

1987

Catalog for 1987-1988

University of Maine

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BULLETIN

CATALOG
FOR 1987-1988

UNIVERSITY OF MAINE



It is the policy of the University of Maine to comply with applicable laws prohibiting discrimination on the grounds of race, color, religion, sex, national origin, age, handicap, or veterans' status in any area of the University. The University's policy shall include, but it shall not be limited to, the requirements of Executive Order 11246 and 11375, as amended in Department of Labor, Office of Federal Contract Compliance Programs 41 CFR, Part 60-2, October 20, 1978; the Age Discrimination in Employment Act, as amended; Section 503 of the Rehabilitation Act of 1973, as amended; and Section 402 of the Vietnam Era Veterans Readjustment Assistance Act of 1974.

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BULLETIN
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Information in this catalog covers the academic year 1987-1988

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 reserves the right to cancel course offerings, to set the minimum and maximum size 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.

Approved Academic Calendar 1987-1988

FALL SEMESTER 1987

Classes begin	Tuesday, September 1, 8:00 a.m.
Add/Drop week	Tuesday-Tuesday, September 1-8
No classes on Labor Day	Monday, September 7
End of 1st 3rd of semester for withdrawals	Tuesday, October 6, 4:30 p.m.
Fall recess begins	Saturday, October 10, 8:00 a.m.
Classes resume	Wednesday, October 14, 8:00 a.m.
Mid-semester reports due	Friday, October 16, 4:30 p.m.
Registration for Spring 1988	Wednesday-Friday, November 11-12
End of 2nd 3rd of semester for withdrawals	Thursday, November 12, 4:30 p.m.
Deadline for filing application for degree (December)	Friday, November 13, 4:30 p.m.
Thanksgiving recess begins	Wednesday, November 25, 9:30 p.m.
Classes resume	Monday, November 30, 8:00 a.m.
Classes end	Friday, December 11, 9:30 p.m.
Final exams begin	Monday, December 14, 8:00 a.m.
Final exams end	Friday, December 18, 6:15 p.m.
<i>Note:</i> Family and Friends Weekend	Friday-Sunday, September 25-27
Homecoming Weekend	Friday-Sunday, October 16-18

SPRING SEMESTER 1988

Classes begin	Monday, January 11, 8:00 a.m.
Add/Drop week	Monday-Friday, January 11-15
End of 1st 3rd of semester for withdrawals	Friday, February 12, 4:30 p.m.
Mid-semester reports due	Friday, February 26, 4:30 p.m.
Spring recess begins	Saturday, March 5, 8:00 a.m.
Deadline for filing application for degree (May)	Friday, March 11, 4:30 p.m.
Classes resume	Monday, March 21, 8:00 a.m.
End of 2nd 3rd of semester for withdrawals	Friday, April 1, 4:30 p.m.
Registration for Fall 1988	Monday-Tuesday, April 11-19
Classes end	Friday, April 29, 9:30 p.m.
Final exams begin	Monday, May 2, 8:00 a.m.
Final exams end	Friday, May 6, 6:15 p.m.
Commencement (tentative)	Saturday, May 7, 10:30 a.m.

Correspondence

Inquiries should be directed as indicated below:

General administrative matters: President, Dale W. Lick

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

College of Arts and Sciences: Dean of the College, Michael Gemignani

College of Business Administration: Dean of the College, W. Stanley Devino

College of Education: Dean of the College, Robert A. Cobb

College of Engineering and Science: Dean of the College, Norman Smith

College of Forest Resources: Acting Dean of the College, Fred B. Knight

College of Life Sciences and Agriculture: Dean of the College, Wallace C. Dunham

University College: Dean of the College, Charles R. MacRoy

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

Continuing educational courses: Continuing Education Division Director, Edward W. Hackett, Jr.

Summer Session: Director, Edward W. Hackett, Jr.

Conferences and Institutes: Director, Bruce G. Stinson

Financial assistance: Director of Student Aid, Burt F. Batty

Financial services for students: Asst. V.P. for Administrative Services, Alden E. Stuart

Foreign students: Advisor: Ruth D. Barry

International Research and Educational Programs: John R. Benoit

Residence halls: Director of Residential Life

Off-campus housing: Asst. Dean of Student Services, Maxine Harrow

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

Student records: Registrar, John F. Collins, Jr.

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.

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 and Gorham (University of Southern Maine).

The University of Maine includes the Colleges of Arts and Sciences, Business Administration, Education, Engineering and Science, Forest Resources, Life Sciences and Agriculture, University College, and the Graduate School.

General Information

The University of Maine is located about half-way between Kittery, the most southerly 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 of the state. 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.

History

The University was established originally 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 arranged 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 Develop-

ment), 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 when it was renamed Bangor Community College; University College replaced Bangor Community College in 1985. 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.

Graduate instruction has been given 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, graduate work has been a separate division in the charge of a dean.

Beginning in 1895, the Summer Session has usually been held each year. Classes are scheduled in three three-week sessions, two five-week sessions, a six-week session and an eight-week session. Summer Session is designed for teachers, school administrators, and for 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 dissemina-

tion 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

It is the policy of the University of Maine System to comply with applicable laws prohibiting discrimination on the grounds of race, color, religion, sex, national origin, age, handicap, or veterans' status in any area of the University. The University's policy shall include, but it shall not be limited to, the requirements of Executive Order 11246 and 11375, as amended in Department of Labor, Office of Federal Contract Compliance Programs, 41CFR, Part 60-2, October 20, 1978; the Age Discrimination in Employment Act, as amended; Section 503 of the Rehabilitation Act of 1973, as amended; and Section 402 of the Vietnam Era Veterans Readjustment Assistance Act of 1974.

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 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 personal commitment to eliminate sexist language. Guidelines on the use of nonsexist language can be provided by the Women in the Curriculum Program or Public Information and Central Services.

In accordance with its policy of complying with non-discrimination laws, the University of Maine 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.

It is the policy of the University of Maine to ensure fair and impartial investigations that will protect the rights of the person(s) filing sexual harassment complaints, the person(s) complained

against, and the University as a whole. The Office of Equal Opportunity in Shibles Hall is responsible for responding to student, faculty, or staff concerns related to sexual harassment.

