Sawyer, Stahl, Stietel, Zellinger

Faculty Associate Russ; Research Associates P. Elias, Robbins

The instruction offered by the Department of Psychology is designed to acquaint the student with psychology as a biological science and as a social science. The department offers courses that introduce the student to psychological theory, methodology, research findings, and applications of psychological principles.

### Requirements for a Major in Psychology

- A. A minimum of 36 hours in psychology courses (Note: 48 hours in psychology is the maximum amount of credit that will count toward the 120 hours needed to graduate.)
- B. The following required courses must be passed with a grade of "C-" or better.
- PSY 100 General Psychology—prerequisite for all other psychology courses
- PSY 341 Statistics in Psychology I
- PSY 345 Principles of Psychological Research—prerequisite: PSY 341.
- PSY 347 Laboratory in Experimental Psychology—prerequisite: PSY 345 (these courses must be taken prior to the senior year.)
- PSY 470 History and Systems of Psychology (may be taken in the junior or senior year)
- Take at least one course from each group: (For students who declare the major for the Fall 1992).

#### *Biological Psychology*

PSY 361 Sensation and Perception

PSY 363 Mechanism of Animal Behavior

PSY 365 Physiological Psychology

#### *Cognitive Psychology*

PSY 350 Cognition

PSY 351 Psychology of Motivation

PSY 352 Learning and Motivation

PSY 356 Theories of Learning

#### *Personality of Social Psychology*

PSY 308 Theories of Personality

PSY 330 Social Psychology

#### *Abnormal and Developmental Psychology*

PSY 312 Abnormal Psychology

PSY 323 Psychology of Childhood

PSY 324 Psychology of Adolescence

- C. Majors must accumulate a minimum grade point average of 2.0 in PSY courses.

D. No more than six hours of PSY 492, Problems in Psychology, may count toward the 36 hours required.

E. No more than three hours of PSY 493, Field Experience may count toward the 36 hours required.

F. Students who transfer from other institutions must take a minimum of 24 hours within the department.

In addition, students are encouraged to take courses in such related areas as anthropology, sociology and zoology. Courses in computer programming, mathematics, physics, and chemistry would be valuable to the psychology major. Psychology majors planning on attending graduate school in psychology are encouraged to take PSY 420 and PSY 421 (Child Study Labs), all the courses offered in psychology methodology (PSY 341, PSY 342, PSY 345, PSY 347), several courses in general experimental psychology, and PSY 492. PSY 492, Problems in Psychology, affords students an opportunity to pursue psychological research in conjunction with one or more faculty members. A minimum grade of "B" in these courses is indicative of ability to do graduate work.

Students who plan to enter vocations focusing on children can obtain a specialized background for that work by taking courses in the developmental psychology area. These include: PSY 323, PSY 324, PSY 420, PSY 421, PSY 425, PSY 426, PSY 428, PSY 429, PSY 522, PSY 524, PSY 525, PSY 526 and PSY 527.

Selected students may participate in the University Affiliated Program (UAP) in the Department of Pediatrics at Eastern Maine Medical Center. An Interdisciplinary concentration in Developmental Disabilities is required. (See UAP and Interdisciplinary Concentrations in Index.)

Students interested in the area of social psychology have many available courses including: PSY 330, PSY 331, PSY 332, PSY 338, PSY 339, PSY 561, PSY 563, and PSY 565.

Courses numbered 500-599 are graduate courses that are open to both undergraduate and graduate students. Junior and/or senior psychology majors are encouraged to enroll in some of these courses (especially 522, 524, 557, and 561) if possible. Undergraduates do not

compete with graduate students for grades in such courses. Undergraduates require permission of the instructor to register for 500-level courses.

### Courses in Psychology

#### 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. Participation in research to a maximum of 4 hours is expected. Cr 3.

#### PSY 301 Psychology and Photography

A survey of the impact of photographs on our behavior, covering art, documentary, commercial and "snapshot" images. Topics include the perception and memory of photographs as well as uses of and attitudes towards photographs. Prerequisite: PSY 100. Cr 3.

#### PSY 302 Psychology of Literature

Psychological approaches to the study of art and literature including psychoanalytic and Marxist theories, experimental aesthetics, investigations of literary change, and the application of the methodology of the behavioral sciences to the study of literary phenomena. Prerequisite: PSY 100. Cr 3.

#### PSY 303 Applications of Behavior Principles

Covers methods employed in the experimental analysis of behavior, principles of respondent (classical) and operant (instrumental) conditioning and applications of principles to the understanding and control of behavior in everyday life situations. Prerequisite: PSY 100. Cr 3.

#### PSY 304 Psychology of Musical Sound

A survey of the relationships among the physical dimensions of sound, the structure and functions of the ear and the perceptions of psychological dimensions related to music. Some psychophysics and psychological scaling are covered, as well as introductory discussion on the reproduction of recorded music. Prerequisite: PSY 100. 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. 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 309 Psychology of Consciousness**  
Examines the scientific approach to the study of consciousness and altered states of consciousness. Topics include the concept of consciousness, aspects of normal consciousness, introspection, the mind-body problem, brain research implications for consciousness, daydreaming, sleep, night dreaming, hypnosis, and meditation. Emphasis on research methods and results and theoretical interpretations. Prerequisite: PSY 100. Cr 3.

**PSY 310 Psychology of Personal Growth**  
A discussion of the basic principles of mental health designed to enhance the personal growth and mental health of the student. Mental health exercises and open-group discussions facilitate self-understanding and meaningful communication. (Pass/Fail Grade Only). Counts toward requirements for a psychology major. 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 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. Prerequisite: PSY 100. Cr 3.

**PSY 331 Applied Social Psychology**  
Application of the concepts and research methods of social psychology to problems in American society. Topics may include racism, international conflict, pollution, poverty, mass media effects, the legal system, and health-re-

lated behavior. Prerequisite: PSY 330 or permission. Cr 3.

**PSY 332 Environmental Psychology**  
An introduction to 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 338 Research in Personality**  
Research studies related to current personality theorizing. Topics may include dogmatism, locus of control, Machiavellianism, need for achievement, and self-esteem. Prerequisite: PSY 308 or equivalent or permission. Cr 3.

**PSY 339 Political Psychology**  
Study of the mutual influence of politics and individual psychology. Topics include the motivation and ideology of political actors, decision making, authoritarian personality, between-group conflict and nuclear war. A writing experience course. Prerequisite: PSY 100 or POS 100. Cr 3.

**PSY 341 Statistics in Psychology I**  
A survey of techniques used to obtain, display, analyze, and interpret data in psychology. Prerequisite: PSY 100. Cr 3.

**PSY 342 Statistics in Psychology II**  
Presents techniques of practical value to the psychologist in analyzing psychological experiments. Prerequisite: PSY 341 and PSY 345. Cr 3.

**PSY 345 Principles of Psychological Research**  
Presents techniques of psychological research and applications of general methodology and specific techniques to major problem areas in behavioral research. Prerequisite: PSY 341. Cr 3.

**PSY 347 Laboratory in Experimental Psychology**  
Develops skills in designing, conducting and evaluating experiments. Topics include classic experiments in cognition and perception. Prerequisite: PSY 345 or permission; PSY 350 recommended. 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 and Motivation**  
Fundamental principles of classical conditioning and operant conditioning, including interrelations between learning and motivation. Re-

search data discussed in relation to various theories of learning. Laboratory work emphasizes demonstrations of fundamental learning phenomena in animal subjects. Prerequisite: PSY 100. Cr 3.

**PSY 353 Learning and Motivation Laboratory**  
(Optional) Prerequisite: Concurrent with PSY 352. Lab 2. Cr 1.

**PSY 356 Theories of Learning**  
Covers the most important psychological theories of the nature of learning including the functional behaviorists (Thorndike, Skinner, Hull), associationists (Pavlov, Guthrie, Estes) and cognitivists (the Gestaltists, Piaget, and Tolman). Prerequisite: PSY 100. Cr 3.

**PSY 361 Sensation and Perception**  
A systematic examination of selected sensory and perceptual processes. Emphasis on experimental method, research findings and theoretical interpretations. Prerequisite: PSY 345 or permission. Cr 3.

**PSY 362 Sensation and Perception Laboratory**  
(Optional) Prerequisite: Concurrent with PSY 361. Lab 2. Cr 1.

**PSY 363 Mechanisms of Animal Behavior**  
Topics include learning, motivation, sensory processes, behavior genetics, innate behavior, social behavior, and the development of behavior. Evaluates methods of investigating and classifying animal behavior. Prerequisite: PSY 100 and a basic course in zoology or biology 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 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. 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 educa-



tion, the effects of poverty, teacher expectancy effects. Prerequisite: PSY 323. Cr 3.

**PSY 426 Social Issues in Developmental Psychology Laboratory**  
(Optional). Lab may include Field Placement. Lab 3. Cr 1.

**PSY 428 Psychology of the Exceptional Child**  
The development and behavior of the exceptional child with special emphasis on practical problems related to the management of children with intellectual, emotional, orthopedic, sensory and academic handicaps. Prerequisite: PSY 323 or permission. Cr 3.

**PSY 429 Learning in Children**  
A survey of theories and research findings pertaining to children's acquisition of information, problem solving, and cognitive development. Prerequisites: PSY 323, junior standing. Cr 3.

**PSY 462 Perception and the Perceptual System**  
Topics include perception of space, form, events, and representations. Prerequisite: PSY 361. 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 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 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. Prerequisites: Nine hours in psychology and permission. Cr 1-3.

**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 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 525 Theories and Paradigms of Developmental Psychology**  
Examines major models of developmental change and human growth including behavioral, ethological systems approaches to the development of cognitive and social functioning. Emphasis on similarities and distinctions between theories and implications for developmental methodology. Prerequisite: permission. Cr 3.

**PSY 526 Psychology of Aging**  
Emphasis on research methods and changes in learning, memory, intelligence etc. in relationship to biological changes and health status. Prerequisite: permission. Cr 3.

**PSY 527 Life-span Developmental Neuropsychology**  
Presents nervous system in relation to developmental changes in behavior, particularly those that affect cognitive, social, and emotional growth. Issues such as critical periods, neural plasticity, disconnection syndromes and congenital disorders are covered. Prerequisite: permission. Cr 3.

**PSY 536 Introduction to Psychodrama**  
Analysis of the interaction between individual personality and group forces in education, family relations, industry, etc. Explores methods of handling personal and interpersonal problems through dramatization of concrete situations. Prerequisite: PSY 100 or permission. Cr 3.

**PSY 537 Advanced Psychodrama**  
An experimental approach to development of self, relations to others, and psychodrama and sociometry as a profession. Psychodrama sessions in the classroom. Prerequisite: PSY 536. 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 542 Psychological Methodology**  
Intermediate survey of methods and techniques employed by psychologists in the evaluation of data and verification of hypotheses. Prerequisite: PSY 345 and PSY 341. Cr 3.

**PSY 544 Psychological Test Theory**  
Covers fundamental theoretical bases of test construction emphasizing practical applications along with statistical concepts necessary for proper evaluation of tests and other assessment techniques. Prerequisite: PSY 341 or equivalent, permission. Cr 3.

**PSY 545 Nonparametric Techniques in Psychology**  
Survey of nonparametric techniques of hypothesis testing uniquely suited to the data of behavioral sciences. Prerequisite: PSY 342 or permission. 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 556 Advanced Perception**  
Current theories and research in perception. Topics include theories of seeing, signal detection theory, depth perception, and perception in its ecological context. Prerequisite: PSY 361 or permission. Cr 3.

**PSY 557 Controversial Issues in Learning**  
Intensive consideration of controversial issues in learning. Cognitive vs. S-R formulations serve as a framework for lectures and discussions. Topics include: latent learning, latent extinction, place vs. response learning, continuity vs. non-continuity positions, discrimination learning, etc. Prerequisite: PSY 352 or PSY 356 or equivalent. Cr 3.

**PSY 558 Advanced Theories of Learning**  
An advanced survey of the most important S-R and cognitive theories of learning. Fundamental learning phenomena are described along



the explanations offered by the classical learning theories of Hull, Tolman, Skinner, and others. Recent research with important theoretical implications is also discussed. Prerequisites: PSY 352 or PSY 356 or 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 563 Group Processes

Considers concepts, methods and findings in the group process including problems of methodology and conceptualization. Students formulate proposals for individual or collective research projects. Prerequisite: PSY 561 or PSY 560 or permission. Cr 3.

#### PSY 565 Attitudes and Opinions

Study of the nature, development, and measurement of social attitudes including applications to understanding, prejudice, intergroup conflict, political and religious behavior. Prerequisite: PSY 330. 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 580 Clinical Gerontology

A multidisciplinary approach to disease and psychopathology as they relate to the psychology of aging. Considers the effects of cerebral vascular disease, heart disease, hypertension, degenerative central nervous diseases etc. on behavior of aging persons. Related topics of mental illness, depression, and anxiety in the elderly are also discussed. Prerequisite: PSY 341 and PSY 526 or permission. Cr 3.

#### PSY 592 Directed Readings:(area)

Opportunity to read in a particular area of psychology under faculty direction. Prerequisite: permission. Cr not to exceed 6.

#### Interdisciplinary Courses

##### INT 501 (ANT, PSY, SPC) Discourse Analysis

Sociological, linguistic, ethnographic, and cognitive sciences approaches to the study of discourse with emphasis on speech including narrative, conversation discourse in courtroom, classroom, and clinical settings. Prerequisite: INT 410 or permission. Cr 3.

##### INT 528 Interdisciplinary Rural Health Care Delivery I (NUR, PSY, SPC, SWK)

A study of health professions, health care delivery models, and interdisciplinary team health care delivery in rural settings. Incorporated will be group process and conflict management strategies. Prerequisite: Permission. Cr 3.

##### INT 529 Interdisciplinary Rural Health Care Delivery II (NUR, PSY, SPC, SWK)

Through use of case studies illustrative of prevalent health problems, students will learn to function as interdisciplinary health delivery team members. Focus will be on needs associated with cultural minorities, rurality and poverty. Prerequisite: INT 528 or permission. Cr 3.





## Public Administration

Professor Ballard (Acting Chairperson)

Professor Taylor

Associate Professors Ahn, Lavery, Ott

Assistant Professors Mageean, Ball-Richardson

A primary goal of the Department of Public Administration is to provide academic preparation for people who seek a professional career in public affairs and administration. In pursuit of this goal, the department offers a comprehensive program of study, the *public management major*, which combines superior professional instruction with a broad liberal arts base. The undergraduate curriculum is designed to coherently blend the contributions of several academic disciplines, integrate both public and private sector perspectives and develop, through an exciting "hands on" internship experience, student capacity to apply in the field what has been learned in the classroom.

An additional mission of the Department is to be of service to public and nonprofit organizations as well as the public at large. In 1990, the Department entered into a partnership with the Margaret Chase Smith Center for Public Policy. Specific department faculty and graduate students work with the Margaret Chase Smith Center professional staff in jointly providing applied research on public policy/program issues, management training and development programs, and consultation services to Maine state and local governments. In addition, the Center publishes reports, articles, newsletters and manuals related to the field of public administration as well as issues facing Maine's public.

### Career Opportunities

Public service career opportunities have been expanding dramatically in response to the changing needs of our dynamic society. Graduates have entered careers at all levels of government—local, substate regional, state, federal and international. They have been employed in general administrative positions as well as in specialized positions such as personnel, budgeting, planning, and public relations, and in substantive policy areas ranging from health and human services and environmental protection to defense, criminal justice, transportation and taxation. Typical positions can be found in city and town management, regional planning commissions, the state budget office and administrative positions in education. Public administration students also have found rewarding careers in the private sector, working for small businesses, large corporations, hospitals and interest groups.

Many graduates have continued their education by pursuing a graduate degree such as the

Masters in Public Administration (M.P.A.), the Masters in City Planning (M.C.P.), the Masters in Business Administration (M.B.A.), Masters in Hospital Administration (M.H.A.), Masters of Public Health (M.P.H.) or a degree in law (J.D.).

### A Tradition of Excellence

The department's undergraduate program, founded in 1945, is the oldest public management program in the nation. The program has particular strength in the area of state and local government administration. This is an outgrowth of its commitment of service to Maine state government and to local governments in the state, especially to the approximately 200 communities in Maine employing town and city managers.

Founded in 1968, *The Masters of Public Administration* is offered by the department at the University of Maine as well as at the University of Maine at Augusta. It is the largest M.P.A. program in Northern New England, is a member of the National Association of Schools of Public Affairs and Administration (NASPAA), conforms with NASPAA standards, and is one of eighty-three accredited programs from over two hundred and thirty throughout the country. The department faculty is comprised of nationally and internationally recognized publishing scholars, who are dedicated to quality teaching of the highest standards.

### The Public Management Major

The Public Management program requires a minimum of 36 credit hours, in addition to prerequisites and electives.

#### A. Prerequisites (9 hours)

- Choose two of the following:  
PAA 100 Foundations of Public Administration  
POS 100 American Government  
PAA 200 Public Management
- ECO 120/121 Principles of Microeconomics/Macroeconomics

Of the 45 credit hour minimum described below, at least 30 credit hours should be in Public Administration (PAA).

#### B. Skills Component (12 hours)

Choose at least one course from each of the following four subareas:

- Communication Skills  
ENG 317 Technical Writing

or  
PAA 390 Critical Analysis in Public Administration

or  
SPC 345 Small Group Communication

or  
SPC 257 Business and Professional Communication

2. Accounting Skills  
PAA 240 Introduction to Governmental Accounting or  
BUA 201 Principles of Accounting I

or  
3. Statistical Knowledge  
MAT 232 Principles of Statistical Inference

or  
PAA 315 Methods and Computers for Public Management and Policy Analysis

PSY 341 Statistics in Psychology I

4. Computer Knowledge  
COS 100 Introduction to Personal Computers

or  
COS 215 Introduction to Computing Using FORTRAN

C. *Public Policy Context (9 hours):*  
Choose at least one course from each of the following three subareas:

1. Public Policy Issues and Analysis  
PAA 220 Introduction to Public Policy or  
PAA 425 Health Care and Human Services

2. Urban and Rural Context  
PAA 233 Urban Politics\*

or  
POS 233 Urban Politics\*

or  
ARE 422 Rural Economic Development

or  
ARE 486 Government Policies Affecting Rural America

3. Local, State and Federal Context  
PAA 370 Urban Policy and Management\*  
or  
POS 360 The States and the Federal System\*\*

\*POS 233 and PAA 370 are strongly recommended for those students (sophomores and juniors) who anticipate possible careers in city management and desire a municipal internship (PAA 495).

\*\*POS 360 is recommended for students who are considering a career in state government and want to take a state internship (PAA 493).



**Management Core (12 hours):**

Choose at least one course from each of the following four subareas:

1. Human Resource Management  
PAA 350 Administration of Public Personnel  
or  
BUA 330 Personnel Management and Industrial Relations
2. Budgeting and Financial Management  
PAA 340 Public Budgeting and Financial Administration  
or  
ECO 472 State and Local Government Finance
3. Organization Behavior and Management  
PAA 430 Public Organization and Management  
or  
BUA 326 Dynamics of Organization and Behavior
4. Law and Management  
PAA 405 Administrative Law  
or  
PAA 410 Local Government Law

**Practical Component**

Choose at least *one* course from the following:

- INT 396 Field Experience  
PAA 493 State Government Internship II  
PAA 495 Municipal Government Internship  
PAA 470 Topics in City and Town Management  
POS 395 Congressional Internship

**Senior Seminar (3 Hours)**

Choose one of the following:

- PAA 390 Critical Analysis or  
PAA 400 Issues in Public Administration or  
PAA 470 Topics in City and Town Management

**3. Electives (a total of 6 hours; at least 3 hours of which must be outside of the Department)**

Any PAA courses from Parts A-F above, that were not selected to meet core requirements.

- PAA 498 Independent Readings in Public Administration  
PAA 505 Intergovernmental Relations\*\*\*  
PAA 515 Computer Applications in Public Administration and Policy\*\*\*  
PAA 520 Policy Studies\*\*\*  
PAA 540 Seminar in Public Financial Management I\*\*\*  
PAA 550 Seminar in Public Personnel Management\*\*\*  
PAA 560 State Administration\*\*\*  
PAA 580 City and Regional Planning\*\*\*  
PAA 585 Comparative Administrative Systems\*\*\*  
POS 361 American Legislative Process  
POS 362 Maine Government and Politics  
POS 462 Executive Leadership in American

\*\*\*Graduate courses at the 500-level may be advised for a few senior students with at least a 3.0 grade point average.

**Politics**

- ANT 437 Medical Anthropology  
ARE 371 Introduction to Natural Resource Economics and Policy  
ARE 473 Land Economics  
ARE 462 Recreation and Park Management  
ARE 474 Land Use Planning  
ARH 162 Modern Architecture and Design  
BUA 202 Principles of Accounting II  
BUA 352 Financial Institutions  
BUA 331 Labor-Management Relations  
CIE 225 Transportation Engineering  
CIE 331 Fundamentals of Environmental Engineering  
ECO 421 Macroeconomics  
ECO 434 Economics of Labor Unions  
ECO 471 Public Finance and Fiscal Policy  
ECO 467 Health Economics  
HTY 272 Industrial Workers in America  
HTY 414 Law and American Society  
HTY 420 Science and Society since 1800  
JMC 100 Introduction to Mass Communication  
JMC 250 Introduction to Advertising  
JMC 375 Mass Media Law and Ethics  
PHI 235 Biomedical Ethics  
PHI 244 Philosophy of Law I  
PHI 230 Ethics  
PSY 330 Social Psychology  
NUR 423 Ethical Issues in Health Care  
NUR 424 Perspectives on Aging  
SPC 267 Public Relations: Oral Communications  
SPC 410 Mass Communication and Human Behavior  
SVE 271 Introduction to Geographic Information Systems  
SVE 321 Cadastral Systems  
SWK 320 Introduction to Social Work and Social Welfare  
SWK 440 Social Welfare Policy and Issues  
SOC 314 Law and Society  
SOC 316 Sociology of Aging  
SOC 337 Sociology of Mental Illness  
SOC 439 Sociology and Health and Medicine

All departments within the College of Social and Behavioral Sciences are required to develop and administer an English proficiency examination for their majors. Each public management major within the Department of Public Administration must take at least *two* of the following *Writing Experience* courses with the Department of Public Administration: PAA 200, PAA 370, POS 233, PAA 405, PAA 350, PAA 430. These courses have a substantial writing experience component. A complete statement of the policy is available in the department office.

**Courses in Public Administration****PAA 100 Foundations of Public Administration**

Theoretical and pragmatic bases for the administrative state in America. Topics include the evolution of bureaucracy, representation, centralization, and executive discretion. Ideas, in-

novations, and debates will be discussed within the context of the developing federal republic.

Cr 3.

**PAA 200 Public Management**

An introduction to the basic managerial functions and processes in public and non-profit organizations. Attention is focused upon concepts, methods, and techniques that are relevant to public management. Topics may include public organizations, leadership, personnel, budgeting and finance, decision making, and public policies and programs. Prerequisite: PAA 100 or POS 100.

Cr 3.

**PAA 220 Introduction to Public Policy**

An introduction to the study of the policy process. Models of policy formulation, selection, execution and impact are considered with reference to specific policy areas, such as health, welfare, defense, budgets and taxes, law enforcement. Prerequisite: POS 100 or PAA 100 or permission.

Cr 3.

**PAA 240 Introduction to Governmental Accounting**

The historical developments of governmental accounting, basic principles of governmental accounting, and details of the theory and practice of accounting for revenues and expenditures.

Cr 3.

**PAA 315 Methods and Computers for Public Management and Policy Analysis**

This course introduces the student to the statistical procedures and computer skills that are used in policy and management settings. The class conducts a research project from the design, data collection, and data entry stages to the analysis, interpretation, and report writing stages. All topics are presented with application in mind.

Cr 3.

**PAA 340 Public Budgeting and Financial Administration**

An analysis of the budgeting process including political aspects. The budget is considered as an instrument of fiscal policy; budget preparation and classification are discussed with special emphasis given to program and performance budgeting. Prerequisite: PAA 200, juniors and seniors only.

Cr 3.

**PAA 350 Administration of Public Personnel**

An analysis of the various functions of public personnel administration, including organization and management and the handling of personnel problems relating to public employees at all levels of government. Prerequisite: PAA 200.

Cr 3.

**PAA 370 Urban Policy and Management**

An analysis of the formation and implementation of urban public policy. Municipal management concerns with human and financial resources, city planning, programs and urban services are considered. In-depth cases are utilized throughout. Prerequisite: POS 233 or PAA 233.

Cr 3.



**PAA 390 Critical Analysis in Public Administration**

Designed to provide public management majors with an opportunity to coordinate knowledge of particular aspects of the discipline with effective and scholarly writing. A balance between scholarly writing within the discipline and administrative writing will be part of the format. Multiple submissions will be required and topics will address issues of relevance in the area of public administration. Prerequisite: PAA 200. Cr 3.

**PAA 400 Issues in Public Administration**

An examination of basic issues in Public Administration. Case studies in such areas as public policy implementation and public management at the international, national, state, sub-state, and local levels in public and non-profit organizations. Prerequisite: Juniors and Seniors only. Cr 3.

**PAA 405 Administrative Law**

Primarily case studies of the legal adjustment of administrative authority and individual liberty, including: judicial control over administration, personal liability of officers, scope and limits of administrative powers and the due process measurement of administrative procedure. Prerequisite: PAA 200. 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 and Human Services Administration**

Provides a historical and current overview of public/non-profit/for-profit health care and human services systems administration in the U.S. Addresses the evolution of the health care and human services delivery systems, their structures and dynamics, basics of financing, functions and roles of public and private institutions in policy implementation and administration, and ethical issues. Prerequisite: PAA 200. Cr 3.

**PAA 430 Public Organization and Management**

Builds on the introduction to concepts of organization and management science in PAA 200. Topics may include, among others, bureaucratic politics, public organization design, organizational information and control systems, and organizational innovation. Prerequisite: PAA 200. Cr 3.

**PAA 470 Topics in City and Town Management**

Considers such specialized topics in municipal administration as the development of the city

management profession, unique concerns of town management, the local economy and economic development, public works and the local infrastructure, and municipal service delivery. Seminar format supplemented with lectures by visiting governmental officials. Prerequisite: Public Management senior or permission. Cr 3.

**PAA 493 State Government Internship II**

Professional experience in a department or agency of state government. Open to selected students. Reports and readings required. Available under the Maine State Government Internship Program enacted by the 103rd Legislature. Summer Session only. 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 departmental major. 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. Cr Ar.

**PAA 498 Independent Readings in Public Administration**

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. Graduate students or permission. Cr 3.

**PAA 515 Computer Applications in Public Administration and Policy**

Practical applications of microcomputers in federal, state, and local governmental units including word processing, financial management, personnel administration, decision-making and policy analysis. 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. 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 students 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 students 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. Prerequisite: PAA 200 or permission. Cr 3.

**PAA 580 City and Regional Planning**

Principles of city and regional planning; legislative aspects and court decisions; administrative organization and application; zoning and land use; financing; formulation of master plans, and their administration; political problems and public relations. 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. Prerequisite: PAA 200 or permission. Cr 3.

**Interdisciplinary Course****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. Prerequisite: junior or senior standing. Cr Ar.



## Sociology

Associate Professor Barkan (Chairperson)

Professors Cohn, Markides, Marks

Associate Professors Gaiaquest, Gallagher, Gardner

Assistant Professor Carter

The major in Sociology offers two options: general sociology, and applied sociology. Students wishing to explore either of these areas should consult the departmental secretary (201 Donald Hall) who will direct them to an appropriate advisor.

### The Sociology Major

This major offers courses designed to further the student's understanding of society. The courses focus on such questions as: How do organizations work, how do they influence our lives? How do different groups affect the self? How is inequality created and maintained--between genders, between races, and between social classes? How do deviant identities arise? What kind of family forms are emerging in the post-industrial world? What impact is the feminist movement having on the occupational and legal systems? Why are rates of physical and mental illness unusually high in some areas of society? Most important, what options do people have to change their groups, organizations, and culture?

### Requirements for Sociology Majors

SOC 101, Introduction to Sociology, is a prerequisite for all other courses offered in the department. A sociology major must then complete satisfactorily a minimum of 34 hours:

SOC 301 Social Organization: The Micro Picture	3
SOC 302 Social Organization: The Macro Picture	3
SOC 460 Major Ideas in Sociology	3
SOC 490 Logic of Sociological Inquiry	3
SOC 491 Practicum in Sociological Research and	
SOC 491L Practicum in Sociological Research Lab	4
Sociology Electives	18

A typical sequence of courses would be to take SOC 101 as a first year student; SOC 301 in the fall of the sophomore year; SOC 302 in the spring of the sophomore year; SOC 460 and SOC 490 in the fall of the junior year; and SOC 491 and SOC 491 laboratory in the spring of the junior year.

### The Applied Sociology Option

The purpose of the applied sociology option is to educate students to develop and apply their skills within organizations, agencies, schools,

hospitals, businesses, governmental units and other groups. This program of study focuses on developing the skills and knowledge which will allow the students to translate sociology into action. Students who complete the requirements of the applied sociology option will have a notation on their transcript identifying that they have been trained in applied sociology.

The sociology major who chooses this option is required to complete a minimum of 43 hours in sociology. In addition to SOC 101 these hours include:

One course in social inequality: (SOC 329, SOC 330, SOC 338, OR SOC 347)	3
Two sociology elective courses	6
SOC 301 Social Organization: The Micro Picture	3
SOC 302 Social Organization: The Macro Picture	3
SOC 320 Perspectives on Applying Sociology	3
SOC 350 Organization in Modern Society	3
SOC 425 Sociology of Social Policy and Social Change	3
SOC 460 Major Ideas in Sociology	3
SOC 490 Logic of Sociological Inquiry	3
SOC 491 Practicum in Sociological Research and	
SOC 491L Practicum in Sociological Research Lab	4
SOC 495 Internship in Applied Sociology 6-12 hours; (min. 6 hrs. required)	6

In addition to the above, students in both programs are encouraged to take a range of courses outside the Department to provide interdisciplinary knowledge in their area of interest.

### Graduation Requirements

A grade of "C" or better is mandatory in all required courses for the major. The GPA for all courses, required and elective, taken for the sociology major must be at least 2.0.

Sociology majors must also complete with a "C" grade or better, the Junior English Proficiency, ENG 212 - Intermediate Composition or ENG 317 - Technical Writing by the end of the junior year.

### Courses in Sociology

#### 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. Cr 3.

#### SOC 202 Social Problems

Introduction to the structure of inequality in American society and the consequences for community and democracy. Topics include economic inequality, poverty, social inequity and social stigma, the connections between wealth and power, societal priorities. Prerequisite: SOC 101 or permission. No juniors or seniors. Cr 3.

#### SOC 301 Social Organization: The Micro Picture

The private and public spheres of society. The study of social interaction in small social settings. The structure and dynamics of small groups. The impact of group structures on the self. Conversations as construction of social reality. Informal group structures in large organizations. Prerequisite: SOC 101; not open to first-year students. 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: SOC 301 or permission. Cr 3.

#### SOC 308 Problems of Violence and Terrorism

A study of the nature and causes of violence, terror and assassination in America, modern and pre-modern societies. Covers the social structure of terrorist organizations, the institutionalization of terror as an instrument of policy by national states. Prerequisite: SOC 101 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. Prerequisite: Any of the following: SOC 101, POS 100, POS 110, POS 212 or permission. Cr 3.

#### SOC 313 Deviant Behavior

Behavior defined by society as deviant. The processes by which an act or actor becomes defined as deviant and the nature of occupying a deviant role. The "techniques" of deviance and the acquisition of a deviant self concept. 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. Topics include problems in defining law, sociological theories of the origins and consequences of law, the relation between law and social change, studies of the legal profession and an examination of the police, courts, and prisons as components of the criminal justice system. Prerequisite: Any one of the following: SOC 101, POS 100, ANT 101, 102 or permission. Cr 3.

**SOC 316 Sociology of Aging**

Analysis of the demographic and sociocultural factors in aging, the aging individual as a person, older people as groups and aggregates within the culture and structure of a changing society, the manner in which society attempts to meet the needs of aging people. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 318 Sociology of the Family**

A sociological approach to the study of the family, including the structure of social relationships, the modern American family as a social institution, the cultural background of the family, and the impact of social change. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 319 Domestic Violence and Social Structure**

Examines domestic conflict and violence both 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. Prerequisite: SOC 101 or permission; not open to first-year students. Cr 3.

**SOC 320 Perspectives on Applying Sociology**

Examines the ways in which sociology can be used in non-academic settings, and can contribute to generating options for development and change in a variety of occupations and social settings. Exploration of: the history and development of applied sociology; the knowledge, contributions, and roles of practicing sociologists in a variety of fields; the skills and knowledge needed for using sociology in different jobs and programs; the integration of sociological theory, knowledge, and methods with strategies for social action, values, politics and ethics in applying sociology. Prerequisite: SOC 101. Cr 3.

**SOC 329 Sociology of Sex Roles**

Analysis of contemporary definitions of femininity and masculinity within American culture with emphasis on the interpersonal and institutional dimensions of these phenomena and the desirability and sources of social change. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 330 Perspectives on Women**

Multi-disciplinary analysis of the personal, interpersonal and institutional dimensions of

women's experience both universal and culturally determined. Focus on the desirability and means of social change. Prerequisite: Sophomore standing or permission. Cr 3.

**SOC 337 The 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. Prerequisite: SOC 101 or PSY 100 or permission of instructor. Cr 3.

**SOC 338 Race and Culture Conflict**

Examination of factors involved in inter-group relationships, with emphasis on minority and majority groups in contemporary United States. Promotes understanding of interactions, conflicts and power differentials between identifiable group and the effects of oppression. Examines culture, values and societal position of selected minority groups. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 343 Sociology of Work and Labor**

Analysis of work and the labor process, focusing on Western societies. Course examines the role of work in the social structure and in the lives of individuals. Theories of the labor process, work in organizational settings, nature of labor markets, paid and unpaid work. Historical and current perspectives on worker/capitalist relations, role of organized labor. Relationship of work to class, race and gender; potential for reorganizing work. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 345 Women, Crime and Criminal Justice**

This course examines theories of women's criminality; patterns of women's criminal behavior; crimes committed against women; and the experience of women as defendants, prisoners, and professionals in the criminal justice system. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 347 Wealth, Power and Prestige**

Analysis of social inequality within society. Theories and topics within the area of social stratification. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 350 Organizations in Modern Society**

Formal or complex organizations are the immediate setting or context for much of modern social life. This course examines the structures, processes, impacts and environments of organizations, using both mainstream and critical theoretical perspectives. Topics include: hierarchy and mobility within organizations, organizational behavior, processes of innovation and diffusion, and the role of gender, race, and class. The course will also explore the relationship of organizations to the wider societal context, formal and informal power, and the development of non-hierarchical organizational models. 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: SOC 101 or permission. Cr 3.

**SOC 370 Small Group Analysis**

Identification and analysis of communication and interaction patterns within small groups. Course involves participation in and observation of such interaction. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 410 The Nature of Social Order**

The question of social order, of how it is possible for people to live together in society despite scarcities and inequalities, is the central question in sociological theory. This course will explore the ways in which sociologists have attempted to answer this question and the related questions of how societies are structured and how the individual is formed within society. These questions will be explored from the perspectives of standard sociological theories and feminist theories. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 419 Introduction to Statistical Research in Sociology**

Introduction to how statistical methods are utilized in sociological research. Topics include: the measurement of social variables; the presentation and description of both quantitative and qualitative data. Descriptive statistics. Introduction to probability theory and its applications. Statistical measurement of association. Sampling, parameter estimation, hypothesis testing. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 425 Sociology of Social Policy and Social Change**

How can sociology play an active role in social policy and social change? What contributions can be made by sociologists to organizational and community development? We often think of social change as a natural and uncontrollable force, or else as an issue for technical "experts" to solve. This course will challenge those beliefs, exploring the diverse ways in which sociological skills, knowledge, and perspectives can be used in understanding and developing options for social policy and social change. Prerequisite: SOC 101 and SOC 320 or permission. Cr 3.

**SOC 431 Canadian Society**

Provides the non-Canadian student with an overview of the structure of Canadian society. Focus on two broad areas: social institutions and social processes. Prerequisite: SOC 101 and at least one semester of Canadian history, or permission. Cr 3.

**SOC 439 Sociology of Health and Medicine**

Explores issues of health, illness and medicine from a sociological perspective. Topics will in-



le: the organization of U.S. health care; uses of, and possible solutions to, problems in 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. Prerequisite: SOC 101 or permission. **Cr 3.**

#### **SOC 442 Population and Society**

Population processes and their effects on society. Includes fertility, migration, mortality; population, resources and technology; population, social change and economic development; family planning and population policy. Prerequisite: SOC 101 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: SOC 101 or permission. **Cr 3.**

#### **SOC 463 The Sociology of Knowledge**

The relationship between knowledge and social interaction. The general characteristics of knowledge as a social phenomenon. The problem of knowledge as being both influenced by and an influence upon the social structure. Prerequisite: SOC 101 or permission. **Cr 3.**

#### **SOC 465 Evolution, Revolution and the Future**

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 developing societies. Considers problems of future society. Prerequisite: SOC 101 or permission. **Cr 3.**

#### **SOC 482 The Sociology of Religion**

Topics include the religious dimensions of social theory and the social construction of religious beliefs, definitions and measurements of religious phenomena, religions in primitive and modern societies, the future of religions. Includes readings by Marx, Weber, Freud, Durkheim. Prerequisite: SOC 101 or permission. **Cr 3.**

#### **SOC 490 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. Prerequisite: Junior and Senior Sociology majors only. **Cr 3.**

#### **SOC 491 Practicum in Sociological Research**

Presents the techniques of data collection and analysis, focusing on survey research. Extensive use will be made of SPSSX, a computer program for data analysis. Specific topics will include sampling, questionnaire design, indices and scales, tabular analysis, and measures of association. Prerequisite: SOC 490 or permission. **Cr 4.**

#### **SOC 495 Internship in Applied 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 attend an internship seminar. Students in the applied concentration must take a minimum of 6 credit hours, and can take up to 12 credit hours; not more than 6 credit hours may be used toward the departmental major. Prerequisite: SOC 320, major in Sociology with senior standing (or by special permission), and permission of the faculty internship supervisor. **Cr 3-12.**

#### **SOC 497 Departmental Projects I**

By permission only.

**Cr 1-3.**

#### **SOC 498 Departmental Projects II**

By permission only.

**Cr 1-3.**

#### **Interdisciplinary Courses**

##### **INT 224 (ARE, SOC) Sociology of Rural Life**

Analysis of the significance of rural society in American culture. Considers the impact of forces of change including population movement and the significance of changes in the social systems of community, family, religion, education, and stratification. Rec 3. **Cr 3.**

##### **INT 324 (ARE, SOC) Contemporary Rural Problems**

A problem-oriented, class participation course focusing on the trends in contemporary rural society. Rural population displacement and mobility, poverty, industrialization; consequent changes in occupational compositions, and related changes. Prerequisite: INT 224 or equivalent. Rec 3. **Cr 3.**

##### **INT 329 (ARE, SOC) The Individual and the Community**

Analysis of the structure and functioning of the community. Emphasis on ways in which individuals and groups are affected by community dynamics. Students participate in a community project. Prerequisite: INT 224 or permission. Rec 3. **Cr 3.**

##### **INT 480 (ANT, SOC, SPC) Sociolinguistics**

Examines relationships between language and society, emphasizing societal rules or norms that explain or constrain language behavior and the functions of language in human societies. Considers speech styles and dialects, languages in contact, bilingualism, and the language problems of developing nations. Prerequisite: INT 410 or permission. **Cr 3.**



## Speech Communication

Associate Professor Peterson (Chairperson)  
 Professors Dopheide, McKerrow, Pettit, Pickering  
 Associate Professors Burns, Langellier  
 Assistant Professors Kuhn, Sherblom, A. Yonovitz, L. Yonovitz  
 Lecturer/Staff Speech Pathologist Riley  
 Faculty Associates Kerr, Olsen

Departmental studies lead to a B.A. in Speech Communication. The programs offered by the department are designed to expand the student's awareness and understanding of the genesis, development, functions, roles, and uses of spoken communication. Departmental majors may concentrate in either Communication Studies or in Communication Disorders. The undergraduate program in Communication Studies prepares majors in the theory, research, and pragmatics of spoken communication between persons, whether the communicating occurs within one-to-one, small group, organizational, or public contexts. The undergraduate program in Communication Disorders equips majors with pre-professional competencies that should enable them to undertake master's study recommended for entrance to the professions of speech-language pathology or audiology (Accredited by the American Speech-Language-Hearing Association).

The department offers programs leading to the Master of Arts degree. Further details may be found in the Graduate School Catalog.

### Requirements for Majors

All departmental majors are required to complete either the program in Communication Studies or the program in Communication Disorders. Further, majors must complete a total of nine hours in the areas of Statistics and Computer Science, Writing, or Language and Critical Thinking (list of acceptable courses available in department office, 315 Stevens). The nine credits must come from two of the three areas with at least three credits in each of the two areas elected. Any of the above hours may be used to meet distribution requirements for the B.A. degree as well as departmental requirements (A list of acceptable courses for meeting B.A. distribution requirements is available in the Dean's Office). Students taking department courses to satisfy requirements within the speech communication major must have a C (2.0) or better in each course.

### Program in Communication Studies

In the Communication Studies program, students develop a broad understanding of communication and how people communicate in a variety of contexts. Students are encouraged to explore the diversity of perspectives on com-

munication and to concentrate on areas of interest. They examine the aesthetic, interpersonal, political, professional, rhetorical, and socio-cultural dimensions of communication in order to prepare themselves for careers that emphasize communication.

Speech Communication majors in the Communication Studies program are required to complete a minimum of 36 credit hours from the following two areas:

1. Each of the following core courses is required (9 credit hours)
  - a. SPC 201 Communication Studies I
  - b. SPC 202 Communication Studies II
  - c. Rhetorical Criticism
    - EITHER SPC 401 Rhetorical Criticism
    - OR
    - SPC 402 Communication Research
2. At least 27 credit hours from the following courses, 12 credit hours of which must be at the 400 level:
  - SPC 102 OR 103 OR 106 (Only one course may be used toward this requirement)
  - SPC 267 Public Relations: Oral Communication Strategies
  - SPC324 Interpersonal Communication in Everyday Life
  - SPC 345 Small Group Communication
  - SPC 347 Argument and Critical Thinking
  - SPC 356 Speech Play and Performance
  - SPC 360 Nonverbal Communication
  - SPC 401 or 402 (If not used to meet a core requirement)
  - SPC403 Persuasion and Social Influence
  - SPC 405 Women and Communication
  - SPC 410 Social Influence of Mass Communication
  - SPC 454 Communication Development in Children
  - SPC 444 Political Rhetoric
  - SPC 466 Narrative Communication
  - SPC 470 Communication in Organizations
  - SPC 480
  - 480 Language and Speech Development
  - SPC 484 Introduction to Speech Science
  - SPC 493 Topics in Speech Communication
3. Electives: Students MAY take additional credits in department courses beyond the requirements for a major. In addition to the courses listed above, students may select:
  - SPC 109 Parliamentary Procedure
  - SPC 257 Business and Professional Communication
  - SPC 277 Interviewing

SPC 368 Teaching of Speech Communication

SPC 496 Field Experience in Speech Communication

SPC 467/468 Problems in Speech Communication

(Note: 72 hours outside the major are required for the B.A. degree)

### Program in Communication Disorders

This program is accredited by the American Speech-Language-Hearing Association (ASHA). Students who declare a major in Speech Communication and desire to concentrate in Communication Disorders must meet a set of special entrance requirements to that program. The requirements are as follows: An overall G.P.A. of at least 2.5, an essay explaining the student's rationale for choosing the major in Communication Disorders, and a statement of future professional goals. All materials are due before April 1 of the academic year preceding desired entrance to the program. Rationale and application materials are available in the departmental office (315 Stevens Hall) or at the Conley Speech and Hearing Center (North Stevens). Special provisions are made for transfer students.

All students in Communication Disorders are expected to take advantage of the laboratory and service opportunities provided through the Conley Speech and Hearing Center. The Center provides training opportunities for those preparing for careers as speech-language clinicians and provides services for persons who are speech, language, or hearing impaired.

#### Required Courses for Students in Communication Disorders Program:

- SPC 130 Introduction to Communication Disorders
- SPC 381/382 Fundamentals of Speech Pathology
- SPC 388 Hearing Impairment
- SPC 480 Language and Speech Development
- SPC 483 Anatomy and Physiology of the Speech Mechanism
- SPC 484 Introduction to Speech Science
- SPC 486 Clinical Practicum I
- SPC 487 Organic Speech Disorders

Other departmental courses appropriate for students in Communication Disorders include



SPC 102, Fundamentals of Interpersonal Communication; SPC 202, Communication Studies; SPC 345, Small Group Communication; SPC 347, Interpersonal Communication in Everyday Life; SPC 496, Field Experience; SPC 454 Communication Development in Children; and SPC 363, Topics in Speech Communication.

The undergraduate has the background which can lead to the advanced study necessary for the attainment of Professional Certification in the State of Maine and/or the Certificate of Clinical Competency which is awarded by the American Speech and Hearing Association.

### Courses in Speech Communication

#### SPC 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. Cr 3.

#### SPC 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. Cr 3.

#### SPC 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. Cr 3.

#### SPC 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. Prerequisite: permission of coordinator, Conley Speech and Hearing Center. (Pass/Fail Grade Only). Cr 1.

#### SPC 109 Parliamentary Procedure

A study of the principles and methods by which groups organize themselves and transact business with efficiency and fairness. Cr 1.

#### SPC 130 Introduction to Communication 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. Not open to first semester first-year students. Cr 3.

#### SPC 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. Cr 3.

#### SPC 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. Cr 3.

#### SPC 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. 3 hours of SPC courses or permission. Cr 3.

#### SPC 267 Public Relations: Oral Communication Strategies

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 SPC courses or permission. Cr 3.

#### SPC 277 Interviewing

A study of the basic principles of interviewing, with emphasis on their practical application in a variety of situations. Prerequisite: Junior or Senior standing. 3 hours of SPC courses or permission. Cr 3.

#### SPC 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: SPC 102 or permission. Cr 3.

#### SPC 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 SPC courses or permission. Cr 3.

#### SPC 347 Argument and Critical Thinking

An introduction to the principles of decision-making through critical applied to reasoned advocacy. Practical application of these principles through classroom experience. Prerequisite: 3 hours of SPC courses or permission. Cr 3.

#### SPC 356 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. Prerequisites: 3 hours of SPC courses or permission. Cr 3.

#### SPC 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. Not open to first-year students. Cr 3.

#### SPC 368 Teaching of Speech Communication

Study of contemporary teaching methods and application through such activities as construction of course outlines and units, microteaching, and evaluations. Some attention to co-curricular activities and professional organizations. Prerequisite: 12 hours of departmental courses. Cr 3.

#### SPC 381 Fundamentals of Speech Pathology I

Assessment of communication disorders in children and adults. Emphasis on interpersonal therapeutic experience and basic procedures in clinical practice. Not recommended for classroom teachers. Limited to junior or senior majors. Prerequisite: permission. Lec 2, Lab 2. Cr 3.

#### SPC 382 Fundamentals of Speech Pathology II

A continuation of SPC 381, with emphasis on intervention and treatment methodologies. Not recommended for classroom teachers. Limited to junior or senior majors. Prerequisite: permission. Lec 2, Lab 2. Cr 3.

#### SPC 388 Hearing Impairment

An introduction to normal auditory function as a basis for understanding disorders of hearing. Covers procedures for hearing assessment and rehabilitation methods. Prerequisite: SPC 130. Cr 3.

#### SPC 389 Introduction to Audiology

A study of the methods of hearing assessment, including their administration and interpretation. Covers audiometric identification of hearing loss and rehabilitation methods. Prerequisite: SPC 388. Cr 3.

#### SPC 401 Rhetorical Criticism

Critical analysis of public messages using criteria as aesthetics, effects, truth, and ethics. Covers rhetor's use of strategies and evidence to adapt to constraints arising from the subject, the audience and/or the rhetor. Traditional and non-traditional kinds of persuasive approaches will be explored. Prerequisite: Not open to first-year students. Cr 3.

#### SPC 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. Prerequisite: SPC 202 or permission. Cr 3.

#### SPC 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 SPC courses or permission. Cr 3.

#### SPC 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. Cr 3.

#### SPC 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. Prerequisite: SPC 201 or SPC 202 or permission. Cr 3.

#### SPC 444 Political Rhetoric

Examines the nature and impact of diverse communication strategies in political campaigns. Emphasis on Congressional and Presidential campaigns. Prerequisite: SPC 201 or permission. Cr 3.

#### SPC 454 Communication Development in Children

Examines the development of pragmatic communication behaviors in children (primarily preschool through grade 8). Strategies for assessing, researching, and facilitating children's communicative development are considered. Prerequisite: Juniors or seniors. Cr 3.

#### SPC 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. Prerequisites: 3 hours of SPC courses or permission. Cr 3.

#### SPC 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. Prerequisite: Juniors or seniors. Cr 3.

#### SPC 480 Language and Speech Development

Considers the psychological and sociological foundations of language development and the sequential aspects of speech development and the interrelationships of the natural and behavioral sciences in understanding the speech and language processes. Not open to first-year students. Recommended for teachers. Cr 3.

#### SPC 483 Anatomy and Physiology of the Speech Mechanism

The structures, muscular system and nervous system underlying breathing, phonation, articulation, and language. Emphasis on normal neurophysiological function with attention to organic pathologies affecting speech and language. Juniors or seniors. Cr 3.

ulation, and language. Emphasis on normal neurophysiological function with attention to organic pathologies affecting speech and language. Juniors or seniors. Cr 3.

#### SPC 484 Introduction to Speech Science

Introduces research findings on the importance of acoustical, physiological, and perceptual factors in speech production and reception. Methodology and instrumentation employed in such research are surveyed. Not open to first-year students. Cr 3.

#### SPC 486 Clinical Practicum I

Supervised therapy experience with selected clients in the Conley Speech and Hearing Center. Minimum of two client contact hours each week, plus weekly supervisory conference. May be repeated for a maximum of eight credits. Prerequisite: SPC 381, SPC 382 and permission of Coordinator. Cr 1-4.

#### SPC 487 Organic Speech Disorders

A study of the diagnosis and treatment of speech disorders of organic origin: cleft palate, cerebral palsy, aphasia, and dysarthrias. Not recommended for classroom teachers. Prerequisite: Sophomore standing. Cr 3.

#### SPC 493 Topics in Speech 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.

#### SPC 496 Field Experience in Speech Communication

Approved work experience for departmental majors in the application of speech 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 speech communication, conferences with faculty supervisor, periodic logs or summaries, plus a final written report. May be repeated up to 6 hours. Prerequisites: 2.0 overall grade point average with at least a 2.5 in SPC courses, 9 hours beyond 100 level courses in SPC and permission of the departmental field experience committee. Cr 1-3.

#### SPC 497 Problems in Speech Communication I

For the advanced student desiring to study a particular problem under the guidance of a member of the staff. Prerequisite: permission of Department Chairperson. Cr 1-3.

#### SPC 498 Problems in Speech Communication II

A continuation of SPC 497. Cr 1-3.

#### SPC 504 Persuasion and Social Influence

Advanced study of current theory and research on the role of communication in changing opinions, attitudes, and beliefs in interpersonal, public, organizational, and mass communication contexts. Prerequisite: Permission. Cr 3.

#### SPC 510 Seminar in Mass Communication

Advanced study of mass communication theory and research, with emphasis on the relationship of human communication and mass media in structuring behavior and experience. Prerequisites: SPC 410 or permission. Cr 3.

#### SPC 524 Seminar in Interpersonal Communication

An advanced considerations with emphasis on the implications of various theories and research traditions for understanding interpersonal traditions. Prerequisite: Permission Cr 3.

#### SPC 555 Seminar in Selected Contemporary Rhetoric

A critical analysis of the materials, structure, style, and historical significance of selected rhetoric (primarily American) from colonial times to the present. May focus on specific topics, periods, social movements, or speakers. Prerequisite: Permission. Cr 3.

#### SPC 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.

#### SPC 579 The Theory of Composition

A study of rhetorical, stylistic, and cognitive perspectives—from classic formulations to current research—on the nature of written composition and issues in composition teaching. (This course is identical with ENG 579). Cr 3.

#### SPC 581 Articulation Disorders

Analysis of articulation disorders having a functional or organic etiology. Consideration of diagnostic practices and therapeutic procedures appropriate to misarticulations stemming from varied causes. Prerequisite: SPC 382 and SPC 483 or permission. Cr 3.

#### SPC 582 Voice Disorders

Analysis of types, symptoms, and causes of abnormal voice production. Consideration of diagnostic practices, medical and psychological referral procedures, and methods for correction of vocal problems of pitch, intensity, rate, and quality. Prerequisite: SPC 382 and SPC 483 or permission. Cr 3.

#### SPC 583 Fluency Disorders

Causation, diagnosis, and treatment of stuttering behavior viewed from various theoretical orientations. Covers clinical management of children and adults who stutter. Prerequisite: SPC 382 or permission. Cr 3.

#### SPC 585 Children's Language Disorders

Focus on procedures for the evaluation and language treatment of the semantic and syntactic aspects of childhood disorders. Prerequisite: SPC 382, SPC 480 and/or equivalent or permission. Cr 3.

#### SPC 586 Current Issues in Clinical Practice

Assists the speech and hearing clinician in keeping abreast of theoretical and applied develop-



ents in clinical practice with children and adults. Prerequisite: permission. (Offered only Summer Session or Continuing Education).

Cr 1-3.

**SPC 588 Aural Rehabilitation**

Considers the effects of hearing loss upon the personal and social development of the individual. Examines principles and procedures auditory training and speech reading as approaches to language development in the hearing-handicapped person. Prerequisite: SPC 388 permission.

Cr 3.

**SPC 593 Topics in Speech Communication**

Advanced study of selected topics. Prerequisite: permission.

Cr 3.

**Interdisciplinary Courses**

**INT 480 (ANT, SOC, SPC) Sociolinguistics**

Examines relationships between language and society, emphasizing societal rules or norms

that explain or constrain language behavior and the functions of language in human societies. Considers speech styles and dialects, languages in contact, bilingualism, and the language problems of developing nations. Prerequisite: INT 410 or permission.

Cr 3.

**INT 501 (ANT, PSY, SPC) Discourse Analysis**

Sociological, linguistic, ethnographic, and cognitive sciences approaches to the study of discourse with emphasis on speech including narrative, conversation discourse in courtroom, classroom, and clinical settings. Prerequisite: INT 410 or permission.

Cr 3.

**INT 528 Interdisciplinary Rural Health Care Delivery I (NUR, PSY, SPC, SWK)**

A study of health professions, health care delivery models, and interdisciplinary team health care delivery in rural settings. Incorpor-

ated will be group process and conflict management strategies. Prerequisite: Permission.

Cr 3.

**INT 529 Interdisciplinary Rural Health Care Delivery II (NUR, PSY, SPC, SWK)**

Through use of case studies illustrative of prevalent health problems, students will learn to function as interdisciplinary health delivery team members. Focus will be on needs associated with cultural minorities, rurality and poverty. Prerequisite: INT 528 or permission.

Cr 3.





## School of Nursing

Associate Professor Lea Acord, *Director*

Associate Professors Mary Regan Brakey, Mary Ellen Symanski, Jean Symonds

Assistant Professors Elizabeth Bicknell, Judy Kuhns-Hastings, Jill Perrone, Mickey Pike, Terese Shipps, Shirley Starrett, Carol Wood

Instructor Sally Carlisle

Manager, Learning Resource Center and Psychomotor Skills Coordinator Irene Marshall

### Purpose

The purpose of the baccalaureate program is to prepare a professional generalist practitioner of nursing who, through the use of the nursing process, can assist individuals, families and groups in a variety of settings to achieve and maintain optimal health.

Education for the practice of professional nursing demands a substantial knowledge of the social, behavioral and biological sciences as a theoretical base. Beginning in the sophomore year, nursing courses are taken concurrently with courses from other disciplines, thus contributing to the development of the liberally educated practitioner.

The first year establishes a foundation for the study of nursing with an introduction to concepts and theories related to understanding the principles of nursing practice. The first nursing course is given in the sophomore year with focus on introducing the student to the professional role of the nurse. Clinical study begins in the junior year, continues throughout the senior year and includes care of patients/clients in a variety of settings such as hospitals, community health agencies, long-term care facilities, schools and industry.

During the senior year, student experiences are planned to encourage synthesis of the knowledge of the preceding years as it affects individuals, families, groups, and communities. The role of the professional nurse that is introduced in the sophomore year and augmented during the junior year is expanded during the senior year.

The program provides a foundation for graduate and continuing education in nursing and serves as a stimulus for continuing intellectual and personal development. Students who successfully complete the undergraduate program of studies (123-126 credits) are eligible to take the licensure examination administered by the Maine State Board of Nursing or a comparable exam in other states. Graduates who successfully pass the licensure examination are eligible to practice nursing as Registered Nurses (R.N.) in the state in which the examination was written.

### Curriculum Overview

First Year			
Fall Semester		Spring Semester	
BCH 207 Fundamentals of Chemistry	4	BCH 208 Elementary Physiological Chemistry	4
BIO 100 Basic Biology	4	ZOL 208 Anatomy and Physiology	4
PSY 100 General Psychology	3	SOC 101 Introduction to Sociology	3
ENG 101 College Composition	3	Humanities	3
Fine Arts	3	Elective	3
	<u>17</u>		<u>17</u>
Sophomore Year			
Fall Semester		Spring Semester	
MCB 300 General Microbiology	3	HNF 280 Human Nutrition for the Health Professions	3
MCB 305 General Microbiology Laboratory	2	MAT 232 Principles of Statistical Inference	3
PHI Philosophy	3	NUR 200 Professional Concepts in Nursing	3
Growth and Development I	3	Humanities	3
ZOL 303 Pathophysiology	3	ZOL 404 Fundamentals of Pharmacology	3
Elective	3		
	<u>17</u>		<u>15</u>
Junior Year			
Fall Semester		Spring Semester	
NUR 300 Health Assessment Through the Lifespan	3	NUR 305 Nursing Care Management of Women and Newborns	4
NUR 301 Nursing Care Management of Adults I	6	NUR 307 Nursing Care Management of Infants and Children	4
PSY 312 Abnormal Psychology	3	NUR 410 Health Related Research	3
Fine Arts Elective	3	Social Science Elective	3
	<u>15</u>		<u>15</u>
Senior Year			
Fall Semester		Spring Semester	
NUR 400 Health Maintenance and Restoration	4	NUR 402 Nursing Care Management in the Community	5
NUR 401 Nursing Care Management of Adults II	5	NUR 408 Psychiatric-Mental Health Nursing	4
NUR 407 Health Promotion Through the Lifespan	3	NUR 406 Management and Leadership in Health Care Systems	4
Elective	3	Elective	3
	<u>15</u>		<u>16</u>



## Program Objectives

The graduate of the undergraduate program will:

1. synthesize theoretical and empirical knowledge from nursing, the behavioral and the physical sciences and humanities, to provide rationale for professional nursing practice.
2. utilize the nursing process to assist individuals, families, groups and communities throughout the life cycle to promote, maintain, and restore optimal health.
3. demonstrate ethical responsibility, professional accountability, and client advocacy in the practice of nursing.
4. utilize principles of teaching and learning to assist clients to achieve optimal health.
5. analyze the findings of health-related research in planning his/her own professional nursing practice.
6. develop a commitment to life-long learning.
7. utilize leadership skills in collaboration with consumers and health professionals to effect needed changes in the health care delivery system.
8. develop and identify a personal philosophy of nursing which incorporates a commitment to the profession.

## Admission

In keeping with the mission of the University of Maine, the School of Nursing admits students from a variety of settings; directly from high schools, transferring from other programs within the University system, transferring from other colleges and universities, and Registered Nurse graduates from diploma and Associate Degree programs in nursing. All students who wish to be considered for acceptance into the nursing program should file an application with the University of Maine Office of Admissions.

## R.N. Students

An "R.N. Studies" program differs from the traditional curriculum in that the School of Nursing has developed a process to assess prior learning. Inherent within the process is the recognition that R.N.s may have attained knowledge and skills in selected areas which can be demonstrated through direct articulation or through specific examinations. In addition, two courses designed for R.N. students assist the student to successfully meet the objectives of the baccalaureate nursing program. Please contact the School of Nursing for further details.

## Grading System

All students enrolled in the nursing program must achieve a minimum accumulative Grade

Point Average of 2.35 in order to progress to 300 level Nursing courses. Nursing students must earn a minimum grade of "C" (2.00) in all courses, and may take a maximum of (3) credits in the general elective area on a Pass/Fail basis. Clinical courses are sequential and must be passed with a grade of "C" before progression in the program is permitted. Refer to SON Student Handbook for additional policies.

To be eligible for graduation with a Bachelor of Science degree with a major in Nursing, the student must have successfully completed all requirements, with "C" grades or better, have a minimum of 123-126 credit hours and a Grade Point Average of at least a 2.00.

## Accreditation

The nursing program is approved by the Maine State Board of Nursing and is accredited by the National League for Nursing. The School is a member of the Council of Baccalaureate and Higher Degree Programs of the National League for Nursing and a member of the American Association of Colleges of Nursing.

## General Information

Nursing majors are required to have a medical history and physical examination completed and a report on file at the Cutler Health Center before enrolling in clinical courses. In addition, cardiopulmonary resuscitation (CPR), which includes adult, child and infant certification. Nursing majors must purchase uniforms before entry into the junior year. Clinical learning experiences take place in a variety of settings and geographic locations. It is the student's responsibility to provide her/his own transportation for sophomore, junior and senior clinical experiences. A \$15.00 course fee is required per semester in the junior and senior years and professional liability and health insurance is strongly recommended for all nursing students.

## Courses in Nursing

### 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. Prerequisite: Sophomore standing or by permission. Lec 2, Lab 3. Cr 3.

### NUR 300 Health Assessment Through the Lifespan

Develops the knowledge and skills necessary to conduct an individual assessment utilizing functional health patterns. Emphasis on data collection through the development of communication, interviewing, history-taking and physical examination skills. Prerequisites: NUR 200, ZOL 208, CHF 201 or by permission. Lec 2, Lab 3. Cr 3.

### 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. Prerequisites: Junior standing. NUR 200, ZOL 303, ZOL 208, MCB 300, MCB 305 or by permission. NUR 300 and HNF 280 may be taken concurrently. Lec 3, Lab 3, Clin 6. Cr 6.

### NUR 304 Concepts in Nursing for the Practitioner

Offers the registered nurse an opportunity to explore the theoretical base of nursing practice. The adult learner is encouraged to explore the use of functional health pattern assessment, the nursing process framework and various nursing theories. Prerequisite: Registered Nurse and by permission. Lec 5. Cr 5.

### NUR 305 Nursing Care Management of Women and Newborns

An examination of reproductive function and sexuality in women from menarche through the childbearing years with emphasis on holistic care for women and newborns. Functional health patterns are used to identify need for nursing intervention. Includes practical experience in inpatient and outpatient settings. Prerequisites: NUR 200, NUR 300, NUR 301, CHF 201, ZOL 404, ZOL 303, HNF 380. Lec 2, Clin 6. Cr 4.

### NUR 307 Nursing Care Management of Infants and Children

Students develop a comprehensive approach to caring for sick children and their families using functional health patterns for holistic assessment. Focus on health care needs of sick children and their families within a developmental framework. Provides clinical experience in inpatient and outpatient settings. Prerequisite: NUR 200, NUR 300, NUR 301, CHF 201, ZOL 404, ZOL 303, HNF 280. Lec 2, Clin 6. Cr 4.

### NUR 312 Clinical Assessment

The purpose of this course is to validate the prior learning and clinical functioning of Registered Nurse students who are seeking a Baccalaureate Degree in Nursing. This clinical evaluation provides the student an opportunity to demonstrate ability to apply the nursing process to care of individual clients in a safe, appropriate, organized and accountable manner. Prerequisite: Junior standing. Registered Nurse. Cr 2.

### NUR 400 Health Maintenance and Restoration

Develops understanding of complex health problems. Functional health patterns provide the basis for course organization. Nursing strategies relating to health maintenance and restoration are discussed. Independent and collaborative nursing responsibilities are emphasized.



sized. Prerequisites: NUR 300, NUR 301, NUR 305, NUR 307. Lec 4. Cr 4.

#### **NUR 401 Nursing Care Management of Adults II**

Emphasizes the application of the nursing process in care delivery for adult clients with complex needs using functional health patterns. Student gain experience in critical thinking during a series of laboratory sessions. Includes clinical application in an acute care setting with faculty members. Prerequisites: NUR 300, NUR 301, NUR 305, NUR 307. Corequisite: NUR 400. Clin 15. Cr 5.

#### **NUR 402 Nursing Care Management in the Community**

Introduces the role of the community health nurse and the community as a client. Functional health patterns are used to assess individuals, families and communities. Current issues influencing the health of families and aggregates in the community are examined. The clinical focus includes health promotion, disease prevention, health maintenance and restoration. Clinical experience includes clients of different ages selected from a variety of community health agencies. Prerequisites: NUR 300, NUR 301, NUR 305, NUR 307. Lec 3, Clin 6. Cr 5.

#### **NUR 406 Management and Leadership in Health Care Systems**

Organizational theory is presented as it relates to the practitioner as a member of a group. Theoretical concepts of group structure and interactions are discussed. An experiential component utilizing leadership and management concepts is provided to meet the students' learning objectives. Prerequisites: NUR 300, NUR 301, NUR 305, NUR 307. Lec 3, Proj 1. Cr 4.

#### **NUR 407 Health Promotion Through the Lifespan**

Self-care and health promotion concepts are applied to individuals and families within the framework of functional health patterns. Theoretical material and research findings used as a basis for understanding the factors which facilitate or inhibit the promotion of health in human beings. Prerequisites: NUR 300, NUR 301, NUR 305, NUR 307. Lec 3. Cr 3.

#### **NUR 408 Nursing Care Management of Mental Health Clients**

Examines the professional dimensions and specific components of psychiatric nursing practice, including interventions in various practice settings. Nursing diagnosis and research are utilized as the rationale for nursing intervention. Prerequisites: NUR 300, NUR 301, NUR 305, NUR 307, PSY 312. Lec 2, Clin 6. Cr 4.

#### **NUR 410 Health Related Research**

Considers 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. Lec 3. Cr 3.

#### **NUR 411 Senior Seminar for R.N.'s**

A senior synthesis seminar and clinical course for R.N. 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. Prerequisites: NUR 304, NUR 410, NUR 312. Lec 2, Proj 3. Cr 5.

#### **NUR 420 Women In 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 422 Historical Perspectives in the Nursing Profession**

A survey of historical and current concerns in the profession. Explores at least one component of the history of nursing in the State of Maine. Prerequisite: 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. Prerequisite: permission. Cr 3.

#### **NUR 424 Perspectives on Aging**

Intended for students in any discipline. Approaches aging as a normal developmental process with analysis of issues confronting the aged. An experiential component allows the student to broaden learning objectives and specify interest areas. Prerequisite: permission. Cr 3.

#### **NUR 427 Clinical Judgement**

Focus on clinical problem-solving using case study method. Opportunities to apply knowledge improve decision-making skills. Prerequisites: one year's clinical experience or permission. Lec 2, Proj 1. Cr 3.

#### **NUR 495 Independent Study in Nursing**

Individualized study with permission of the instructor. May or may not have an experiential component. Prerequisite: permission. 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.

#### **Interdisciplinary Courses**

##### **INT 528 Interdisciplinary Rural Health Care Delivery I (NUR, PSY, SPC, SWK)**

A study of health professions, health care delivery models, and interdisciplinary team health care delivery in rural settings. Incorporated will be group process and conflict management strategies. Prerequisite: Permission. Cr 3.

##### **INT 529 Interdisciplinary Rural Health Care Delivery II (NUR, PSY, SPC, SWK)**

Through use of case studies illustrative of prevalent health problems, students will learn to function as interdisciplinary health delivery team members. Focus will be on needs associated with cultural minorities, rurality and poverty. Prerequisite: INT 528 or permission. Cr 3.



## School of Social Work

### Associate Professor Berkun, *Interim Chairperson and Undergraduate Program Coordinator*

Professor Watkins

Associate Professor Whitaker

Assistant Professors Butler, Coleman (Graduate Program Coordinator), DePoy, Hansen, Werrbach

Instructor Blunt (Field Coordinator)

### The Social Work Major

The social work major is designed to prepare students for beginning-level generalist professional social work practice in a broad range of social work settings. The program has been accredited by the Council on Social Work Education. It leads to the degree of Bachelor of Arts in Social Work upon receipt of which graduates are qualified to take the test for licensing as Licensed Social Workers in the State of Maine.

Social workers help people cope with complex interpersonal and social problems, obtain the resources they need to live with dignity, and work for the social changes necessary to make society more responsive to people's needs. Based on a strong liberal arts background, social work majors acquire the knowledge, skills and values necessary for the professional practice of social work. Study for the social work major includes courses in theory, research, and practice. Study culminates during the senior year in a 400-hour supervised practicum in a social agency. In the practicum, students sharpen and integrate their academic knowledge and practice skills. Prior to the field practicum, students engage in a volunteer experience unless they have had other appropriate social work experience.

Graduates of the program are employed in public and voluntary social agencies in settings such as child and adult protective services, family planning, group homes, half-way houses, schools, correctional institutions, medical facilities and many others. Graduates of this program are given credit toward work in many master's level social work programs, thus shortening the time needed to complete the requirements for the MSW.

### Declaring the Social Work Major

Students considering the social work major should seek early advisement from a member of the social work faculty to explore their interests and assure correct course sequencing. In order to be admitted to the social work program, students must have at least a 2.5 grade point average, be of sophomore standing, enrolled in the College of Social and Behavioral Sciences, and submit a Personal Statement Form to the baccalaureate Social Work Program Coordinator prior to or at the time they submit the declaration of the major in social work to the College of Social and Behavioral Sciences. The

Personal Statement Form is available in the departmental office (112 Annex C). It will be reviewed by the Social Work Program Coordinator and an interview scheduled with an advisor in the social work program to discuss the student's interest and assist the student in planning a meaningful educational program.

Students who are enrolled in another college in the University should discuss their interest in social work with a member of the social work faculty before submitting a Personal Statement Form or declaring social work as a major.

### Requirements for the Social Work Major

SWK 320 Introduction to Social Work and Social Welfare

SWK 440 Social Welfare Policy and Issues

SWK 350 Human Behavior and the Social Environment

SWK 361 Social Work Methods I

SWK 397 Independent Projects in Social Welfare I (Junior Volunteer Experience)

SWK 462 Social Work Methods II

SWK 463 Social Work Methods III

SWK 490 Social Work Research I

SWK 495 Field Practicum in Social Work (2 semesters)

In addition to the above, each social work major is required to complete:

SOC 101 Introduction to Sociology

PSY 100 General Psychology

ZOL 208 Anatomy and Physiology

PSY 323 Psychology of Childhood OR

CHF 201 Introduction to Child Development

SOC 338 Race and Culture Conflict

Correct course sequencing is essential for the social work major. Detailed information about requirements and course sequencing are in the *BSW Program Guide*. The *Program Guide* may be obtained in the departmental office. Early review of the guide is recommended.

### Graduation Requirements

A grade of "C" or better is mandatory in all required courses.

The Junior English Proficiency requirement is met by passing with a "C" grade or better

ENG 212, Intermediate Composition, or ENG 317, Technical Writing.

### University Affiliated Program

Social work majors with particular interest in developmental disabilities may apply for participation in the University Affiliated Program (UAP), an interdisciplinary concentration. UAP students do their field practicum in agencies serving children with developmental disabilities and upon completion of the UAP requirements receive a Certificate of Completion in addition to the Bachelor of Arts degree in Social Work. (See UAP and Interdisciplinary Concentrations in the index for more detail).

### Master of Social Work Program

The Department of Social Work offers graduate study leading to the Master of Social Work (MSW) degree. The MSW requires a minimum of 60 credit hours of study and may be completed in two to four years. The program prepares students for advanced social work practice from a generalist perspective. During their second year of study students choose a field of practice with families and children, or in health and mental health. Graduates find employment in a wide range of settings. More information may be obtained from the Graduate School and from the Department of Social Work.

### Courses in Social Work

#### SWK 320 Introduction to Social Work and Social Welfare

Focus 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. Prerequisite: SOC 101. Cr 3.

#### SWK 350 Human Behavior and the Social Environment

Examines normative development, development of sense of self, behaviors, attitudes and values of adults in relationship to the social structures, organizations, institutions and societal groups with which they interact. Connections are made to social work theory, social welfare institutions and social work practice.



Prerequisite: PSY 100, SOC 101, and PSY 323 or CHF 201 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. Prerequisite: SWK 440 and 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. Prerequisite: SOC 101 or permission. (Continuing Education Only). Cr 3.

#### SWK 368 Psychosocial Aspects of Disability

Examines the impact of disability, including hidden disabilities, on people's development, self-concept, and self-esteem. The effects of societal attitudes, structures, legislation and institutions on the disabled individual also are examined critically. Prerequisite: SOC 101 or permission. (Continuing Education Only). Cr 3.

#### SWK 375 Hunger As An Issue in Social Welfare

Examines the social issue of hunger from a political and social policy perspective, compares hunger in the United States with that in third world nations, and investigates governmental and private organizational strategies for the reduction of hunger. Prerequisite: SOC 101 or permission. Cr 3.

#### SWK 397 Independent Projects in Social Welfare I

By permission only. 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. 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 exper-

iences. Prerequisite: SWK 361. Limited to senior social work majors. 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. Prerequisite: SWK 462. Limited to senior social work majors. Cr 3.

#### SWK 490 Social Work Research I

Beginning methods of social work research. Topics include integration of social work theory, practice and research, problem formulation, ethical concerns, research design, program evaluation. 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. Prerequisite: Limited to social work majors who have completed at least 75 course credit hours. Taken concurrently with SWK 462 and SWK 463. 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 501 Orientation to Social Work Values, History and Practice

Generalist practice in social work, history of social welfare policy and services, human diversity issues, social work values and ethics, social work practice in rural communities. Prerequisite: admission to the MSW program. Cr 1.

#### 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 normative adult behaviors, values and attitudes as influenced by age, gender, social class, social structures and other environmental factors. 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. Corequisite: SWK 495. Prerequisite: first year MSW students. 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. Corequisite: SWK 595. Prerequisites: SWK 560 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 protocol 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. Corequisites: SWK 560 or SWK 563. Cr 4-6.

#### SWK 597 Advanced Topics in Social Work

Content varies to suit student needs. May be repeated for credit. Prerequisite: Permission. Cr 1-3.

#### Interdisciplinary Courses

##### INT 528 Interdisciplinary Rural Health Care Delivery I (NUR, PSY, SPC, SWK)

A study of health professions, health care delivery models, and interdisciplinary team health care delivery in rural settings. Incorporated will be group process and conflict management strategies. Prerequisite: Permission. Cr 3.

##### INT 529 Interdisciplinary Rural Health Care Delivery II (NUR, PSY, SPC, SWK)

Through use of case studies illustrative of prevalent health problems, students will learn to function as interdisciplinary health delivery team members. Focus will be on needs associated with cultural minorities, rurality and poverty. Prerequisite: INT 528 or permission. Cr 3.



# University College

Charles R. MacRoy, *Dean*

Tracy R. Gran, *Associate Dean*

University College provides responsible access to a wide variety of educational opportunities at the University of Maine. The College, established in 1985 as both an academic and support service unit of the University of Maine, offers associate degrees in the liberal arts and career programs; offers a Bachelor of University Studies through its Division of Continuing Education; provides academic assessment and support services for those students not adequately or appropriately served by other University of Maine divisions; and provides Maine citizens and others with an opportunity for continuing their education in part-time evening programs and summer sessions, in conference and workshop programs, in cooperative education activities, and in special programs designed for individual and specific groups with special needs.

Organized around three principal activities, namely, academic degree programs, academic assessment and support services, and university/community support services, *University College* offers access to the University of Maine's resources both to student populations and Maine's business, industry, and public agency constituencies. *Academic Degree Programs* include; Business Management, Dental Assisting, Dental Hygiene, Health Information Technology, Human Services, Legal Technology, Liberal Studies, and University Studies. *Academic Assessment and Support Services* are provided by the Developmental Studies Program, counseling, tutoring, and writing and mathematics laboratories. *University/Community Support Services* include the Conferences and Institutes Division, the Continuing Education Division and Special Programs.

Located on both the Bangor and Orono campuses of the University of Maine, *University College* provides commuter and residence hall students as well as traditional and non-traditional learners with caring "teaching" faculty, a strong academic advising system, an intimate learning environment conducive to personal growth, and educational opportunities which are innovative, challenging and rewarding.

Specifically, two-year Associate of Science degrees are offered on the Bangor Campus in:

Business Management

Dental Hygiene

Health Information Technology

Human Services (programs in chemical addiction counseling, child and youth services, developmental disabilities, gerontology, men-

tal health, and infant toddler preschool.

Legal Technology (options in Criminal Justice and Para-Legal)

The two-year Associate of Arts degree in Liberal Studies is offered on both the Bangor and Orono campuses.

The four-year Bachelor of University Studies degree is offered through the Continuing Education Division (evening division).

A three-semester certificate, Dental Assisting Program is also available.

## Admission

The responsible access policy at University College offers opportunities in higher education not only to high school graduates who have taken college preparatory courses, but to older adults, veterans, holders of high school equivalency certificates, and non-college preparatory students.

New applicants and transfer students are normally required to take diagnostic tests in reading, writing, and mathematics. The Liberal Studies, Business Management, Legal Technology and Human Services programs require such testing after admission for course placement purposes. The Dental Hygiene and Health Information Technology programs require testing prior to admission determination. All candidates are notified of the testing schedule when they submit their admission applications. In some cases, as an alternative to a career program, a student may be admitted as an "undeclared major" until study skills courses are fulfilled.

Liberal Studies students who need three or more basic preparatory courses in reading, writing, and mathematics will be offered a provisional admission to the degree program with the understanding that (a) they will initially be students in the Developmental Studies Program and (b) they will remain in the program until they pass the required preparatory courses in a mandated semester-by-semester time sequence. After earning this certificate, applicants will then be students in good standing in the Liberal Studies program. Provisional status can generally be satisfied in two semester.

For detailed information on University College, contact:

Director of Admissions

University College

Acadia Hall

Bangor, Maine 04401

Telephone: 207-581-6161

## Advanced Placement

In certain subjects, candidates who have completed advanced work in secondary schools or have had training and/or experience in certain professional or semi-professional fields, may apply for advanced placement and credit at University College. Candidates interested in advanced placement and credit may take the College Level Examination Program (CLEP) tests, administered by the College Entrance Examination Board. The Office of Testing and Research at UM has established a CLEP Testing Center in Alumni Hall. Inquiries on procedure should be directed to this office.

Duplicate credit may not be granted. For example, credit may not be granted for passing an examination in a field in which a student has already taken the equivalent or a more advanced course. Once the examination is passed, the score and the credit granted by the college dean are entered by the registrar on the student's permanent record. Each case will be considered individually on its own merits.

The Human Services Program offers an Assessment of Prior Learning Program (APLP) in which human service degree candidates may receive advanced standing by demonstrating human service knowledge and competencies. Inquiries should be made to the Human Services Program, Caribou Hall, 581-6030.

## Academic Advising

A successful academic performance is enhanced by intelligent, intensive, and meaningful academic advising.