Undergraduate Degree Programs

Arts and Sciences (B.A. Degree)

Anthropology	Mathematics
Art (Studio, Art History)	Medical Technology
Biology	Music (B.A., B.M. in Performance & B.M. in Music Education)
Broadcasting	Philosophy
Chemistry	Physics
Computer Science	Political Science
Economics	Psychology
English	Public Management
Foreign Languages & Classics (French, German, Latin, Modern Languages, Romance Languages, Spanish)	Social Work
Geological Sciences	Sociology
History	Speech Communication
International Affairs	Theatre
Journalism	Zoology (including pre-medical & pre-dental)

Business Administration (B.S. Degree)

Accounting	Management
Finance	Marketing

Education

Elementary Education	Art Education
Secondary Education	Physical Education and Recreation

Engineering and Science (B.S. Degree)

Chemical Engineering	Mechanical Engineering
Chemistry	Mechanical Engineering Technology
Civil Engineering	Pulp & Paper Technology
Computer Engineering	Surveying Engineering
Electrical Engineering	
Engineering Physics	

School of Engineering Technology (Associate Degree)

Civil Engineering Technology	Mechanical Engineering Technology*
Electrical Engineering Technology*	

*Two-plus-two programs. Qualified students may continue for two additional years to receive a baccalaureate degree in Engineering Technology.

Forest Resources (B.S. Degree)

Forest Engineering (jointly with College of Engineering and Science)	Wildlife Management
Forestry	Wood Technology
Recreation and Park Management	Forest Management Technology (Associate Degree)

Life Sciences and Agriculture (B.S. Degree)

Agriculture	Child Development/ Family Relations
Animal Sciences (includes pre-vet)	Entomology
Agribusiness and Resource Economics	Food and Nutrition
Agricultural Engineering (jointly with College of Engineering & Science)	Food Science
Agricultural Mechanization	Health and Family Life Education
Biochemistry (including pre-med)	Home Economics
Biology (including pre-med)	Landscape Horticulture
Botany	Microbiology (including pre-med)
	Molecular and Cellular Biology
	Natural Resources
	Nursing
	Plant & Soil Sciences

Technical Division (Associate Degree)

Agricultural Mechanization Technology*	Landscape and Nursery Management
Animal Agriculture Technology	Merchandising
Animal Medical Technology	Resource & Business Management*

*Two-plus-two program. Qualified students may continue for two additional years to receive a baccalaureate degree.

University College (Associate Degree)

Business Management	Mental Health Technology)
Dental Hygiene	Legal Technology (One-year Certificate Program)
Human Services (Chemical Addiction Counseling, Child and Youth Services, Developmental Disabilities, Gerontology,	Dental Assisting
	Liberal Studies
	Medical Records Technology

Graduate Degree Programs

Doctor of Philosophy:

Biological Sciences	Nutritional Sciences
Chemical Engineering	Oceanography
Chemistry	Physics
Civil Engineering	Plant Sciences
Forest Resources	Psychology
History	Wildlife
Individualized Programs	Zoology

Doctor of Education

Master of Arts with major in one of the following:

Economics*	Liberal Studies*
Education	Mathematics*
English*	Psychology
French	Speech Communication*
History*	Theatre*

*Indicates non-thesis option

Master of Science with major in one of the following:

Agricultural and Resource Economics	Chemistry
Agricultural Engineering	Civil Engineering
Animal Sciences	Community Development
Biochemistry	Computer Science
Botany and Plant Pathology	Education
Chemical Engineering	Electrical Engineering
	Entomology
	Food Science
	Forestry

Geological Sciences	Quaternary Studies
Human Development	Resource Utilization
Mechanical Engineering	Surveying Engineering
Microbiology	Wildlife Management
Oceanography	Zoology
Physics	
Plant and Soil Sciences	

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

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

Master of Public Administration

Master of Science in Medical Technology

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
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

Office of Research

This office has the responsibility for planning, coordinating and administering the program of organized research of the University of Maine. The objective is accomplished through procedures designed to:

- A. Coordinate the research 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 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 by promoting multidisciplinary and interdisciplinary approaches to solving identified problems. Comprehensive and timely information on grant support is made available on a continuing basis.

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

The Maine Agricultural Experiment Station

The Maine Agricultural Experiment Station has been undertaking research for Maine and its people for over one hundred years. Originally devoted to research for Maine's farm community, now "The Experiment Station has central responsibility in the state for research in agriculture, forest resources, and rural economic development." To accomplish this mission the

Experiment 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. Over one hundred scientists participate in research programs designed to use the techniques of modern science to address 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, 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.

The Faculty Research Fund

The University Trustees have set aside two permanent funds, the Dr. Thomas U. Coe Fund, and the William H. Weppeler Fund for Faculty Research, the income to be used each year by the faculty for carrying on any scholarly activity. From time to time, some additional funds are made available to the Faculty Research Funds Committee for the same purpose. Applications for grants from these funds should be addressed to the Administrative Assistant to the Faculty Research Funds Committee.

Faculty Summer Research Grants

This is a program of support to provide a limited number of grants to underwrite faculty research projects during the summer. Recipients are selected on the basis of information supplied in a

proposal which explains the research project to be conducted during the period for which the grant is made. The Research Fund Committee serves as a screening committee to evaluate the proposals. Application information may be obtained from the Administrative Assistant to the Faculty Research Funds Committee.

The Scientific Equipment and Book Fund Award

Once a year these funds are awarded to faculty members for the purchase of scientific equipment or books which will be used to stimulate or support a research project. Funds are allocated to faculty members of demonstrated research ability rather than to outfit a new faculty member with basic research equipment. The Faculty Research Funds Committee serves as a screening committee to evaluate the proposals. Application information may be obtained from the Administrative Assistant to the Faculty Research Funds Committee.

The Land and Water Resources Center

This office provides leadership and focus to the University's research and public service activities dealing with land and water resources. Specific objectives are to design, organize, and administer a problem-oriented program of research; to determine the need for research information and to deliver that information in a form compatible with user needs; and to foster the training of students in land and water resources by involving them in the center's activities.

Funded projects often are interdisciplinary and involve faculty and students from more than one academic department. Because it draws upon the research talents of faculty throughout the University, the center's program is flexible and 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 of excellence, emphasizing research and graduate studies. The center provides leadership in the development of quality research programs with emphasis upon

the Gulf of Maine, its related coastal zone, and other related cold water regions. The center provides a focus for the development of planned programs. Units within the University which are components of the center include the Joint Institutional Sea Grant Program and the Ira C. Darling Center at Walpole, Maine.