All students at University College are assigned a specific faculty academic advisor. The faculty academic advisor is responsible for the management of all academic matters for their student advisees. The faculty advisor assists the University College student in course selection and sequence, registration, add/drop transactions, policy information, referral, transfer, and graduation requirements. Periodic meetings during the semester between the faculty advisor and advisee is the norm at University College and academic advising is a personally intensive experience.



## Academic Assessment and Support Services

### Developmental Studies Program

Professor Smith (Chairperson)

Associate Professors Holden, Pinette, Schonberger; Lecturer Blake.

Courses offered by this program provide students opportunities to improve their competencies in mathematics, science, writing, reading, and study skills. Students may elect to take these basic skills courses or, if test results indicate the need, may be required to take developmental courses as a condition of admission. Students needing extensive improvement in basic skills will likely need to spend additional semesters at the college to complete degree requirements.

The number of students in the Developmental Studies classes rarely exceeds 18; instruction, therefore, is provided in a small-group setting. A limited number of credits earned in Developmental Studies courses may be accepted for degree credit by some programs. Grades earned in Developmental Studies courses are included in the computation of a student's overall grade point average.

#### Courses in Developmental Studies

##### DSE 020A Basic Writing Skills I

Emphasizes the basics of English composition including grammar, spelling, sentence construction, and the organization of sentences into paragraphs. Students successfully completing this course are required to take DSE 021A. Cr 3.

##### DSE 021A Basic Writing Skills II

The mechanics of good writing including spelling, punctuation, capitalization, correct word usage and sentence structure will be studied with emphasis on writing expository papers. Cr 3.

##### DSI 011A Developmental Studies Skills

Provides the opportunity to improve specific academic skills including spelling, vocabulary,

sentence skills, and study skills. Prerequisite: Developmental Studies testing or permission. Cr 1.5.

##### DSI 015A Individual Mathematics Preparation

Designed primarily for those who need assistance in gaining specific math skills required in such areas as physical sciences, biological sciences, allied health, agriculture, business, clerical trades, and general trades (construction, electrical and electronics, drafting, etc.). An individualized program of study to meet each student's needs. Cr 1-3.

##### DSM 025A Fundamentals of Mathematics

Reviews arithmetic and introduces algebra and informal geometry. Problem solving is stressed. Cr 3.

##### DSM 030A Introductory Algebra I

This is the first course of a two semester sequence. Topics covered include: an arithmetic review, the language of algebra, signed numbers, linear equations, inequalities and polynomials. Cr 3.

##### DSM 031A Introductory Algebra II

This is a continuation of DSM 030A. Topics include algebraic fractions, radicals, quadratic equations and systems of equations. Prerequisite: DSM 030A. Cr 3.

##### DSM 035A Algebra

Emphasis on solving equations, factoring, graphing, applications of algebra to practical problems. Prerequisite: competence in basic arithmetic. Cr 3.

##### DSR 041A Reading Laboratory

Emphasis on reading rate, flexibility, vocabulary, comprehension and study skills. Less intensive than DSR 061A. (Pass/Fail Grade Only). Cr 1.

##### DSR 051A College Reading and Study Skills I

Designed for students needing two semesters of instruction in reading and study skills. After the successful completion of this course, students are required to take DSR 061A. Prerequisite: Development Studies testing. Cr 3.

##### DSR 061A College Reading and Study Skills II

Instruction concentrates on comprehending various types of reading passages, expanding vocabulary, learning note-taking methods and other effective study techniques, and improving general reading rates. Cr 3.

##### DSR 071A Academic Reading and Writing Skills

Instruction concentrates on how to read critically and how to develop, analyze, and structure ideas into writing. Prerequisite: DSR 061A. Developmental Studies testing. Cr 3.

##### DSS 020A Fundamentals of General Chemistry

Designed primarily for those who need assistance in gaining specific chemistry competencies required in such areas as physical sciences, biological sciences, allied health, engineering and agriculture. An individualized program of study to meet each student's needs. Cr 3.

##### DSS 030A Fundamentals of General Physics

Designed primarily for those who need assistance in gaining specific physics competencies required in such areas as physical sciences, biological sciences, allied health, engineering and agriculture. An individualized program of study to meet each student's needs. Cr 1-3.



## Other Academic Assessment and Support Services

### Counseling and Testing

Personal counseling and testing are available for all University College students at the Center for Counseling Services in Room 139 Eastport Hall, Bangor, 581-6100.

Placement testing is provided by appointment on the Bangor Campus in Acadia Hall and

at Orono in Chadbourne Hall. To find out specific times you should call 581-6161.

### Writing and Mathematics Laboratories

Another vital academic service at University College involves the writing and math labs.

Many students may need extra assistance in completing their math and writing requirements. These students as well as those who simply want to enrich their skills are provided additional personalized instruction by professional staff. The laboratories are located in Room 136 Eastport Hall.

## University/Community Support Services

### Conferences and Institutes Division

Established in 1973, this division brings together groups of participants and qualified resource people to share information and ideas, develop new skills and insights, and seek solutions to current problems. Annually, over 40,000 people participate in more than 350 conferences, seminars, workshops, short courses, institutes, and symposia. The division is also responsible for all non-credit continuing education. Annually it administers over 400 courses and programs to nearly 5,000 students through its Community and Professional Management program offerings. The office is located in Chadbourne Hall.

### Continuing Education Division

The Continuing Education Division coordinates the part-time study of non-traditional and non-degree students on the Orono and Bangor campuses and in a wide geographical area surrounding the Orono campus. Over 450 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 sometimes be applied toward degree programs or may be primarily for professional or personal use. 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 Continuing Education Division 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 specific courses to be used for personal or occupational development. A number of students who are recent high school graduates are beginning their college career by enrollment in C.E.D. classes.

A large variety of degree credit courses are available on the Orono and Bangor campuses as well as at selected outreach centers. Courses offered may 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 C.E.D. course are encouraged to visit the C.E.D. office in Chadbourne Hall, 581-3142.

### Summer Session

The Summer Session, established in 1895, is designed to meet the needs of regularly enrolled college students, educators, and those who seek 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 the Summer Session is fully recognized and may be counted toward the degrees which the University of Maine confers or may be transferred to other colleges and universities.

In 1990 over 6,700 students enrolled in the Summer Session. Of these, approximately 30 percent were residents of other states and approximately 4 percent were residents of other countries. Nearly 30 percent were enrolled in graduate level courses.

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

The Summer Session Office is located in 122 Chadbourne Hall, (207) 581-3142. 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.

### The Office of Special Programs

The Office of Special Programs on the Bangor campus serves as a one-stop access point for anyone wishing to explore personal enrichment and career development opportunities through continuing education. Staff are available for private interviews to provide close personal advice and assistance in a relaxed setting.



## Bachelor of University Studies

The Bachelor of University Studies presents to the highly motivated adult 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 adult part-time students.

The program is offered for many individuals: those 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; 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 to displace proven current programs or offerings of the University or of other schools and colleges. The degree differs in two major respects from traditional B.A. and B.S. degrees. First, it is offered only through the Continuing Education Division and only for

adults who can attend the University on a part-time basis. Second, each student, in consultation with a C.E.D. advisor, will design a program leading to specific educational goals but not necessarily within any one department, division, school, or college. Individual plans are approved by an advisory committee composed of representatives of each of the University Colleges. The program is designed to be flexible and adaptable to the needs of the individual part-time adult student.





## Academic Degree Programs

### Business Management

#### Associate of Science Degree Program

Professor King (Chairperson)  
Assistant Professors Criner and Roper

The Business Management Program is designed to prepare men and women for employment or advancement in business, industry, government, or service organizations as managers or administrative assistants, and to provide an opportunity for self-employed persons to further develop managerial skills.

The Program is offered at the Bangor campus both during the day and in the evening. It will also be offered in the evening at various off-campus locations as sufficient interest is generated.

The curriculum provides a balanced foundation of professional courses, liberal arts and elective. There are ten required business courses in such subjects as marketing, taxation, business management. Required liberal arts courses are in the social and political sciences and the humanities. Electives are provided to enable the students to pursue their own special areas of interest. Towards that end, independent study and cooperative education/field experience programs are included among the electives. It is also possible to obtain the associate's degree in Business Management with a concentration in banking, real estate, or data processing.

Sixty (60) credit required for the degree. A minimum Program and overall grade point average of 2.0 is also required. Students transferring to the Program must complete at least 15 hours of Business courses in the Department to meet residency requirements.

Applicants must have a high school diploma or its equivalent. Scholastic aptitude and college ability tests may be recommended or required. Certain preparatory courses may be required in appropriate cases. These courses may be taken along with regular program courses but may extend the time required to get a degree.

#### Courses in Business Management

##### **BUS 101A Principles of Microeconomics**

Considers principles of microeconomics and their application to economic and business decision-making. Topics include supply and demand analysis, costs of production, marginal analysis and pricing and output behavior of firms under alternative market conditions.

Cr 3.

Business Management Specimen Programs			
CONCENTRATION IN BANKING			
First Year		Second Year	
First Semester		Second Semester	
BUS 101A Microeconomics	3	MAT 101A Mathematics for the Consumer	3
BUS 158A Data Processing I	3	BUS 204A Managerial Accounting	3
BUS 104A Financial Accounting	3	BUS 201A Marketing	3
ENG 101A Critical Written Expression	3	SPE 101A Oral Communications	3
Principles of Banking (AIB)	3	Law and Banking Applications (AIB)	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>
Third Semester		Fourth Semester	
BUS 230A Statistics	3	ENG 230A Business, Professional and Technical Writing	3
BUS 155A Introduction to Taxation Management Fundamentals (AIB)	3	Money and Banking (AIB)	3
POS 102A State and Local Government	3	BUS 212A Business Management Seminar	3
OR		BUS 251A Principles of Finance Federal Regulation of Banking (AIB)	3
HTY 204A American Foreign Policy	3	<b>TOTAL HOURS</b>	<b>15</b>
OR			
HTY 254A Contemporary America	3		
OR			
HUM 201A Literature and The Exploration of Human Value Supervision & Personnel Administration	3		
<b>TOTAL HOURS</b>	<b>15</b>		

##### **BUS 102A Business Management I**

Presents forms of business organization, economic framework, the managerial functions, managerial decision making and concepts of managerial economics relations to need of specific businesses.

Cr 3.

##### **BUS 103A Business Law I**

Emphasis on the contracts, agency and property.

Cr 3.

##### **BUS 104A Financial Accounting**

Covers the principles and procedures used in the preparation of balance sheets and income

statements. Deals with the systematic recording, classifying, and analyzing of business transactions, preparation and presentation of accounting information, and asset valuation and analysis.

Cr 3.

##### **BUS 106A Introduction to Real Estate**

Provides entry level competency in real estate. Students successfully completing the course qualify for a Sales Agent license under the revised Real Estate License law and are eligible to perform all brokerage services under the supervision of a designated broker.

Cr 3.



**BUS 155A Introduction to Taxation**

An introductory survey of federal taxation as it applies to individuals and businesses. Covers payroll taxes as well as federal income tax on individuals, partnerships and corporations.

Cr 3.

**BUS 158A Data Processing I**

Emphasis on practical business applications through an introduction to the use of word processing, data base management, and spread sheet software.

Cr 3.

**BUS 201A Marketing**

Covers theoretical principles, consumer and product characteristics, trade practices, market channels, and the improvement of markets and marketing.

Cr 3.

**BUS 202A Business Management II**

A continuation of BUS 102A. Explores the ways in which people in the work place relate to each other and to the business organization. Prerequisite: BUS 102A.

Cr 3.

**BUS 203A Business Law II**

Introduces the uniform commercial code and explores the laws governing business enterprise organization. Emphasis on sales contracts, negotiable instruments, secured transactions, partnerships, and corporations. Prerequisite: BUS 103A.

Cr 3.

**BUS 204A Managerial Accounting**

Explores the preparation and utilization of financial information for management purposes. Focuses on cost determination, cost control, liabilities and stockholders equity valuation and analysis. Prerequisite: BUS 104A.

Cr 3.

**BUS 206A Real Estate Law**

The first of two courses for students working towards the State of Maine Real Estate Associate Brokers' License. Covers the prescribed aspects of Real Estate Law. Prerequisite: Sales Agent License.

Cr 3.

**BUS 207A Macroeconomics**

Applies introductory macroeconomic theory to contemporary national and international economic issues. Topics include business cycle, employment, inflation, and international trade theories as well as fiscal and monetary policy concepts. Prerequisite: BUS 101A or equivalent.

Cr 3.

**BUS 210A Insurance and Risk Management**

Covers the discovery and realization of existing risks and the analysis of probability and seriousness of these risks. Also considers methods of dealing with risks and the implementation and evaluation of meeting various risks through transfer to particular types of insurance such as property, liability and life and health. Prerequisite: BUS 102A or permission.

Cr 3.

**BUS 212A Business Management Seminar**

A capstone course designed to integrate material from several core courses depending upon the students enrolled in the course and availa-

**CONCENTRATION IN DATA PROCESSING**

First Year		Second Year	
First Semester		Second Semester	
BUS 101A Microeconomics	3	MAT 101A Mathematics for the Consumer	3
BUS 158A Data Processing I	3	BUS 204A Managerial Accounting	3
BUS 104A Financial Accounting	3	BUS 201A Marketing	3
ENG 101A Critical Written Expression	3	SPE 101A Oral Communications	3
BUS 102A Business Management I	3	BUS 258A Data Processing II	3
<b>TOTAL HOURS</b>	<b>15</b>	COS 125A Introduction to Computer Science "BASIC" Programming	3
		<b>TOTAL HOURS</b>	<b>18</b>
Second Year			
Third Semester		Fourth Semester	
BUS 230A Statistics	3	ENG 230A Business, Professional and Technical Writing	3
BUS 155A Introduction to Taxation	3	BUS 103A Business Law I	3
BUS 202A Business Management II	3	BUS 212A Business Management Seminar	3
POS 102A State and Local Government	3	BUS 251A Principles of Finance	3
OR		INT 135A Business Data Analysis	3
HTY 204A American Foreign Policy	3	<b>TOTAL HOURS</b>	<b>15</b>
OR			
HTY 254A Contemporary America	3		
OR			
HUM 201A Literature and The Exploration of Human Value	3		
INT 168A Business Data Processing-COBOL	3		
<b>TOTAL HOURS</b>	<b>15</b>		

**CONCENTRATION IN REAL ESTATE**

First Year		Second Year	
First Semester		Second Semester	
BUS 101A Microeconomics	3	MAT 101A Mathematics for the Consumer	3
BUS 158A Data Processing I	3	BUS 204A Managerial Accounting	3
BUS 104A Financial Accounting	3	BUS 201A Marketing	3
ENG 101A Critical Written Expression	3	SPE 101A Oral Communications	3
BUS 102A Business Management I	3	BUS 206A Real Estate Law	3
BUS 106A Introduction to Real Estate	3	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>18</b>		
Second Year			
Third Semester		Fourth Semester	
BUS 230A Statistics	3	ENG 230A Business, Professional and Technical Writing	3
BUS 155A Introduction to Taxation	3	BUS 103A Business Law I	3
BUS 202A Business Management II	3	BUS 212A Business Management Seminar	3
POS 102A State and Local Government	3	BUS 251A Principles of Finance	3
OR		BUS 260A The Role of the Designated Broker	3
HTY 204A American Foreign Policy	3	<b>TOTAL HOURS</b>	<b>15</b>
OR			
HTY 254A Contemporary America	3		
OR			
HUM 201A Literature and The Exploration of Human Value	3		
BUS 226A Real Estate Practice	3		
<b>TOTAL HOURS</b>	<b>15</b>		



ility of faculty. Prerequisite: BMB seniors only. Cr 3.

#### **BUS 214A Intermediate Accounting**

Provides a broad review of accounting and the foundation necessary for an in-depth examination of particular major accounting problems. Prerequisite: BUS 204A or by permission. Cr 3.

#### **BUS 216A Real Property Valuation**

Emphasis on real estate appraisal. Also covers construction methods and components, residential architecture, and land use planning, codes, and ordinances. Prerequisites: BUS 206A. Cr 3.

#### **BUS 220A Personal Selling**

Develops basic persuasive abilities, especially those which underlie leadership. The role of selling in the management of the business firm is emphasized. Cases, role playing and projects are used. Students develop sales presentations. Cr 3.

#### **BUS 226A Real Estate Practice**

The second course for student working toward the Maine Real Estate Associate Brokers' License. Covers all the general functions of real estate brokerage in Maine including listings, sales, financing, mathematics, advertising, and closing procedures. Prerequisite: BUS 206A. Cr 3.

#### **BUS 230A Statistics**

Covers the nature and use of statistics, including methods of collecting, organizing, interpreting, and reporting data for business management decisions. Introduces such topics as graphical and numeric data description, probability, estimation, and hypothesis testing. Prerequisite: MAT 101A, second year students only. Cr 3.

#### **BUS 240A Starting and Developing a Business**

Students gain experience in developing a business plan and in understanding the interrelationships of planning, production, marketing, and financial aspects of the business organization. Cr 3.

#### **BUS 251A Principles of Finance**

Topics include the function of finance in a firm, specific tasks assigned to a financial manager, tools and techniques to measure managerial performance, the role of finance in the American economy, how managerial finance is used to further economic goals. Prerequisite: BUS 104A or permission. Cr 3.

#### **BUS 258A Data Processing II**

Students achieve proficiency at the intermediate level on word processing, data base, and spreadsheet packages on the microcomputer. Prerequisite: BUS 158A or equivalent. Cr 3.

#### **BUS 260A The Role of the Designated Broker**

Equips the student with the skills required by a Designated Broker for an agency. Upon successful completion of this course and completion of one year as a full-time licensed Associate Broker, the student will qualify for a Real Estate Broker license in the state of Maine. This course is now a requirement for the Broker's License under the new Real Estate License law. Prerequisite: BUS 226A or an Associate Broker license. Cr 3.

#### **BUS 269A Business Data Processing-COBOL II**

Expands upon basic COBOL language skills and programming techniques. Advanced concepts will include table handling, sequential and random file processing, the use of subpro-

grams and sorting, merging and updating files. Prerequisite: INT 168A and permission. Cr 3.

#### **BUS 289A Topics in Business Management**

An independent study undertaken by special arrangement and direction of the faculty of the Business Management Program or a special course created at the request of a group of students with special interests not served by a regularly scheduled course. Cr 1-3.

#### **BUS 294A Cooperative Education/Field Experience**

A work experience that integrates classroom theory with practical experience in a job directly related to the Business Management Program. The pre-planned work experience may be suitable paid and/or volunteer work. Both academic and work supervision will be provided. Prerequisite: 30 hours credit and Business Management faculty approval. Cr 3-9.

#### **Interdisciplinary Courses**

##### **INT 135A (BUS, LIB) Business Data Analysis**

Provide data processing experience through the use of a mainframe statistical package in the analysis of business data. The class constructs a marketing questionnaire followed by the collection and analysis of the data. Prerequisites: BUS 158A or COS 125A and an introductory statistics course. Cr 3.

##### **INT 168A (BUS, LIB) Business Data Processing-COBOL**

An introduction to the designing and writing of business application programs using the COBOL programming language. The programs will be run on a microcomputer. Prerequisite: COS 125A. Cr 3.





## Dental Health Programs

Associate Professor Graham, Chairperson

### Dental Hygiene

Associate of Science Degree Program

Associate Professors Bearor, Graham, Lee  
Assistant Professor Marsh-Perry

A program in dental hygiene provides an attractive opportunity to men and women interested in health careers. The main concern of the dental hygienist is the maintenance of good oral health in relation to total health. The student is educated to perform clinical services, such as patient assessment, instrumentation, dental radiography and application of fluorides and sealants. The students also learn to be an oral health educator, to teach patients and the community the principles of preventive oral health care. The program emphasizes the dental hygienists' role in the prevention of oral disease. Laboratory equipment and a modern dental hygiene clinic are among the facilities provided by the program. Extramural clinical experience is gained through the cooperation of the Veterans Administration Center in Togus, Maine. Students gain enrichment experiences through extramural rotation assignments in general and specialty dental practices and community dental clinics. In addition to the permanent faculty, staff also is drawn from practicing dentists and dental hygienists throughout the State.

The curriculum is designed to give the student a well-rounded foundation in health sciences, specific knowledge and clinical skills in the dental sciences, and an understanding in the humanities. The courses are particularly suited to those who have a sincere interest in science and enjoy working with people.

The Dental Hygiene Program is accredited by the Commission on Dental Accreditation of the American Dental Association, a specialized accrediting body recognized by the Council on Postsecondary Accreditation and by the United States Department of Education.

Applicants must have a high school diploma or GED certificate. Recommended for admission to the Program is a college preparatory course in high school. Previous academic courses in laboratory biology and chemistry, mathematics including algebra II or its equivalent are required. Additional diagnostic testing in reading, writing and math may be required upon receipt of the application. Students accepted for admission are further required to have a complete physical examination, including dental, optical

and hearing examinations within 3 months prior to entering the program. Students must begin the Hepatitis B vaccination series at least 2 months prior to entering the preclinical dental hygiene courses and be certified in Cardiopulmonary Resuscitation (CPR). It is solely the responsibility of the applicant to insure that the completed application and related materials (high school transcript, any transcripts of grades beyond high school, test scores, recommendations, etc.) are received by the Admissions Office. Early application is encouraged because class size is limited.

#### Fee

Each Dental Hygiene student purchases an instrument kit, a lab coat, clinical uniforms, safety glasses and name pin. Transportation costs to attend extramural clinical sites within the Bangor area are the student's responsibility as are the licensing examination fees.

Beyond room, board and tuition, estimated cost including books and clinical supplies is approximately \$3000. These fees are subject to change without notice.

#### Academic Progress

All students enrolled in the Dental Hygiene Program must achieve a minimum accumulative Grade Point Average of 2.0 before progression in the program is permitted. Dental Hygiene students must earn a minimum of "C" in all courses.

To be eligible for graduation the student must have successfully completed all requirements, have a minimum of 75 credit hours and a Grade Point Average of at least a 2.00. Professional behavior and attitude are expected at all times.

#### Degree

Upon successful completion of this Program, the student will be awarded the degree of Associate of Science in Dental Hygiene.

### Curriculum in Dental Hygiene A.S. Degree Program

#### Required Courses:

ENG 101A Critical Written Expression	
SPE 101A Oral Communications	
PSY 101A Introduction to Psychology	
SOC 101A Introduction to Sociology	
BIO 160A Anatomy and Physiology	
BIO 280A Pathophysiology	
BCH 160A Introduction to Biochemistry	
MCB 160A Medical Microbiology	
DEH 110A Preclinical Dental Hygiene	
DEH 111A Preclinical Dental Hygiene Theory	
DEH 112A Oral, Head and Neck Anatomy	
DEH 113A Dental Radiology	
DEH 150A Clinical Dental Hygiene I	
DEH 151A Clinical Dental Hygiene Theory I	
DEH 152A Oral Pathology	
DEH 153A Oral Histology and Embryology	2
DEH 155A Nutrition	3
DEH 210A Clinical Dental Hygiene II	3
DEH 211A Clinical Dental Hygiene Theory II	2
DEH 212A Pharmacology and Anesthesiology	2
DEH 213A Dental Materials	2
DEH 214A Periodontology	2
DEH 216A Dental Materials Lab	1
DEH 250A Clinical Dental Hygiene III	3
DEH 251A Clinical Dental Hygiene Theory III	1
DEH 252A Dental Specialties	3
DEH 253A Community Dentistry	3
DEH 254A Ethics, Jurisprudence and Office Management	2

TOTAL HOURS

75



## Courses in Dental Hygiene

- DEH 102A Chairside Dental Assisting II**  
Presents the fundamental concepts of endodontics, oral surgery, orthodontics, prosthodontics, periodontics, and pediatric dentistry. Students will gain a knowledge and appreciation for the specialty practices, with theories and functions. Emphasis placed on the dental assistant's role in these areas. Prerequisite: DEA 100A, DEA 101A, DEA 104A, DEH 213A or permission of instructor. Lec 2, Lab 2. Cr 3.
- DEH 110A Preclinical Dental Hygiene**  
Practical experience in techniques of instrumentation, operation and maintenance of chairside and support equipment and data gathering procedures. (Pass/Fail grade only). Cr 3.
- DEH 111A Preclinical Dental Hygiene Theory**  
Essentials of dental hygiene theory and practice related to clinical experience. Prerequisite: enrollment in Dental Hygiene Program. Lec 3. Cr 3.
- DEH 112A Oral, Head and Neck Anatomy**  
A study of tooth morphology and function, structures of the oral cavity, and gross anatomy of the head and neck. Prerequisite: Enrollment in Dental Hygiene Program. Lec 2, Lab 2. Cr 3.
- DEH 113A Dental Radiology**  
Topics include ionizing radiation, the history of x-rays, their production and properties, radiation measurement, radiation hazards and principles of radiation safety. Covers theory and practice of exposing, processing, mounting and interpreting dental radiographs. Prerequisite: Enrollment in Dental Health Programs. Lec 1.5, Lab 3. Cr 3.
- DEH 150A Clinical Dental Hygiene I**  
Practical application of dental hygiene theories and techniques with emphasis on individual patient's oral health needs and patient education. Prerequisite: DEH 110A, DEH 111A, DEH 112A, DEH 113A, BIO 160A, BIO 280A, BCH 160A. (Pass/Fail Grade Only). Clinic 8 hours. Cr 2.
- DEH 151A Clinical Dental Hygiene Theory I**  
Introduction to the theories and techniques of clinical dental hygiene practice including selected prophylactic skills, medical emergency procedures, patient interaction and the principles of preventive dentistry. Prerequisite: DEH 110A, DEH 111A, DEH 112A, DEH 113A, BIO 160A, BIO 280A, BCH 160A. Lec 3. Cr 3.
- DEH 152A Oral Pathology**  
A study of diseases of the oral cavity and surrounding structures and clinical differentiation between the normal and abnormal appearance of tissues. Prerequisite: DEH 112A, BIO 160A, BIO 280A, BCH 160A. Lec 2. Cr 2.
- DEH 153A Oral Histology and Embryology**  
A study of the origin, growth, development, and microscopic anatomy of the tissues of the oral cavity and surrounding structures. Prerequisite: DEH 112A, BIO 160A, BCH 160A. Lec 2, Lab 1. Cr 2.
- DEH 155A Nutrition**  
Fundamental principles of normal nutrition, the functions of nutrients, nutritional deficiencies, food values, eating patterns, food processing, purchasing and safety. Emphasis on relationship of nutrition and oral health to the dietary counseling of the dental patient. Prerequisite: BIO 160A, BCH 160A; Corequisite: DEH 150A. Lec 3. Cr 3.
- DEH 210A Clinical Dental Hygiene II**  
A continuation of the practical application of dental hygiene theories and techniques with emphasis on selected advanced techniques. Students will rotate through the extended clinical facility at the V.A. Center Hospital in Togus. Prerequisite: DEH 113A, DEH 150A, DEH 151A, DEH 152A, DEH 153A, DEH 155A, MCB 160A. Clinic 12 hours. (Pass/Fail Grade Only). Cr 3.
- DEH 211A Clinical Dental Hygiene Theory II**  
A continuation of dental hygiene theories and techniques with emphasis on treatment of the periodontal patient, advanced clinical skills and advanced patient management techniques. Prerequisite: DEH 150A, DEH 151A, DEH 152A, DEH 153A, DEH 155A, MCB 160A. Lec 2. Cr 2.
- DEH 212A Pharmacology and Anesthesiology**  
Emphasis on drugs and anesthetics used in dental practice. Prerequisite: DEH 150A, DEH 151A, DEH 152A, DEH 153A, BCH 160A, MCB 160A. Lec 2. Cr 2.
- DEH 213A Dental Materials**  
Various dental procedures, materials and devices commonly used in dental practice. Prerequisite: Enrollment in the Dental Health Programs. Lec 2. Cr 2.
- DEH 214A Periodontology**  
Clinical features, histopathology and diagnosis of various forms of periodontal disease and the philosophy of various surgical and nonsurgical periodontal treatments. Prerequisite: DEH 150A, DEH 151A, DEH 152A, DEH 153A, DEH 155A, MCB 160A. Lec 2. Cr 2.
- DEH 216A Dental Materials Lab (Dental Hygiene Lab)** Cr 1.
- DEH 217A Dental Materials Lab (Dental Assisting Lab)** Cr 2.
- DEH 239A Special Topics in Dental Auxiliary Education**  
Specialized theory and skills in auxiliary disciplines. Topics vary from semester to semester, depending upon expressed interests or identified needs. Designed to fill specialized needs of a given student population or address immediate dental auxiliary issues and trends outside of current course offerings. Prerequisite: Permission. Cr 1-4.
- DEH 250A Clinical Dental Hygiene III**  
A continuation of the practical application of dental hygiene theories and techniques with emphasis on selected advanced techniques. Students will have rotating assignments at the on-campus clinical facility and the V.A. Center Dental Clinic in Togus. Prerequisite: DEH 210A, DEH 211A, DEH 212A, DEH 213A, DEH 214A. Clinic 16 hours. (Pass/Fail Grade Only). Cr 3.
- DEH 251A Clinical Dental Hygiene Theory III**  
A continuation of dental hygiene theories and techniques with emphasis on dental research. Information regarding dental hygiene employment is also included. Prerequisite: DEH 211A, DEH 212A, DEH 213A, DEH 214A. Lec 1. Cr 1.
- DEH 252A Dental Specialties**  
A survey of operative dentistry, orthodontics, endodontics, oral surgery, pedodontics and prosthodontics, with emphasis on the dental hygienist's role in patient education and assisting with clinical procedures. Prerequisites: DEH 210A, DEH 211A, DEH 212A, DEH 213A. Lec 3. Cr 3.
- DEH 253A Community Dentistry**  
Covers current concepts in community oral health education, audiovisual techniques, group motivation, public health agencies, programs and project planning and the essentials of epidemiology and biostatistics. Also provides a comprehensive study of fluoride and the various public health methods of providing the community with fluoride on local, state and national levels. Prerequisite: DEH 210A, DEH 211A. Lec 3. Cr 3.
- DEH 254A Ethics, Jurisprudence and Office Management**  
Provides a foundation in professional ethics, knowledge of the laws governing the dental profession and understanding of the activities involved in practice management. Also explores current issues and controversies. Prerequisite: DEH 250A, DEH 251A. Lec 2. Cr 2.
- DEH 255A Environmental Control of the Dental Operative Field**  
Develops knowledge in additional intraoral functions that enhance the quality and quantity of restorative dental services available for the patient. Cr 1.



## Dental Assisting Certificate Program

Associate Professor Graham; Instructor Webb

This program is designed for individuals who are interested in becoming members of the dental health care delivery system. The curriculum is designed to provide a broad educational experience in the theory and practice of dental assisting, as well as a background in biological sciences and the humanities.

The Dental Assisting student will be educated in four-handed dentistry and in duties which may be delegated to dental assistants, including dental radiography, oral health education and business office responsibilities. Students gain practical experience through clinical and laboratory sessions and through extramural assignments in general and specialty dental practices, community and hospital dental clinics and dental laboratories.

The courses of study are particularly suited to those who have a sincere interest in science and enjoy working with people. The curriculum includes content in five areas: liberal studies, biomedical sciences, dental sciences, clinical sciences and clinical practice. The program emphasizes the knowledge and skills necessary for chairside dental assisting, but also prepares students to perform clinical support services, selected laboratory procedures and basic business office procedures.

The Dental Assisting Program is accredited by the Commission on Dental Accreditation of the American Dental Association, a specialized accrediting body recognized by the Council on Postsecondary Accreditation and by the United States Department of Education.

### Admission

To be eligible for admission, the applicants must have a high school diploma or its equivalent. Applicants are required to have taken one year of a laboratory science, preferably biology or chemistry and have satisfactorily completed courses in mathematics and typing. Students excepted for admission are further required to have a complete physical examination (including dental, hearing and optical examinations) within 3 months prior to entering the program. In addition, students must begin the Hepatitis B vaccination series at least 2 months prior to beginning the first term and be certified in Cardiopulmonary Resuscitation (CPR). It is solely the responsibility of the applicant to insure that the completed application and related materials such as high school transcripts, test scores, any transcripts of grades beyond high school, recommendations, etc. are received by the Admissions Office. Early application is encouraged because class size is limited.

### Specimen Curriculum

First Year		Second Semester	
First Semester			
BIO 105A Human Biology	4	DEA 102A Chairside Dental Assisting II	3
DEA 100A Introduction to Dental Assisting	1	DEA 105A Biodental Sciences II	3
DEA 101A Chairside Dental Assisting I	4	DEA 150A Clinical Practice II	6
DEA 104A Biodental Sciences I	3	DEA 152A Dental Office Management	3
DEA 113A Dental Radiology for Dental Assistants	3	DEA 153A Dental Health Education	2
DEH 213A Dental Materials	2	HUS 103A Interpersonal Relationships in the Helping Professions	3
DEH 217A Dental Materials Lab	2		
<b>TOTAL HOURS</b>	<b>19</b>	<b>TOTAL HOURS</b>	<b>20</b>

### Fees

Each dental assisting student purchases a laboratory coat, clinical uniforms, safety glasses, name pin and clinical supplies. Transportation costs to clinical assignments within the Bangor area are the student's responsibility, as are certification examination fees. The estimated cost for book and supplies, beyond tuition, room and board, is approximately \$1200. These fees are subject to change without notice.

### Academic Progress

Students in the Dental Assisting Program must earn a grade of "C" or better in all Dental Assisting courses and an overall grade point average of 2.0 to graduate with a Certificate in Dental Assisting. Thirty-nine (39) credits are required for the certificate. Professional conduct and attitude are expected at all times.

### Certification

Upon graduation students will be eligible to take the Certification Examination in General Chairside Assisting and Radiation Health and Safety administered by the Dental Assisting National Board. Successful completion of the examination carries with it the credential of Certified Dental Assistant (CDA) and qualifies the candidate for licensure in Dental Radiography from the Maine Board of Dental Examiners.

### Courses in Dental Assisting

**DEA 100A Introduction to Dental Assisting**  
Explores the history of dentistry, professional ethics and jurisprudence and the roles of each member of the dental health team. Basic ter-

minology will be introduced. Prerequisite: permission. Lec 1. Cr 1.

**DEA 101A Chairside Dental Assisting I**  
Introduces the dental assisting student to the care and use of dental equipment and dental assisting skills, with emphasis on operative dentistry procedures. Prerequisite: enrollment in the Dental Assisting Program or permission of instructor. Lec 2, Lab 4. Cr 4.

**DEA 104A Biodental Sciences I**  
Introduces the essentials of microbiology, dental and oral anatomy, general pathology, pharmacology and medical/dental emergencies as they relate to the dental assistant's role in patient care. Prerequisite: permission. Lec 3. Cr 3.

**DEA 105A Biodental Sciences II**  
Covers the essentials of oral histology, oral embryology, head and neck anatomy, oral pathology, and human nutrition. Prerequisite: BIO 105A or permission. Lec 3. Cr 3.

**DEA 113A Dental Radiology For Assistants**  
Ionizing radiation, the history of x-rays, their production and properties, radiation measurement, radiation hazards and principles of radiation safety, and interpretation of dental radiographs. The theory and practice of exposing, processing and mounting dental radiographs. Prerequisite: Enrollment in the Dental Assisting Program or permission of instructor. Lec 1.5, Lab 3. Cr 3.

**DEA 150A Clinical Practice**  
Provides experience in chairside dental assisting under direct supervision in private practice offices, community and hospital clinics. Prerequisite: DEA 100A, DEA 101A, DEA 104A, DEA 113A, DEH 213A, BIO 105A. 24 hours clinic. Cr 6.



**DEA 151A Dental Therapeutics and Office Emergencies**

The essentials of drug action, administration and toxicity of drugs. Emphasis on analgesics, sedatives, hypnotics, stimulants and anesthetics. Chemo-therapeutic agents related to infection and infectious diseases, histamine, anti-histamine and steroids are presented. First aid techniques and interceptive procedures for dental office emergencies are stressed. Prerequisite: DEH 112A, BIO 115A. Lec 2. Cr 2.

**DEA 152A Dental Office Management**

A survey including communications, appointment control, business and patient record keeping, dental payment plans, inventory control and hazard communication programs. Information on seeking employment is also included. Prerequisite: permission. Lec 3. Cr 3.

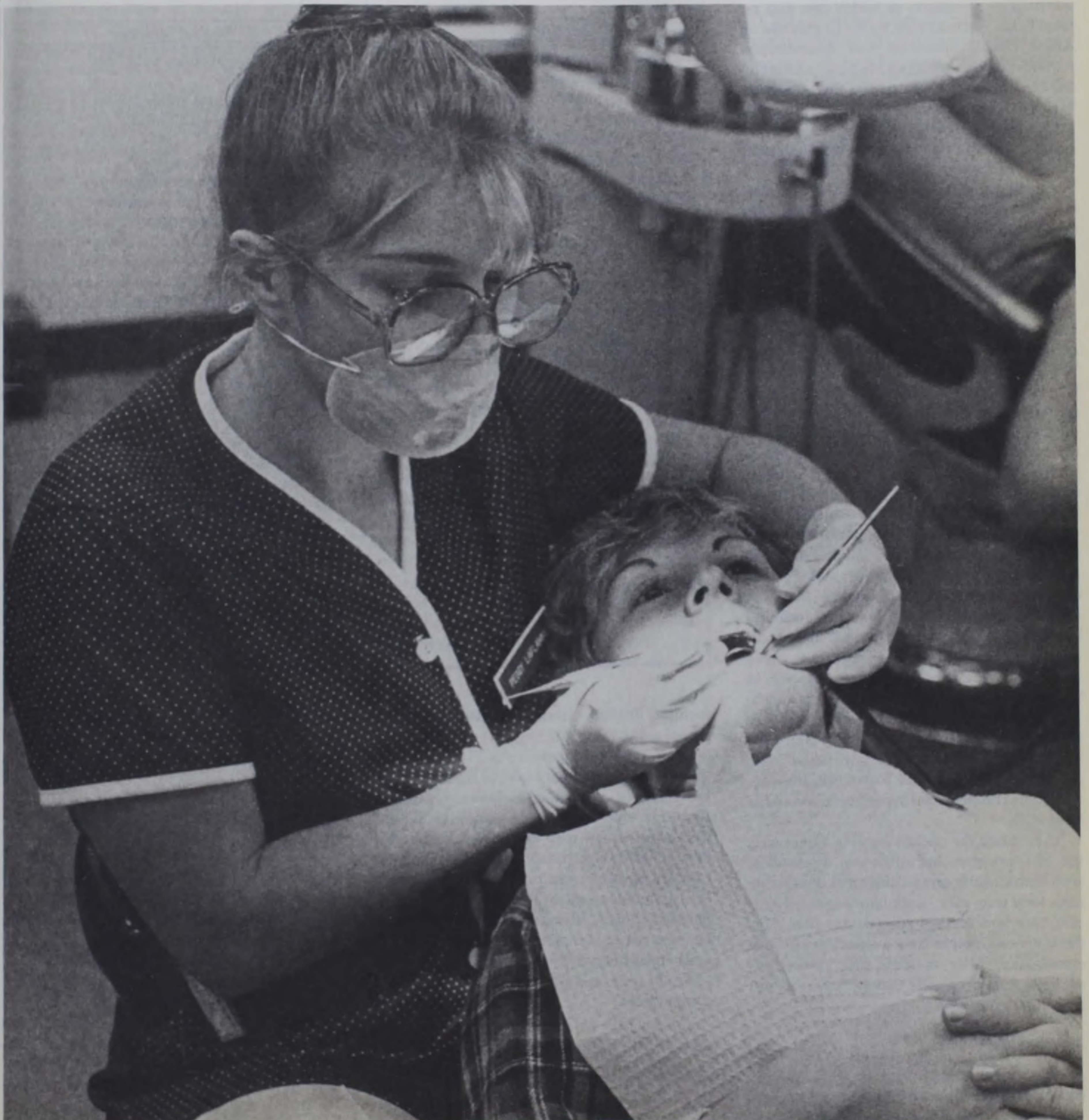
**DEA 153A Dental Health Education**

Emphasis on theories and techniques of patient education and motivation. Discusses prevention and control of dental diseases, and the role

of the dental assistant in dental health education. Prerequisite: DEA 104A and enrollment in DEA 105A, or permission. Lec 2. Cr 2.

**DEA 154A Dental Assisting Seminar**

Integrates dental assisting theory and techniques with emphasis on the role of a dental assistant as a member of the dental health team, the principles of work simplification and efficiency of motion. Prerequisite: DEA 110A, DEA 102A, DEA 151A, DEH 152A, DEH 153A, DEH 154A. Lec 1. Cr 1.





## Health Information Technology

### Associate of Science Degree Program

Associate Professor Benson, (Chairperson);  
Instructors Veilleux, Cropley

The Health Information Technology (HIT) program prepares graduates to meet the need for information specialists in health care and related fields. Accreditation by the Committee on Allied Health Education and Accreditation (CAHEA) of the American Medical Association (AMA), in conjunction with the American Medical Record Association (AMRA), allows graduates of the program to take the national accreditation examination for designation as an Accredited Record Technician (A.R.T.).

Graduates of the HIT program will demonstrate entry level competencies to perform technical skills such as organizing, analyzing, and technically evaluating medical records according to established standards; compiling various administrative and health statistics; coding symptoms, diseases, operations, procedures and other therapies according to recognized classification systems; maintaining and using a variety of health record indexes, special registries and storage and retrieval systems; transcribing medical reports; entering and retrieving computerized health data; and controlling the usage and release of health information.

The HIT curriculum is designed to meet entry level competencies in nine basic areas: management, legal aspects, personnel administration, health information systems, health records, information and retention and retrieval, health statistics, quality assurance systems, and classification and indexing systems. Required courses include 38 credit hours of technical courses, 18 credit hours of general liberal studies, and 7 credit hours of science. Sixty-three credit hours are required for the Associate of Science degree in Health Information Technology. Within the technical courses, there are three directed clinical experiences in which the students are placed in clinical sites where, with the guidance of a clinical supervisor, they demonstrate competencies in predetermined technical skills.

To facilitate the clinical learning experience, the HIT program has affiliation agreements with Maine health care facilities including acute care, long term care, ambulatory care, psychiatric care and various special care sites. Students are required to have a complete physical examination prior to their first clinical experience and to provide transportation to and from the clinical site.

#### Admission

Applicants must have a high school diploma or equivalent. Recommended high school subjects

Specimen Curriculum			
		First Year	
		First Semester	Second Semester
HIT 101A Introduction to Health Information Technology	4	HIT 151A Legal Issues in Health Information	3
HIT 111A Health Care Delivery Systems	3	HIT 161A Medical Transcription	3
HIT 131A Medical Terminology	3	HIT 171A Directed Clinical Practice I	1
BIO 160A Anatomy and Physiology	4	BIO 280A Pathophysiology	3
ENG 101A Critical Written Expression	3	BUS 158A Data Processing	3
		SPE 101A Oral Communications	3
<b>TOTAL HOURS</b>	<b>17</b>	<b>TOTAL HOURS</b>	<b>16</b>
		Second Year	
		Third Semester	Fourth Semester
HIT 201A Coding and Data Abstracting	3	HIT 251A Quality Assurance	3
HIT 221A Directed Clinical Practice II	2-5	HIT 261A Personnel Supervision	3
HIT 231A Health Care Statistics	3	HIT 271A Directed Clinical Practice III	2-5
PSY 101A Introduction to Psychology	3	HIT 281A Health Information Technology Seminar	1
General Elective:	3	HIT 141A Data Processing and Management of Health Information	3
Suggested Options		SOC 101 Introduction to Sociology	3
HIT 294A Cooperative Education OR		<b>TOTAL HOURS</b>	<b>15</b>
ENG 230A Business, Professional and Technical Writing OR			
BUS 258A Data Processing II			
<b>TOTAL HOURS</b>	<b>15</b>		
<b>TOTAL HOURS: 63</b>			

include English, laboratory Required high school subjects include English and Laboratory Science. Typing competency of 35 w.p.m. is required (this requirement may be fulfilled in the first semester). science, and algebra. Applicants should be able to type of 35 words per minute (this requirement may be fulfilled within the first semester). Admission testing, administered on campus and a personal interview will be required of all applicants. If pre-college preparation courses are indicated, the student will be expected to complete the necessary course work in addition to the required courses of the program. Full and part-time students are accommodated.

#### Academic Progress

HIT students must earn a grade of "C" or better in all technical (HIT) courses and an overall

average of 2.0 or better to graduate. Sixty-three (63) credits are required for the degree. Professional behavior and attitude is expected at all times.

#### Courses in Health Information Technology

##### HIT 101A Introduction to Health Information Technology

Introduces the fundamental theories and principles of health information including an overview of the health information profession, content and analysis of the health record, standards for accreditation and licensure of the health facility, utilization of the master patient index, various filing and storage methodologies, and maintenance of the paper, automated and micro-filmed record. Prerequisite: Health Information Technology students only. Lec 3, Lab 2. Cr 4.



**HIT 111A Health Care Delivery Systems**

Topics include the health care industry; governmental, voluntary and for-profit organizations; various types of health care facilities, occupations and delivery of services; the medical staff organization and bylaws; current ethical issues facing health care today. **Cr 3.**

**HIT 131A Medical Terminology**

A study of the definitions and construction of medical terms through analysis of word structure. Basic prefixes, suffixes, roots and abbreviations, as well as symptomatic, disease, and operative terminology are covered. Terms related to basic disease processes pathophysiology, patient examination and diagnostic and surgical procedures, as well as specialized terminology encountered in such areas as respiratory therapy, nuclear medicine, anesthesiology, physical medicine, oncology, psychiatry and pharmacy are also studied. **Cr 3.**

**HIT 151A Introduction to Legal Issues in Health Information**

Focus on the legal issues effecting health information such as the patient's rights, an overview of the legal system, confidentiality of patient information, the appropriate release of information, the use of informed consents and malpractice issues. Lec 2, Lab 2. **Cr 3.**

**HIT 161A Medical Transcription**

Develops basic transcription proficiency by integrating spelling, grammar, medical terminology with typing and word processing applications. Includes instruction in the use of transcription equipment, reference material, formatting reports, production and accuracy standards. Prerequisite: HIT 131A and typing competency. Lec 2, Lab 2. **Cr 3.**

**HIT 171A Directed Clinical Practice I**

The first of three directed clinical practices, designed to introduce the functions of a Medical Record Department through supervised field work in local hospitals and health care facilities. Prerequisites: HIT 101A, HIT 111A, HIT 131A. **Cr 1.**

**HIT 201A Coding and Data Abstracting**

A general overview of nomenclature and classification systems, with focus on coding inpatient clinical information from medical records, assigning the principal diagnosis, and sequencing codes appropriately. Prerequisites: HIT 131A, BIO 160A, BIO 280A. **Cr 3.**

**HIT 211A Coding II**

An advanced coding course in classification of inpatient, outpatient, and specialized clinical information, employment of data abstracting using automated and manual systems, and grouping health information for reimbursement purposes. Prerequisites: BIO 160A, BIO 280A, HIT 131A, HIT 201A. **Cr 3.**

**HIT 221A Directed Clinical Practice II**

The second of three directed clinical practices, designed to introduce the in-depth functions of record control, discharge analysis, release of information and transcription through supervised field work in local hospitals and health care facilities. Prerequisites: HIT 101A, HIT 171A. **Cr 2-5.**

**HIT 231A Health Care Statistics**

An introduction to descriptive and vital statistics including definitions, data collection and computation methodologies for hospitals and public health statistics, reporting requirements, report writing and computer applications using spreadsheets and graphics software. Prerequisites: HIT 101A, BUS 158A and math competency (as indicated by preadmission testing). **Cr 3.**

**HIT 251A Quality Assurance**

The functions of quality assurance inspected through the development of a facility wide Q.A. plan, the development of studies utilizing new and pre-set criteria, problem identification and the follow-up communication system to facilitate resolution of identified problem areas within individual health care departments. Includes information pertaining to the functions of utilization review and forms design. Computer applications will be comprised of database software

and the evaluation of prewritten QA/UR Coding application software. Prerequisites: HIT 101A, BUS 158A. Lec 2, Lab 2. **Cr 3.**

**HIT 261A Personnel Supervision**

Focus on health related management issues with emphasis on the principles of authority and responsibility; delegation and effective communication; organizational charts, job descriptions and policies and procedures; employee motivation, discipline and performance evaluations. Prerequisite: Health Information Technology students only or permission. **Cr 3.**

**HIT 271A Directed Clinical Practice III**

The third of three directed clinical practices, introducing on-the-job coding and abstracting, statistical reporting, management functions, quality assurance, utilization review, and the Tumor Registry through supervised field work in local hospitals and health care facilities. Prerequisites: HIT 201A, HIT 221A. **Cr 2-5.**

**HIT 281A Health Information Technology Seminar**

Identifies trends in the health care delivery systems, changing technology, methods and regulations. The student will complete a research project. Health Information Technology students only. **Cr 1.**

**HIT 294A Cooperative Education**

A professional activity under general supervision of an experienced professional in the field. Students gain practical experience, integrate classroom learning with job performance and develop future placement possibilities. 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. Not open to first semester first-year students. **Cr 1-3.**



## Honors Program

Associate Professor Surpless, College Honors Secretary

Two-year students of exceptional academic ability are invited to apply to pursue an associate degree with honors. Students enrolled at University College normally are granted admittance to the Honors Program after the first semester of work on the basis of their grade point average and faculty recommendation. However, students of exceptional ability may be admitted directly from high school as first semester first year students on the basis of their admission folder and an interview with the College Honors Secretary and/or the Honors Director. In order to earn an associate degree with honors, a minimum of nine hours of honors courses is required. This would include a minimum of two honors courses from the first year/sophomore/junior sequence of HON 101, HON 102, HON 201, HON 202, HON 301, and

HON 302 plus the second year independent study project, HON 299.

The first year-sophomore-junior sequence of courses HON 101, HON 102, HON 201, HON 202, HON 301, and HON 302 is taken in common with students from the other eight colleges within the University and courses are taught by faculty drawn from all colleges of the University. The independent study project (HON 299) is undertaken in the fourth semester and is done in the student's career area or, in the case of Liberal Studies students, in an area of special interest.

HON 101, HON 102, HON 201, HON 202, HON 301, and HON 302 meet the free elective requirement. HON 299, at the discretion of the program faculty, may also meet area distribution requirements.

In addition to the required honors course work, a one hour oral examination must be successfully completed before the associate degree can be awarded with honors. One half of the oral exam is over the work done in HON 299; the other half is over a reading list compiled from the works studied in the student's other Honors courses. The level of honors awarded at the associate degree is either - no Honors or Honors. The designation is based on the quality of the HON 299 project or paper and the performance on the oral examination. The Honors designation is recommended by the faculty examining committee to the College Honors secretary.

Additional information about the Honors Program and a full description of courses may be found elsewhere in this catalog. (See index)





## Human Services

### Associate of Science Degree Programs

Professor Mary L. Cormier (Chairperson)  
 Professor Scott  
 Associate Professors Setter, Samuelian

Human Service Programs are offered in chemical addiction counseling, children and youth services, developmental disabilities, early childhood, gerontology, and mental health. The programs are occupational programs designed to prepare generalists for direct-care and first-level supervisory positions in human services. Graduates are employed as human service workers in a wide variety of human service programs such as mental health institutes, mental retardation facilities, mental health centers, day care centers, general hospitals, group homes, nursing homes, half-way houses, and community-based programs. Human service workers function as mental health workers, recreation workers and activity directors, outreach workers, community support workers, child-care workers, teacher assistants and substance abuse counselors.

The Human Service Programs are approved by the National Council for Standards in Human Service Education.

#### Practicum

Field experiences are offered in the mental health systems, substance abuse system, developmental disabilities systems, educational systems and criminal justice system in programs for children, adults and senior citizens. Beginning in the second semester of the curriculum, students are assigned to field placement experiences under supervision of an agency supervisor and a human service faculty member. Three competency-based field placement courses, 14 semester hours, and 500 clock hours, must be satisfactorily completed before graduation. Two-hour seminars accompany each field placement course.

#### Transfer

Although the Programs are designed to prepare graduates for employment, transfers to baccalaureate programs are appropriate for those demonstrating the potential. Transfer agreements exist with related bachelor's degree programs.

#### Academic Progress

Students are expected to maintain the same academic level of standing as defined in the student handbook. Required courses and the minimum number of credit hours as defined by the Program curriculum must be satisfactorily com-

### Specimen Curriculum in Chemical Addiction Counseling

First Year			
First Semester		Second Semester	
ENG 101A Critical Written Expression	3	HUS 102A Practicum in Human Service	4
HUS 100A Introduction to Human Services	3	PSY 201A Developmental Psychology	3
HUS 101A Group Processes	3	BIO 105A Human Biology and Lab	4
PSY 101A Introduction to Psychology	3	2 Introductory Courses	6
SOC 101A Introduction to Sociology	3	<b>TOTAL HOURS</b>	<b>17</b>
<b>TOTAL HOURS</b>	<b>15</b>		
Second Year			
Third Semester		Fourth Semester	
HUS 203A Practicum in Human Services	4	HUS 204A Practicum in Human Services	6
HUS 110A Alcohol and Alcoholism	3	HUS 208A Individual Assessment	3
SPE 101A Oral Communications	3	HUS 207A Behavioral Research Methodology	3
HUS 205A Interviewing and Counseling	3	HUS 211A Alcohol Treatment and Rehabilitation	3
Elective*	3	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>16</b>		

pleted. A grade of "C" or above is required in all practicum courses. An accumulative average of 2.0 is required for graduation. Sixty-three (63) credits are required for the degree.

The faculty and administration reserve the right to admit and retain only those students who, in their judgment, possess academic, health, and personal suitability for the Human Service Programs. Health and personal suitability criteria will be communicated to each student in writing at the beginning of the student's program. Student assessment is carried out by the faculty on a monthly basis.

The Human Services Program faculty and administration reserves the right to make curriculum and policy changes as necessary for continued high level professional education. Students will be apprised of such changes and informed of available options.

#### Admission

A high school diploma or it's equivalent is required for admission. In addition to testing and a successful personal interview, two positive letters of recommendation are also required for

admission. The letters of recommendation must be from human services professionals who can attest to the applicant's potential to be effective in helping relationships. If testing indicates the need for developmental courses, the student will be advised to take a lighter load which may result in an extension of the program beyond the usual 2 year period.

#### Degree

Upon successful completion of this Program, the student will be awarded the Associate of Science in Human Services.

#### Transportation

Transportation to and from classes and practicum locations is the student's responsibility.

#### Registration

It should be noted that any HUS student wishing to register in any one semester for more than 16 semester hours (exclusive of Physical Education) must obtain permission from his or her advisor.



## Chemical Addiction Counseling

This career program provides the graduate with skills necessary to work as a substance abuse counselor and a generalist human service worker in areas of prevention, treatment, rehabilitation, and after-care programs related to chemical addiction.

Candidates for admission must be committed to a career of working with people whose lives have been touched by alcoholism or drug addiction. Individuals recovering from alcoholism or other addictions are particularly encouraged to apply. Former alcoholics or drug addicts must have demonstrated quality sobriety to be admitted to the Program.

## Children and Youth Services

This program is designed to prepare graduates to work as human service workers and in prevention, non-residential, residential, and rehabilitation programs of youth and adolescents. Human service workers function in direct line positions providing services to children and youth.

## Developmental Disabilities

The Developmental Disabilities option of the Human Service Programs is designed to prepare human service workers to work primarily in direct service with individuals with mental retardation, cerebral palsy, epilepsy, autism and other handicapping conditions. Graduates are employed in community-based programs, schools and within the State of Maine System.

## Gerontology

This program is designed to prepare human service workers and individuals to work in a number of existing and new entry-level jobs in community based and institutional programs for the elderly. Graduates are employed in social service type positions, activity directors and community based programs for senior citizens.

## Mental Health

This program option is offered to meet the needs for entry and middle-level workers in the field of mental health. It is designed to provide the graduate with skills to work in a variety of mental health settings, mental health institutes, comprehensive mental health centers in both public and private mental health programs.

## Infant Toddler Preschool

The program reflects the generalist human service worker philosophy and curriculum model. Graduates of this program will have skills to be employed in daycare programs, headstart pro-

Specimen Curriculum in Children and Youth Services			
		First Year	
		First Semester	Second Semester
ENG 101A Critical Written Expression	3	HUS 102A Practicum in Human Services	4
HUS 100A Introduction to Human Services	3	PSY 301A Developmental Psychology	3
HUS 101A Group Process	3	BIO 105A Human Biology and Lab	4
PSY 101A Introduction to Psychology	3	HUS 120A Child Mental Health	3
SOC 101A Introduction to Sociology	3	1 Introductory Course	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>17</b>
		Second Year	
		Third Semester	Fourth Semester
HUS 203A Practicum in Human Services	4	HUS 204A Practicum in Human Services	6
SPE 101A Oral Communications	3	HUS 207A Behavior Research Methodology	3
HUS 205A Interviewing and Counseling	3	HUS 208A Individual Assessment Elective*	3
HUS 221A Adolescent Mental Health	3	<b>TOTAL HOURS</b>	<b>15</b>
1 Introductory Course	3		
<b>TOTAL HOURS</b>	<b>16</b>		
Specimen Curriculum in Developmental Disabilities			
		First Year	
		First Semester	Second Semester
ENG 101A Critical Written Expression	3	HUS 102A Practicum in Human Service	4
HUS 100A Introduction to Human Services	3	PSY 201A Child and Developmental Psychology	3
HUS 101A Group Processes	3	BIO 105A Human Biology	4
PSY 101A Introduction to Psychology	3	HUS 130A Nature and Needs of the Developmentally Disabled	3
SOC 101A Introduction to Sociology	3	1 Introductory Course	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>17</b>
		Second Year	
		Third Semester	Fourth Semester
HUS 203A Practicum in Human Services	4	HUS 204A Practicum in Human Service	6
SPE 101A Oral Communications	3	HUS 207A Behavioral Research Methodology	3
HUS 205A Interviewing and Counseling	3	HUS 208A Individual Assessment Elective*	3
HUS 231A Methods of Working with Developmentally Disabled	3	<b>TOTAL HOURS</b>	<b>15</b>
1 Introductory Course	3		
<b>TOTAL HOURS</b>	<b>16</b>		

grams, nursery schools and other early childhood programs.

### Courses in Human Services

**HUS 100A Introduction to Human Services**  
A non-theoretical orientation to the national, state and local human service delivery systems including human service specialty areas, models, and professions and their interrelationships. Covers professional ethics, confidentiality and

relevant professional terminology as well as basic helping skills. Cr 3.

### HUS 101A Group Processes

A study of group functioning and leadership including factors involved in-group cohesions and group conflict; communication systems, emotional styles, and role functions in groups; techniques of role playing, psychodrama, and sociodrama. Small group studies itself and practices communication and sensitivity skills. Cr 3.



**HUS 102A Practicum in Human Service**

Students practice skills of objective observing, reporting and recording, interpersonal relationships, interviewing and other helping relationship skills under professional supervision during weekly seminars. Students acquire in-depth understanding of the human service delivery system, and explore topics such as confidentiality, ethics, professionalism, values, and human rights and dignity. Students spend five weeks within three different agencies. Prerequisites: open only to HS majors; HUS 100A and permission. Cr 4.

**HUS 103A Interpersonal Relationships in the Helping Professions**

Explores theories of behavior management, learning, and motivation and develops related skills. The development of verbal and nonverbal interpersonal relationship skills will include listening and attending skills, cognitive and affective responses, leading responses, and self-involving responses also covers principles of interviewing and assertiveness skills. Cr 3.

**HUS 110A Alcohol and Alcoholism**

Introduces the historical and contemporary use and abuse of alcohol. Special attention to abuse of alcohol, the properties of alcohol which promote its use; the psychological and sociological theories explaining alcohol and drug use; the etiology of alcoholism; and the conceptual models of alcoholism. Cr 3.

**HUS 120A Child Mental Health**

An interdisciplinary applied course that expands on the physical, emotional, intellectual and social growth processes. Addresses positive mental health and explores prevention, detection and rehabilitation programming. Cr 3.

**HUS 130A Nature and Needs of the Developmentally Disabled**

Explores the physiological, psychological, educational, and familiar characteristics of developmental disabilities. Covers mental retardation, cerebral palsy, epilepsy, autism, and other handicapping conditions closely related to mental retardation. Considers the historical development of treatment for the developmentally disabled as well as current definitions and concepts. The practicum site will be used to assist in the identification and knowledge of the developmentally disabled. Cr 3.

**HUS 140A Introduction to Gerontology**

Traces the historic, legal and political aspects of services to the elderly and considers the economic, physiological, psychological adjustments of older persons, as well as transportation, communication, learning and social concerns. Also considers the unique cultural, social and communication needs of ethnic minorities, and the role and function of a gerontology specialist. Cr 3.

**HUS 150A Introduction to Mental Health**

An in-depth exploration presenting treatment models for acute and chronic mentally dis-

**Specimen Curriculum in Gerontology**

First Year			
First Semester		Second Semester	
ENG 101A Critical Written Expression	3	HUS 102A Practicum in Human Service	4
HUS 100A Introduction to Human Services	3	PSY 201A Child and Developmental Psychology	3
HUS 101A Group Processes	3	BIO 105A Human Biology	4
PSY 101A Introduction to Psychology	3	2 Introductory Courses	6
SOC 101A Introduction to Sociology	3	<b>TOTAL HOURS</b>	<b>17</b>
<b>TOTAL HOURS</b>	<b>15</b>		
Second Year			
Third Semester		FOURTH Semester	
HUS 203A Practicum in Human Services	4	HUS 204A Practicum in Human Service	6
HUS 140A Introduction to Gerontology	3	HUS 208Aa Individual Assessment	3
SPE 101A Oral Communications	3	HUS 207A Behavioral Research Methodology	3
HUS 205A Interviewing and Counseling	3	HUS 241A Activity/Recreation Leadership	3
Elective*	3	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>16</b>		

**Specimen Curriculum in Mental Health**

First Year			
First Semester		Second Semester	
ENG 101A Critical Written Expression	3	HUS 102A Practicum in Human Service	4
HUS 100A Introduction to Human Services	3	PSY 201A Child and Developmental Psychology	3
HUS 101A Group Processes	3	BIO 105A Human Biology	4
PSY 101A Introduction to Psychology	3	HUS 150A Introduction to Mental Health	3
SOC 101A Introduction to Sociology	3	1 Introductory Course	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>17</b>
Second Year			
Third Semester		Fourth Semester	
HUS 203A Practicum in Human Services	4	HUS 204A Practicum in Human Services	6
SPE 101A Oral Communications	3	HUS 207A Behavioral Research Methodology	3
HUS 205A Interviewing and Counseling	3	HUS 208A Individual Assessment	3
HUS 251A Psychosocial Rehabilitation	3	Elective*	3
1 Introductory Course	3	<b>TOTAL HOURS</b>	<b>15</b>
<b>TOTAL HOURS</b>	<b>16</b>		

**\*Electives**

HUS 206A Principles of Rehabilitation  
 HUS 209A Behavior Management Techniques  
 HUS 212A Prevention and Early Detection of Substance Abuse  
 HUS 213A Drugs: Use and Abuse  
 HUS 214A Human Services Agency Management  
 HUS 217A Addictions  
 HUS 232A Resource Awareness and Utilization  
 HUS 242A Physiology and Pathology of the Elderly  
 POS 100A National Government  
 PSY 305A Abnormal Psychology  
 PSY 253A Adolescent Psychology  
 SOC 151A Contemporary Social Problems



ordered individuals in residential and community based programs. Cr 3.

#### HUS 160A Introduction to Infants, Toddlers and Preschoolers

An introduction to the nature and needs of young children. Developmentally appropriate methods of caregiving will be studied. Interpersonal skills needed for working with young children and their families will be developed through discussion and role playing. Descriptions of services for young children will be presented by professionals working in the field. Prerequisite: HUS 100A or permission. Cr 3.

#### HUS 196A Human Service Practicum

Experiential learning in a wide range of human services. Students gain knowledge and skills related to their particular placement. Includes field experience and seminars. Prerequisite: permission. Cr 1-6.

#### HUS 203A Practicum in Human Service

Provides experiential learning in the student's chosen functional area (e.g. chemical addiction counseling, child mental health, developmental disabilities, gerontology, and mental health). Emphasis on the delivery system including prevention, non-residential care, residential care, and aftercare services. Includes weekly conferences in which students share experiences, and demonstrate acquisition of helping skills. Prerequisites: open only to HS majors; HUS 102A. Cr 4.

#### HUS 204A Practicum in Human Service

Students spend entire semester in a human service agency related to their chosen functional area. Students gain a deeper understanding of the delivery system within their specialty area and an increased sophistication in helping relationship skills. Includes a weekly seminar. Prerequisites: open only to HS majors; HUS 203A. Cr 6.

#### HUS 205A Interviewing-Counseling

Theory and practice of psychological interviewing for the purposes of gathering data and/or modifying human behavior including current theories and techniques of counseling and psychotherapy. Includes experience with interviewing and counseling techniques under professional supervision. Prerequisite: PSY 101A. Cr 3.

#### HUS 206A Principles of Rehabilitation

Presents the philosophies, principles, theories, strategies and techniques of the rehabilitation process in relation to applications in a variety of human service settings for various populations. Specific applications (i.e. physical fitness, career counseling and work adjustment) will be discussed. Prerequisites: PSY 101A or permission. Cr 3.

#### HUS 207A Behavioral Research Methodology

An introduction to the nature, methods, principles and techniques of behavioral research. Emphasis on understanding the journal reports of research and the potential application of re-

Specimen Curriculum in Infant Toddler Preschool			
First Year			
First Semester		Second Semester	
ENG 101A Critical Written Expression	3	HUS 102A Practicum in Human Services	4
HUS 100A Introduction to Human Services	3	PSY 201A Developmental Psychology	3
HUS 101A Group Processes	3	BIO 105A Human Biology and Laboratory	4
PSY 101A Introduction to Psychology	3	SPE 101A Oral Communication	3
SOC 101A Introduction to Sociology	3	HUS 160A Introduction to Infants, Toddlers, and Preschoolers	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>17</b>
Second Year			
Third Semester		Fourth Semester	
HUS 203A Practicum in Human Services	4	HUS 204A Practicum in Human Services	6
2 Introductory Courses	3	HUS 207A Behavioral Research Methodology	3
HUS 205A Interviewing & Counseling	3	HUS 208A Individual Assessment	3
1 Curriculum course	3	HUS 263A Family Interactions and Relationships with the Community	3
<b>TOTAL HOURS</b>	<b>16</b>	<b>TOTAL HOURS</b>	<b>15</b>

search to human services. Prerequisite: PSY 101A or permission. Cr 3.

#### HUS 208A Individual Assessment

Study and practice of the methods by which individuals deal with other people and social systems. Covers objectives and group psychological tests such as the MMPI, Strong Vocational Interest Blank. Students practice the techniques of psychological assessment under professional supervision. Prerequisite: PSY 101A or permission. Cr 3.

#### HUS 209A Behavior Modification Techniques

Concepts and techniques of behavior modification applied to the developmentally disabled. The practicum site supplements classroom experience. Covers identifying and recording behavior, outlining consequences, and identifying and implementing procedures to modify behavior. Students develop modification program which could effectively be used at their practicum site. Prerequisite: PSY 101A. Cr 3.

#### HUS 211A Alcohol Treatment and Rehabilitation

In view of the underlying fact that the process of matching patient and treatment is not yet highly developed, attention is given to methods of treatment which will reflect the special situations, backgrounds, and interests of those in contact with the alcoholic. Kinds of intervention and the role of the change-agent are explored. Prerequisite: HUS 110A. Cr 3.

#### HUS 212A Prevention and Early Detection of Substance Abuse

Addresses issues such as what constitutes responsible use of drugs, how society's attitude

towards drugs affects prevention and treatment, effective use of different prevention techniques (i.e. schools, industry, courts, etc.), future areas of research in substance abuse. Prerequisite: HUS 211A. Cr 3.

#### HUS 213A Drugs: Use and Abuse

Introduces the medical and psycho-social aspects of drug use including the pharmacology of drugs and the cultural milieu of their users, current federal drug laws and their development, the dimensions of legal/illegal use and misuse/abuse of drugs. Prerequisite: HS degree candidate or permission. Cr 3.

#### HUS 214A Human Service Agency Management

Explores management theories and examines the process and techniques involved in the management of small, community-based human service programs. Covers policy development, personnel management, fiscal responsibilities, goal setting, and report and grant writing. Prerequisite: PSY 101A or permission. Cr 3.

#### HUS 215A Applied Group Process

Considers relevant theory and develops specific skills in group process through a training laboratory approach. Topics include encounter groups, group counseling, group process consultation in organizations, human relation skill development, and conflict management. Prerequisite: HUS 101A or permission. Cr 3.

#### HUS 216A Supervision in Human Services

Consider relevant theory. The supervisory process, the decision-making process and various leadership theories will be enhanced by group practical applications. Prerequisite: PSY 101A. Cr 3.



**HUS 217A Addictions**

Explores addictions that interfere with healthy functioning and effective living. Addictions other than alcohol and drug will be covered, such as food, work and compulsive gambling. The differences and similarities between all addictions will be explored.

Cr 3.

**HUS 221A Adolescent Mental Health**

An interdisciplinary applied course which integrates physical, emotional, intellectual and social aspects of adolescent development. Explores prevention, detection and rehabilitation programs. Emphasis on interrelationships of the physiological, psychological and cognitive systems. Prerequisite: HUS 120A or permission.

Cr 3.

**HUS 231A Methods of Working with the Developmentally Disabled**

Presents methods to improve physical, social, educational, and perceptual-motor skills of the developmentally disabled. Includes discussion of recreational and leisure time resources within the community, social adjustment of the developmentally disabled and basic tenets of personal and social guidance. Students apply course content to their practicum setting. Prerequisite: HUS 130A or permission.

Cr 3.

**HUS 232A Resource Awareness and Utilization**

Covers community, regional, state and federal resources as well as interrelationships between public and private programs, development of program financing, and program models. Also

includes current provisions and programs relative to educational planning and development of an in-depth awareness of sheltered workshop and boarding-home programs. Guest lecturers from local and state agencies. Open discussion.

Cr 3.

**HUS 241A Activity/Recreational Leadership**

Presents procedures, practices, and aids for organizing and conducting programs to maintain the physical, social, and emotional functioning of the elderly. Also explores administrative skills, communication skills, client assessment, activities, volunteer programs, programming and implementation. Existing programs of public and private agencies, organizations and community groups will be examined. Prerequisites: Permission.

Cr 3.

**HUS 242A Physiology and Pathology of the Elderly**

Familiarizes the student with the developmental physiological process of aging and commonly occurring pathophysiology of the elderly. The signs and symptoms, diagnosis, treatment and prognosis of geriatric illnesses are presented. Emergency treatment procedures and referral mechanisms are discussed. Prerequisite: BIO 105A.

Cr 3.

**HUS 251A Psychosocial Rehabilitation**

Historical and current theory and practice of psychosocial rehabilitation for individuals with mental disorders. Provides an opportunity to develop assessment, planning, and intervention skills which may be applied in a variety of

mental health settings. Prerequisite: HUS 130A or HUS 150A.

Cr 3.

**HUS 260A Senior Seminar**

Selected topics chosen to augment the human service curriculum. May include such specialties as behavioral engineering, community service methods, mental health methods, activity therapies, corrections. Professionals with specialties in topic area will teach seminars integrating reading, discussions and practical experience. Prerequisite: Human Services Degree Candidates.

Cr 3.

**HUS 263A Family Interactions and Relationships with the Community**

A presentation, examination and discussion of the responsibilities shared among children, families and individuals in the community. Prerequisite: HUS 100A or permission.

Cr 3.

**HUS 289A Special Topics in Human Services**

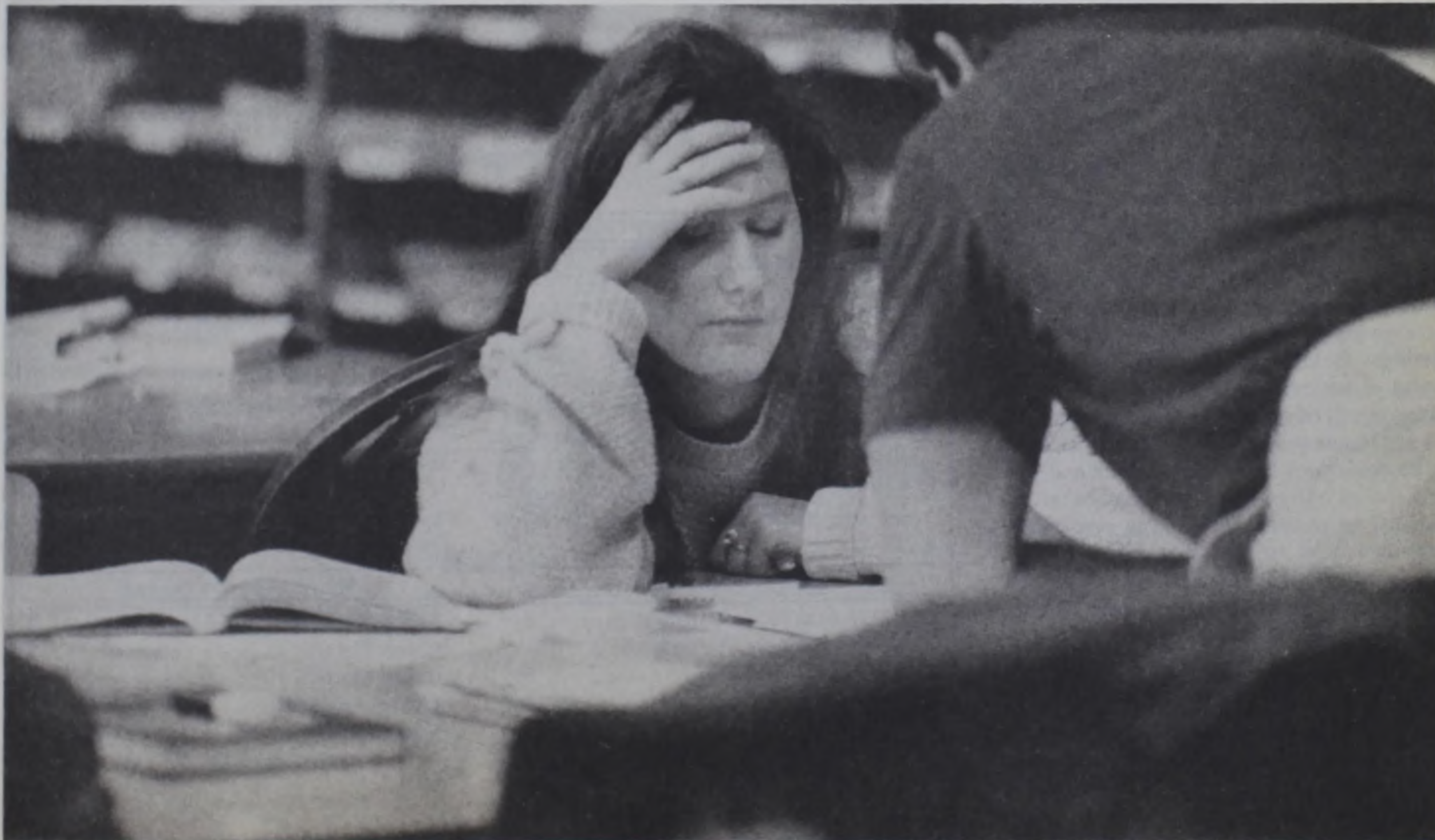
An opportunity to acquire specialized skills within human service disciplines. Topics vary depending on expressed interest or identified needs. Prerequisite: Permission.

Cr 3.

**HUS 298A Independent Study**

May include research, reading or an experiential project to gain additional knowledge of particular human service worker functions conducted under the guidance of a human services faculty member. Prerequisite: Permission.

Cr 1-3.





## Legal Technology

### Associate of Science Degree Program

Associate Professor Kurr (Chairperson)

Professor Foley

Associate Professor Chesley

Few human institutions play a greater role in our lives than the law. The Legal Technology Program offers both intellectual stimulation and attractive opportunities for men and women interested in various legal support service careers.

Following is a partial list of careers being filled by graduates of the Legal Technology Program: case preparation specialist, paralegal or legal assistant, criminal justice planner, witness advocate, municipal police officer, state police officer, sheriff, insurance investigator, claims adjuster, private security investigator, security systems specialist, fish and game warden, coastal warden, park ranger, forest ranger, U.S. customs officer, U.S. border patrol officer, Internal Revenue Service intelligence agent, juvenile officer, probation officer, corrections specialist, social worker, criminal justice instructor.

The curriculum provides a balanced foundation in liberal arts courses, professional courses, and electives. There are eight required professional courses such as investigations, forensics, organization and management, criminal law for students with career goals in the area of criminal justice and civil litigation, legal research, real estate transfers, and estate administration for students with career goals as paralegals. Required liberal arts courses are in the social and political sciences and the humanities. Career electives are offered to enable students to pursue their own special professional areas of interest in criminal justice or para-legalism such as juvenile justice, business and industrial security, consumer law, and domestic relations. Additional electives also may be used in the liberal arts and other areas.

Sixty (60) credits are required for the degree. A minimum Program and overall grade point average of 2.0 is also required. Students transferring to the Program must complete at least 15 hours of the professional courses as well as satisfying all other program requirements.

Applicants must have a high school diploma or its equivalent. Scholastic aptitude and professional or college ability tests may be recommended or required. Pre-college preparatory courses may be required in appropriate cases. These courses may be taken along with the regular program courses but may extend the time required to get a degree.

### Courses in Legal Technology

**LET 100A Introduction to the Legal System**  
Emphasis on the development of American law, the substance and procedure of the civil and criminal law systems. Cr 3.

### Specimen Program

Suggested sequence for students with differing career goals. This sequence represents the usual schedule of course offerings.

#### Criminal Justice

First Year		Second Year	
First Semester (Fall)		Second Semester (Spring)	
LET 100A Introduction to the Legal System	3	LET 150A Principles of Organization and Management II	3
LET 110A Principles of Organization and Management I	3	LET 160A Introduction to Forensics	3
LET 120A Principles of Criminal Law	3	LET 170A Legal Technology Report Writing	3
ENG 101A Critical Written Expression	3	Career Elective	3
SPE 101A Oral Communications	3	Liberal Arts Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>

#### Second Year

Third Semester (Fall)		Fourth Semester (Spring)	
LET 200A Principles of Investigation	3	LET 260A Constitutional Law	3
ENG 230A Business, Professional and Technical Writing	3	Career Elective	3
Career Elective	3	Career Elective	3
Career Elective	3	Liberal Arts Elective	3
Liberal Arts Elective	3	Free Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>

#### Paralegal

First Year		Second Year	
First Semester (Fall)		Second Semester (Spring)	
LET 100A Introduction to the Legal System	3	LET 216A Principles of Litigation	3
LET 105A Legal Research and Materials	3	LET 218A Estate Administration	3
LET 120A Principles of Criminal Law	3	BUS 158A Data Processing I	3
ENG 101A Critical Written Expression	3	Liberal Arts Elective	3
SPE 101A Oral Communications	3	Liberal Arts Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>

#### Second Year

Third Semester (Fall)		Fourth Semester (Spring)	
LET 212A Real Estate Transfers	3	LET 260A Constitutional Law	3
ENG 230A Business, Professional and Technical Writing	3	Career Elective	3
Career Elective	3	Career Elective	3
Career Elective	3	Liberal Arts Elective	3
Liberal Arts Elective	3	Free Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>15</b>



**LET 105A Legal Research and Materials**  
Introduces research methods and the use of legal materials in preparing legal memoranda. Students use statutes, case reporters, digests, treatises, legal encyclopedias, restatements, Shepard's Citations and other related law finders in preparing several memoranda. Assignments require frequent use of the Penobscot County Law library. Cr 3.