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

The University's marine laboratory is located six miles from the mouth of the Damariscotta River, an estuary of the Gulf of Maine. Regional habitats include everything from marshes and tidal flats to rocky shores and subtidal rock walls. Deep-sea conditions can be reached 10-20 miles offshore. The center has 13,000 square feet of laboratory space and a wide variety of sampling and analytic equipment, including a scanning electron microscope, a coulter counter, an elemental (CHN) analyzer, gas chromatographs, 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. A steel and concrete pier provides berthing for vessels (one equipped with a hydraulic winch) and a number of outboard motor boats are 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 library contains several thousand volumes and an extensive reprint collection. Laboratory space for visiting investigators can be arranged.

The Sea Grant College Program

This part of the Center for Marine Studies provides a focus for the University of Maine and other cooperating institutions on the 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 Sea Grant College Program, in partnership with the University of New Hampshire, receives its primary funding through grants from the Office of Sea Grant, National Oceanic and Atmospheric Administration.

Institute for Quaternary Studies

This is a global effort by faculty members with joint appointments in the departments of Anthropology, Botany and Plant Pathology, History, and Geological Sciences, who have pooled their talents in studying the Quaternary Period. Their interdisciplinary projects relate the effects of glaciation to the physical, chemical, social, and economic conditions of the present and future.

Center for the Study of Early Man

The Center for the Study of Early Man is an affiliate of the Institute for Quaternary Studies and is affiliated with the Department of Anthropology. It was created in 1981 to improve research, education, and information dissemination on Pleistocene prehistory of North and South America. The center recently has begun the "Peopling of the Americas" publication program which includes books and monographs, an annual Current Research series, and a newspaper called the *Mammoth Trumpet*.

Center professional staff conduct archaeological research at several North American sites, experimental research on stone and bone technology, and studies of Pleistocene human and non-human osteology and paleoecology.

Laboratory for Surface Science and Technology

The Laboratory for Surface Science and Technology (LASST) is a research organization devoted to developing, characterizing, and understanding new materials and analysis methods for application in surface and interface science. It supports the research needs of LASST members, other University of Maine faculty, and state and regional industries. Although LASST is primarily a research organization, its activities also support the high technology graduate and undergraduate educational programs at the University of Maine. Major research areas include surface crystallography, microwave acoustics, surface phase transitions, adsorption and catalysis, analytical methods, and surface optical effects.

Migratory Fish Research Institute

Formed by faculty members with research interests in migratory fishes, the institute's goal is to

stimulate, coordinate, and conduct basic and applied research on migratory fishes. It also fosters efforts to improve educational offerings in the biology of fishes. The institute supports an active seminar series and awards research and travel grants to graduate students and young faculty members on a competitive basis. The Migratory Fish Research Institute is an interdisciplinary program, involving principally people from the departments of Entomology, Geology, Economics, Anthropology, Political Science, Botany, and Zoology.

International Research and Educational Programs

The Office of International Research and Educational Programs was organized to provide a vehicle to foster increased short-term and long-term international research and development work among the faculty and staff of the University and to increase the number of qualified international students at the undergraduate and graduate levels at the University of Maine. Each summer approximately twelve short courses designed for the international community are administered by this office.

Office of External Affairs

The Department of Industrial Cooperation

This office coordinates specific task contracts between the University of Maine and outside agencies: government, corporations, and individuals. The department is located in Boardman Hall.

The Cooperative Extension Service

The University of Maine Cooperative Extension Service 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 members 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 16,000

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 agents 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 Service 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.

Maine Technical Service Program

The program identifies and responds to the technical needs of Maine business and industry by utilizing the resources available at the University of Maine.

The Bureau of Labor Education

The Bureau of Labor Education provides educational opportunities and programs of special interest to Maine workers and their organizations. The types of topics covered within the bureau's educational programs and applied research include functions and administration of employee organizations, labor law, and occupational health and safety.

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.

Project on Balanced Growth for Maine

The Project on Balanced Growth for Maine was initiated in 1971 in recognition of the responsibility of the land grant University to help promote balanced economic development in the state. The basic objective of any economic development effort is to improve the well-being of people while taking into account any associated costs, such as a negative impact on the environment. The project has focused on problems and opportunities in the Maine economy with this objective in mind. In attempting to spotlight major issues, for example, the project was co-sponsor of the first energy conference in Maine (1973) and the first conference on Maine's future (1975).

Among the project's activities has been research on major policy issues affecting the present and future performance of the Maine economy. In most cases, the research projects have been sponsored by various economic interests, public and private, or by grants obtained by project staff who have identified key problem areas and initiated the research to study them.

The public service aspect of the project is most important. Various activities have been directed at promoting better understanding and cooperation between municipal officials and local businessmen. Other efforts have sought to mobilize public and private groups to promote economic growth at local, regional and state levels. Facilitating communications among the various groups involved in economic development through formal conferences and informal meetings has become an important element of the project's activities.

In summary, the Project on Balanced Growth seeks to improve jobs and income in Maine by actively participating in and influencing economic development efforts.

Public Information and Central Services (PICS)

PICS serves as the University of Maine's official link with the media and is responsible for UM's major publications (including graphic arts and editing), photography and broadcast-related needs. The staff disseminates news releases, story leads, photos and print and broadcast material to the local, state, and national 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. PICS is responsible for UM's general information materials, directories, catalogs, bulletins, weekly calendar, UM News and other publications. PICS also assists UM departments and offices in their individual media counseling, publications, broadcasting (radio and television), photographic, graphic arts/design and editing needs. The Speakers' Bureau, experts referral service and campus tours are also administered through PICS.

The Pulp and Paper Foundation

Supported by private funding from 135 companies located in 25 states and several hundred individual donations, the foundation encourages a strong teaching and research program in pulp and paper technology, with a significant scholarship program available to qualified students.

Other Facilities and Services

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 Data Processing Services

Located in the Computing Center, this group provides support for instructional, research,

consulting and administrative needs of the University community. The Computer Science and other departments provide relevant academic offerings. The staff of the computing center develops and maintains programming systems and applied programs, conducts short courses and workshops, and provides programming assistance.