**LET 110A Principles of Organization and Management I**  
Examines line activities of law enforcement and private security agencies with emphasis on the patrol function and the prevention of crime. Includes traffic, investigative, juvenile, vice, and other specialized operational units. Cr 3.

**LET 120A Principles of Criminal Law**  
Covers local, state and federal laws and their development, application, and enforcement. Cr 3.

**LET 150A Principles of Organization and Management II**  
Applications to criminal justice agencies and private security organizations. Introduces concepts of organizational behavior. Cr 3.

**LET 160A Introduction to Forensics**  
Application of physical science to judicial matters. Covers the collection, identification and preservation of physical evidence for use in the courts as well as the techniques and limitations of science laboratory capabilities. Prerequisites: LET 110A, LET 120A. Cr 3.

**LET 170A Legal Technology Report Writing**  
Examines records and communications systems currently in use or under development. Helps student to improve skills in written communication. Emphasis on the reporting of legal matters. Cr 3.

**LET 200A Principles of Investigation**  
Applications to accidents, crimes and other incidents. Theory and application of scientific method to such cases, including interviewing of witnesses, gathering of facts and evidence and drawing conclusions. Prerequisites: LET 100A, LET 120A, LET 160A. Cr 3.

**LET 205A Police Role in Crime and Delinquency**  
Introduction to deviant behavior and current criminological theories with emphasis on police applications. Discussion of crime prevention and the phenomena of crime. Cr 3.

**LET 210A Consumer Transactions**  
A survey of selected topics in American law that have impact on our daily lives with emphasis

on substantive law rather than procedure. Covers landlord/tenant law, motor vehicle repair and purchase, insurance regulations, employment regulations. Cr 3.

**LET 212A Real Estate Transfer Procedures**  
Theory and practice of creating an adequate history of title to real estate. Also covers other closing documents, their purpose, and their statutory references. Assignments require frequent use of Penobscot County Registry of Deeds. Cr 3.

**LET 216A Principles of Litigation**  
Investigates the important steps of civil and criminal procedure and the relevant, accompanying documents, starting with the commencement of an action or arrest, through the appellate procedure and the enforcement of the judgment or incarceration. Students acquire the skills of file and document organization. Prerequisite: LET 100A or equivalent. Cr 3.

**LET 218A Estate Administration**  
Prepares the student to participate in the disposition of a decedent's estate through the probate process. Covers probate procedure and documents, the rules of intestate succession, the rules for executing a valid will, the function of the Personal Representative, the procedures for Formal and Informal Probate, and the tax considerations--income and inheritance--of administering an estate. Cr 3.

**LET 220A Principles of Supervision**  
Introduces the supervision process with emphasis on techniques for effective supervision in both the public and private sectors. Cr 3.

**LET 222A Domestic Relations**  
Introduces the Maine law of divorce including custody and property division and the Maine law of adoption and paternity. Also covers the drafting requirements of complaints, motions, interrogatories and agreements as well as interviewing techniques. Cr 3.

**LET 225A Juvenile Justice System**  
The concept of juvenile justice explored through the interrelation of the judicial system and law enforcement agencies. Cr 3.

**LET 230A Traffic Accident Investigation**  
Enables personnel with police traffic service responsibilities to acquire knowledge and skill in conducting traffic accident investigations, implementing traffic law enforcement activities, planning and supervising police traffic service functions and accident prevention programs. Cr 3.

**LET 235A Communications Skills in Legal Technology**  
Designed to expand and refine communication skills directly related to the criminal justice field. It is strongly recommended that students enrolling in this course first fulfill their English and speech requirements. Cr 3.

**LET 240A Business and Industrial Security**  
Emphasis on appropriate countermeasures to combat increases in business and industrial crime. Cr 3.

**LET 245A Women in Crime: The Female as Victim and as Offender**  
Topics include variations in female criminality by race and social class, treatment of women by the criminal justice system and what women can do to prevent victimization. Cr 3.

**LET 250A Consumer Fraud and White Collar Crime**  
The development, philosophy and general principles of consumer fraud and white collar crime, with emphasis on identification as well as the development of appropriate investigative techniques. Cr 3.

**LET 255A Legal Rights of Women**  
A survey of the legal status of women as individuals in their interrelationships with others, such as family. Cr 3.

**LET 260A Constitutional Law**  
Considers the provisions of the Constitution which relate to persons employed in the criminal justice field, para-legal and legal assistant field, and business and industrial security. Prerequisite: LET 100A. Cr 3.

**LET 294A Cooperative Education/Field Experience**  
Pre-planned work experience for the Legal Technology student, combining suitable paid and/or volunteer work in the community and academic courses and supervision. Provides an opportunity to practice skills learned in academic course work, obtain job experience and evaluate chosen career. Prerequisite: 30 hours credit and permission of chairperson. (Pass/Fail grade only). Cr 3.

**LET 298A Directed Individual Study in Legal Technology**  
Provides an opportunity to undertake study in specialized areas not covered in the regular course offerings. Prerequisite: permission of program faculty. Cr 3-6.



## Liberal Studies

### Associate of Arts Degree Program

Professor Stephen Hyatt (Chairperson)

The Liberal Studies Program offers every Maine citizen access to two years of high quality college education in the best liberal arts tradition. The Program endeavors to provide a foundation in the humanities, social sciences, mathematics, and natural sciences.

Candidates for admission must have a high school diploma or its equivalent. Exceptions may be made in rare cases by the Chairperson of the Admission Policy committee. It is strongly recommended that recent high school graduates complete the College Entrance Examination Board Scholastic Aptitude Test (SAT). Placement testing is required in the areas of reading, writing, and mathematics.

Liberal Studies students who need five or more preparatory courses in reading, writing, and mathematics will be offered a provisional admission to the degree program with the understanding that (a) they will initially be students in the Developmental Studies Program and (b) they will remain in that program until they pass the required preparatory courses in a mandated semester-by-semester time sequence. Applicants will then be students in good standing in the Liberal Studies program. Provisional status can generally be satisfied in two semesters. Normally, the number of semesters to complete the degree will be more than four for those students who are required to complete two or more preparatory courses.

Students in the Liberal Studies Program will be expected to maintain the same academic level of standing as is currently in effect in other associate degree programs offered by various colleges or divisions of the University.

Upon successful completion of this program, the student will be awarded the degree of Associate of Arts in Liberal Studies. For those who graduate and wish to continue their college education towards a baccalaureate degree, Liberal Studies courses are transferable to appropriate baccalaureate programs, and students who successfully gain admission to such programs normally would enter as juniors.

Students must complete a minimum of 60 credit hours of study for the degree of Associate of Arts in Liberal Studies. Of these credits, 45 must be earned in Liberal Studies courses. Area requirements include five courses in English and Humanities, four in Social and Behavioral Sciences, one in Natural Science, one in Mathematics and one in Mathematics or Science.

Students transferring from other colleges must complete 15 credit hours in Liberal Studies and meet all other program requirements. A minimum grade point average of

### Specimen Program\*

First Year			
First Semester		Second Semester	
ENG 101A Critical Written Expression (required)	3	SPE 101A Oral Communications (required)	3
MUS 101A Listening to Music	3	SOC 101A Introduction to Sociology	3
MAT 110A Problem Solving Using Intermediate Algebra and Geometry	3	BIO 110A Introduction to Biological Science	4
HTY 105A United States History to 1865	3	HTY 155A United States History from 1865	3
PSY 101A Introduction to Psychology	3	Elective	3
<b>TOTAL HOURS</b>	<b>15</b>	<b>TOTAL HOURS</b>	<b>16</b>
Second Year			
Third Semester		Fourth Semester	
ENG 110A Critical Appreciation of Literature (Required)	3	SOC 110A Courtship, Marriage and the Family	3
BIO 210A Ecology	4	Electives	12
DRA 101A Introduction to Theatre	3	<b>TOTAL HOURS</b>	<b>15</b>
Electives	6		
<b>TOTAL HOURS</b>	<b>16</b>		

\*The Specimen Program is one of many which will meet the requirements for the degree. Students will consult with an advisor concerning Program requirements.

2.0 is required for graduation. Students receiving an Associate of Arts in Liberal Studies degree must be enrolled in the program the semester of their graduation.

### Pre-Forest Resources Concentration in Liberal Studies

This concentration in Liberal Studies is available to students interested in pursuing an education related to forest resources. Successful completion of this program qualifies the student for the Associate of Arts degree in Liberal Studies with a Pre-Forest Resources Concentration. Students receiving this associate degree will also be eligible for placement in the College of Forest Resources baccalaureate programs.

### The Gateway Program

#### Program Description

The University College Gateway program serves the student whose admission to a baccalaureate program has been delayed due to a need for additional academic preparation. Gateway will provide a high level of intellectual challenge and stimulation and a solid back-

ground in liberal arts courses. Developmental courses in mathematics, reading and writing will be available if the need exists.

Students will receive strong academic advising to help them improve their academic skills and to make the transition to a baccalaureate program of their choice.

The Gateway program provides a one year integrated curriculum of 26 credit hours. A minimum grade point average of 2.5 is required for successful completion of the program and transition to a baccalaureate degree program. Normally the student enters the baccalaureate program as a sophomore.

#### Admission

Candidates for admission to the Gateway program must have a high school diploma or its equivalent.

Completion of the College Entrance Examination Board Scholastic Aptitude Tests (CEEB SAT) is required. Pre-admission diagnostic testing for all candidates is required in order to provide appropriate academic advising.

Students needing additional preparation in reading, writing or mathematics are provided special instruction in small group settings.



## Courses in Drama and Theatre

Associate Professor Batty; Assistant Professor Bates

### DRA 101A Introduction to Theatre

Traces the historical development of drama from its beginnings in the religious rituals of primitive tribal societies to its contemporary status. All aspects of production will be studied in relation to the overall impact of the play.

Cr 3.

### DRA 151A Play Production

Practical hands-on experience in the technical, artistic and interpretive preparation of a dramatic presentation. All aspects of production studied as they relate to theatre in general and applied in the preparation of a specific production. Course culminates in a public performance prepared and presented by the class on the UC campus. Prerequisite: DRA 101A or permission.

Cr 3.

### DRA 298A Directed Study in Theatre

Student and instructor will determine the specific nature and extent of involvement in a theatre project. Progress will be monitored through consultations with the instructor and a final report due by the last day of classes during the semester. May be repeated for a maximum of 3 credits. Prerequisite: DRA 101A or permission.

Cr 1-3.

## Courses in English

Professor Nadelhaft; Associate Professors Baker, Batty, Booth, Danielson, Kurth, Levy, Phillips; Assistant Professor Bates, Foley

### ENG 101A Critical Written Expression

Provides intensive practice in various types of expository prose, with constant emphasis on thought, clarity, logic, organization and development. Grammar, usage, punctuation, vocabulary and spelling are treated in relation to thought and expression.

Cr 3.

### ENG 110A Critical Appreciation of Literature

Introduces a variety of novels, short stories, plays and poems from different periods. The student is made aware of different literary themes, techniques and styles, and is given instruction in methods of literary analysis. Prerequisite: ENG 101A.

Cr 3.

### ENG 185A Introduction to Mythology

Reading and investigation of important early Western mythological texts with emphasis on Babylonian, Sumerian, and Greek mythology. Texts include myths and collections of myths vital to western civilization and literature and classical works rich in allusions to mythology.

Cr 3.

### ENG 210A Creative Writing

Experience in the writing of fiction, drama, poetry and songs. Students can specialize in one form or can attempt a variety of forms. Prerequisite: ENG 101A and/or permission of the division.

Specimen Curriculum			
Suggested sequence for students in the Pre-Forest Resources Concentration			
First Year			
First Semester		Second Semester	
ENG 101A Critical Written Expression	3	SPE 101A Oral Communications	3
BIO 110A Introduction to Biological Science	4	FTY 102 Introduction to Forest Resources II	2
OR		FTY 210 Wildland Fire Management	2
BIO 135A Introduction to Forest Resources	1	ENG 110A Critical Appreciation of Literature	3
WLM 320 Introduction to Wildlife Conservation	2	MAT 141A Elementary Algebra and Trigonometry	3
MAT 141A Elementary Algebra and Trigonometry	3	OR	
OR		DSM 025A Fundamentals of Mathematics	3
DSM 025A Fundamentals of Mathematics	3	OR	
OR		DSM 035A Algebra	3
DSM 035A Algebra	3	SOC 101A Introduction to Sociology	3
PSY 101A Introduction to Psychology	3	Total Hours	16
Total Hours	15		
Second Year			
Third Semester		Fourth Semester	
MAT 115A Elementary Statistics	3	ENG 230A Business, Professional and Technical Writing	3
OR		Electives (L.S.)	6
ARE 120A Statistics	3	ARE 110A Economics	3
MAT 141A Elementary Algebra and Trigonometry (unless already met)	3	BUS 158A Data Processing I	3
OR		OR	
LNM 150A Fundamentals of Forest Soils	3	COS 125A Introduction to Computer Science	3
FTY 105 Introduction to Forest Management	2-3	OR	
Electives (L.S.)	6	ARE 122A Data Processing	3
Total Hours	14-18	Total Hours	15

Prerequisite: ENG 101A and/or permission of the division. Cr 3.

### ENG 215A Contemporary Literature

Readings in major works of fiction, drama, and nonfiction which exemplify the development of literature in the contemporary period. Specific tests may vary. Prerequisite: ENG 110A or permission of the division. Cr 3.

### ENG 225A Intermediate Critical Written Expression

A continuation of ENG 101A which provides additional writing experience, with particular emphasis on the extended essay using a variety of source materials (literary, primary, and secondary), and on more complex forms of organization and analysis. Prerequisite: ENG 101A or equivalent. Open only to UC students. Cr 3.

### ENG 230A Business, Professional and Technical Writing

Principles and practice of business, professional and technical writing including various types of correspondence, the preparation and execution

of reports, and presentation of data of a specialized nature with emphasis on clarity, conciseness and accuracy. Prerequisite: ENG 101A or permission. Rec 3. Cr 3.

### ENG 240A Survey of English Literature

Examines selected themes of English literature drawn from poetry, drama and fiction within a broad historical context. Prerequisite: ENG 110A or permission of the division. Cr 3.

### ENG 245A Survey of American Literature

A thematic analysis of American literature which examines the differences between neo-classic, romantic, regional, realistic, naturalist and contemporary views of experience. Topics may include peoples relationship with the land, the artist in American society or the American hero-heroine. Prerequisite: ENG 101A and ENG 110A or permission. Cr 3.

### ENG 250A Utopian and Dystopian Literature

Examines Utopian and Dystopian constructs in literature from varied historical periods. Con-



siders what such works reveal about power, wealth, education, family, property, status, religion, sexuality, idealism and spiritual enlightenment. Cr 3.

#### ENG 255A Women in Literature

A broad chronological and thematic study of the works of women writers in both the British and American literary traditions. Writers not regularly included in literature courses will receive particular attention. Prerequisites: ENG 110A, ENG 101A or permission of the division. Cr 3.

#### SPE 101A Oral Communications

Designed to increase understanding of communication and its components and to improve skills in public speaking and group discussion. Cr 3.

#### SPE 102A Interpersonal Communication

Explores interactions between people and the management of communication skills which facilitate healthy relationships. Emphasis on human communication theory and skills development. Also examines communication dynamics within helping professions. Prerequisite: SPE 101A. Cr 3.

### Field Experience

#### LIB 294A Cooperative Education/Field Experience

Pre-planned work experience for the Liberal Studies student, combining suitable paid work and/or volunteer work in the community with academic courses and supervision. Students gain work experience, integrate academic understanding with working life and explore possible career goals. Prerequisite: 30 hours credit with recommendations from two faculty members. Credit arranged 1 to 6 Hrs. May be repeated to a total of 9 credit hours. (Pass/Fail Grade Only). Cr 1-6.

#### LIB 296A Independent Study in Liberal Studies

An elective option for an individual student or a group of students interested in pursuing a subject or theme through independent reading and research. Progress monitored through meetings with instructor. Prerequisites: ENG 101A and successful completion of 12 credits. Credits: 1 to 3, depending on the learning plan. May be repeated to a total of 9 credit hours. Cr 1-3.

### Courses in History

Professor DeFroscia

#### HTY 101A Western Civilization to 1714

Emphasis on ancient Egypt, the Near East, classical Greece and Rome, and the Middle Ages to 1714 and on the contributions of these civilizations to the development of contemporary thought and institutions. Cr 3.

#### HTY 105A United States History to 1865

Examines the colonial and revolutionary years as well as basic 19th century problems such as

## Specimen Gateway Curriculum

The curriculum is integrated and includes the following courses:

### First Semester (Fall)

Gateway Orientation Course  
ENG 101A Critical Written Expression  
MAT 110A Problem Solving Using Intermediate Algebra and Geometry  
PSY 101A Introduction to Psychology  
BCY 105A Human Ecology and the Future

### Second Semester (Spring)

Gateway Orientation Course  
ENG 225A Intermediate Critical Written Expression  
MAT 160\* Algebra and Trigonometry  
SOC 101A Introduction to Sociology  
SPE 101A Oral Communications

\* Recommended by College of Engineering and College of Science, alternate course COS 125A.

the acquisition of new territories, sectionalism and the Civil War. Cr 3.

#### HTY 151A Western Civilization from 1714

A survey of Western civilization from the 18th century to the present with emphasis on the leading political events. Cr 3.

#### HTY 155A United States History from 1865

The institutions and forces at work in the United States since the Civil War, with emphasis on the historical background of contemporary political, social and economic problems. Cr 3.

#### HTY 204A American Foreign Policy

Surveys American foreign policy since 1945 and its results in our current international posture. Covers the methods and assumptions of the policy makers, the myths and fallacies of policy, and the responsibilities of states in the international family. Includes an overview of the American stance in Europe, Latin America, Africa, and Asia and the U.S. policy on such diplomatic questions as revolution, co-existence, war, and counterinsurgency. Cr 3.

#### HTY 254A Contemporary America

Examines the political, social and cultural history since WW II. special attention given to the Emphasis on the challenges of the 1960's and 70's and popular American cultures studies. HTY 105A and/or HTY 155A recommended. Cr 3.

### Courses in Humanities

#### HUM 201A Literature and The Exploration of Human Values

Examines forces and goals which motivate and guide human behavior. Readings include representative selections from non-fiction, fiction, poetry and drama; discussions focus on what the works reveal about power, wealth, ownership, status, sexuality, love, idealism and spiritual enlightenment. Cr 3.

#### HUM 280A Introduction to Films

Provides students with a critical framework for interpreting films and demonstrates how film makers have treated various themes. Prerequisite: ENG 101A. Cr 3.

#### HUM 296A Topics

A flexible elective in any aspect of literature or language approved by the Humanities staff. Prerequisite: ENG 101A and approval of the Humanities staff. Cr 1-3.

### Courses in Mathematics

Professor Hsu; Associate Professor Zoldi; Assistant Professor Drelles, Saada

**MAT 101A Mathematics For The Consumer**  
Students gain expertise in applying arithmetic, algebra, and problem solving techniques to cope with personal and business related financial and economic activities. Prerequisite: One year of high school algebra (knowledge should be current). Admission to the course depends upon performance on a departmental qualifying examination given the first day of class. Lec 3. Cr 3.

#### MAT 104A Fundamental Concepts of Mathematics

Topics may include set theory, logic, number theory, graph theory, topology and groups among others. Prerequisite: One year high school algebra. Cr 3.

#### MAT 110A Problem Solving Using Intermediate Algebra and Geometry

Emphasizes the use of mathematical language, concepts, and skills in solving problems encountered in various interdisciplinary fields. Topics include intermediate algebra and 1, 2, or 3-dimensional geometry. Prerequisites: DSM 035A or a year of high school algebra. Cr 3.

#### MAT 115A Elementary Statistics

Emphasis on the basic concepts and applications. Collection, analysis, and presentation of data are extensively discussed. Elementary probability is covered. Decision-making with large and small samples and prediction based on correlation and regression are also included. Prerequisite: one year of high school algebra or its equivalent. Cr 3.

#### MAT 118A Introductory Finite Mathematics: A Liberal Studies Approach

Presents underlying mathematical concepts related to the application of finite mathematics in



career fields of liberal studies majors. Topics include introductory treatment of sets, graphs, linear modeling, matrices, linear programming, probability, games of strategy and statistics. Computer solutions using package programs may be used. Prerequisite: Two years of high school algebra. Cr 3.

#### **MAT 141A Elementary Algebra and Trigonometry**

Topics include numbers, functions, graphs, factoring, exponents and radicals, logarithms, linear equations, quadratic equations, and solutions to triangles. Prerequisite: Forest Management Technology students. Cr 3.

#### **MAT 142A Algebra and Trigonometry**

Topics include factoring and fractions, exponents and radicals, linear, quadratic, and fractional equations and inequalities, graphs and functions, linear, quadratic, rational, higher degree and trigonometric functions and solutions to triangles. Prerequisite: Engineering Technology students. Cr 3.

#### **MAT 160A Algebra and Trigonometry**

A pre-calculus course including number systems, factoring, analytic geometry, functions, equations, trigonometric functions, and their application. Prerequisite: one year of high school algebra or DSM 035A. Cr 4.

#### **MAT 164A Analytical Geometry and Introductory Calculus**

Topics include trigonometric identities and equations, inverse trigonometric functions, exponential and logarithmic function, matrix algebra, determinants, progression, elements of analytic geometry including conic sections, polar coordinates, and introductory calculus including derivative and its applications. Prerequisite: MAT 142A. Cr 3.

#### **MAT 246A Introductory Calculus**

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. Prerequisite: MAT 164A. Cr 4.

#### **MAT 261A Calculus I**

An introduction to differential and integral calculus. Limits, continuity, differentiation and integration of algebraic functions, applications. Prerequisite: MAT 160A or its equivalent. Cr 4.

#### **MAT 289A Topics in Mathematics**

An independent study undertaken by special arrangement with the Division of Natural Sciences and Mathematics, or a special course created at the request of a group of students with specific interests that are not served by a regularly scheduled course. Cr 1-4.

#### **MAT 368A Ordinary Differential Equations**

An introduction to ordinary differential equations and their applications. A brief introduction to partial differential equations. Prerequisite: MAT 246A. Rec 3. Cr 3.

#### **MAT 369A 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: MAT 246A or its equivalent. Cr 3.

#### **COS 125A An Introduction to Computer Science**

An introduction to the computer and computer science through the use of IBM-compatible microcomputers. The programming language BASIC is studied and applied to a variety of problems from the fields of mathematics, science, business and education. Prerequisite: DSM 035A or its equivalent. Lec 2, Lab 1. Cr 3.

#### **Interdisciplinary Courses**

##### **INT 135A (BUS, LIB) Business Data Analysis**

Provide data processing experience through the use of a mainframe statistical package in the analysis of business data. The class constructs a marketing questionnaire followed by the collection and analysis of the data. Prerequisites: BUS 158A or COS 125A and an introductory statistics course. Cr 3.

##### **INT 151A (BIO, ENG) Essays on Human Ecology**

Introduces basic ecological principles and examines changes in the environment and their implications for the future of the planet and the race. Includes literature related to nature and man's relationship to nature, and occasional student essays. Prerequisite: ENG 101A. (3 credits of Science and 3 credits of English). Cr 6.

##### **INT 168A (BUS, LIB) Business Data Processing-COBOL**

An introduction to the designing and writing of business application programs using the COBOL programming language. The programs will be run on a microcomputer. Prerequisite: COS 125A. Cr 3.

#### **Courses in Music**

Professor Klocko

##### **MUS 101A Listening to Music**

Develops intelligent music listening through the study of musical elements, instruments, mediums, and principles of musical forms in classical, popular and non-Western music. Students discuss records and tapes as well as live and TV concerts. Cr 3.

##### **MUS 110A PopRockSoul**

A consideration of popular music today, covering the types of popular music and their interactions, important performers and composers, the music industry and the mass media and the

sociological role of popular music as an expression of differing and changing values in American culture. Cr 3.

##### **MUS 120A Listening to Orchestral Music**

Students learn to listen to orchestral music actively and intelligently. Study of musical elements, instruments, and orchestral forms and styles as well as historical development of the orchestra and orchestral literature and selected works or representative composers. Course content is correlated with concerts of the Bangor Symphony Orchestra, the UM Orchestra, and touring orchestras. Cr 3.

##### **MUS 150A American Music**

A study of music in America from colonial times to the present. Emphasis on the development of musics unique to America, including American Indian, country and western, spirituals, gospel, blues, ragtime, and the different styles of jazz. Cr 3.

##### **MUS 250A World Music**

A study of folk, classical and popular musics in Africa, Native American and South America, Slavic Europe, Asia and the Pacific, and their functions within these cultures. Also considers influence of Western music on the traditional music of each area and the influence of non-Western music on European-American music. Prerequisite: any music history or music literature course or permission. Cr 3.

##### **MUS 298A Directed Study in Music**

Individually designed study in an area of music-making, such as piano, recorder, voice, sight-singing, or music theory. One private lesson per week. Course may be repeated if enrollments permit. Prerequisite: permission. Cr 3.

##### **MUP 151A Musical Performance Workshop**

Study and development of the various skills necessary for performing music: tone quality, technique, diction, interpretation, stage presence, group balance and blend, music reading. Students participate in public performance. Prerequisite: audition. Cr 3.

#### **Courses in Natural Sciences**

Associate Professors Benson, Naber, Storch; Assistant Professor Klose

##### **BIO 105A Human Biology**

Introductory biology for non-science majors. All organ systems of the human body are discussed, including nerves, senses, digestion, circulation, reproduction and hormones. Limited consideration of cell structure and physiology. Lec 3. Cr 3.

##### **BIO 106A Human Biology Lab**

An optional laboratory experience for students in BIO 105A. May be taken concurrently with or following BIO 105A. Lab 3. Cr 1.

**BIO 110A Introduction to Biological Science**  
Examines the underlying unity of all living things at the molecular and cellular level. Consideration of evolution, plant and animal cell



structure and function, photosynthesis and respiration, the genetic codes, heredity, and ecosystems. Companion course to BIO 135A. Lec 3, Lab 3. Cr 4.

#### BIO 135A Introduction to Botany and Zoology

A basic biology course dealing with the diversity of life. Examines representative plants and animals, from the simple to the complex, and their structure and function. Lec 3, Lab 3. Cr 4.

#### BIO 160A Anatomy and Physiology

A study of the structural and functional relationships of the human body systems including concepts of the regulatory process that integrate body cells, tissues, and organs. Lec 3, Lab 3. Cr 4.

#### BIO 210A Ecology

Considers the principles and processes of natural ecosystems from a biological perspective including the relationships of organisms to each other and their environment. Selected aspects of human ecology will be considered but are not the major emphasis. Includes investigative laboratory and field work. Lec 3, Lab 3. Cr 4.

#### BIO 260A Animal Behavior

Introduces the biology of behavior including the genetics, physiology, ecology, and evolution of behavior and sociobiology. An evolutionary approach to human behavior is included. Prerequisites: BIO 110A or BIO 210A or BIO 135A or permission. Cr 3.

#### BIO 280A Pathophysiology

A study of mechanisms by which disease occurs in humans, including the response of the body to disease processes and the effects of these mechanisms on normal function. Covers general principles and responses of specific organ systems. Open to Health Information Technology and Dental Hygiene students, others by permission. Prerequisite: BIO 160A. Cr 3.

#### BIO 298A Topics in Biology

An independent study undertaken by special arrangement with the Division of Natural Sciences and Mathematics, or a special course created at the request of a group of students with specific interests that are not served by a regularly scheduled course. Cr 1-3.

#### ECY 150A Human Ecology and the Future

Discussion of readings including energy, resources, population, pollution, and technology. Cr 3.

#### MCB 160A Medical Microbiology

A study of cell structure, metabolism, and the role of microorganisms in disease including microbial control, infection, immunity, host-parasite relations, and epidemiology. Laboratory study includes the properties of bacteria and related organisms, techniques and means of identification. Lec 3, Lab 3. Cr 4.

#### NFS 150A Nutrition

Presents the fundamental principles of normal nutrition including the functions of various

nutrients and their sources, deficiencies and food values. Lec 3. Cr 3.

#### BCH 160A Introduction to Biochemistry

Basic principles of general, organic, and biochemistry are covered. Organic structures and functional groups are introduced. Topics in biochemistry include carbohydrates, lipids, proteins, nucleic acids, and enzyme action. High school chemistry is recommended. Lec 3, Lab 3. Cr 4.

### Courses in Political Science

Associate Professor Surpluss

#### POS 100A National Government

Introduces the major principles, structures, and processes of the U.S. National government. Topics include the Constitution and its development, federalism, separation of powers, the development and role of political parties, interest groups, voting behavior, the presidency, the bureaucracy, Congress, the national courts, and political expression. Cr 3.

#### POS 102A State and Local Government

Introduces the structure and operation of state and local governments. Examines state constitution, the state-federal relationship, the governor's office, state legislators and state judiciary. Explores the process of local selfgovernment including mayor-council, council manager, and commission forms of government as well as forms, procedures, and problems in metropolitan areas. Cr 3.

#### POS 200A The Election Process

Surveys the election process in the United States including nomination procedures, political parties, campaigns, and election results. The role of the new technology in campaigns and the impact and responsibility of the press. Students gain practical experience in an actual campaign. Cr 3.

#### POS 204A Introduction to British Government

Topics include: the historical background and constitutional structure of modern British government; political parties, voting, and elections; the parliament, the cabinet, and the Crown; public administration and the bureaucracy; selected modern public policies. POS 100A or POS 102A or POS 200A recommended but not required. Cr 3.

### Courses in Psychology

Associate Professor Pare; Assistant Professor Grunder

#### PSY 101A Introduction to Psychology

Introduction to the scientific study and interpretation of behavior. Covers basic principles and applications of psychological development, emotion, motivation, perception, learning, thinking and cognitive processes, intelligence, personality and animal behavior. Cr 3.

#### PSY 103A Psychology of Adjustment

A study of the processes involved in the adjustment of the individual to the problems of everyday living. Emphasis on techniques for resolving conflict situations in the social environment and on those aspects of adjustment directly related to personal growth. Cr 3.

#### PSY 201A Child and Developmental Psychology

An introduction to developmental theories and principles in psychology. Emphasis on human socio-emotional and cognitive development from birth to adolescence. Prerequisite: PSY 101A. Cr 3.

#### PSY 205A Abnormal Psychology

Provides an introduction to behavior disorders, insight into the personality of the disturbed person, historical perspective on changing classification and therapy. The prevention, analysis and rehabilitation of disturbed individuals, and the resources for assistance for the individual with emotional difficulties are covered. Prerequisites: an introductory psychology course or permission. Cr 3.

#### PSY 253A Adolescent Psychology

Covers biological, social, affective, and cognitive aspects of the development of adolescents from puberty to young adulthood including research, theories, concepts, and principles. Prerequisites: PSY 101A and PSY 201A or permission. Cr 3.

### Courses in Science

Associate Professor Zoldi

#### SCI 105A Energy, Food and Shelter

Investigation of ecologically appropriate shelter design, construction alternatives, materials, and alternative energy sources. The basic concepts of energy, solar greenhouses, organic agriculture and aquaculture, and passive solar design fundamentals are covered. Students participate in design projects and field trips. Lec 3. Cr 3.

#### SCI 289A Topics in Physical Science

An independent study undertaken by special arrangement with the Division of Natural Sciences and Mathematics, or a special course created at the request of a group of students with specific interests that are not served by a regularly scheduled course. Cr 1-3.

#### EAS 155A Our Physical World

Considers human interaction with the continuous processes that shape our earth and the universe. Students study a particular geological area through lab exercises. Field trips and a research paper. Lec 3, Lab 3. Cr 4.

#### PHY 155A Principles of Physics

Fundamentals of mechanics, energy, properties of matter, heat, and wave characteristics. Emphasis on understanding concepts, laws, and theories, and their applications to the real world. Laboratory work includes observation and recording of data, graphing, techniques in



set-up, use and adjustment of equipment. Lec 3, Lab 3. Cr 4.

#### CHY 110A Principles of Chemistry

Descriptive and qualitative approaches are used to develop an understanding of chemical principles with emphasis on quantitative relationships. Provides a strong foundation for subsequent work in chemistry courses. Lec 3, Lab 3. Cr 4.

### Courses in Sociology

Professor Hyatt; Associate Professor Gran

#### SOC 101A Introduction to Sociology

Presents the fundamentals of sociology including description and analysis of the structure and dynamics of human society, social norms, intergroup relations, social change, stratification and institutions. Cr 3.

#### SOC 105A Culture and Society

Surveys the dynamics of cultural evolution and its significance to humans. Special attention will be directed toward cultural theory, language and culture, culture and personality and the dynamics of culture change, as well as the social, economic, political and ideological aspects of the organization of culture. Cr 3.

#### SOC 110A Courtship, Marriage, and the Family

A sociological analysis of historical and contemporary American courtship, marriage, and family patterns and related controversies. Also examines crosscultural courtship, marriage and family patterns. Prerequisite: SOC 101A or permission. Cr 3.

#### SOC 151A Contemporary Social Problems

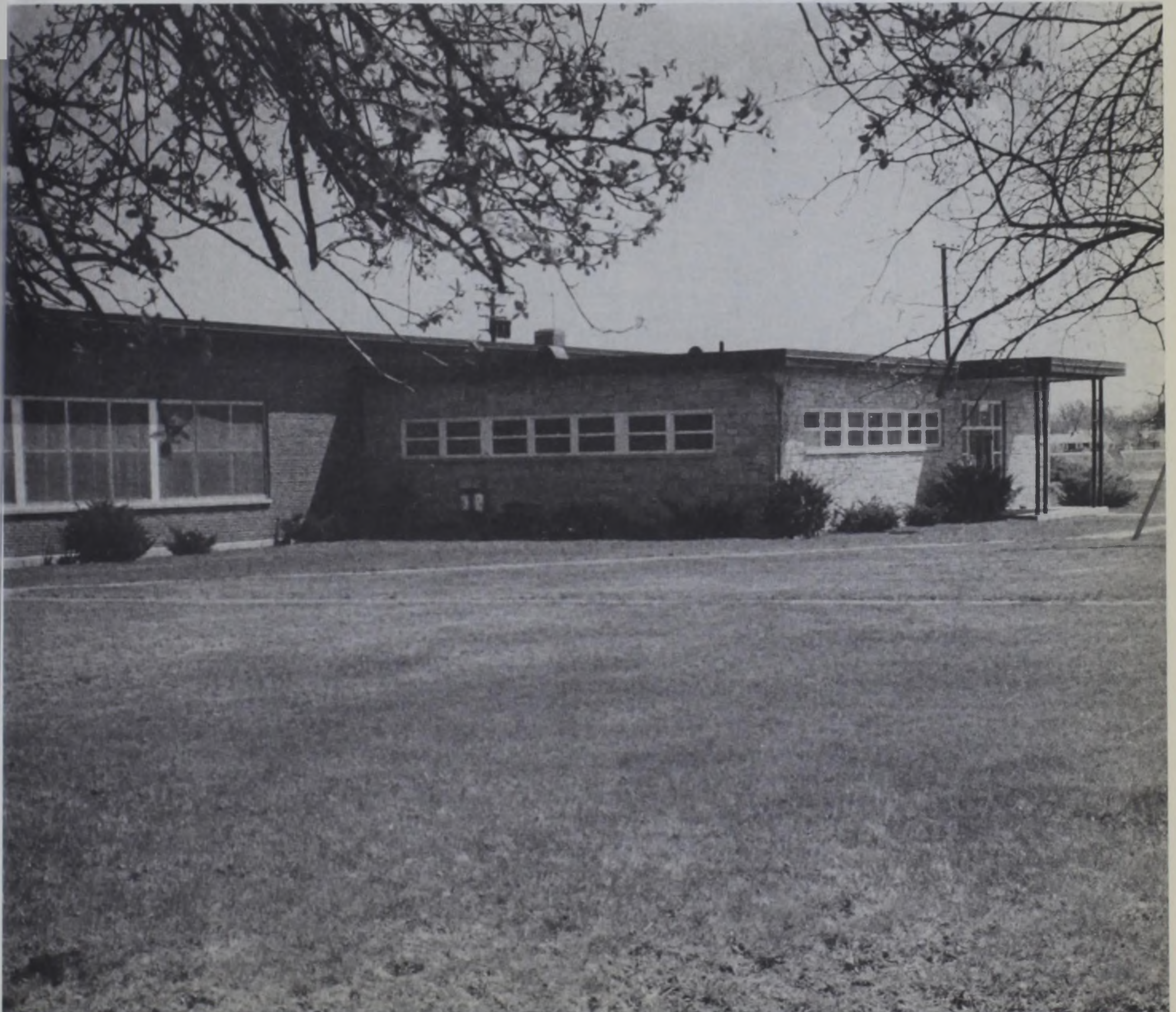
Emphasis on problems of social deviance, conflict and inequality, human progress. Prerequisite: SOC 101A. Cr 3.

#### SOC 155A Sociology of Death

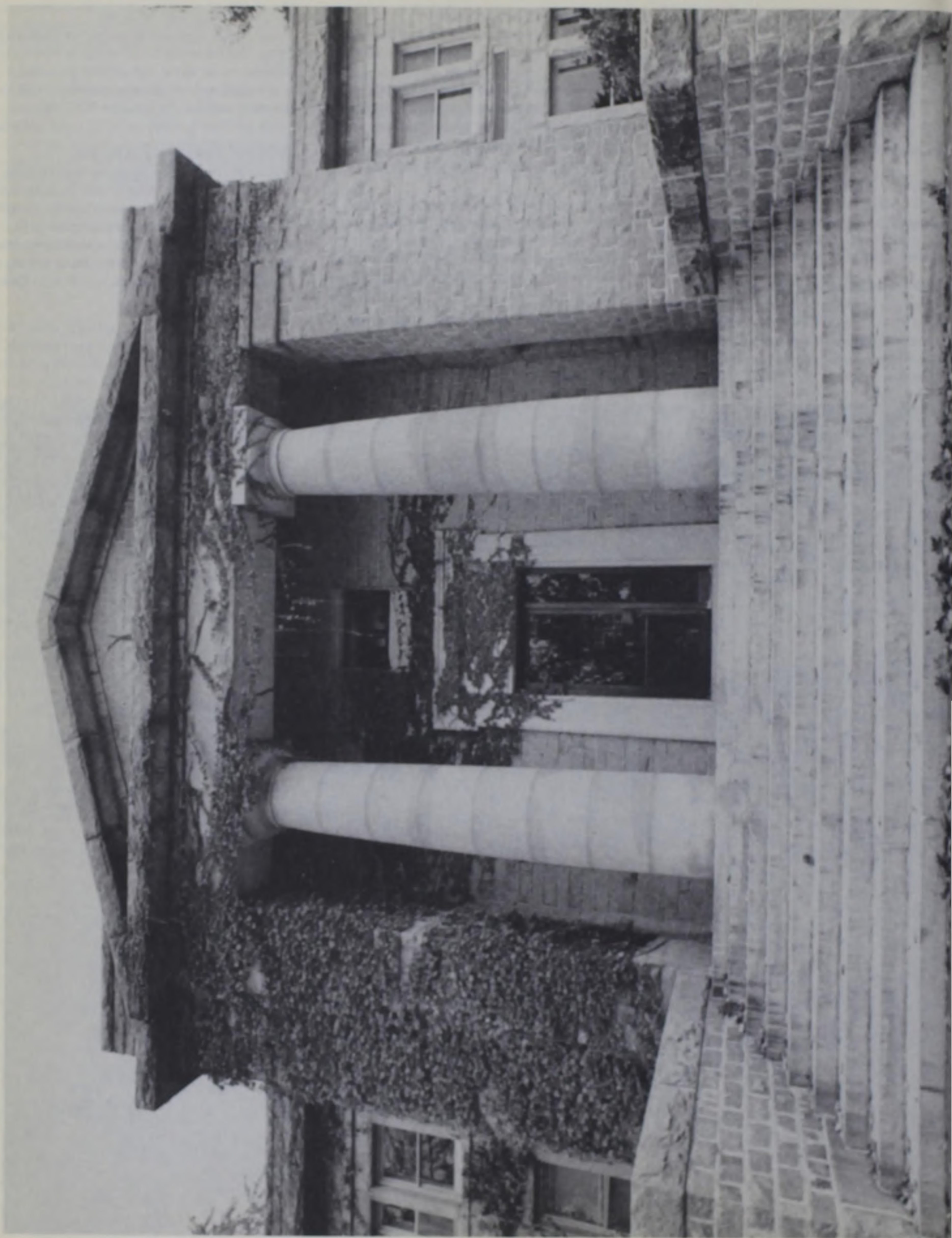
A sociological approach to analysis of death and dying. Examines death and dying as biological imperatives, as social and cultural phenomena, as spiritual and religious occurrences, and as economic realities. Prerequisite: SOC 101A. Cr 3.