University facilities include an IBM 3033 processor with 16 MBytes and an IBM 4381-III processor with 32 MBytes of main storage. The current configuration includes more than 1500 telecommunications ports and more than 10 billion bytes of disk storage. Five tape drives are available: densities of 6250/1600/800 bpi all are supported. The base operating system is VM/370. CMS provides interactive and batch facilities while DOS/VSE with CICS provides transaction processing as well as batch capabilities. A number of minicomputers including a VAX 11/780 also are connected to the system. Through BITNET, Maine systems connect to educational institutions throughout the world.

The Instructional Systems Center

The Instructional Systems Center is a service organization designed to assist faculty and staff with instruction and presentations. To achieve this end, the center is organized into five divisions. The Instructional Development Division assists in writing objectives, test items, consultation on the preparation and use of audio, video, and graphic instructional materials. The Micro Division includes management of three general use microcomputer clusters (CAPS, Memorial Union, Fogler Library) and consultation to novice microcomputer users at these locations. In addition, this division assists students, faculty, and staff with personal purchases of microcomputers. The Equipment Division provides audiovisual equipment, e.g., slide projectors, video cassette players, etc., and repairs campus-owned AV equipment, including computers. The Product Division creates a variety of graphic, photographic, audio, and video instructional materials and consults with those seeking to produce these products. The Film Division serves as a resource for faculty who are trying to locate film or video titles for instructional use. Many titles appropriate for campus use may be found in the ISC Film Library, even though it primarily serves the public schools of Maine.

The Libraries

The Raymond H. Fogler Library, on the Orono campus, faces the south end of the Mall with another entrance opposite the Memorial Union. It 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: 622,000 volumes, 4,500 periodical subscriptions, 500,000 microforms, and more than 1,350,000 U.S. and Canadian federal government publications. Specialized collections include Maine-related materials, sound recordings and music scores, maps, manuscripts, and educational materials (book and audiovisual) for teachers and students. Students and faculty have access to electronic databases for computerized literature searching, on a fee basis, in the Information Services Department. Zenith and APPLE microcomputers are available for use at no charge.

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

The University of Maine Art Collection

Founded in 1946, the University of Maine Art Collection is one of the earliest and most distinguished land grant University art collections in the United States. The permanent collection of over 4,000 works in every major medium includes significant paintings by such important artists as George Inness and John Marin, and many fine prints by such artists as Piranesi, Hogarth, Goya, Daumier, Homer, Whistler, Kollwitz, Rouault, and Picasso. The majority of these works are placed in public spaces and offices all over the University campus.

The art collection mounts approximately eighteen exhibitions each year in galleries I and II in Carnegie Hall, Hauck Gallery and the Graphics Gallery in the Memorial Union, and the Alumni Hall Gallery. These exhibitions include individual and group shows of the best artists working in Maine and across the country, as well as shows which explore a particular subject matter, medium, period, or culture, often organized in collaboration between the curator of the Art Collection and undergraduate muse-

um interns and students in art history seminars. In addition, each year the art collection circulates the Vincent A. Hartgen Traveling Art Exhibition to schools and libraries around the state.

Observatory and Planetarium

The observatory and planetarium are operated by University staff and students for the Department of Physics and Astronomy. These facilities are used for programs open to the public and for student projects. The observatory houses an 8-inch refractor, and is open on clear nights when student operators are available. Individuals and groups may visit the planetarium on the second floor of Wingate Hall year round to view a variety of educational and entertaining star shows.

Maine Center for the Arts

The Maine Center for the Arts opened on September 20, 1986. Billed as "Maine's newest and most spectacular cultural facility," the center houses the Hutchins Concert Hall, the Hudson Museum, the Palmer Gallery, and the Bodwell Dining Area.

The Hutchins Concert Hall seats 1,628 in ultimate comfort. The first season of events included everything from ballet to bluegrass, and featured performances by such artists as Isaac Stern and Yo-Yo Ma, the Hartford Ballet, the McLain Family Band, Lee Greenwood, Arlo Guthrie, Marcel Marceau, and many others. The schedule is designed to provide a great diversity of experience to the students at the University of Maine, the surrounding region, and to the entire State of Maine.

Student tickets for all Hutchins Concert Hall events are available at a substantial discount, often half-price. New students may be eligible for free tickets.

The Hudson Museum

The Hudson Museum is located in the Maine Center for the Arts on the UM campus. The Anthropology Museum, formerly located in South Stevens Hall, has been incorporated into this new facility. The new museum's collection is still largely, but not exclusively, anthropological. The new facility is many times larger and the collection, already very extensive, can be much more adequately exhibited and its scope ex-

panded. It will continue to function as a teaching and research aid not only for University students, but also for the community at large.

The Hudson Museum's permanent collection includes one of the finest assemblages of pre-Columbian Mexican and Central American materials in this country. The collection also includes materials from the Native Americans of the Northwest Coast area, Plains and Eastern Indians, Ecuador, the Arctic, Oceania, Asia and Africa. Visiting exhibits will be regularly brought to the museum to supplement the permanent collection. Regular hours are Tuesday-Friday, 9:00 to 4:00; Saturdays, 9:00 to 3:00; and Sundays 11:00 to 4:00. Admission is free for visitors, but donations are encouraged. Groups may expect a modest charge and admission fees may sometimes be charged 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

In order to improve the quality of education for all students through the inclusion of the experience and ideas of women in courses throughout the University, the Women in the Curriculum Program (WIC) consults with faculty and provides small grants for curriculum development and research. WIC is responsible for developing the Women's Studies Program and implementing the nonsexist language policy. It shares responsibility for women's development programs with the Equal Opportunity Office.

Additional WIC programs include: Weekly Lunch Seminars on Women's Topics, Women's History Month, Hartman Awards to Maine Women of Achievement, Research Colloquium on Women, WIC Teaching Colloquium, Guest Speakers and Performers, and a Newsletter.

Handicapped Student Services (Onward Program)

Handicapped Student Services facilitates the education of handicapped students by providing a point of coordination for any special services they may need while attending UM.

Some of the services provided or coordinated through Handicapped Student Services are 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.

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

Office of Student Services

Center for Student Services

The staff works closely with individual students and student groups helping them solve problems relative to their personal, social, and academic concerns. They act as a resource to Student Government and other student organizations, assist students in the development and evaluation of student life policies, and serve in an ombudsman capacity by working with students to speed up the administrative problem-solving process. The office also addresses specific student needs through the following sub units:

- Commuter Student Services
- Discipline Program
- Franco-American Centre
- Indian Programs and Minority Services
- International Student Office
- Memorial Union (Student Activities and Organizations)
- New Student Orientation
- Non-Traditional Student Services
- Substance Abuse

Counseling Center

The Counseling Center's mission is to provide services and programs which promote the personal development and psychological well-be-

ing of students, and to encourage a University atmosphere which is conducive to growth and which maximizes students' educational attainments.

In order to carry out this mission, the Counseling Center is staffed by experienced, doctoral level counselors, psychologists and a psychiatric consultant. The staff provides a full range of counseling and mental health services to help students who are experiencing difficulties 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 and preventative 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, freshmen through graduate, 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 for service.

Counseling Center offices are located at 101 Fernald Hall and the Cutler Health Center. Students can make appointments at either location.

Office of Career Planning and Placement

This office provides counseling and assistance to students who are planning careers and/or seeking employment. The program is designed to serve students from all seven colleges including undergraduate and graduate divisions as well as 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 career resource library is located within the office which contains extensive written and audio-visual materials on careers, employers, and graduate schools.

Special programs are sponsored by this office on an on-going basis. These programs are designed to help students make connections with

employers, either for career information or for placement assistance. Examples of such programs include Career Day, the Maine Mentor Program, the Education Job Fair, and the Maine Recruiting Consortium.

Employers from a variety of local and national firms conduct interviews on campus for graduating seniors. A number of organizations also interview underclass students on campus for summer positions. In addition, the office collects and publishes information regarding job openings for graduates. A job match and referral service is provided for students seeking part-time and summer jobs. Students are also encouraged to develop their own, personalized job search and assistance is provided through individual counseling and group workshops such as "Discovering and Marketing your Skills," "Resume Writing" and "Sweaty Palms: The Art of Interviewing."

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 initial application to file is the Financial Aid Form (FAF) available at high schools, and the UM Student Aid Office. Applications must be filed each year, whether or not the student has filed previously. Priority funding will be given to applications filed 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:

Supplementary Educational Opportunity Grants. These grants are made available from federal funds to students who meet certain need standards.

Perkins Loans (formerly NDSL). Amounts awarded are based on student need. No interest is charged on loans until repayment begins. Ordinarily a repayment period of 10 years is permitted at an interest charge of five percent of the unpaid balance beginning 6 months after

graduation. Grace periods of three years on payment of principal or interest are allowed for military service, Peace Corps service and VISTA service. Also, no payments are required as long as the student remains at least a half-time student 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 the academic-year basis only and must be reapplied for each year. They are not automatically renewed.

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 the campus or in various off-campus agencies. Location of employment is usually limited to within the State of Maine. Many jobs provide work experience directly related to the student's educational objective, also 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.

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.

University Scholarship. This is gift aid, based primarily on need, but academic achievement or special donor requirements may be additional criteria. Scholarships awarded through the Student Aid Office are primarily for undergraduates. Aid to graduate students is available through the Graduate School.

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.

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

Emergency Loans. Short-term emergency loans are available in amounts ranging from \$25 to \$200 per semester. Contact the Student Aid Office for further information.

Guaranteed Student Loan Program. Student bank loans for educational purposes are available with repayment after graduation. Contact

your family bank, credit union or other lending institution for information.

International Student Adviser

The University maintains an office to provide information and assistance to students who are not citizens of the United States. The International Student Adviser's Office assists students in understanding the administrative regulations of the institution; local, state and national laws; accepted standards of conduct; and expectations and reactions of those one encounters in a new cultural environment.

This office is responsible for issuance of the U.S. Immigration I-20 or IAP-66 forms necessary for the international students to obtain student visas from the American consulate in their native country. All international students, including those with "F" student or "J" exchange student status, must report to the International Student Adviser's Office as soon as convenient after arrival on campus. Advice concerning immigration regulations, necessary forms, etc. is available so that international students may remain in the United States as long as necessary to achieve their educational goals.

Health Service

The Cutler Health Center offers a comprehensive health care program for all students including part-time students and CED students. Services are user funded. Those who wish to enroll in the prepaid program pay a health fee for the academic year which covers most of the outpatient services provided on campus.

For those who choose not to participate in the prepaid program, out patient care will be provided on a fee-for-service basis. Ordinarily, such fees will be comparable to area fees. The following outpatient services are offered at Cutler Health Center on the Orono campus. Most of them are covered by the voluntary health fee.

1. Outpatient services for illnesses and accidents.
2. Provision for 24-hour emergency care for currently enrolled students while the University is in session.
3. Health promotion programs and services.
4. Diagnostic laboratory and x-ray services.
5. Pharmacy services.
6. Gynecological and contraceptive services.
7. Physical Therapy.

In addition, the Cutler Health Center includes a 12-bed in-patient facility. Charges are made

for in-patient services. These charges may be paid on a fee for service basis or through the student health and accident insurance plan offered to students in addition to the prepaid outpatient health fee program. Most major insurance programs also cover a portion of these charges.

The Health Center staff consists of full-time physicians, a physician's assistant, part-time medical specialists, registered nurses, a health educator, and ancillary personnel.

University employees utilizing the tuition waiver benefit are not eligible for care at the health center. Services to employees are available on an emergency basis only. These include first aid and help with arrangements for emergency medical care elsewhere.

Religious Affairs

Seven religious groups provide opportunities for religious programming, worship, study, conversation, and witness: Hillel Foundation for Jewish students, Maine Christian Association for Protestant students, St. George's Greek Orthodox Church for Greek Orthodox students, Our Lady of Wisdom Parish/Newman Center for Roman Catholic students, and the Canterbury Club (Episcopal). The chaplains are available for counseling or instruction. The Intervarsity Christian Fellowship and Navigators, two 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.