#### SSC 289A Topics in Social Science

Topics vary depending upon expressed interest and identified needs. A topic may be analyzed from the perspective of one or all of the disciplines in social science. Respective topics include women in politics, the urban environment, the American city, perspectives on death and dying. Prerequisite: permission. Cr 3.









# University-wide Programs

## Canadian Studies Program

Canadian Studies at the University of Maine ranks as one of the most outstanding and comprehensive programs of its kind in the United States. Students have an unusual opportunity for interdisciplinary study of Canada in all colleges. Administered through the Canadian-American Center, Canadian Studies is predominantly an undergraduate program although graduate degrees on Canada may be arranged in several departments on campus.

For an undergraduate program of study, students may obtain either a concentration or minor in Canadian Studies. In most colleges, a concentration in Canadian Studies requires 18 credit hours or 6 courses. The courses must include CAN 101: Introduction to Canadian Studies, two core courses and three related courses which can be selected from either Canadian Core courses or Canadian Related courses. Courses taken at a Canadian University through the Canada Year Program administered by the Canadian-American Center can also be included in the Concentration.

CAN 501: The making of the Canadian Identity is available to graduate students and senior undergraduate students who have completed their senior/concentration in Canadian Studies and/or are considering graduate work on Canada. Students who are qualified or are considering graduate study on Canada should contact the center regarding this course and the M.A. and Ph.D. program at the University of Maine.

For twenty years the Center has sent students in the Canada Year Program to Canadian Universities. University of Maine students have studied in Newfoundland (Memorial University), Prince Edward Island (University of Prince Edward Island), Nova Scotia (Dalhousie University, Acadia University), New Brunswick (University of New Brunswick, Mount Allison University), Québec (Université Laval, McGill University, Université de Sherbrooke, Concordia University, Université du Québec à Chicoutimi), Ontario (University of Toronto, York University, Carleton University, University of Guelph), Alberta (University of Calgary) and British Columbia (University of British Columbia, Simon Fraser University, University of Victoria).

Although participation in Canadian Studies is not a prerequisite to the Canada Year program, applications from students in Canadian Studies will be given preference by the selection committee. Study in Canada allows a student to strengthen his or her major by adding courses not offered at Orono and to live in an area with a different culture or language.

Courses with a 400 number are for selected undergraduate and graduate students.

### Canadian Core Courses

- CAN 101 Introduction to Canadian Studies
- CAN 401 Readings in Canadian Studies
- CAN 501 The Making of the Canadian Identity
- ARH 162 Modern Architecture and Design
- ARH 168 Canadian Art
- ARH 361 Topics in Art History
- ANT 422 Folklore of Maine and the Maritime Provinces
- ANT 457 North American French Cultures and Societies
- ANT 460 Peoples and Cultures of the Circumpolar Area
- ANT 472 North American Prehistory
- ANT 490 Topics in Anthropology: a. French Canadian Immigration b. The Arts of Native Canada
- ECO 439 International Trade and Commercial Policy
- ECO 440 Canadian Economics: Issues and Policies
- ECO 445 Regional Economics
- ENG 236 Canadian Literature
- ENG 436 Topics in Canadian Literature
- FRE 254 Popular Culture in French Canada
- FRE 256 French Canadian Civilization
- FRE 297 French May Term in Quebec City
- FRE 442 French Language of North America
- FRE 452 The Novel of Quebec
- FRE 456 Seminar in Quebec Studies
- FRE 550 Seminar in French Canadian Literature and Language
- FRE 552 Films, Video Drama, and Literature in French Canada
- GEO 214 Geography of Canada and the United States
- GEO 301 Historical Geography of North America
- GEO 302 Geographical Perspectives on Atlantic Canada
- GEO 350 The Geography of Canada
- HTY 111 Canada: From Cartier to Trudeau
- HTY 199 Problems in History
- HTY 272 The Industrial Worker in America
- HTY 458 History of French Canada and Franco-Americans

- HTY 459 Colonial Canada
- HTY 460 Modern Canada
- HTY 482 Canada and the American Economy
- HTY 499 Contemporary Problems in History
- HTY 521 Canada and the United States, 1783 to the Present
- HTY 522 Canadian Economic History
- HTY 550 Readings in Bibliography and Criticism in Canadian History
- HTY 599 Special Topics in History
- POS 243 Canadian Government and Politics
- POS 456 Canadian Political Parties
- POS 496 International Affairs Internship
- POS 531 Topics in Comparative Politics
- POS 537 Evaluation and Development of Canadian Government and Politics
- POS 587 Problems in International Law (Canada)
- SOC 431 Canadian Society

### Canadian Related Courses

- ANT 221 Introduction to Folklore
- ANT 425 Oral History and Folklore
- ANT 451 North American Indian Ethnology
- ANT 473 Historic Archaeology
- ANT 474 Analysis of Historic Artifacts
- ANT 570 Seminar in Northeastern North American Prehistory
- ANT 573 Advanced Methods in Historic Archaeology
- BUA 328 Canadian/U.S. Business: A Comparison
- BUA 345 International Management
- BUA 376 International Marketing
- ECO 439 International Trade and Commercial Policy
- ECO 445 Regional Economics
- FOL 490 Topics in Foreign Languages: Bilingualism and Biculturalism
- FRE 440 Franco-American Civilization
- GEO 215 Cultural Geography
- GES 324 Geology of North America
- GES 543 Quaternary History of Northeastern North America
- HTY 199a Problems in History
- INT 539 Ice Ages and Humankind
- JMC 214 The Foreign Media
- OCE 270 Oceanography Today
- OCE 370 Introduction to Oceanography
- POS 387 International Law
- SOC 442 Population and Society

For complete details about the Canadian Studies concentration, contact the Canadian-



American Center, Canada House, 154 College Avenue.

### Courses in Canadian Studies

#### **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. Requirements will include a field trip

to Canada. Prerequisite: First-year student or sophomore standing. Cr 3.

#### **CAN 300 Seminar in Canadian Studies**

Advanced seminar in the study of Canadian culture. Course modules will examine Canadian culture from historical, geographic, literary, and aesthetic perspectives. Prerequisite: CAN 101 plus 6 hours of core courses in Canadian studies. 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.

#### **CAN 501 The Making of Canadian Identity**

Explores the evolution of a distinct Canadian identity from the sixteenth to the twentieth centuries, with an interdisciplinary focus on anthropological, geographical, historical, political, literary and cultural factors. Cr 3.





## The University Honors Program

Director Nadelhaft

### General

The University of Maine offers its Honors Program to all above-average students who are interested in cross- and inter-disciplinary studies. The Program is based on the belief that genuine excellence in college-level studies means broad competence in areas outside a major field of specialization as well as excellence within it; to that end, Honors courses involve students and faculty from all disciplines and fields at UM. Honors course work allows the student both a range and a flexibility not available in any academic major. The double emphasis on learning which both broadens and deepens has been the foundation for the building of courses in the Program: to expand students' perspectives by exploring areas of thought not closely related to their major fields, and to allow them to work in their majors, during the junior and senior years, with greater depth than would be possible within a conventional course pattern. Honors study begins with interdisciplinary broadness and culminates in a focused, in-depth project in the major field.

### Administrative Structure

The Honors Program is university-wide and is administered by a part-time director. The policy-making body for the program is the Honors Council, consisting of the Honors Director chair, the secretaries of the nine college honors committees, three at-large faculty members, coordinator of the First-year Course, and four honors students. Each of UM's nine colleges has a college honors committee chaired by a college honors secretary; these currently are: A&H—Professor William Small, Little Hall; ASA—Professor Melvin Gershman, Hitchner Hall. BUA—Professor Robert Strong, South Stevens Hall; EDU—Professor John Maddaus, Shibles Hall; EGR—Professor Kenneth Mumme, Jenness Hall; FOR—Professor Christopher Murdoch, Nutting Hall; SBS—Professor Gordon Kulberg, Little Hall; SCI—To be announced; UC—Professor Kay Surpless, Belfast Hall; Students with questions about the program should see the Honors Secretary of their college and consult the Honors listing within their college's entry in this catalog (see Index).

### Admission

Entering first year students are invited to join the Honors Program on the basis of their admission records and on the recommendation of guidance counselors. To be eligible for the Program, students should have a minimum 3.0

point average, score well on the SAT, and show curiosity, initiative, and intellectual flexibility in academic work. Students may also enter the Program on request by applying to the director. Second-semester first year students and first-semester sophomores are invited into the Program through faculty recommendations based on academic performance in a particular course at UM, and by the director on the basis of cumulative grade point averages. Transfer students wishing to join Honors should consult with the director.

### Courses and Requirements

In the first year, students ordinarily take HON 101 and 102, Honors Seminar, which consists of readings in basic texts of western civilization from early creation myths to contemporary issues. This course emphasizes reading, writing and discussion of ideas; each section is limited to no more than 12 students. During the sophomore year, students may take HON 201, *The Science of Nature: Darwin and Einstein*, and HON 202, *The Science of the Individual and Society: Freud and Marx*, which is structured much like HON 101 and 102 but which allows for sustained and in-depth study of major figures in Western thought. In the junior year, either HON 301 or HON 302, Group Tutorial, is required; each group of students does substantial reading in a specific topic or theme and meets weekly for discussion with a tutor. At the junior level, students may also take HON 397, Honors Specialized Study, an independent reading course in the major field, and HON 395, Honors Thesis Preparation, to help in selecting a thesis topic and advisor. In the senior year, HON 498, Honors Directed Study, and HON 499, Honors Thesis, are required, culminating in a senior thesis or project, and a final oral examination.

To graduate with Honors a student must complete HON 301 or HON 302, HON 498, HON 499, and at least two additional Honors courses.

To remain in good standing in Honors, students must maintain a minimum 3.0 grade point average in all their course work at UM.

### Degree

The level of honors awarded—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 senior examining committee to the college Honors secretary. The designation appears

both on the student's degree and on the transcript.

### Honors Courses and College Requirements

All honors courses carry degree credit and satisfy basic area requirements in each of the nine colleges. In some colleges, HON 101 and HON 102 substitute for the first year composition requirement, ENG 101. At the junior and senior levels, some honors courses may count towards the major. See the honors entry under the appropriate college for further information.

### Organization of Honors Students

All students in the Honors Program are members of OHS, a student organization which publishes a newsletter and sponsors a variety of activities throughout the academic year.

### For Further Information

All questions about the University Honors Program should be addressed to Ruth Nadelhaft, Director, University Honors Program, Thomson Honors Center.

### Honors Courses

#### HON 101 Honors Seminar I

Reading and discussion of basic texts in Western civilization, from early creation myths through the Renaissance. Writing Experience Credit. **Cr 4.**

#### HON 102 Honors Seminar II

Reading and discussion of basic texts in Western civilization, from the Enlightenment to the present. Writing Experience Credit. **Cr 4.**

#### HON 190 Honors Summer Readings: Basic

An individually arranged program of readings for independent study during the summer. Course credit is given the following fall semester. For students wanting to supplement their work in HON 101 and 102. Prerequisite: permission. **Cr 1.**

#### HON 201 *The Science of Nature: Darwin and Einstein*

A study of thinkers who have radically altered the way we perceive the world around us, with attention to their influence in philosophy, literature and the arts. **Cr 4.**

#### HON 202 *The Science of the Individual and Society: Freud and Marx*

A study of thinkers who have radically altered the way we perceive the world around us, with



attention to their influence in science, philosophy, history, sociology, literature and the arts.

Cr 4.

**HON 290 Honors Summer Readings: Intermediate**

Guided summer readings and reports, individually adapted to the student's program of study. Credit is given the following fall semester. For students wanting to supplement their readings in HON 201 and HON 202. Permission: permission.

Cr 1.

**HON 297 Honors Independent Study**

A tutorially conducted study of a topic outside the student's major field. Prerequisite: permission.

Cr 1-3.

**HON 298 Honors Independent Research**

A research project done under the supervision of a faculty member. May not be substituted for the senior research project or thesis. Prerequisite: permission.

Cr 1-3.

**HON 299 Honors Project**

A directed independent project, required of students taking two-year degrees with Honors.

Cr 3.

**HON 301 Honors Group Tutorial I**

Small group discussion, under tutorial direction, of important readings in a specific topic or theme. May be repeated for credit with permission of the director of the Honors Program.

Cr 2.

**HON 302 Honors Group Tutorial II**

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 Program.

Cr 2.

**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 395 Honors Thesis Preparation**

Designed to assist third-year Honors students to learn the procedures which result in successful selection of a thesis topic. (Pass/Fail Grade Only).

Cr 1.

**HON 397 Honors Specialized Study**

A tutorially conducted study in the student's major field, usually resulting in the choice of a

thesis topic. May be repeated once for credit with permission.

Cr 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 "R" (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. Writing Intensive Credit.

Cr 3.





## Onward Special Services Program

Director Herlihy

Associate Director Ellis

Assistant Professors Davis, Devoe, Boynton, Herbold, Stearns

Counselor Atkinson

Coordinator of Services for Students with Disabilities, Schilmoeller

Tutor Coordinator Doucette

The Onward Special Services Program offers special academic 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 to students with disabilities.

All program services are designed to assist non-traditional students, low income students and students with disabilities 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.

Any student who wants more information about these services or who feels they could benefit from participation in these services should contact the Onward Special Services Program. Our offices are located in the Onward Building on Flagstaff Road. Our telephone number is 581-2320

### 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. 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. Students who work for the Program assist Program counselors in providing support and orientation activities for the new student. Contact the Onward Program, 581-2319.

### Office of Services for Students with Disabilities

The primary purpose of the Office of Services for Students with Disabilities is to facilitate the education of students with physical or learning disabilities by providing a point of coordination for any special services they may need while attending UM.

Some of the services provided or coordinated through Services for Students with Disabilities are advising, special orientation to cam-

pus, readers, recorders, tutors as needed, the ordering of taped texts, assessment of learning disabilities documentation, classroom relocation, lift keys, priority registration, mediation and advocacy, as well as personal, educational, and vocational counseling.

The Office of Services for Students with Disabilities, located in the Onward Building, will be happy to supply further information and answer questions. Students with special needs are urged to contact the Counselor/Coordinator of Services for Students with Disabilities, Onward Building, UM, Orono, ME 04469. Phone (207)581-2319. TTY for the Deaf (207) 581-2311.

### Tutoring

The Onward Program provides tutorial services for UM students who need academic assistance related to their course work. Tutorial assignments are made in small groups of three to promote and encourage collaborative learning. By working together, students learn how to process course material by sharpening their reasoning and questioning skills. Sessions are process-oriented, learner centered and require the active participation of each group member.

Requests for tutors are accepted during the first 8 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 Onward Tutor Program at 581-2319.

### 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.

#### ONE 011A Developmental Writing

This course in the basics of sentence structure, spelling, mechanics and paragraph coherence offers individualized and small group instruction to students with limited writing experience. Tutors are available for extra help. **Cr 3.**

#### ONE 012A Onward Writing

Students who need practice in controlling paragraphs and developing ideas in prose work towards mastering the essay form. Frequent

conferences with the instructor and group work with peers help to build the writer's confidence; class discussions and the sharing of drafts generate ease with both the form and the content of college papers. Prerequisite: ONE 011A.

**Cr 3.**

#### ONE 013A Advanced Onward Writing

Students whose verbal scores and writing samples attest to an adequate background may enroll in this course that combines reading in American essays and stories with writing about social issues and literature. Each student is expected to produce seven or eight respectable essays that present an opinion about an American cultural issue and support that thesis with evidence from readings and class discussions. Prerequisite: ONE 012A.

**Cr 3.**

#### ONE 014A English Grammar Workshop

Designed to provide the background in English grammar that is a necessary prerequisite to a solid understanding of the English language and the study of other languages. Lec 2. **Cr 2.**

#### ONM 011A 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 012A 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 011A or permission.

**Cr 3.**

#### ONM 013A 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 012A or permission.

**Cr 3.**

#### ONO 011A Onward Orientation

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, Course Selection and Pre-registration, Add/Drop Procedures, Learning styles, Super-learning, Time Management, Note Taking, Preparing for Tests, Test Taking, Test Anxiety, Stress



Management and Relaxation, Career Exploration and Information, Strong-Campbell Interest Inventory, Goal Setting, AIDS and Responsible Sexuality. (Pass/Fail Grade Only). Cr 2.

#### ONR 011A Developmental Reading

For students whose level of reading and analytical skills need significant improvement before they enter regular university courses. Develops positive reading and study habits, as well as vocabulary building. Activities include discussion of assigned readings, frequent short writing assignments, and basic skills building with tutors. Cr 3.

#### ONR 012A Onward 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 011A. Cr 3.

#### ONR 013A Advanced Onward 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 012A. Cr 3.

#### ONS 011A Onward Biology

Introduces biology using a 5 kingdom approach. Includes a review of basic cytology, heredity, photosynthesis, respiration and ecology. Emphasis on an appreciation for living systems as well as an increased awareness of their importance to the successful and continued existence of all other lifeforms. Prerequisite: permission. Cr 3.

#### ONS 012A Onward Chemistry

Introduces the basic fundamental laws and theories that govern matter and its behavior in nature. Includes an overview of chemical equations, formulas and their manipulation, gas laws, matter state delineations, solutions, reactions, bonding, and a brief introduction to organic chemistry. Prerequisite: ONS011A or permission. Cr 3.

#### ONS 013A Onward Physics

For students with little or no physics background. Includes review of the metric system,

mechanics, motion in one or more directions, energy, momentum, vectors, gas laws, sound, light, and electricity. Prerequisite: ONM012A or permission. Cr 3.

#### ONS 014A Onward Zoology

A continuation of ONS011A with emphasis on the diversity and continuity of the Kingdom Animalia. Includes an extensive review of classification procedures including the effective use of biological keys at the Phylum and Class levels. A number of the Animalia Phyla covered in a variety of ways including lectures, simulated computer dissections, and individual student research and writing. Emphasis on ecological considerations, environmental awareness, habitat preservation, and constructive versus destructive approaches to human dominion over the animal world. Prerequisite: ONS011A or permission. Cr 3.





## The Women's Studies Program

### General Information

The Interdisciplinary Concentration in Women's Studies has the following goals: The goals of the program are 1) to teach and learn about all women's experiences, past and present; 2) to make women visible in their similarities and differences; 3) to value personal experience as a way of knowing; 4) to create new knowledge about women and apply it to personal, political, and institutional change; 5) to strengthen the links among women and among women's programs in the community and on campus; and 6) to empower women by increasing choices in all women's lives.

The Women's Studies program enables students to achieve a more complete understanding of the roles, contributions, and experiences of women. The structure provided by the four core courses in Women's Studies, and the guidance available in the selection of Approved Electives, assures the student a focused and coherent experience.

The Interdisciplinary Concentration in Women's Studies contributes significantly to the programs of students who plan careers in such fields as social work, medicine, government, journalism, education, communication, counseling, law, business, or management. Even for those planning careers in areas with no direct focus on women, however, an awareness of the history, culture, and experiences of women can help such students better understand our contemporary world, with its changing roles and patterns for women and men alike.

### Administrative Structure

A university-wide program, the Interdisciplinary Concentration in Women's Studies is administered by the Coordinator of Women's Studies. General policy for the Women's Studies program is the responsibility of the Coordinator of Women's Studies and the Women's Studies Committee. The membership of the Women's Studies Committee is drawn from faculty, students, and the community. Decisions about the Women's Studies curriculum and the monitoring and evaluation of the program's quality are the responsibility of the Coordinator of Women's Studies and the faculty members of the Women's Studies program.

### Requirements

Students electing the Interdisciplinary Concentration in Women's Studies are required to take an 18-hour program of study that consists of the following:

- A. Nine hours in three required core (WST) courses:

WST 101 Introduction to Women's Studies  
WST 410 Feminist Theory  
WST 480 Senior Seminar in Women's Studies

- B. Nine hours chosen from the following:
1. WST 210 Topics in Women's Studies
  2. Field Experience (three to six hours)
  3. Approved Electives:
    - CHF 451 Family Relationships
    - EDL 420 Changing Roles of Women & Men in Education
    - ENG 255A Women in Literature
    - ENG 256 British Women's Literature
    - ENG 246 American Women's Literature
    - ENG 471 Feminist Critical Theory
    - ENG 481 Topics in Women's Literature
    - HTY 332 Womanhood in America
    - HTY 494 Women, History and American Society: Selected Topics
    - LET 255A Legal Rights for Women
    - NUR 420 Women in Health
    - PHI 439 Feminist Social and Political Theory
    - SOC 330 Perspectives on Women
    - SOC 345 Women, Crime, and Criminal Justice
    - SPC 405 Women and Communication

A number of "topics" courses in various departments occasionally focus entirely on women, and other courses have partial content on women that may make them suitable as Approved Electives; other courses have been proposed that may be approved as electives. For lists of such courses and their availability, contact the WIC office.

### Core Courses in Women's Studies

The four core (WST) courses described below are interdisciplinary and multicultural. Additionally, each of the four courses recognizes the diversity of women in such areas as race, class, ethnicity, sexual preference, and religion.

All four of the Women's Studies courses meet the requirements for a Writing Experience course. Students may undertake directed study at an intermediate or advanced level with WST 298 and WST 498, and may also arrange for Field Experience.

### Advising and Information

All students electing the Interdisciplinary Concentration in Women's Studies will be assigned a Women's Studies advisor to assist them with designing their program and choosing their courses.

Students, faculty, and others desiring information about the Women's Studies program or its WST courses, or its Approved Electives, may contact the Women's Studies Office. All ques-

tions about the program should be addressed to the Coordinator of Women's studies, Shibles Hall (581-1228).

### Sex and Gender Balanced Courses

The following courses have partial content on women; more information can be obtained from the specific department where the course is housed:

CHF 200 Family Interaction  
CHF 351 Human Sexuality  
CHF 451 Family Relations  
NUR 305 Reproductive/Maternal Newborn Health Care  
PHI 102 Philosophy and Modern Life  
PHI 106 Social Issues in Recent Religious and Philosophical Thought  
PHI 107 Existentialism  
PHI 443 Twentieth Century Marxist Philosophy  
PHI 452 Philosophy of Natural Science  
SOC 329 Sociology of Sex Roles  
SOC 319 Domestic Violence and Social Structure

### Courses in Women's Studies

**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. **Cr 3.**

**WST 201 Topics in Women's Studies**  
An interdisciplinary intermediate level study of topics such as "Women and Creativity," "Women and Science and Technology," and "Ethnic American Women." Prerequisite: WST 101 or permission. **Cr 3.**

**WST 298 Directed Study in Women's Studies**  
Individual study, 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. Prerequisite: WST 101 or permission. **Cr 3.**

**WST 410 Feminist Theory**  
An advanced interdisciplinary multicultural introduction to the main traditions of feminist theory. 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



"Motherhood in Nature and Culture," "Women and Aging," "Women's Spirituality," and "Understandings of Femininity." Prerequisites: WST 101, WST 410 and senior standing or permission. Cr 3.

**WST 498 Directed Study in Women's Studies**

Advanced individual study, research and writing projects in Women's Studies and related areas, conducted under the guidance of a fa-

culty member associated with the Women's Studies program, arranged on request. Prerequisite: WST 101 and Junior or Senior standing and permission. Cr A





# Administration and Faculty

## Officers of Administration

### Officers of the University of Maine

**Chancellor:** Robert L. Woodbury

**Interim President:** John C. Hitt, Alumni Hall

**Interim Vice President for Academic Affairs:**

Gregory N. Brown, Alumni Hall

**Vice President for Research and Public Service:** Gregory N. Brown, Alumni Hall

**Vice President for Student Affairs:** John R. Halstead, Alumni Hall

**Vice President for University Development:** Robert Holmes, Jr., Crossland Hall

**Associate Vice President for Undergraduate Programs:** Marisue Pickering, Alumni Hall

**Associate Vice President for Graduate Programs:** Charles E. Tarr, Winslow Hall

**Assistant Vice President for Cooperative Extension:** Judith Bailey, Winthrop C. Libby Cooperative Extension Building

**Assistant Vice President for Enrollment Management:** Joyce D. Henckler, Chadbourne Hall

**Assistant Vice President and Director for the Maine Agricultural Experiment Station:** Wallace C. Dunham, Winslow Hall

**Assistant Vice President for Public Affairs:** Adrie Nab, Public Affairs Building

**Assistant Vice President for Research:** Paul D. Uttormark, Alumni Hall

**Assistant Vice President for Student Services:** Dwight L. Rideout, Memorial Union

**Director of Equal Opportunity:** Suzanne Estler, Alumni Hall

**Director of Financial Management:** Charles F. Rauch, Alumni Hall

**Director of Institutional Planning:** Anita S. Wihry, Alumni Hall

**Executive Director for Computing, Communications and Instructional Technology:** Owen Gaede, Alumni Hall

**Registrar:** John F. Collins, Jr., Wingate Hall

**University Librarian:** Elaine M. Albright, Fogler Library

### Officers of Divisions of the University of Maine

**College of Applied Sciences and Agriculture:** Wallace C. Dunham, Dean, Winslow Hall

**College of Arts and Humanities:** Leslie A. Fleming, Dean, North Stevens Hall

**College of Business Administration:** W. Stanley Devino, Dean, South Stevens Hall

**College of Education:** Robert A. Cobb, Dean, Shibles Hall

**College of Engineering:** Norman Smith, Dean, Barrows Hall

**College of Forest Resources:** G. Bruce Wiersma, Dean, Nutting Hall

**College of Science:** Dagmar Cronn, Dean, Aubert Hall

**College of Social and Behavioral Sciences:** Julia M. Watkins, Dean, Stevens Hall

**University College:** Charles R. MacRoy, Dean, Schoodic Hall

**Graduate School:** Charles E. Tarr, Dean, Winslow Hall

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**School of Human Development:** Richard A. Cook, Director, Merrill

**School of Nursing:** Lea Acord, Director, 160 College Avenue

**School of Social Work:** Cleo S. Berkun, Interim Chairperson, 118 Annex C

**Academic and Career Exploration Program:** Dana W. Birnbaum, Coordinator, Alumni Hall

**Admissions:** William J. Munsey, Director, Chadbourne Hall

**Alumni Association:** H. Maxwell Burry, Executive Director, Crossland Hall

**Athletics and Recreation:** Director, Memorial Gymnasium

**Bureau of Labor Education:** John R. Hanson, Director, Maine Tech Center

**Canadian American Center:** Peter G. Morici, Director, Canada House

**Career Center:** Adrian J. Sewall, Director, Chadbourne Hall

**Center of Innovation and Entrepreneurship:** Jake Ward, Interim Director, Maine Tech Center

**Center for Marine Studies:** Robert E. Wall, Director, Coburn Hall

**Margaret Chase Smith Center for Public Policy:** Steven C. Ballard, Director, Coburn Hall

**Conferences and Institutes:** Bruce G. Stinson, Director, Chadbourne Hall

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- Sawicki, Jana L. (1981). B.A., 1974, Sweet Briar College; M.A., 1977, Columbia University; Ph.D., 1983; Associate Professor of Philosophy.
- Sayles, Richard (1981). B.S., 1973, University of Rhode Island; M.S., 1975; Ph.D., 1981, Brown University; Associate Professor of Mechanical Engineering.
- Scantlebury, Kathryn C. (1990). B.S., 1978, Flinders University of South Australia; M.Sc., 1986, Curtin University of Technology, Australia; Assistant Professor of Education, Science.
- Schilmoeller, Gary L. (1980). B.A., 1967, Rockhurst College; M.A., 1969, University of Kansas; M.A., 1974; Ph.D., 1977; Associate Professor of Child Development and Family Relations.
- Schnitker, Detmar F. (1969). B.S., 1961, University of Gottingen, West Germany; M.S., 1966, University of North Carolina; Ph.D., 1967, University of Illinois; Professor of Oceanography, Cooperating Professor of Geological Geological Sciences, Marine Studies.
- Schomaker, Peggy K. (1966). B.S., 1949, Pennsylvania State University; M.S., 1957; Ph.D., 1961, Michigan State University; Associate Professor of Consumer Economics and Management.
- Schonberger, Ann K. (1976). B.A., 1962, Wellesley College; M.A.T., 1963, Harvard University; M.A., 1967, University of Wisconsin, Madison; Ph.D., 1976; Professor of Developmental Studies.
- Schonberger, Howard (1971). B.A., 1962, University of Chicago; Ph.D., 1968, University of Wisconsin, Madison; Professor of History.
- Schriver, Edward O. (1968). B.S., 1954, Gorham State College; B.D., 1960, Andover Newton Theological Seminary; M.Ed., 1955, Maine; M.A., 1961; Ph.D., 1967; Associate Professor of History.
- Schroeder, Craig J. (1988) B.S., 1980, Iowa State University; M.S., 1982; Ph.D., 1985, North Carolina State University; Assistant Professor of Food Science, Cooperating Assistant Professor of Microbiology.
- Schupp, James R. (1988). B.S., 1978, Bowling Green University; M.S., 1984, Ohio State University; Ph.D., 1984; Assistant Professor of Pomology; Extension Fruit Specialist.
- Schutz, Pamela N. (1979). B.A., 1965, Hillsdale College; M.S., 1977, Western Michigan University; Ed.D., 1978; Associate Professor of Education.
- Schwintzer, Christa R. (1984). B.A., 1962, Berea College; M.A., 1963, University of Michigan; Ph.D., 1969; Professor of Botany.
- Scontras, Charles A. (1961). B.S., 1952, University of New Hampshire; M.Ed., 1957, Maine; M.A., 1965; Ph.D., 1968; Professor of Modern Society; Faculty Associate in History; Research Associate, Bureau of Labor Education.
- Scott, Sandra L. (1977). A.S., 1975, Maine; B.A., 1981; M.S., 1983; Professor of Human Services.
- Sears, Theresa A. (1987). A.B., 1976, Northern Illinois University; A.M. 1977, University of Chicago; Ph.D., 1982, Cornell University; Assistant Professor of Spanish.
- Segal, Howard P. (1986). B.A., 1970, Franklin and Marshall College; M.A., 1972, Princeton University; Ph.D., 1975; Associate Professor of History; Director, Technology and Society Project; Cooperating Associate Professor of Engineering and Technology.
- Servello, Frederick A. (1989) B.S., 1979, State University of New York, College of Environmental Science and Forestry; M.S., 1981, Virginia Polytechnic Institute and State University; Ph.D., 1985; Assistant Professor of Wildlife.



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- Shea, Harry D.** (1983). B.A., 1969, Dartmouth College; M.A., 1984, Maine; Instructor of Computer Science.
- Shepard, Robert K.** (1975). B.S., 1963, University of Michigan; M.F., 1964, Duke University; Ph.D., 1970, University of Michigan; Associate Professor of Forest Resources.
- Sheppard, Edmund M.** (1962). B.S., 1956, University of Miami; M.S., 1958, Massachusetts Institute of Technology; Ph.D., 1962, Purdue University; Professor of Electrical Engineering.
- Sherblom, John C.** (1980). B.A., 1972, Bates College; M.A., 1979, Oklahoma State University; Ph.D., 1986, Maine; Assistant Professor of Speech Communication.
- Sherburne, James A.** (1987). B.A., 1967, Maine; M.S., 1969; Ph.D., 1972, Cornell University; Director of the Office of International Programs; Professor of Wildlife.
- Shick, J. Malcolm** (1974). B.S., 1969, College of William and Mary; M.S., 1971; Ph.D., 1974, Texas A & M University; Professor of Zoology; Cooperating Professor of Oceanography.
- Shipp, Therese** (1989) B.S.N., 1966, St Anselm's College; M.S., 1974, Boston University; D.N.Sc., 1988; Assistant Professor of Nursing.
- Shottafer, James E.** (1964). B.S., 1954, State University of New York College of Environmental Science and Forestry; M.S., 1956, Syracuse University; Ph.D., 1964, Michigan State University; Professor of Wood Technology.
- Sidell, Bruce D.** (1977). A.B., 1970, Boston University; M.S., 1972, University of Illinois; Ph.D., 1975; Professor of Zoology; Cooperating Professor of Biochemistry.
- Singer, John T.** (1985). B.A., 1975, Denison University; Ph.D., 1983, University of Georgia; Associate Professor of Microbiology.
- Skehan, John W.** (1982). B.S., 1953, Washington State Teacher's College; M.Ed., 1954, Maine; Ed.D., 1981, Vanderbilt University; Associate Professor of Education.
- Skorpen, Erling R.** (1968). B.A., 1954, College of Idaho; B.A., 1956, Oxford University, England; M.A., 1958; Ph.D., 1960, Yale University; Professor of Philosophy.
- Slaby, Bohdan M.** (1972). B.S., 1958, University of Alberta, Canada; M.S., 1960; Ph.D., 1968, University of Washington; Professor of Food Science; Cooperating Professor of Microbiology.
- Slavin, Charles P.** (1984). A.B., 1976, Princeton University; M.A., 1980, University of Wisconsin, Madison; Ph.D., 1984; Assistant Professor of Mathematics.
- Slott, Kathryn E.** (1982). B.A., 1970, University of Pennsylvania; M.A., 1972; M.L., 1976, University de Bordeaux, France; Ph.D., 1980, University of Pennsylvania; Associate Professor of French.
- Smagula, John M.** (1973). B.S., 1965, Rutgers, The State University; M.S., 1967, University of Massachusetts at Boston; Ph.D., 1973, University of Massachusetts, Amherst; Professor of Horticulture.
- Small, William** (1972). B.A., 1961, Bowdoin College; M.A., 1966, Middlebury College; Ph.D., 1972, University of Connecticut; Professor of German.
- Smith, Andrew L.** (1988) B.S., 1978, Whitworth College; M.S., 1980, Purdue University; Ph.D., 1984, University of Washington; Assistant Professor of Chemistry.
- Smith, Charles W.** (1968). B.S., 1962, Allegheny College; Ph.D., 1968, Ohio University; Chair and Professor of Physics; Cooperating Professor of Engineering and Technology.
- Smith, David C.** (1965). B.S., 1955, Farmington State College; M.Ed., 1956, Maine; M.A., 1958; Ph.D., 1965, Cornell University; Bird and Bird Professor of American History; Professor, Agricultural History; Cooperating Professor, Quaternary Studies.
- Smith, Laurence D.** (1982). B.A., 1972, Indiana University; M.A., 1975; M.A., 1979, University of New Hampshire; Ph.D., 1983; Associate Professor of Psychology.
- Smith, Norman** (1962). B.Sc., 1952, Leeds University, England; M.Sc., 1954, Durham University, England; M.S., 1959, Maine; Ph.D., 1970, University of Newcastle, England; Dean, Engineering and Science; Professor, Agricultural and Forest Engineering; Cooperating Professor, Applied Sciences and Agriculture.
- Smith, R. Kent** (1971). B.A., 1957, Aurora University; M.S., 1963, Northern Illinois University; Ed.D., 1971, Maine; Chair and Professor of Developmental Studies.
- Snell, Patricia M.** (1986). B.S., 1957, University of Maine at Farmington; M.Ed., 1965, Maine; Extension Agent, Aroostook County; Associate Extension Educator.
- Snider, Davida J.** (1981). B.A., 1973, Virginia Polytechnic Institute and State University; M.F.A., 1976, Memphis State University; Associate Professor of Theatre and Costume Designer.
- Snyder, William M.** (1977). B.A., 1968, Maine; M.A., 1972, University of Maryland; Ph.D., 1977; Associate Professor of Mathematics.
- Sosnaud, Jeffrey E.** (1986). B.A., 1977, Yale University; J.D., 1983, University of California at Berkeley; Instructor of Business Law.
- Soule, Hayden M.** (1960). B.S.A.E., 1960, Maine; M.S., 1968; Associate Professor of Bio-Resource Engineering.
- Soule, William L.** (1966). A.B., 1953, Harvard College; M.E.A., 1963, George Washington University; M.A., 1981, University of Massachusetts; Assistant Chair and Associate Professor of Mathematics.
- Spector, Janet** (1986). B.A., 1972, Trinity College; M.A., 1974, University of Connecticut; Ph.D., 1983, Stanford University; Assistant Professor of Education.
- Spirakos, Basile J.** (1988) Dipl. 1981, Aristotle University, Greece; M.S., 1983, University of Minnesota; Ph.D., 1988, West Virginia University; Assistant Professor of Civil Engineering.
- Spurrell, A. C. Lloyd** (1987). B.A., 1973, University of Calgary, Canada; B.A., 1975; M.S., 1978; Ph.D., 1988, University of Nebraska; Assistant Professor of Accounting.
- Stack, Lois B.** (1986). B.S., 1973, University of Wisconsin, Madison; M.S., 1980; Ph.D., 1984; Associate Extension Educator; Ornamental Horticulture Specialist; Associate Professor of Landscape; Greenhouse Supervisor.
- Standbrook, Grant** (1988). B.S., 1961, University of Minnesota-Duluth; Assistant Ice Hockey Coach; Lecturer in Physical Education.
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- Stearns, Fern C.** (1983). B.A., 1954, Maine; M.A., 1959; Assistant Professor of Developmental Mathematics.
- Stearns, William F.** (1960). B.S., 1958, Maine; M.A., 1960; Associate Professor of Mathematics.
- Steneck, Robert S.** (1982). B.S., 1973, Baldwin-Wallace College; M.S., 1978, Maine; Ph.D., 1982, Johns Hopkins University; Associate Professor of Oceanography; Cooperating Associate Professor of Botany.
- Stimpson, Don D.** (1965). B.A., 1955, Maine; D.V.M., 1960, Ontario Veterinary College, Canada; Chair and Associate Professor, Department of Animal, Veterinary and Aquatic Sciences.
- Stokes, Martin R.** (1978). B.Sc., 1971, Leeds University, England; Ph.D., 1978, Glasgow University, Scotland; Associate Professor of Animal and Veterinary Sciences.
- Stone, William F.** (1966). B.A., 1956, Maine; M.A., 1961, University of Florida; Ph.D., 1963; Professor of Psychology.
- Storch, Kay S.** (1974). B.S., 1960, Otterbein College; M.S., 1962, University of Illinois; Ph.D., 1966; Associate Professor, Biological Sciences
- Storch, Richard H.** (1966). B.A., 1959, Carleton College; M.S., 1961, University of Illinois; Ph.D., 1966; Professor of Entomology.
- Stratton, Donald P.** (1974). B.M., 1963, Manhattan School of Music; M.M., 1964; Professor of Music.
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- Stubbs, Donald A.** (1970). A.B., 1962, Washington and Lee University; Ph.D., 1967, George Washington University; Professor of Psychology.
- Sucec, James** (1964). B.S., 1962, University of Connecticut; M.S., 1963; Professor of Mechanical Engineering.



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- Surpluss, Kathleen J. (1973). B.A., 1968, Maine; M.A., 1972; Associate Professor of Political Science.
- Symanski, Mary E. (1985). B.S.N., 1979, University of Delaware; M.S., 1985, University of Maryland; Associate Professor of Nursing.
- Symonda, Jean M. (1984). R.N., 1954, Lawrence Memorial Hospital; B.S., 1958, Boston University; Ed.D., 1990, Vanderbilt University; Associate Professor of Nursing and Coordinator of the Registered Nursing Studies Program.
- Tarz, Charles E. (1968). B.S., 1961, University of North Carolina; Ph.D., 1966; Associate Vice President for Academic Affairs and Dean of the Graduate School; Professor of Physics.
- Tavantzis, Stylianos (1980). B.S., 1971, Agricultural School of Athens, Greece; M.S., 1977, Pennsylvania State University; Ph.D., 1980; Associate Professor of Plant Pathology; Cooperating Associate Professor of Biochemistry and Microbiology.
- Taylor, G. Thomas (1972). B.A., 1967, University of Virginia; M.A., 1969; Ph.D., 1973, University of Colorado; Chair and Professor of Public Administration.
- TeBrake, Janet K. (1986). B.A., 1970, Youngstown University; M.A., 1976; Ph.D., 1984, Maine; Lecturer in History.
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- Thai, Khi Van (1978). B.A., 1965, National Institute, Vietnam; M.A., 1969; M.P.A., 1975, Maxwell School of Citizenship and Public Affairs; Ph.D., 1978; Associate Professor of Public Administration.
- Thomas, Sandra J. (1989). B.A., 1974, Maine; Assistant Women's Basketball Coach, Lecturer in Physical Education.
- Thompson, Edward V. (1966). A.B., 1956, Cornell University; Ph.D., 1962, Brooklyn Polytechnic Institute; Professor of Chemical Engineering and Pulp and Paper Foundation Professor.
- Thorpe, Geoffrey L. (1979). B.A., 1968, University College of North Wales; B.Ph., 1970, University of Liverpool, England; Ph.D., 1973, Rutgers, The State University; Associate Professor of Psychology and Director of Clinical Training.
- Tjepkema, John (1984). B.A., 1965, University of Michigan; M.A., 1967; Ph.D., 1971; Professor of Plant Physiology.
- Toner, Carol N. (1990). B.A., 1968, Carthage College; M.Ed., 1976, Maine; Ph.D., 1989; Assistant Professor of History.
- Tonn, Marietta M. (1987). B.S., 1976, Pittsburg State University; M.A., 1982; Ph.D., 1987, University of Kansas; Assistant Professor of Speech Communication.
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- Tyler, Seth (1976). B.A., 1970, Swarthmore College; Ph.D., 1975, University of North Carolina; Professor of Zoology.
- Uhl, Sarah C. (1990). B.A., 1975, State University of New York at Rochester; M.A., 1985, State University of New York at Stony Brook; Ph.D., 1987; Assistant Professor of Anthropology.
- Unertl, William N. (1977). B.S., 1967, University of Wisconsin, Madison; M.S., 1969; Ph.D., 1973; Professor of Physics.
- Urbanaki, Marie O. (1971). B.A., 1944, University of Texas; M.A., 1965, Western Illinois University; Ph.D., 1973, University of Kentucky; Professor of English; Cooperating Professor, Engineering and Science.
- Vadas, Robert L. (1967). B.S., 1962, Utah State University; Ph.D., 1968, University of Washington; Professor of Botany, Oceanography and Zoology.
- Valleau, William G. (1962). B.S., 1955, University of Kentucky; M.S., 1962, Rutgers, The State University; Ph.D., 1963; Professor of Zoology.
- van Steenberghe, Paul (1981). B.S., 1977, Maine; M.A., 1981; Lecturer in Mathematics.
- Vayda, Michael E. (1986). B.A., 1979, University of New Hampshire; B.S., 1979; M.S., 1981, Princeton University; Ph.D., 1983; Associate Professor of Biochemistry.
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- Voronietzky, Baycka (1983). M.M., 1963, Warsaw Conservatory; M.M., 1974, University of Massachusetts; Associate Professor of Music.
- Walk, Steven R. (1988). B.S., 1981, University of Pittsburgh; M.S., 1986; Assistant Professor of Electrical Engineering Technology.
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- Walker, Scott C. (1990). B.A., Princeton University; Assistant Football Coach, Lecturer in Physical Education and Athletics.
- Wall, Robert E. (1986). A.B., 1957, Carleton College; Ph.D., 1965, Columbia University; Director, Center for Marine Studies; Professor of Marine Science.
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- Watling, Leslie E. (1976). B.Sc., 1965, University of Calgary, Canada; M.S., 1969, University of the Pacific; Ph.D., 1974, University of Delaware; Associate Professor of Oceanography; Cooperating Associate Professor of Zoology.
- Webb, Lana (1990). A.S., 1978, Maine; Instructor in Dental Health.
- Webber, Susan E. (1965). B.S., 1963, Maine; M.S., 1972; Special Assistant Professor of Institutional Management.
- Weber, William J. (1978). B.A., 1967, Oglethorpe College; M.A., 1970, Maine; Program Administrator; Associate Extension Educator.
- Weiner, Marli F. (1988). B.A., 1974, Johns Hopkins University; M.A., 1976, Sarah Lawrence College; Ph.D., 1986, University of Rochester; Assistant Professor of History.
- Werrbach, Gail B. (1988). B.S., 1975, University of Vermont; M.S.W., 1980, Simmons College; Ph.D., 1988, University of Texas at Austin; Assistant Professor of Social Work.
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- White, Gregory K.** (1976). B.A., 1968, Vanderbilt University; M.B.A., 1973, University of Alaska; Ph.D., 1976, Washington State University; Director, Environmental Studies Center; Associate Professor, Agricultural and Resource Economics.
- White, Jefferson A.** (1972). B.A., 1952, Baylor University; M.A., 1961, Yale University; M.S., 1981; Ph.D., 1964; Chair and Professor of Philosophy.
- White, Robert C.** (1978). B.S., 1963, Springfield College; M.Ed., 1964; Ed.D., 1976, Baylor College of Medicine, University of Houston; Director, Continuing Education Division; Associate Professor;
- Whiteside, Jennifer** (1990). B.S., 1986, Maine; M.S., 1988, Iowa State University; Lecturer I in Hotel, Restaurant and Tourism Management.
- Whitney, Allison I.** (1986). B.S., 1962, Maine; M.S., 1964; Lecturer in Electrical Engineering.
- Wicks, Ulrich** (1969). B.A., 1963, Northern Illinois University; M.A., 1969, University of Iowa; Ph.D., 1970; Associate Professor of English.
- Wieck, Anatole** (1986). B.M., 1978, Juillard School of Music; M.M., 1979; D.M.A., 1987; Associate Professor of Music.
- Wiedenhoft, Mary H.** (1986). B.S., 1980, Iowa State University; M.S., 1982, Washington State University; Ph.D., 1986; Assistant Professor of Agronomy.
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- Wihry, David F.** (1969). A.B., 1964, Merrimack College; Ph.D., 1972, Maxwell School of Citizenship and Public Affairs; Associate Professor of Economics.
- Wilkinson, J. Norman** (1970). B.A., 1964, University of Michigan; M.A., 1965; Ph.D., 1970; Professor of Theatre.
- Williams, Matthew S.** (1985). B.S., 1972, University of Connecticut; B.S., 1975; M.S., 1978; Extension Agent, Aroostook County; Associate Extension Educator.
- Wilson, James A.** (1968). B.A., 1962, Lake Forest College; Ph.D., 1971, University of Wisconsin, Madison; Professor of Resource Economics and Cooperating Professor of Economics.
- Wilson, John R.** (1969). A.B., 1963, Bates College; M.A., 1967, University of Kansas; Ph.D., 1969; Associate Professor of English.
- Wilson, Margery Y.** (1983). B.A., 1964, Bates College; M.A., 1968, University of Kansas; Instructor of English.
- Winkin, John W.** (1974). B.A., 1941, Duke University; M.A., 1954, Columbia University; Ed.D., 1961; Head Baseball Coach; Lecturer in Physical Education.
- Winne, Clinton H.** (1983). B.S., 1952, United States Military Academy; M.S., 1959, University of Michigan; Assistant Dean and Associate Professor, Engineering and Technology; Assistant Director of the Technical Experiment Station.
- Winowich, Nicholas S.** (1987). B.S., 1972, Carnegie-Mellon University; M.S., 1973; Ph.D., 1986; Assistant Professor of Mechanical Engineering.
- Wohlgemuth, Andrew R.** (1969). A.B., 1959, University of Pennsylvania; M.A., 1966, Syracuse University; Ph.D., 1969; Professor of Mathematics.
- Wolpert, Seth** (1989). B.A., 1979, Rutgers, The State University; M.S., 1986; Ph.D., 1989; Assistant Professor of Electrical Engineering.
- Wood, Bonnie G.** (1974). B.A., 1957, Maine; M.S., 1961, University of Pennsylvania; M.S., 1969, Maine; Ph.D., 1972; Chair and Professor of Zoology.
- Wood, Carol L.** (1987). B.S.N., 1975 University of Illinois; M.S.N., 1977; Assistant Professor of Nursing.
- Work, Gerald G.** (1967). B.A., 1960, Albright College; M.Ed., 1962, Ohio University; Ph.D., 1967; Professor of Education.
- Worobetz, Nestor B.** (1991) B.S., 1985, Centre College; Ph.D., 1990, Purdue University; Assistant Professor of Management Information Systems.
- Wren, Jeffrey** (1975). B.S., 1971, College of William and Mary; M.Ed., 1974, Maine; Aquatics Director, Swim Coach, Lecturer in Physical Education;
- Wyman, O. Lewis** (1965). B.S., 1949, Maine; M.S., 1963, University of Massachusetts; Business and Economics Specialist; Extension Educator; Cooperating Professor of Business Management.
- Yates, Martin G.** (1986) B.A., 1979, University of Montana; A.M., 1981, Indiana University; Ph.D., 1987; Research Assistant Professor of Geological Sciences.
- Yonovitz, Albert** (1989). B.S., 1969, Kent State University; M.A., 1972, University of Connecticut; Ph.D., 1973; Assistant Professor of Speech Communication.
- Yonovitz, Leslie B.** (1989). B.S., 1964, University of Illinois; M.A., 1966, Bradley University; Ph.D., 1978, University of North Carolina; Assistant Professor of Speech Communication.
- Young, Richard C.** (1987). B.S., 1981, Maine; Assistant Athletic Trainer; Lecturer in Physical Education.
- Yvon, Bernard R.** (1970). B.S., 1960, Westfield State College; M.Ed., 1963; Ed.D., 1970, Wayne State University; Professor of Education and Child Development; Cooperating Professor of Human Development.
- Zeichick, Herbert H.** (1969). B.S., 1958, Boston University; M.Ed., 1960; Extension Agent, Penobscot County; Extension Educator.
- Zeph, Lucille A.** (1979). B.S., 1970, Boston State College; M.Ed., 1976, Boston College; Ed.D., 1983, Vanderbilt University; Associate Professor of Education; Coordinator of University Affiliated Programs.
- Zibilske, Larry M.** (1981). B.S., 1973, Texas A & M University; M.S., 1975; Ph.D., 1979, University of Missouri; Associate Professor of Soil Microbiology, Cooperating Associate Professor of Microbiology.
- Ziegenbein, Don R.** (1982). B.S., 1961, Babson College; M.B.A., 1962; Lecturer III in Business Administration.
- Zingler, Raymond H.** (1990). B.A., Kansas State College; Assistant Football Coach, Lecturer in Physical Education and Athletics.
- Zoldi, John M.** (1971). B.S.E.E., 1965, Clarkson College; M.S.E.E., 1971; Associate Professor of Physical Science and Mathematics.
- Zollitsch, Reinhard** (1969). B.A., 1962, University of Kiel, Germany; M.A., 1964, Maine; M.A., 1969, University of Massachusetts, Amherst; Ph.D., 1971; Associate Professor of German.



## Living Emeriti and Emeritae

- Andersen, Charles L.** (1955-1987). B.A., University of Utah, 1949; M.A., 1951. Assistant Professor Emeritus of English.
- Baker, Gregory** (1935-1968). B.S., Maine, 1924; M.F., Yale, 1939. Professor Emeritus of Forestry.
- Banasiak, Chester F.** (1960-1985). B.S., Michigan State University, 1948; M.S., University of Massachusetts, 1952; Ph.D., Maine, 1974. Associate Research Professor Emeritus of Wildlife Resources.
- Barry, Ruth D.** (1965-1986). B.S., Maine, 1976; M.S., 1977. Assistant Dean Emerita of Student Services.
- Bates, Edwin H.** (1953-1980). B.S., Maine, 1937; M.S., University of Wisconsin, 1961. Extension Director Emeritus and Extension Educator.
- Beamesderfer, John William** (1947-1976). B.S., Gettysburg College, 1932; M.S., University of Michigan, 1939; Ph.D., 1947. Professor Emeritus of Chemistry.
- Bell, Harry Adelbert** (1949-1982). B.S., Maine, 1949. Extension Educator Emeritus.
- Bennett, Austin Edward** (1962-1982). B.S., University of Connecticut, 1951; M.Ed., Colorado State University, 1962. Extension Educator Emeritus.
- Beyer, Frank Kemp** (1947-1968). B.S., Cornell University, 1929; M.S., University of Wisconsin, 1930. Associate Professor Emeritus of Forestry.
- Biscoe, Jonathan** (1946-1973). B.S., Massachusetts Institute of Technology, 1931; M.S., 1932. Professor Emeritus of Physics.
- Bishop, David W.** (1962-1990). B.S., Harvard College, 1949; M.A., Maine, 1951; Ed.D., New York University, 1970. Professor Emeritus of Education.
- Bissell, Lewis Prouty** (1949-1976). B.S., University of New Hampshire, 1940; M.F., Yale University, 1947. Associate Extension Educator Emeritus.
- Bobalek, Edward George** (1963-1980). B.S. St. Mary's College, 1938; M.S., Creighton University, 1940; Ph.D., Indiana University, 1942. Professor Emeritus of Chemical Engineering.
- Bost, James Stephen** (1947-1988). A.B., University of Illinois, 1947; A.M., 1951; Ph.D., Indiana University, 1961. Professor Emeritus of Theatre.
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## Index

- abbreviations and symbols ..... 25-26  
 ability tests ..... 19, 283  
 academic advising ..... 13  
   Applied Sciences and  
     Agriculture ..... 45  
     B.A. programs ..... 39  
     University College ..... 283  
 Academic Affairs,  
   Vice President for ..... 14, 20  
 Academic and Career Exploration  
   Program ..... 3  
 Academic Assessment and Support  
   Services ..... 284-285  
 Academic credit for prior learning ..... 20  
 Academic departments,  
   for complete listing, *see*  
   particular college, division,  
   etc.  
 Academic dismissal ..... 14  
 Academic information ..... 13-15  
   admission requirements ..... 13, 22, 23  
   advising ..... 13  
   degrees offered ..... 2-3  
   grades/grading system ..... 13  
   graduation requirements ..... 14-15  
 Academic Management Services ..... 18  
 Academic probation ..... 14, 21  
 Academic orientation ..... 39  
 Academic requirements ..... 13  
   for admission ..... 13, 22, 23  
   for federal student assistance ..... 8-9  
   for graduation ..... 14-15  
   *see also* specific colleges,  
   departments, etc.  
 Academic Standing, Committee on ..... 14  
 Academic suspension ..... 14, 21  
 Acceptance deposit ..... 17, 22  
 Accounting (Bus. Adm.) ..... 127, 129  
   courses ..... 130  
 Accreditation ..... 4  
   *see also* individual colleges,  
   departments, etc.  
 Accumulative grade average ..... 13  
 ACE ..... 3  
 Achievement tests ..... 20  
 ACT examination ..... 19  
 Acting,  
   *see* Theatre  
 Activity fee ..... 9, 17  
 Add-Drop policy ..... 18, 41  
 Administration, Business,  
   *see* Business Administration,  
   College of  
 Administration (ED) courses (EAD) ..... 135  
 Administration officers ..... 319  
 Administration, Public,  
   *see* Public Administration  
 Admission ..... 19-23  
   acceptance deposit ..... 17, 21-22  
   application fee ..... 17  
   residency ..... 17  
   University College ..... 283  
   *see also* specific college, degree,  
   department, etc.  
 Admissions Office ..... 19  
 Adult Education (ED) courses  
   (EAE) ..... 135-136  
 Adult students ..... 286  
   *see also* Students,  
   non-traditional  
 Advanced placement ..... 20  
   Credit for Prior Learning ..... 20  
   Foreign Language ..... 20, 40, 100  
   University College ..... 283  
 Advanced Study Certificate ..... 3, 152-153  
 Advertising (Journalism) ..... 258  
 Advising, academic ..... 14  
   Applied Sciences and  
     Agriculture ..... 45  
     B.A. Programs ..... 39  
     University College ..... 283  
   Aerospace Studies ..... 147-148  
   Agency concentration (Health and  
     Family Life Education) ..... 76  
   Agribusiness ..... 47  
   Agribusiness Administration ..... 45, 47-48  
   Agribusiness and Resource  
     Economics ..... 45, 47-48  
     minor (ASA) ..... 80  
   Agribusiness and Resource  
     Economics (Sustainable  
       Agriculture) ..... 45, 70-71  
   Agribusiness Economics ..... 47  
   Agricultural Advisory Committee ..... 5  
   Agricultural and Natural Resource  
     Education minor (ASA) ..... 80  
   Agricultural and Resource  
     Economics ..... 45, 47-50, 70  
     Agribusiness Administration ..... 47-48  
     Agribusiness Economics ..... 47  
     courses (ARE) ..... 48-50  
     courses (ARE) Technical  
       Division ..... 85-86  
     Resource Economics ..... 47, 48  
   Agricultural Engineering ..... 54-55, 149-150  
   Agricultural Experiment Station ..... 1, 5  
   Agricultural Mechanization,  
     *see* Agricultural Engineering,  
     Food Engineering, Food  
     Production and Processing  
   Agriculture,  
     *see* Applied Science and  
     Agriculture, College of  
   Air Force ROTC ..... 147  
   Alumni placement (careers) ..... 8  
   Anatomy and Physiology (Zoology) ..... 241  
   Animal Industry option minor  
     (ASA) ..... 80  
   Animal Medical Technology ..... 83  
   courses (AVA) ..... 86  
   Animal Sciences  
     minor requirements (ASA) ..... 80-81  
   Animal, Veterinary, and Aquatic  
   Sciences ..... 45, 51-53  
   minor (ASA) ..... 80-81  
   Sustainable Agriculture ..... 69  
 Anthropology ..... 248-251  
   Center for the Study of the First  
     Americans ..... 248  
   foreign language requirements ..... 40, 100  
   Geography courses (GEO) ..... 251  
   Hudson Museum ..... 4-5, 10  
   International Affairs in  
     Anthropology ..... 42, 114, 248, 255  
   Museum ..... 248  
   Northeast Archives of Folklore  
     and Oral History ..... 5, 248  
   Quaternary Studies, Institute  
     for ..... 248  
 Apparel and Home Furnishings  
   Merchandising ..... 85  
 Appeal policy (academic standing) ..... 14  
 Application  
   fees ..... 17  
   *see also* Admission  
 Application for Degree or  
   Certificate ..... 14  
 Applied Music  
   courses ..... 117  
   fees ..... 116-117  
 Applied Sciences and Agriculture,  
   College of ..... 45-87  
   admission requirements ..... 22-23, 46  
   Agribusiness Administration ..... 47-48  
   Agribusiness and Resource  
     Economics ..... 47-48  
   Agricultural Engineering ..... 149-150  
   Aquacultural Engineering ..... 55, 150  
   Aquaculture ..... 64-65  
   Associate of Science degree  
     program ..... 2, 45-46  
   Bachelor of Science degree  
     program ..... 2, 45  
   Bio-Resource Engineering ..... 54-56, 149-150  
   Bio-Resource Engineering  
     Technology ..... 57  
   Economic Development of  
     Natural Resources ..... 45  
   Entomology ..... 58-59  
   Food Engineering ..... 45, 150  
   Food Industry Management ..... 60  
   Food Industry Systems ..... 65  
   Food Processing ..... 60  
   Food Science ..... 60  
   Forest Engineering ..... 55-56, 169-170, 191-192  
   graduation requirements ..... 46  
   Honors Program ..... 80  
   Human Development, School of ..... 45, 72-79  
   Interdisciplinary Studies ..... 64-71  
   Landscape Horticulture ..... 61  
   minors ..... 45, 80-83  
   Natural Resources ..... 66-69  
   Plant, Soil and Environmental  
     Sciences ..... 61-63  
   Pre-veterinary Science ..... 51  
   Sustainable Agriculture ..... 69-70  
   teacher certification ..... 71, 75, 80  
   Technical Division ..... 46, 83-86



- see also individual departments,  
 schools, programs  
 Appraisal and Basic Professional  
 courses (EDB) ..... 136  
 Apprenticeship,  
 see Clinical programs, Field  
 experience, Internship, etc.  
 in departmental descriptions  
 Aptitude tests ..... 19  
 Aquacultural Engineering ..... 55  
 Aquaculture ..... 64-65  
 see also Bio-Resource  
 Engineering: Animal,  
 Veterinary and Aquatic  
 Sciences  
 Aquatic and Marine Sciences  
 (Zoology) ..... 240  
 Archaeology,  
 see Anthropology  
 Armed Forces Personnel  
 Air Force ROTC ..... 147  
 Army ROTC ..... 175  
 deferred admission ..... 20  
 National Guard ..... 175  
 Naval ROTC ..... 177  
 residency classification ..... 18  
 Aroostook Farm ..... 5  
 Art ..... 90-94  
 Art Education ..... 90-91, 133  
 Art Education courses (AED) ..... 93  
 Art History ..... 90  
 Art History courses (ARH) ..... 93-94  
 Developmental Disabilities ..... 29, 43, 90  
 foreign language requirements ... 40, 100  
 Studio Art ..... 90  
 University Affiliated Program ..... 29, 43  
 Art Collection ..... 4  
 Art Museum ..... 4  
 Art teaching specialist certification ..... 91  
 Arts and Humanities, College of ..... 89-126  
 Art ..... 90-94  
 courses, see particular  
 department for course  
 descriptions  
 Dance ..... 123-124  
 degrees offered ..... 2, 3, 89  
 English ..... 95-99  
 foreign language requirements ... 39, 100  
 Foreign Languages and Classics . 100-108  
 History ..... 109-113  
 International Affairs ..... 42, 114-115  
 Music ..... 116-120  
 Performing Arts, School of ..... 116-123  
 Philosophy ..... 124-126  
 Theatre ..... 121-123  
 see Bachelor of Arts (B.A.) for  
 academic requirements,  
 graduation requirements,  
 special programs, etc.  
 see also particular department,  
 school, etc.  
 Arts, Maine Center for the ..... 4, 10  
 Assessment and Support Services .... 284-285  
 Assessment of Prior Learning  
 Program ..... 283  
 Associate degrees (A.A., A.S.)  
 admission requirements ..... 23  
 course numbers ..... 13  
 degrees offered ..... 2  
 Forest Management Technology . 189, 193  
 Engineering Technology ..... 181  
 Technical Division (ASA) ..... 2, 84-87  
 University College ..... 2, 283  
 Astronomy  
 courses (AST) ..... 239  
 Planetarium ..... 4  
 Audio/Visual Division ..... 4  
 Audio-visual media courses (INM) ..... 140  
 Auditions (Music) ..... 22, 116  
 Away status  
 B.A. candidates ..... 41, 43  
 Business Administration ..... 128  
 Engineering ..... 146  
 study abroad ..... 43  
 Baccalaureate degrees (B.A., B.S.)  
 graduation requirements ..... 39-41  
 with distinction ..... 14  
 Bachelor of Arts degree (B.A.)  
 academic advising ..... 39  
 admission requirements ..... 23, 39  
 away status ..... 41, 43  
 College Composition  
 requirements ..... 39, 96  
 degree options ..... 41-42  
 foreign language requirements ... 40, 100  
 graduation requirements ..... 14, 15, 41  
 Interdisciplinary course  
 concentrations ..... 27-37, 42  
 program offerings ..... 2  
 transfer credit ..... 41  
 Bachelor of Music in Music  
 Education ..... 2, 116  
 Bachelor of Music in Performance ..... 2, 116  
 Bachelor of Science degrees (B.S.) ..... 2, 3  
 Bachelor of University Studies .. 3, 21, 283, 286  
 Band (Music) ..... 22  
 Bangor campus (University College) ... 1, 283  
 Bangor Community College,  
 see University College  
 Bilingual Education (ED) courses  
 (EBI) ..... 136  
 Bills ..... 17  
 Biochemistry ..... 208-209  
 Biology ..... 210-211  
 courses (BIO) ..... 210-211  
 courses (BIO), Liberal Studies ... 307-308  
 requirements for major  
 (Zoology) ..... 242  
 Biology, Agricultural ..... 45  
 Biology, Cell ..... 232, 241  
 Biology, Forest,  
 see Forest Biology  
 Biology of Fishes (Zoology) ..... 240  
 Biology, Marine (Botany) ..... 213  
 Biology, Marine (Zoology) ..... 240, 241  
 Biology, Molecular and Cellular,  
 see Molecular and Cellular  
 Biology  
 Bio-Resource Engineering .... 54-55, 149-150  
 Agricultural Engineering . 54-55, 149-150  
 Aquacultural Engineering ..... 55, 150  
 Food Engineering ..... 55, 150  
 Bio-Resource Engineering  
 Technology ..... 57  
 courses (BRE) ..... 86, 181-182  
 Biotechnology, Plant (Botany) ..... 213  
 Blueberry Hill Farm ..... 5  
 Board of Trustees ..... 320  
 Books and supplies ..... 17  
 Botany ..... 212-215  
 Ecology ..... 213  
 Marine Biology ..... 213  
 minor (ASA) ..... 81  
 Plant Biotechnology ..... 213  
 Plant Pathology ..... 213  
 Plant Physiology ..... 213  
 Systematics and Evolution ..... 213  
 Broadcast Journalism ..... 258  
 Broadcasting,  
 see Journalism and Mass  
 Communications  
 Bureau of...  
 see under subject, e.g. Labor  
 Education, Bureau of  
 Business Administration,  
 College of ..... 1, 127-132  
 Accounting ..... 129, 130  
 admission requirements ..... 23, 127  
 Agribusiness Administration ... 45, 47-48  
 courses ..... 130-132  
 Finance ..... 127, 129  
 foreign language placement ..... 127-128  
 Honors Program ..... 128  
 Forestry Business  
 Administration ..... 189, 195  
 Management ..... 127, 129  
 Management Information  
 Systems ..... 127, 129-130  
 Marketing ..... 127, 130  
 Business concentration  
 (Computer Science) ..... 219  
 Business Management ..... 287-289  
 Business Office ..... 18, 20  
 Campus visits ..... 10, 19  
 Canada Year Program ..... 27, 102, 311  
 Canadian-American Center .... 4, 27, 102, 311  
 Canadian Studies ..... 27-28, 41, 102, 311-312  
 Career Center ..... 8, 134  
 Career Explorations Program (B.A.) ..... 3  
 Career opportunities,  
 see individual departments,  
 programs, of study, etc.  
 Cell Biology (Zoology) ..... 234-235  
 see also Molecular and Cellular  
 Biology  
 Center for...  
 see under subject, e.g. Marine  
 Studies, Center for  
 Certificate of Advanced Study ..... 3  
 Certificate programs  
 Agriculture (teaching) ..... 72, 76, 81  
 Dental Assisting ..... 292-293  
 Education ..... 133, 134  
 Medical Technology ..... 42, 230  
 Onward Program ..... 315-316  
 Paralegal Studies ..... 302  
 Pulp and Paper Management .... 152-153  
 Wildlife ..... 198  
 see also teacher certification  
 Certification of teachers, provisional ..... 42  
 Chemical Addiction Counseling ..... 297-298



- see* Human Services for admission, courses, etc.
- Chemical Engineering ..... 151-156  
   Pulp and Paper Technology .. 151-153, 155
- Chemistry ..... 216-219  
   foreign language requirements ... 40, 100  
   minor (ASA) ..... 81  
*see also* Biochemistry, Chemical Engineering
- Child Development/Family Relations ..... 72-73  
   courses (CHF) ..... 76-77  
   courses (ECE) ..... 77  
   Early Childhood Environments . 72, 73, 77  
   Individual and Family Services .... 72, 73  
   teacher certification ..... 72  
   University Affiliated Program .. 27, 43, 72
- Children and Youth Services ..... 298  
*see* Human Services for courses, etc.
- Chorus (Music) ..... 22
- Churches ..... 9
- Civil Engineering ..... 157-160
- Civil Engineering Technology ... 181, 182-183  
   Construction track ..... 183  
   Surveying track ..... 183  
*see also* Construction Management Technology
- Classical Studies ..... 28, 41  
   foreign language requirements ... 28, 100
- Clinical Laboratory Sciences ..... 42, 230
- CLEP ..... 20, 146, 283
- Clothing Merchandising,  
*see* Merchandising and Consumer Resources;  
 Merchandising (Apparel and Home Furnishings)
- College Board Achievement Tests ..... 19
- College Composition Placement Examination ..... 39
- College Entrance Examination Board (CEEB) ..... 19, 283
- College Level Examination Program (CLEP) ..... 20, 146, 283
- College of...,  
*see* under subject, *e.g.* Education, College of
- College Scholarship Service (CSS) ..... 8, 22
- College Work-Study Program ..... 8
- Communication Disorders ..... 274-275
- Communication fee ..... 17
- Communication Studies ..... 274  
*see also* Speech Communication; Journalism
- Community Development degree ..... 3
- Community Support Services ..... 285
- Commuter/Non-Traditional Student Services ..... 7
- Comprehensive fee ..... 9, 10, 17
- Computer Engineering ..... 161-162  
*see also* Computer Science; Electrical Engineering
- Computer Science ..... 219-221  
   Business ..... 219  
   courses (COS) ..... 220-221
- courses (COS) Liberal Studies ..... 307  
   Economics ..... 219  
   Electrical Engineering ..... 219  
   foreign language requirements ... 40, 100  
   Mathematics ..... 219  
   minor (ASA) ..... 81  
*see also* Computer Engineering
- Computing and Data Processing Services ..... 10
- Computing and Instructional Technology ..... 4
- Conditional status  
   language requirement ..... 41  
   University College ..... 283
- Conferences and Institutes Division ... 4, 285
- Confidentiality of records ..... 13
- Conley Speech and Hearing Center ..... 274
- Conservation Engineering,  
*see* Bio-Resource Engineering
- Construction Management Technology ..... 181, 183, 184
- Construction track (Civil Engineering Technology) ..... 182
- Continuing Education Division ..... 285  
   admission ..... 20  
   Bachelor of University Studies .. 2, 20, 286  
   CLEP ..... 20  
   correspondence ..... 20  
   Education ..... 134  
   University College ..... 285
- Cooperative education  
   B.A. programs ..... 43  
   Engineering ..... 145  
   Wildlife ..... 198  
*see also* individual colleges, departments, courses
- Cooperative Extension ..... 6
- Cooperative programs  
   Anthropological research ..... 248  
   Canada Year ..... 27, 311  
   courses, interdepartmental ..... 25-26  
   Industrial Cooperation, Dept. of ..... 6  
   Katahdin Area Health Education Center ..... 7  
   Maine Cooperative Fish and Wildlife Research Unit ..... 198  
   National Student Exchange ..... 43  
   New England regional student program ..... 21  
   Sea Grant Program ..... 1, 6  
   study abroad ..... 43, 102, 128, 313  
   University Affiliated Program ..... 29, 43  
   Zoology research ..... 240
- Correspondence  
   admission ..... 19  
   Continuing Education Division ... 20, 283  
   Summer Session ..... 283  
   University College admission ..... 283
- Council for, of...,  
*see* subject, *e.g.* Economic Education, Council on
- Counseling  
   Counseling Center ..... 8  
   Onward Program ..... 5, 315  
   University College ..... 285  
   University Retention Programs ..... 5
- Counseling Services, Center for ..... 285
- County Extension Associations ..... 6
- Course abbreviations and symbols ..... 25-26
- Course descriptions,  
*see* individual departments, programs, etc.
- Course fees ..... 17
- Course numbering system ..... 13  
*see also* individual colleges
- Credit by examination  
   College Level Examination Program (CLEP) ..... 20, 283  
   foreign language ..... 40, 100  
   mathematics ..... 20
- Curriculum,  
*see* individual departments and programs
- Cutler Health Center  
   counseling ..... 8  
   fees ..... 9, 17  
   immunizations ..... 13  
   services ..... 8, 9
- Cytotechnology ..... 42, 230
- Dance ..... 123
- Darling (Ira C.) Center ..... 4, 6, 234, 240
- Data Processing,  
*see* Computer Engineering; Computer Science
- Data Processing Services ..... 11
- Dean's List ..... 13
- Deferred admission ..... 20
- Degree hours ..... 13
- Degrees  
   application form ..... 14  
   Associate, *see* Associate degrees  
   Baccalaureate, *see* Baccalaureate degrees  
   Bachelor of Arts (B.A.) ..... 2-3, 39-44  
   Bachelor of Music in Music Education ..... 2, 116  
   Bachelor of Music in Performance ..... 2, 116  
   Bachelor of Science (B.S.) ..... 2  
   Bachelor of University Studies .. 2, 20, 286  
   Certificate of Advanced Study . 2, 152-153  
   Doctor of Education (Ed.D.) ..... 3  
   Doctor of Philosophy (Ph.D.) ..... 3  
   Master of Arts in Teaching ..... 3  
   Master of Business Administration ..... 3  
   Master of Professional Studies ..... 3-4  
   Master of Science (M.S.) ..... 3  
   One-year Certificate Program ..... 2  
   professional ..... 3  
   University College ..... 283, 286  
   with Distinction ..... 14  
   with Honors ..... 14  
*see also* particular college, department, etc.
- Delinquent accounts ..... 17
- DeMerritt Forest ..... 5
- Dental Assisting ..... 292-293
- Dental Hygiene ..... 290-291
- Department of...,  
*see* subject name, *e.g.* Anthropology
- Deposits  
   acceptance ..... 17, 22  
   residence halls ..... 18



- Development, Human,  
see Human Development
- Developmental courses  
(Onward Program) ..... 315-316
- Developmental Disabilities ..... 298  
see Human Services for  
admission, courses, etc.
- Developmental Disabilities Studies ..... 29, 42  
Art Education ..... 91  
Child Development/Family  
Relations ..... 72  
Education ..... 43  
Foods and Nutrition ..... 43  
Health, Physical Education and  
Recreation ..... 43  
Human Services ..... 298  
Nursing ..... 43  
Psychology ..... 264  
Social Work ..... 291  
Sociology ..... 43  
University Affiliated Program ..... 43
- Developmental Studies ..... 284
- Dietician training ..... 45, 72, 74
- Disabilities, persons with  
non-discrimination policy ..... 1
- Disabilities, students with  
Onward Program ..... 5, 315
- Discrimination policies ..... 1-2, 10, 19
- Dismissal, academic ..... 14  
readmission ..... 21
- Dismissal, provisional ..... 14
- Division of...,  
see under subject, e.g.  
Continuing Education  
Division
- Dormitories ..... 17
- Double major ..... 15  
B.A. candidates ..... 41  
Education ..... 133  
Engineering ..... 146
- Drama,  
see Theatre
- Drummond Chapel ..... 9
- Early admission (junior year) ..... 20
- Early Childhood Environments ..... 72, 73, 77
- Earth Sciences (Natural Resources) ..... 67
- Ecological Studies  
see Environmental Issues and  
Ecological Studies
- Ecology (Botany) ..... 213
- Ecology and Field Biology  
(Zoology) ..... 240
- Economic Development of Natural  
Resources (ASA) ..... 45
- Economic Education, Maine  
Council on ..... 7
- Economics ..... 252-254  
International Affairs in  
Economics ..... 42, 114, 252, 255  
Marxist-Socialist Studies ..... 34-35
- Economics (Computer Science) ..... 219
- Education  
Agricultural and Natural  
Resource Education ..... 81  
Art ..... 90-91, 93, 133  
certification ..... 134  
foreign languages ..... 101  
minor (ASA) ..... 81  
Music ..... 116
- Education and Cultural Services,  
Maine State Department of ..... 72, 134
- Education, College of ..... 1, 133-143  
admission requirements ..... 23  
Art Education ..... 90-91, 93, 133  
certification ..... 134  
Continuing Education Division ..... 134  
courses ..... 134-143  
graduation requirements ..... 134  
Honors Program ..... 134  
Music Education ..... 116  
residency requirements ..... 133  
University Affiliated Program ..... 29, 43
- Education, international  
Canada Year ..... 27, 311  
International Programs, Office  
of ..... 7  
international students ..... 9, 19, 101  
study abroad ..... 43, 101, 311
- Education Testing Service ..... 19
- Education minor (ASA) ..... 81
- Electrical Engineering ..... 161-166  
Computer Engineering ..... 161-162  
Computer Science ..... 219  
Mechanical Engineering  
double major ..... 172-173
- Electrical Engineering Technology ..... 182, 184-185
- Elementary Education  
certification ..... 72, 133  
Child Development/Family  
Relations ..... 72  
Human Development ..... 72, 75  
University Affiliated Program  
(UAP) ..... 29, 43
- Employment,  
see Career Center, Financial Aid
- Employment opportunities,  
see individual departments,  
programs, etc.
- Engineering, College of ..... 1, 145-187  
admission requirements ..... 23  
Aerospace Studies ..... 147-148  
Agricultural Engineering ..... 54-55, 149-150  
Aquaculture Engineering ..... 55, 150  
Bio-Resource Engineering ..... 54-55, 149-150  
Bio-Resource Engineering  
Technology ..... 57, 181, 182  
Chemical Engineering ..... 151-156  
Civil Engineering ..... 157-160  
Civil Engineering Technology ..... 181, 182-183  
Computer Engineering ..... 161-162  
Construction Management  
Technology ..... 181, 183-184  
courses, see individual  
departments  
double major ..... 146  
Electrical Engineering ..... 161-166  
Electrical Engineering  
Technology ..... 182, 184-185  
Engineering Physics ..... 167-168  
Engineering Technology,  
School of ..... 181-187  
Engineering Technology  
courses (GET) ..... 182-186  
Forest Engineering ..... 55-56, 167-170, 191-192  
General engineering courses ..... 171  
graduation requirements ..... 145  
Honors Program ..... 146  
Mechanical Engineering ..... 172-174  
Mechanical Engineering  
Technology ..... 182, 186-187  
Military Science ..... 175-176  
Naval Science ..... 177  
Pulp and Paper  
Technology ..... 151-153, 155, 173  
Surveying Engineering ..... 178-180  
Technology and Society Project .. 145-146  
transfer students ..... 146
- Engineering Physics ..... 167-168
- Engineering Technology,  
School of ..... 1, 181-187  
admission requirements ..... 23  
Bio-Resource Engineering  
Technology ..... 57, 181-182  
Civil Engineering Technology ..... 181, 182-183  
Construction Management  
Technology ..... 181, 183-184  
Electrical Engineering  
Technology ..... 182, 184-185  
graduation requirements ..... 181  
Mechanical Engineering  
Technology ..... 182, 186-187  
Surveying ..... 181, 183  
transfer credit ..... 181  
see also Engineering, College of;  
and particular programs of  
study
- English ..... 95-99  
courses (ENG) ..... 95-99  
courses (ENG) Liberal Studies ... 305-306  
foreign language requirements ... 40, 100  
placement in writing courses ... 20, 39, 96  
writing laboratories ..... 285  
Writer's Workshop ..... 96  
writing concentration ..... 95
- English as a Foreign Language  
Intensive English Institute ..... 101, 108  
Test ..... 20
- Enrollment,  
see Admission
- Entomology ..... 59
- Entomology, Environmental ..... 68
- Entrance requirements, academic ..... 22-24  
see also individual colleges,  
departments, etc.
- Entrance test requirements ..... 19, 20
- Environmental Entomology  
(Natural Resources) ..... 68
- Environmental History and Social  
Science (Natural Resources) ..... 67
- Environmental Interpretation  
concentration (Forestry) ..... 196-197
- Environmental Issues and  
Ecological Studies ..... 29-30, 41
- Environmental studies,  
see Ecology; Forest Resources,  
College of; Marine Studies;  
Natural Resources;  
Quaternary Studies; Sea  
Grant College Studies;  
Wildlife Management;  
Zoology