Office of University Retention Programs

The Office of University Retention Programs, established in 1986, works to help students remain at the University of Maine until their educational goals are reached. It does so in several significant ways. First, it interviews students leaving school prematurely to ascertain the reasons for their departure. It also conducts other research on patterns of student withdrawal from

school. Based on the results of this research, programs are developed and recommended 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. In this regard, it works with the University as a whole and with the separate colleges to improve this experience by easing the transition from high school to college and by enriching the freshman year with programs designed to make students aware of the full range of opportunities available at the University. Acting as a student advocate, the office also 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 such as this can focus on the individual, but it can also focus on systemic causes and solutions to the attrition problem which affects a broad range of students.

In short, the Office of University Retention Programs addresses both University-wide and individual student programs which affect the rate at which students are able to realize academic success. By solving these problems, the office aims to improve the student success rate as well as improve the quality of the University experience.

Student Life

Student Government

The University of Maine Student Government is the largest 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 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. There are eight governing boards, many committees, and other divisions repre-

senting 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 interests requesting assistance.

The General Student Senate is the legislative unit of the Student Government and is under the leadership of the vice-president.

The eight boards that help make up the Student Government are the Guest Lecture Series, S.E.A., the Graduate School Board, the Off-Campus Board, the Interdormitory Board, the Student Legal Services Board, and the Panhellenic Council. All Board chairpersons hold seats in the Cabinet of the Student Government. All Student Government committees and meetings are open to all students, as well as memberships to those committees.

General Student Senate (GSS)

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.

Fraternity Board

The fraternities on the University of Maine campus are represented by the University of Maine Fraternity Board. The board's purpose is to coordinate and assist in the implementation of programs and policy issues affecting the fraternities.

Guest Lecture Series

The Guest Lecture Series is a board of student government whose mandate 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 bringing speakers of special interest through co-funding and other support.

Graduate Student Board

The Graduate Student Board has the responsibility of representing graduate students in University decisions, maintaining the Graduate Center, sponsoring various graduate student activities and allocating funds to special graduate student needs.

Interdormitory Board

As the student governing body of the 22 residence halls at U.M., the IDB's purpose is to coordinate and assist in the implementation of programs, policies and activities directly involving on-campus students.

Off-Campus Board

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

Panhellenic Council

The Panhellenic Council is a representative council for the many women on campus who are sorority members. It also aids in the formulation and implementation of policy regarding the University administration, and it has the duty of disbursing allocations from the Student Activity Fee. The monies go toward various functions such as the Winter Carnival and Greek Week, as well as fund-raising for charity.

Student Legal Services

The Student Government funds this program which provides free legal advice and representation to students on such issues as landlord-tenant relationships, divorce, small claims, and civil and (advice only) criminal proceedings.

The office is staffed by one attorney, two full-time paralegals and student paralegals.

Any University 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.

Student Entertainment and Activities

S.E.A. is funded by Student Government and run by the students. S.E.A. provides the University community with a variety of activities: weekend movies, special events, dances, magicians, mime, comedians, musical entertainment, etc., as well as the monthly calendar and a daily telephone recording of campus events.

Freshman Residency Requirement

The University of Maine believes that living in campus residence halls is an educational opportunity that all freshmen 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, a residency requirement will be implemented in Fall 1987 for all freshmen who are under age 20, who do not live in the immediate area and who do not have exceptional circumstances that would prevent them from living on campus. For additional information on this policy, please contact the Department of Residential Life at (207) 581-4584.



Academic Information

Registration

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

Freshmen

All members of the incoming freshman class are required to attend the two orientation sessions held during the summer and in the fall immediately prior to the start of classes at the Orono campus. The dates when they are held each year are furnished to incoming freshmen and their parents.

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

Upperclassmen

Upperclassmen transferring to the University of Maine should contact the dean of their prospective college (upon being admitted to the University) to register for the upcoming semester.

All currently registered students planning to return to UM must meet with their adviser to register for the upcoming semester.

Academic advisors are assigned to all students for help in planning their educational programs to ensure their meeting graduation requirements, for counsel and guidance in academic work, and for advice about study or classwork problems. The final responsibility for fulfilling degree requirements, however, rests with each student.

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 300-499: Upper level baccalaureate courses; with appropriate qualification and permission, may be taken for graduate credit.

Courses numbered 500-599: Graduate level courses; with appropriate qualifications 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. For purposes of comparison, 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; P, Passed for degree credit 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 (primarily for thesis).

Non-credit grades: W, dropped without penalty.
Incomplete grades: A grade of incomplete must be made up at the discretion of the instructor; however, this action must be taken no later than one calendar year from the end of the semester in which the student was registered for the work. At that time an incomplete grade will automatically change to an E. Any incomplete grades remaining on a student's record at the time of graduation will change automatically to "E".

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

The accumulative average is the quotient of the grade points divided by the total hours, carried to two decimal places. The grade points are the product of the course credit hours and the numerical value of the letter grade. The total hours are the sum of the course credit hours from all courses 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 considered valid grading addresses.) A student's academic performance is considered confidential information and written permission of the student is required to fulfill inquiries by those 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, upon receipt of a semester final grade report, suspects an error, should contact his or her instructor without delay. Records are assumed to be correct if a student does not report errors to the Registrar's Office within six months of the completion of a course.

Academic Requirements

Students are advised that they must meet the specific academic requirements as shown in the University catalog in effect at the time of their initial matriculation. In the event that a student is absent from the University for two or more years during a program of instruction, 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 making satisfactory progress and which are not. Those students not fulfilling academic requirements are placed on probation, 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

*Except for most associate degree programs which 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.

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 graduation. 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 for graduation by the college;
2. First semester freshmen who receive a GPA below 1.0;
3. Students on probation who fail to improve in the subsequent semester, or
4. Upperclass students readmitted following suspension or dismissal and who show no improvement.

Provisional Dismissal

First semester Freshmen 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.

During Suspension or Dismissal

While 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.

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, at a grade point level specified by the department or college (in no event less than 1.8, and usually at least 2.0); and (b) accumulate the number of degree hours specified by the college for the curriculum pursued. Details are given under each college's listing.

In order to be considered for graduation, a student must complete an Application for Degree or Certificate form during the final semester. These forms are available in the Registrar's Office. If, for any reason, application is made, but no degree is conferred, another application must be submitted prior to the next commencement. 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, either directly or after intervening military service, 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.

The average grade is based on the student's total work at the University of Maine which must include sixty (60) hours of resident study at the time of graduation. Candidates must take their senior year at the University of Maine.