- Equal Opportunity policies ..... 1-2  
 Equal Opportunity, Office of ..... 1, 5, 8, 9  
 Errors in grade reports ..... 13  
 Evening courses (CED) ..... 20  
 Examinations, placement ..... 20  
   College Level Placement  
     Examinations ..... 20, 146, 283  
     English ..... 20, 39, 96  
     Foreign Languages ..... 20, 40, 100  
     Mathematics ..... 20  
     Music ..... 22, 116  
     University College ..... 283  
 Exchange programs  
   Canada Year ..... 27, 102, 311  
   International students ..... 9, 19  
   National Student Exchange ..... 43  
   New England Board of Higher  
     Education ..... 21, 102  
   Study abroad ..... 43, 102  
   Wildlife ..... 198  
 Expenses,  
   *see* Financial information  
 Experimental farms ..... 5  
 Extension, Cooperative ..... 6-7  
 Faculty ..... 321  
 Faculty advising ..... 5  
   Applied Sciences and  
     Agriculture ..... 45  
   B.A. programs ..... 39  
   University College ..... 283  
   *see also* Academic advising  
 Faculty responsibility ..... 13  
 Faculty Research Fund ..... 6  
 FAF ..... 8, 22  
 Failing grades ..... 13  
 Family Life,  
   *see* Health and Family Life  
     Education  
 Family Relations,  
   *see* Child Development/Family  
     Relations  
 Family Studies,  
   *see* Individual and Family Studies  
 Farm structures,  
   *see* Bio-Resource Engineering  
 Farms, experimental ..... 5  
 Fashion Merchandising,  
   *see* Merchandising (Apparel  
     and Home Furnishings);  
     Merchandising and  
     Consumer Resources  
 Fees ..... 17-18  
   acceptance deposit ..... 17, 22  
   applied music ..... 116  
   Dental Assisting Certificate  
     Program ..... 292  
   Dental Hygiene Program ..... 290  
   health ..... 9, 17  
   Nursing, School of ..... 279  
   student activity ..... 9, 17  
 Field Biology (Zoology) ..... 240  
 Finance (Bus. Adm.) courses ..... 131  
 Financial aid ..... 8-9, 22  
   Financial Aid Form ..... 8, 22  
   installment plan ..... 18  
 Financial Documentation Form ..... 19  
 Financial information ..... 17-18  
 First Americans, Center for the  
   Study of the ..... 24, 82  
 First year residency requirement ..... 10  
 Fish and Wildlife Research Unit,  
   *see* Maine Cooperative Fish and  
     Wildlife Unit  
 Fish Biology (Zoology) ..... 240  
 Fish, Migratory ..... 6  
 Fisheries and Aquaculture,  
   *see* Bio-Resource Engineering;  
     Animal, Veterinary, and  
     Aquatic Sciences  
 Flight Screening Program  
   (AFROTC) ..... 147  
 Fogler, Raymond H., Library ..... 4  
 Folklore  
   Franco-American Studies ..... 30  
   Northeast Archives of Folklore  
     and Oral History ..... 5, 248  
 Food Engineering ..... 55, 150  
 Food Industry Management ..... 60  
 Food Industry Systems ..... 65  
 Food Processing and Processing  
   Technology ..... 65  
 Food Science ..... 60  
 Foods and Nutrition  
   minor (ASA) ..... 81  
   University Affiliated Program ..... 43  
   *see also* Human Nutrition and  
     Foods  
 Foreign Language Placement  
   Examination ..... 20, 40, 100  
 Foreign language  
   requirements (B.A.) ..... 40, 100  
   requirements (Bus. Adm.) ..... 128  
 Foreign Languages and Classics ..... 98-106  
   advanced placement ..... 20, 40, 100  
   courses in English (FOL) ..... 102-103  
   credit by examination ..... 20, 40, 101  
   English as a foreign language  
     (IEI) ..... 108  
   French language courses  
     (FRE) ..... 30, 103-104  
   French major requirements ..... 100  
   German language courses  
     (GER) ..... 105-106  
   German major requirements ..... 101  
   graduation requirements (B.A.) ..... 40  
   graduation requirements for  
     majors ..... 39-40, 101  
   Greek language courses (GRE) ..... 28, 106  
   Intensive English Institute ..... 101-102, 108  
   Interdisciplinary Studies ..... 101  
   International Affairs in Foreign  
     Languages ..... 42, 101, 115, 255-256  
   Italian language courses (ITA) ..... 106  
   junior year abroad ..... 102  
   Latin courses (LAT) ..... 28, 106  
   Latin major requirements ..... 101  
   minor (ASA) ..... 81  
   Modern Languages major  
     requirements ..... 101  
   Romance Languages major  
     requirements ..... 101  
   Russian language courses  
     (RUS) ..... 106  
   Spanish language courses (SPA) ..... 106-107  
 Spanish language major  
   requirements ..... 101  
   study abroad ..... 43, 102  
   teacher preparation ..... 101  
   total immersion programs ..... 102  
 Foreign students,  
   *see* International students  
 Forest Biology ..... 194-195  
 Forest Business Administration ..... 195  
 Forest Engineering ..... 55-56, 169-170, 191-192  
   courses (FOE) ..... 200-201  
 Forest Management ..... 194-195  
   Forest Biology ..... 194-195  
   Forest Management ..... 194  
 Forest Management Technology ..... 189, 193  
 Forest Resources, College of ..... 1, 189-205  
   admission requirements ..... 23, 189  
   courses ..... 200-205  
   DeMerritt Forest ..... 5  
   Forest Biology ..... 194-195  
   Forest Business Administration .. 189, 195  
   Forest Engineering . 55-56, 169-170, 191-192  
   Forest Management ..... 194  
   Forest Management Technology .. 189, 193  
   graduation requirements ..... 189  
   Honors Program ..... 189-190  
   pre-Forest Resources  
     concentration in Liberal  
     Studies ..... 304  
 Recreation and Park  
   Management ..... 196-197, 202-203  
   Timber Utilization ..... 194  
   Wildlife Management ..... 198, 203-204  
   Wood Technology ..... 199, 204-205  
 Forest Resources Research  
   Advisory Committee ..... 5  
 Forestry ..... 194-195  
 Forgiveness policy ..... 14  
 Former students, readmission of ..... 14, 21  
 Franco-American Centre ..... 9  
 Franco-American Studies ..... 30, 41  
 French language  
   courses (FRE) ..... 103-104  
   graduation requirements ..... 101  
   study abroad ..... 43, 102  
   total immersion program ..... 102  
   *see also* Franco-American  
     Studies  
 French Language Center for  
   International  
     Training and Development ..... 7  
 Freshman Advising (B.A. programs) ..... 39  
 Gateway Program ..... 304  
 General Equivalency Diploma  
   (GED) ..... 22  
 General information ..... 1-10  
   accreditation ..... 3  
   degree programs ..... 2-3  
   history of the University ..... 1  
   mission statement ..... 1  
 General Student Senate ..... 9-10  
 Genetics and Evolutionary Biology  
   (Zoology) ..... 241  
 Geographical Information and  
   Analysis, National Center for ..... 7  
 Geography ..... 30-32, 41  
   courses (GEO) ..... 251



- Geological Sciences ..... 222-225  
 foreign language requirements ... 40, 100  
 Quaternary Studies ..... 6  
 minor (ASA) ..... 81
- Geopolitics (Geography) ..... 32
- German language  
 courses (GER) ..... 105-106  
 graduation requirements ..... 101  
 study abroad ..... 102  
 total immersion program ..... 102
- Gerontology ..... 299  
*see* Human Services for  
 admission, courses, etc.
- Government,  
*see* Political Science; Student  
 government
- Government and Public Policy  
 (Natural Resources) ..... 67
- Grades/grading system ..... 13  
 graduation requirements ..... 14-15  
 pass/fail grades ..... 13, 41, 146  
*see also* individual colleges,  
 departments, etc.
- Graduate degree programs ..... 3
- Graduate School  
*see* the Graduate School Catalog
- Graduation  
 application form ..... 14-15  
 requirements (B.A. degree) ..... 39-41  
*see also* specific colleges,  
 departments, etc.
- Grants ..... 6, 8
- Greek language  
 Classical Studies ..... 28  
 courses (GRE) ..... 106
- Guest Lecture Series ..... 10
- Handicapped students ..... 1  
*see also* Onward Program
- Hartman Awards ..... 5
- Hatch Act ..... 1
- Hartgen Gallery ..... 4
- Health and Family Life Education ..... 76  
 University Affiliated Program ..... 29
- Health Education Center, Katahdin  
 Area ..... 7
- Health fee ..... 17
- Health Information Technology ..... 294-295
- Health Insurance Plan ..... 17, 19
- Health Professions  
 Committee ..... 39, 42, 45, 321, 241
- Health Service ..... 8, 9, 17
- Health, Physical Education and  
 Recreation  
 B.A. program requirements ..... 41  
 courses ..... 141-143  
 Dance concentration ..... 123  
 requirements for majors ..... 133  
 University Affiliated Program ..... 29
- Hearing,  
*see* Speech Communication
- High school requirements,  
*see* Academic admission  
 requirements
- Highmoor Farm ..... 5
- History ..... 109-113  
 Art History ..... 89, 90  
 courses (HTY) ..... 109-113  
 courses (HTY) Liberal Studies ..... 306  
 foreign language requirements ... 40, 100
- International Affairs in  
 History ..... 42, 109, 115, 256  
 minor (ASA) ..... 81  
*see also* Northeast Archives of  
 Folklore and Oral History
- History and Philosophy (ED)  
 courses (EDH) ..... 137
- History of the University ..... 1
- Home Furnishings Merchandising,  
*see* Merchandising (Apparel  
 and Home Furnishings);  
 Merchandising and  
 Consumer Resources
- Honors Program ..... 14, 313-314  
 Applied Sciences and  
 Agriculture ..... 80  
 B.A. candidates ..... 42-43  
 Business Administration ..... 128  
 Education ..... 134  
 Engineering ..... 146  
 Forest Resources ..... 189-190
- Honors Students Organization  
 (OHS) ..... 313
- Horticulture,  
*see* Landscape Horticulture
- Housing ..... 17  
 deposit ..... 18  
 off-campus ..... 10  
 refunds ..... 18  
 Residents on Campus ..... 10
- Hudson Museum ..... 4-5, 10
- Human Development courses  
 (HUD) ..... 77-78
- Human Development, School of ..... 1, 72-79  
 admission requirements ..... 23  
 Child Development/Family  
 Relations ..... 72-73  
 courses ..... 76-79  
 Developmental Disabilities ..... 29, 72  
 Early Childhood Environments ..... 72, 73  
 Elementary Education ..... 72  
 Health and Family Life  
 Education ..... 76
- Human Development courses  
 (HUD) ..... 77-78
- Human Nutrition and Foods ..... 29, 75
- Human Nutrition and Foods  
 courses (HNF) ..... 77-78
- Individual and Family Studies ..... 72, 73
- Merchandising and Consumer  
 Resources ..... 75  
 teacher certification ..... 72, 76
- Human Nutrition (University  
 Affiliated Program) ..... 29, 43
- Human Nutrition and Foods ..... 75  
 courses (HNF) ..... 77  
 University Affiliated Program ..... 29, 43
- Human Services ..... 297-301  
 Assessment of Prior Learning  
 Program ..... 283  
 Chemical Addiction Counseling .. 297, 298  
 Children and Youth Services ..... 298  
 courses (HUS) ..... 298-301  
 Developmental Disabilities ..... 29, 298  
 Gerontology ..... 298
- Infant Toddler Preschool ..... 298
- Mental Health ..... 298
- University Affiliated Program ..... 29, 43
- Humanities,  
*see* Arts and Humanities,  
 College of
- Humanities courses (HUM) ..... 306
- Hutchins Concert Hall ..... 10
- Immunization Law ..... 13
- Incomplete grades ..... 13
- Indian Programs and Minority  
 Services ..... 9
- Individual and Family Studies  
 concentration ..... 72, 73
- Individualized Programs degrees ..... 3
- Industrial Cooperation,  
 Department of ..... 6
- Infant Toddler Preschool ..... 299  
*see* Human Services for  
 admission, courses, etc.
- Innovation and Entrepreneurship,  
 Center for ..... 7
- Insect science,  
*see* Entomology
- Installation plan ..... 18
- Institutes,  
*see* Conferences and Institutes
- Instructional Technology ..... 4
- Insurance fee ..... 17
- Intensive English Institute ..... 101, 103, 108
- Interdepartmental courses ..... 26
- Interdisciplinary course  
 concentrations  
 (ICCs) ..... 27-37, 41-42  
 Canadian Studies ..... 27-28  
 Classical Studies ..... 29  
 Developmental Disabilities ..... 28-29  
 Environmental Issues and  
 Ecological Studies ..... 29-30  
 Franco-American Studies ..... 30  
 Geography ..... 30-32  
 Latin American Studies ..... 32  
 Legal Studies ..... 32-33  
 Linguistics ..... 33  
 Marine Resources ..... 33-34  
 Marxist-Socialist Studies ..... 34-35  
 Medieval Studies ..... 35  
 Peace Studies ..... 35-36  
 Public Relations ..... 36-37  
 Religious Studies ..... 37
- Inter-fraternity Council ..... 10
- International Admissions  
 Application ..... 19
- International Affairs ..... 42, 114-115, 255-256  
 Anthropology ..... 114, 248, 255  
 Economics ..... 114, 252, 255  
 Foreign Languages ..... 101, 115, 255-256  
 History ..... 109, 115, 256  
 Political Science ..... 115, 256, 261
- International Education Exchange,  
 Council on (CIEE) ..... 102
- International Programs, Office of ..... 7
- International Student Program ..... 9
- International students, admission of ... 19, 20
- Internships,  
*see* descriptions of individual  
 departments



- nvoices ..... 17  
 Italian language courses (ITA) ..... 106  
 Job Placement  
   Career Center ..... 8  
   student employment ..... 8  
   work-study ..... 9  
 Joint Institutional Sea Grant  
   Program ..... 6  
 Journalism and Mass  
   Communication ..... 257-260  
   Advertising ..... 258  
   Broadcast Journalism ..... 258  
   Business option ..... 258  
   foreign language requirements ... 40, 101  
   minor (ASA) ..... 82  
   News Editorial ..... 258  
   Pre-M.B.A. program ..... 258  
 Junior year abroad ..... 102  
   *see also* study abroad  
 Katahdin Area Health Education  
   Center ..... 7  
 Labor Education, Bureau of ..... 7  
 Laboratory for Surface Science  
   and Technology ..... 6  
 Land Grant college and universities ... 1, 6-7  
 Land Grant Universities of New  
   England Exchange Program ..... 102  
 Land Use Planning ..... 67  
 Landscape and Nursery  
   Management ..... 85  
   courses (LNM) ..... 87  
 Landscape Horticulture ..... 61-62  
   minor (ASA) ..... 82  
 Language,  
   *see* English, Foreign Languages  
   and Classics  
 Language competency  
   B.A. candidates ..... 39, 40  
   English ..... 19, 39, 96, 101  
   Foreign languages ..... 40, 100, 101  
   Intensive English Institute ..... 101  
   placement examinations ..... 20, 40, 100  
   Test of English as a Foreign  
     Language ..... 19, 20, 101  
   *see also* individual colleges and  
   departments for  
   requirements  
 Late fees (late payment) ..... 17  
 Latin American Studies ..... 32, 42  
 Latin Language  
   Classical Studies ..... 28  
   courses (LAT) ..... 106  
   graduation requirements for  
   majors ..... 101  
 Law,  
   *see* Legal Studies, Legal  
   Technology, Pre-Law studies  
 Law School Admission Test ..... 39  
 Law, School of ..... 1  
 Legal aid for students ..... 10  
 Legal Studies ..... 32-33, 42  
 Legal Technology ..... 302-303  
 Liberal Arts,  
   *see* Arts and Humanities,  
   College of  
 Liberal Studies ..... 304-309  
   courses (LIB) ..... 306  
 Libraries ..... 4  
 Linguistics ..... 33, 42  
 Literature (English) ..... 95-99  
 Literature (Foreign)  
   *see* Foreign Languages and  
   Classics  
 Loans, student ..... 8  
 Lobster Institute ..... 6, 7  
 Maine Agricultural Advisory  
   Committee ..... 5  
 Maine Agricultural Experiment  
   Station ..... 1, 5  
 Maine Air National Guard ..... 147  
 Maine Campus (newspaper) ..... 258  
 Maine Center for the Arts ..... 4, 10-11  
 Maine Cooperative Fish and  
   Wildlife Research Unit ..... 198, 240  
 Maine Council on Economic  
   Education ..... 7  
 Maine Department of Inland  
   Fisheries and Wildlife ..... 198, 240  
 Maine Inventors Network ..... 7  
 Maine Lobster Institute ..... 6-7  
 Maine Marine Advisory Program ..... 6  
 Maine Masque Theatre ..... 121  
 Maine Mentor Program ..... 8  
 Maine Public Broadcasting Network ..... 258  
 Maine Recruiting Consortium ..... 8  
 Maine State Board of Nursing ..... 278, 279  
 Maine State Department of  
   Education and Cultural Services ... 72, 134  
 Maine Visual Arts Dialog ..... 4  
 Management (Bus.Adm.) ..... 127, 129  
   courses ..... 130-131  
 Management Information Systems  
   (Bus.Adm.) ..... 129  
   courses ..... 132  
 Mandatory fees ..... 17  
 Margaret Chase Smith Center for  
   Policy Studies ..... 7  
 Marine Advisory Program ..... 6  
 Marine Biology (Botany) ..... 213  
 Marine Biology (Zoology) ..... 240, 241  
 Marine Bio-Resources ..... 3, 51  
 Marine laboratory (Darling  
   Center) ..... 4, 6, 234, 240  
 Marine Resource Utilization ..... 34, 82  
 Marine Resources ..... 33-34, 42  
   minor (ASA) ..... 82  
 Marine Resources and Sciences  
   (Natural Resources) ..... 67  
 Marine Sciences (Zoology) ..... 240, 241  
 Marine Studies, University of  
   Maine Center for ..... 6  
   *see also* Aquaculture; Fish  
   (Biology); Oceanography;  
   Marine Resources; etc.  
 Marine Technology ..... 34, 82  
 Marketing (Bus.Adm.) ..... 127, 130  
   courses ..... 131  
 Marxist-Socialist Studies ..... 34-35, 42  
 Master's degrees, *see* Graduate  
   School Catalog  
 Mathematics ..... 226-229  
   courses (EMA) ..... 138  
   courses (MAT) ..... 226-229  
   courses (MAT) Liberal Studies ... 306-307  
   foreign language requirements ... 40, 101  
   minor (ASA) ..... 82  
   placement examination ..... 20  
 Mathematics (Computer Science) ... 219-220  
 Mathematics laboratories  
   University College ..... 285  
 Matriculation fee ..... 17  
 Meal plans ..... 17  
 Measuring and Testing (ED)  
   courses (EDA) ..... 136  
 Mechanical Engineering ..... 172-174  
   Pulp and Paper option ..... 173  
 Mechanical Engineering  
   Technology ..... 182, 186-187  
 Mechanization, Agricultural,  
   *see* Production and Processing  
   Technology  
 Medical Records Technology,  
   *see* Health Information  
   Technology  
 Medical Technology ..... 42, 230  
 Medieval Studies ..... 35, 42  
 Mental Health ..... 298, 299  
   *see* Human Services for  
   admission, courses, etc.  
 Mental health services ..... 8  
 Merchandising (Apparel and Home  
   Furnishings) ..... 85  
   courses (CLD) ..... 87  
 Merchandising and Consumer  
   Resources ..... 74  
   courses (MCR) ..... 78-79  
 Microbiology ..... 231-233  
 Microcomputer Resource Center ..... 4  
 Migratory Fish Research Institute ..... 6  
 Military personnel, *see* Armed  
   Forces personnel  
 Military Science ..... 175-176  
   B.A. degree credits ..... 41  
   *see also* Aerospace Engineering,  
   Naval Science  
 Minority student services ..... 8-9  
 Minors (ASA) ..... 45, 80-82  
 Mission statement ..... 1  
 Modern Languages  
   graduation requirements ..... 99  
 Molecular and Cellular Biology ..... 232  
 Morrill Act ..... 1  
 MPBN ..... 258  
 Multicultural Affairs, Center for ..... 9  
 Museums and galleries ..... 4, 10  
 Music ..... 116-120  
   applied music fees ..... 116  
   auditions ..... 116  
   courses ..... 117-120  
   courses (MUS) Liberal Studies ..... 307  
   foreign language requirements ... 40, 100  
   master classes ..... 10  
   Music Education degree ..... 116  
   Music in Performance degree ..... 116  
   non-music majors ..... 22, 116  
   teacher certification ..... 116  
 National Center for Geographic  
   Information and Analysis ..... 7  
 National Student Exchange ..... 43  
 National Teacher Education  
   examination ..... 134



- Natural History and Ecology  
(Natural Resources) ..... 67
- Natural Resources ..... 45, 66-69
- Agricultural and Natural  
Resource Education minor  
(ASA) ..... 80-81
- Earth Science ..... 67
- Environmental Entomology ..... 68
- Environmental History and  
Social Science Perspectives ..... 67
- Government and Public Policy ..... 67-68
- Individualized concentration ..... 66
- Land Use Planning ..... 67
- Marine Resources and Sciences ..... 67
- Natural History and Ecology ..... 67
- Resource and Environmental  
Economics ..... 67
- Soil and Water Conservation ..... 67
- Waste Management ..... 68
- see also* Ecology, Environmental  
Studies, Wildlife, etc.
- Natural Sciences courses (Liberal  
Studies) ..... 307-308
- Naval Science Department ..... 177
- New England Association of  
Schools and Colleges ..... 3, 19
- New England Board of Higher  
Education ..... 21
- New England Regional Student  
Program ..... 21
- New Student Fee ..... 17
- New Student Orientation ..... 13, 17, 39
- placement tests ..... 20, 39, 40, 95
- News Editorial Sequence ..... 258
- Newspaper (Maine Campus) ..... 258
- Non-credit grades ..... 13
- Non-degree students admission ..... 21
- Continuing Education Division ..... 20
- Non-discrimination policies ..... 1-2, 8, 19
- Non-resident classification ..... 18
- Non-resident tuition ..... 17
- Non-traditional students ..... 10
- Northeast Archives of Folklore and  
Oral History ..... 5, 248
- Nursery Management ..... 84-85
- Nursing, School of ..... 1, 278-280
- admission requirements ..... 23
- fees ..... 279
- licensure ..... 278
- RN Studies Program ..... 279
- University Affiliated Program .. 29, 31, 44
- Nutrition,  
*see* Foods and Nutrition;  
Human Nutrition and Foods
- Observatory ..... 4
- Oceanography ..... 234-35
- see also* Marine Resources;  
Marine Studies; Migratory  
Fish Research Institute; Sea  
Grant Program; Marine  
Science
- Off-Campus Board ..... 10
- Office of...  
*see* under subject, e.g. Student  
Aid, Office of
- OHS ..... 313
- Onward Special Services Program .. 5, 315-316
- Oral History ..... 5, 248
- Orchestra (Music) ..... 22
- Orientation (B.A. candidates) ..... 39
- Orientation for New Students ..... 13, 17, 19
- dormitory fee ..... 17
- testing ..... 20, 39, 41
- Palmer Gallery ..... 10
- Panhellenic Council ..... 10
- Paralegal Studies ..... 302
- Park Management (Forestry) ..... 196-197
- Pass/fail grades  
B.A. candidates ..... 41
- Engineering ..... 146
- Passing undergraduate grades ..... 13
- Pathology, Plant ..... 213
- Peace Studies ..... 35-36, 42
- Pell Grant Program ..... 8, 22
- Performing Arts,  
School of ..... 1, 116-123
- Dance ..... 123
- Music ..... 116-120
- Theatre ..... 121-122
- Perkins Loans ..... 8
- Permanent residents, admission of ..... 19
- Philosophy ..... 124-126
- foreign language requirements ... 40, 100
- minor (ASA) ..... 82
- Religious Studies ..... 37, 124
- Physical Education  
*see* Health, Physical Education,  
and Recreation
- Physics ..... 236-239
- Astronomy courses (AST) ..... 239
- courses (PHY) ..... 237-239
- Engineering Physics ..... 167-168
- foreign language requirements ... 40, 100
- minor (ASA) ..... 82
- Physiology, Plant (Botany) ..... 213
- Placement in courses  
advanced placement ..... 20
- English ..... 20, 39, 96
- Foreign Languages ..... 40, 100
- Mathematics ..... 20
- Music ..... 22, 116
- University College ..... 283, 285
- Planetarium ..... 4
- Plant Biotechnology (Botany) ..... 213
- Plant Pathology (Botany) ..... 213
- Plant Physiology (Botany) ..... 207
- Plant Protection (ASA) ..... 71
- Plant Science (ASA) ..... 71
- Plant, Soil, and Environmental  
Sciences ..... 45, 61-63
- Landscape Horticulture ..... 61
- minor (ASA) ..... 82-83
- Policy Studies, Margaret Chase  
Smith Center for ..... 7
- Political Science ..... 261-263
- courses (POS) ..... 261-263
- courses (POS) Liberal Studies ..... 308
- foreign language requirements ... 40, 100
- International Affairs ..... 42, 115, 256
- Portfolio assessment (advanced  
placement) ..... 20
- Practica,  
*see* specific departments,  
programs, etc.
- Pre-dental studies ..... 41, 241
- advising ..... 39
- curriculum (Zoology) ..... 241
- required courses ..... 42
- Pre-dietetic Intern curriculum ..... 72, 74
- Pre-law advising ..... 39
- Pre-medical Studies ..... 41
- advising ..... 39
- curriculum (Zoology) ..... 241
- Pre-optometry Studies ..... 45, 241
- advising ..... 39
- curriculum ..... 241
- required courses ..... 42
- Pre-osteopathy Studies ..... 241
- Pre-podiatry Studies ..... 241
- Pre-veterinary Science Studies ..... 45, 51, 241
- curriculum (ASA) ..... 51
- curriculum (Zoology) ..... 241
- Probation, academic ..... 14
- Probation, remedial ..... 14
- Progress grade ..... 13
- Provisional certificates for teachers ..... 42
- Provisional dismissal ..... 14
- Psychology ..... 264-267
- courses (PSY) ..... 264-267
- courses (PSY) Liberal Studies ..... 308
- Developmental Disabilities ..... 29, 43
- minor (ASA) ..... 83
- University Affiliated Program ..... 29, 43
- Public Administration ..... 268-270
- Public Administration, Bureau of ..... 4, 268
- Public Affairs ..... 10
- Public Exhibition Program (Art) ..... 4
- Public Relations ..... 36-37, 42
- Public Service, Office of Research  
and ..... 5
- Pulp and Paper option (Mechanical  
Engineering) ..... 173
- Pulp and Paper Technology ..... 151-153
- Quaternary Studies, Institute for ..... 6, 248
- Radio station WMEB-FM ..... 258
- Reading and Language Arts (ED)  
courses (ERL) ..... 138-139
- Readmission ..... 14, 21
- Recreation and Park Management ... 196-197
- courses (RPM) ..... 202-203
- Environmental Interpretation ... 196-197
- Park Management ..... 196
- Tourism ..... 197
- Recreation fee ..... 17
- Refunds ..... 18
- Regional programs  
New England Board of Higher  
Education ..... 21
- New England Land Grant  
Universities ..... 102
- New England Regional Student  
Program ..... 21
- Sea Grant College Program ..... 6
- student exchange ..... 21
- study abroad ..... 43, 102
- tuition reduction ..... 21
- Registrar's Office ..... 14
- transfer credit ..... 41
- Registration ..... 13
- Religious affairs ..... 9
- Religious Studies ..... 37, 42



- Philosophy Department ..... 124
- Remedial Education,  
see Special Education;  
Developmental Studies
- Remedial probation ..... 14
- Requirements, academic  
for admission ..... 22, 23  
for graduation ..... 14-15  
see also specific departments,  
colleges, etc.
- Research Funds, Faculty ..... 5-6
- Research and Public Service, Office of ..... 5
- Research, Office of ..... 7
- Residence and dining halls ..... 17
- Residency requirement ..... 18  
Armed Forces personnel ..... 18  
Business Administration ..... 127  
Education ..... 133-134  
first year students ..... 10  
graduation requirement ..... 14
- Resident status ..... 18
- Residential Life, Office of ..... 10
- Residents on Campus (ROC) ..... 10
- Resource and Environmental  
Economics (Natural Resources) ..... 67
- Responsibility of faculty ..... 13
- Responsibility of students ..... 13
- Restaurant Management,  
see Hotel/Restaurant  
Management
- Retention Programs, University  
Office of ..... 5
- RN Studies Program ..... 279
- Romance Languages ..... 101
- Room and board ..... 17  
refunds ..... 18  
deposits ..... 18
- ROTC (Air Force) ..... 147
- ROTC (Army) ..... 175
- ROTC (Navy) ..... 177
- Russian language  
courses (RUS) ..... 106  
Modern Languages major ..... 101
- Salutatorian ..... 14
- Scholarships ..... 8-9, 22  
Air Force ROTC ..... 147  
Army ROTC ..... 175  
College Scholarship Service ..... 8  
Naval ROTC ..... 177
- Scholastic Aptitude Test (SAT) ..... 19-20, 304
- School of...,  
see under subject, e.g. Nursing,  
School of
- Science courses (SCI) Liberal  
Studies ..... 308
- Sciences, College of ..... 207-245  
admission requirements ..... 23, 207  
Biochemistry ..... 208-209  
Biology ..... 210-211  
Botany ..... 212-215  
Chemistry ..... 216-218  
Clinical Laboratory Sciences ..... 42, 230  
Computer Science ..... 219-221  
courses, see individual  
departments  
Cytotechnology ..... 230  
degrees offered ..... 2, 3, 207  
foreign language requirements ... 40, 100  
Geological Sciences ..... 222-225  
graduation requirements ..... 207  
Mathematics ..... 226-228  
Medical Technology ..... 42, 230  
Microbiology ..... 231-233  
Molecular and Cellular Biology ..... 232  
Oceanography ..... 228-229  
Physics ..... 236-239  
Zoology ..... 240-245
- Sea Grant College Program ..... 1, 6
- Secondary Education ..... 133
- Self-Help Career Lab ..... 8
- Services for Students with  
Disabilities ..... 5
- Sex discrimination ..... 1, 8, 19
- Smith, Margaret Chase, Center for  
Policy Study ..... 7
- Social and Behavioral Sciences,  
College of ..... 247-282  
Anthropology ..... 248-251  
Economics ..... 252-254  
foreign language requirements ... 40, 100  
International Affairs ..... 255-256  
Journalism and Mass  
Communication ..... 257-260  
Nursing, School of ..... 247, 278-280  
Political Science ..... 261-263  
Psychology ..... 264-267  
Public Administration ..... 268-270  
Social Work, School of ..... 281-282  
Sociology ..... 271-273  
Speech Communication ..... 274-277  
for admission and graduation  
requirements, special  
programs, etc. see Bachelor  
of Arts (B.A.) degree
- Social Work, School of ..... 281-282  
Developmental Disabilities ..... 29, 43  
foreign language requirements ... 40, 100  
University Affiliated Program ..... 29, 43
- Socialist Studies,  
see Marxist-Socialist Studies
- Sociology ..... 271-273  
Applied Sociology option ..... 271  
courses (SOC) ..... 271-273  
courses (SOC) Liberal Studies ..... 309  
Developmental Disabilities ..... 29, 43  
foreign language requirements ... 40, 100  
University Affiliated Program ..... 29, 43
- Soil and Water Conservation  
(Natural Resources) ..... 67
- Soil and Water Conservation  
Engineering,  
see Bio-Resource Engineering
- Soil Science (Sustainable  
Agriculture) ..... 71  
minor (ASA) ..... 82
- Soils,  
see Plant, Soil and  
Environmental Sciences
- Sororities ..... 10
- Spanish language  
courses (SPA) ..... 106-108  
graduation requirements ..... 100  
Latin American Studies ..... 32  
study abroad ..... 102
- total immersion program ..... 102
- Speakers' Bureau ..... 10
- Special Education  
University Affiliated Program ..... 29, 43
- Special Programs, Office of ..... 286
- Speech and Hearing Center ..... 274
- Speech Communication ..... 274-277  
Communication Disorders ..... 274-275  
Communication Studies ..... 274  
Developmental Disabilities ..... 29, 43  
foreign language requirements ... 40, 100  
University Affiliated Program ..... 29, 43
- Sponsored Programs Division ..... 5
- Stafford Loan ..... 8, 22
- State Board of Examination  
(Nursing) ..... 278, 279
- State Department of Education ..... 72, 134
- Statements, financial ..... 17
- Student activity fee ..... 9, 17
- Student Affairs, Division of ..... 7-9
- Student Aid, Office of ..... 8-9, 21
- Student employment ..... 8
- Student government ..... 9-10
- Student Health Service ..... 9, 17
- Student Legal Services ..... 10
- Student Life ..... 9-10
- Student newspaper ..... 258
- Student records (grades, etc.) ..... 13
- Student responsibility ..... 5
- Student Senate ..... 9
- Student Services ..... 7-8  
see also Academic Assessment  
and Support Services
- Student teaching ..... 141, 183
- Students, disabled ..... 5, 315
- Students, international  
admission ..... 19  
International Student Office ..... 10
- Students, non-resident ..... 10, 18
- Students, non-traditional ..... 10, 133, 285
- Students, resident ..... 10, 18
- Studio Art ..... 90  
courses (ART) ..... 91-93
- Study abroad ..... 43, 101  
Canada Year Program ..... 102, 311  
Business Administration ..... 128
- Summer Session ..... 1, 285  
Bachelor of University Studies ... 283, 286  
Education ..... 134  
non-degree students ..... 21  
University College ..... 283
- Supplementary Educational  
Opportunity Grants ..... 8
- Surveying Engineering ..... 178, 180
- Surveying Technology ..... 181, 183
- Suspension, academic ..... 14  
readmission ..... 14, 21
- Sustainable Agriculture ..... 69-70  
Agricultural and Resource  
Economics ..... 70-71  
Animal, Aquatic and  
Veterinary Science ..... 71  
minor (ASA) ..... 80  
Plant Protection ..... 71  
Plant Science ..... 71  
Soil Science ..... 71  
Sustainable Agriculture ..... 70



- Systematics and Evolution (Botany) ..... 213
- Teacher certification ..... 133, 134
- Art Education ..... 91, 133
- Applied Sciences and
- Agriculture ..... 72, 76, 81
- Child Development/Family
- Relations ..... 72
- elementary ..... 72, 134
- foreign languages ..... 100
- Health and Family Life
- Education ..... 76
- Music Education ..... 116
- provisional ..... 42
- Technical Division (ASA) ..... 84-87
- admission requirements ..... 23
- Animal Medical Technology ..... 45, 84
- courses ..... 86-87
- Landscape and Nursery
- Management ..... 84-85
- Merchandising ..... 85
- Technology and Society Project
- (TSO) ..... 145
- Television facilities ..... 4, 258
- Test of English as a Foreign
- Language ..... 19, 20, 101-102
- Testing and Research Office ..... 20
- Theatre ..... 121-122
- courses (DRA) Liberal Studies ..... 305
- Tourism
- Forestry ..... 197
- Tours of campus ..... 10, 19
- Transcripts (course grades)
- transfer students ..... 19, 21
- withheld ..... 17
- Transfer students
- admission ..... 21
- Applied Sciences and
- Agriculture ..... 46
- B.A. candidates ..... 41
- Business Administration ..... 127
- credit evaluation ..... 21-22
- Education ..... 133
- Engineering ..... 146, 181
- registration ..... 13
- Transfer within the University of
- Maine system ..... 21
- Trustees, Board of ..... 320
- Tuition ..... 17
- reduction (New England
- Regional Student Program) ..... 21
- Tutoring (Onward Program) ..... 315
- UAP,
- see* University Affiliated
- Program
- Undergraduate degree programs ..... 2-3
- University Administration ..... 319
- University Affiliated Program ..... 29, 43
- Art Education ..... 91
- Child Development/Family
- Relations ..... 72
- Education ..... 29, 43
- Foods and Nutrition ..... 29, 43
- Human Services ..... 29, 43
- Nursing ..... 29, 43
- Psychology ..... 264
- Social Work ..... 281
- University Business Office ..... 17, 18
- University College ..... 1, 283-309
- academic advising ..... 283
- Academic Assessment and
- Support Services ..... 284-285
- admission ..... 22, 283
- Bachelor of University
- Studies ..... 20, 283, 286
- Business Management ..... 287-289
- Chemical Addiction
- Counseling ..... 297, 298
- Children and Youth Services ..... 298
- Continuing Education Division ..... 285
- courses, *see* individual
- departments
- Dental Assisting ..... 292-293
- Dental Hygiene ..... 290-291
- Developmental Disabilities ..... 298
- Developmental Studies ..... 284
- Gerontology ..... 298, 299
- Health Information Technology .. 294-295
- Honors Program ..... 296
- Human Services ..... 297-301
- Legal Technology ..... 302-303
- Library ..... 4
- Infant Toddler Preschool ..... 298, 300
- Mental Health ..... 298, 299
- transfer credit ..... 283
- University Faculty ..... 321
- University grants ..... 8
- University Health Professions
- Committee ..... 39, 42, 45, 231, 241
- University Honors Program ..... 313-314
- University Retention Programs,
- Office of ..... 5
- University Scholarship ..... 8
- University Studies ..... 286
- University-wide programs ..... 311-318
- University/Community Support
- Service ..... 285
- Unpaid bills ..... 17
- URSUS ..... 11
- U.S. Fish and Wildlife Service ..... 198, 240
- Valedictorian ..... 14
- Veterans' benefits ..... 15
- Veterinary Science,
- see* Animal, Veterinary, and
- Aquatic Sciences;
- Pre-veterinary Studies;
- Animal Medical Technology
- Waste Management (Natural
- Resources) ..... 68
- Water Resources,
- see* Land and Water Resources
- Center
- Wildlife Management ..... 198
- courses (WLM) ..... 203-204
- graduation requirements ..... 189, 198
- Withdrawals
- refunds ..... 18
- University Retention Programs ..... 5
- Witter Animal Science Center ..... 5
- WMEB-FM (radio station) ..... 258
- Women
- achievement awards ..... 5
- admitted as students ..... 1
- Women in the Curriculum Program ..... 5
- Women's Studies ..... 5, 42, 317-318
- Wood Technology ..... 199
- courses (WTY) ..... 204-205
- graduation requirements ..... 189
- Work-Study Programs ..... 8
- Writing concentration (English) ..... 99
- Writing laboratories
- Onward Program ..... 315
- University College ..... 285
- Writing proficiency requirements
- B.A. candidates ..... 39, 96
- Writing Workshop ..... 96
- Yearbook fee ..... 17
- Zoology ..... 240-245
- Anatomy and Physiology ..... 240
- Aquatic and Marine Sciences ..... 240
- Biology major ..... 242
- Biology of Fishes ..... 240
- Cell Biology ..... 241
- Ecology and Field Biology ..... 240, 241
- foreign language requirements ... 40, 100
- Genetics and Evolutionary
- Biology ..... 240
- health professions preparation ... 39, 241
- Marine Biology ..... 240
- minor (ASA) ..... 83
- Pre-medical studies ..... 39, 241
- see also* Environmental Issues
- and Ecological Studies;
- Marine Studies;
- Microbiology; Molecular
- and Cellular Biology;
- Biology; Wildlife;
- Pre-veterinary Studies