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 fulltime attendance, all of which must have been in resident instruction at the University of Maine.

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.



Financial Information

General Information

All charges are payable in full prior to the first day of classes for each semester. After that, a \$25.00 late fee is assessed. All accounts are carried in the name of the student. Bills and statements are mailed to the student, not the parent. 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.

The University expects the student to be financially responsible. 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 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 \$15.00 is required of each student who elects to pursue a degree program.

New Student Orientation Fee

All new students (freshmen and transfers) are charged a one-time orientation fee of \$32.00. The fee is \$65.00 if the student resides in a dormitory during the New Student Orientation Program.

Tuition

Undergraduate and Associate

Maine Residents

\$50.30 per credit hour.

Non-Residents

\$152.00 per credit hour.

Non-Resident students enrolled under the New England Board of Higher Education Exchange Program are billed at 25 percent above the Maine Resident rate.

Room and Board

Regular

Residence Halls	Semester	Year
21-meal plan	\$1595.00	\$3190.00
14-meal plan	\$1565.00	\$3160.00

Colvin Hall		
Coop-Housing	Semester	Year
21-meal plan	\$1325.00	\$2650.00
York Village and Chadbourne Hall		
(Room Only)	\$ 792.50	\$1585.00
Commuter, York Village, Chadbourne Hall Meal Plans		
	Semester	
5 meal plan (any 5 breakfast/lunch)		\$ 236.50
5 meal plan (any 5 lunch/dinner)		\$ 280.50
10 meal plan (any 10 meals 7 days a week)		\$ 592.50
14 meal plan (any 14 meals 7 days a week)		\$ 772.50
21 meal plan (any 21 meals 7 days a week)		\$ 802.50

Student Activity Fee

A mandatory student activity fee of \$17.50 per semester, a communication fee of \$3.00 per semester and a recreation fee of \$7.50 per semester are charged to all students enrolled for six or more credit hours.

A mandatory student life fee of \$100.00 per semester is charged to all students enrolled for 12 (twelve) or more credit hours. The Student Life Fee will be pro-rated for part-time students.

Yearbook (Optional)

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

Student Health and Insurance Fee (Optional)

The combination health fee and insurance package is an excellent way for students to safeguard against medical expenses. All enrolled students are eligible to participate. The charge for both the health fee and the insurance is \$334.00 per year. If purchased separately and without insurance, the health fee is \$80.00.

Late Registration Fee

A late registration fee of \$25.00 is charged all students not registered for classes by the registration deadline. The late registration fee is also assessed to students who are late paying their semester bill.

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 \$175.00.

Course Fees

Course fees are charged in several courses. The amounts are listed in the Schedule of Classes. The invoices for course fees are mailed to the student approximately four (4) weeks after the beginning of each semester. Course fees for courses dropped after the second week of classes are not retracted.

Applied Music Fees

The fees for students registered in applied courses in music are indicated in the Music section of the catalog. These are billed after the beginning of the semester.

Acceptance Deposits

New incoming students must remit a \$100 admission confirmation deposit after they are admitted to the University of Maine. An additional \$50 deposit must be made if the student will be living in University housing.

These deposits will be credited to the student's first semester bill.

The acceptance and room deposits will be refunded if notification that the student will not attend is received before May 1. If notification is received on or after May 1, the deposits are forfeited.

Room Deposits

Returning students electing to live in residence halls for the next academic year must sign up and pay a \$50 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 June 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) 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.
- (3) No tuition credit will be processed for courses which are dropped after the second week of classes. Courses which are dropped retroactively to the second week of classes are likewise not eligible for tuition credit.

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.

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 of Pawtucket, R. I. 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 \$40.00 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 has a spouse who has a residence 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 Assistant Vice President for Administrative Services. If the Assistant Vice President for Administrative Services's decision is considered incorrect, the student may appeal the Assistant Vice President's decision in the following order:

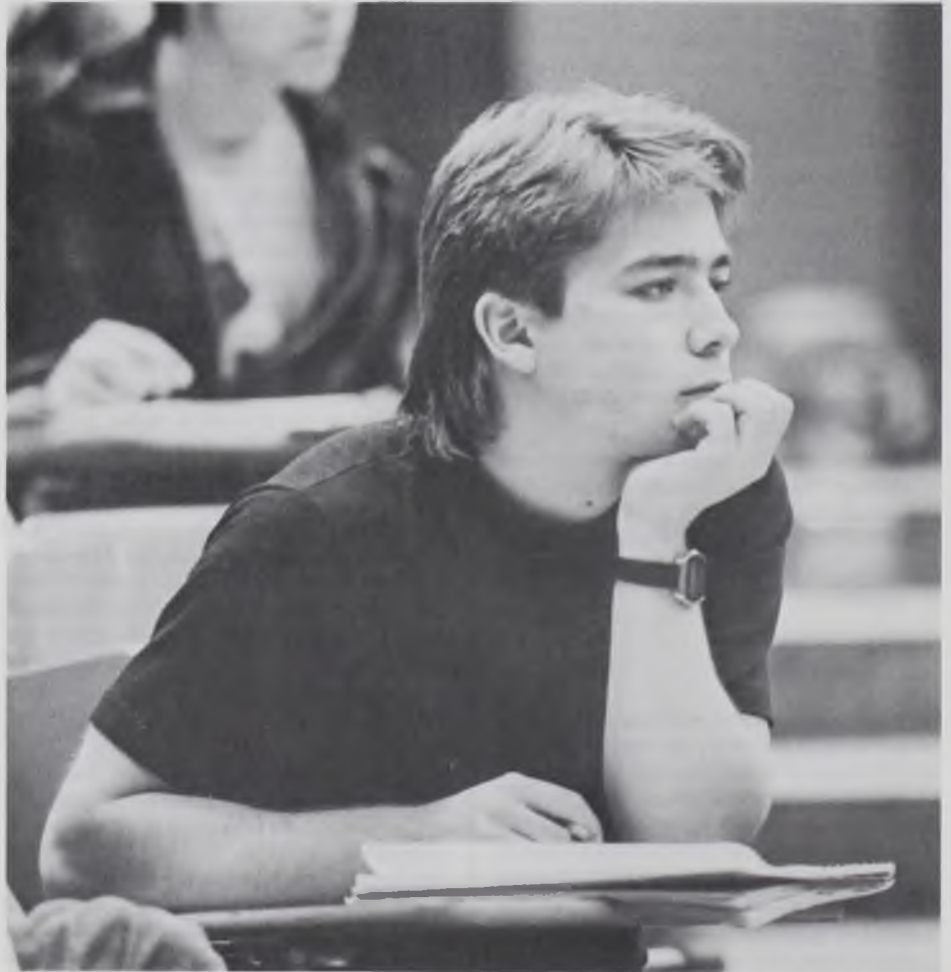
1. President
2. Treasurer, University of Maine, Chancellor's Office (This decision must be considered final).

In the event that the Assistant Vice President for Administrative 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 Assistant Vice President's decision as set forth in the preceding paragraph.

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

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.



Admissions

William J. Munsey, Director; Albert F. Hackett, Associate Director;

Jeanette F. Ulmer, Associate Director, (University College); Susan B. Hall, Assistant Director; Andre L. Pelletier, Assistant Director; Joyce D. Henckler, Associate Dean, Enrollment Management; Steven D. Ritzi, Admissions Counselor; Elizabeth A. Skelton, Admissions Counselor

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 University notifies candidates between

December (Early Decision) and mid-April for September enrollment and between November and early January for Spring semester enrollment. Deadline dates for the application and supporting academic documents is recommended as a guide to students who also seek University housing and consideration for financial aid. Candidates applying for the fall semester are advised to submit the application and supporting academic documents by February 1. Spring semester applicants are advised to submit the University application and supporting academic documents by November 1. 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 degree candidates if applicants fail 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.

Entrance Test Requirements

Scholastic Aptitude Test (SAT)

Candidates for admission to four-year degree programs and the associate degree programs on the Orono campus 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 the community college programs found in a later section of this catalog. Candidates applying for admission to associate and bachelor degree programs at the Orono campus

must submit SAT or ACT Test results no later than January of the senior year in high school. Test scores submitted after February 1 will delay the reviewing and notification process for prospective students.

Achievement Test

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.

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

The College Board will administer tests on each of the following dates:

Saturday, October 10, 1987*
 Saturday, November 7, 1987
 Saturday, December 5, 1987
 Saturday, January 23, 1988
 Saturday, March 19, 1988 (SAT only)
 Saturday, May 7, 1988
 Saturday, June 4, 1988

Please forward official test results from the Education Testing Service. The University of Maine College Board code number is 3916.

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.

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

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. Students interested in credit by examination should contact the department chairperson.

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 complete the mathematics qualifying examination administered by the Department of Mathematics. Examinations are administered during New Student Orientation or during the first week of classes.

Early Decision

Prospective freshmen, who have selected the University of Maine as their college of choice, and whose academic achievement and personal goals reflect a strong commitment to enroll at the University, should consider Early Decision. Early Decision provides the opportunity for high school students to finalize college plans early in the senior year. Early Decision is designated for students with outstanding academic achievement, entrance examination test results which reflect strong intellectual aptitude and counselor or faculty recommendations which reflect the candidates' academic and personal strengths. The University of Maine is in agreement with other colleges regarding Early Decision ground rules. Students should discuss the option of Early Decision with their parents, school counselor, and through a personal interview on campus.

Candidates filing the University application must state in writing the desire to be considered

for Early Decision and if admitted will enroll at the University of Maine and withdraw all other college applications. The deadline to apply for Early Decision is November 15. Candidates must have on file with the Admissions Office the University application, the transcript of academic work completed through the junior year, the school recommendation and results of the College Board, Scholastic Aptitude Test or the ACT examination. Candidates applying for Early Decision who seek financial assistance from the University must file by December 1 with the College Scholarship Service, the early version FAF (Financial Aid Form). The early FAF will be mailed to Early Decision candidates by the Admissions Office. Candidates accepted for Early Decision will be notified in late December. Acceptance under Early Decision is contingent upon the successful completion of all academic work of the senior year. Candidates admitted to the University under Early Decision will be required to submit a \$150.00 non-refundable deposit.

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 allow 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 degree status must make their request in writing to the Admissions Office prior to May 1 for fall semester enrollment and prior to January 1 for spring semester enrollment.

Deferred Admission (The Army College Fund)

It is the policy of the University of Maine to defer enrollment for up to three years for approved degree candidates who have been accepted to participate in the U.S. Army College Delayed Entry program.

Candidates in this program who pursue college work while on active duty must secure written prior approval from the academic dean of the undergraduate college to which the candidate has been approved for any course work attempted. Official transcripts of academic work must be filed with the academic dean's office upon completion of the course work and students will be required to maintain academic standards commensurate with University requirements. It is the responsibility of the student to maintain contact with the University and to complete all University degree requirements in accordance with University regulations. Once a student has been admitted to an undergraduate college of the University, he/she can not change his/her undergraduate college or major field of study without prior approval of the academic dean.

Upon written notification by the Admissions Office of the candidates approved University application, the candidate must submit a written request to participate in the U.S. Army College Delayed Entry program.

Admission to Continuing Education Courses

The University of Maine and University College offer academic programs through the Continuing Education Division. Categories of admission in Continuing Education include:

1. Degree Students: Candidates for admission to degree programs through the Continuing Education Division must meet all entrance requirements for either undergraduate or graduate degree enrollment. Applications should be filed with the undergraduate Admissions Office or the graduate school Admissions Office.
2. Non-degree Students: Non-degree students who have not made formal application for degree status but are interested in registering for courses through the Continuing Education Division. Students must satisfy prerequisites for any course in which they enroll. Non-degree students who seek to change their registration to that of a degree candidate at a later date, must submit the University application and supporting academic documents to the Admissions Office. Many CED non-degree students have the long range objective of earning the associate or baccalaureate degree. Others have short range objectives and enroll in courses that offer vocational or academic enrichment.
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 continue undergraduate work must contact the Academic Dean of the undergraduate college in which the candidate plans to enroll. Candidates will be notified by the Dean's office of the readmission decision.

Transfer Candidates

The admission of transfer students to the University is determined by the availability of open-

ings in undergraduate degree programs and the competitive academic credentials submitted by candidates.

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. Applications must include a statement of the names and addresses of all schools and colleges attended as well as information indicating the anticipated academic major. 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 UM may not be 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 can not be accepted for evaluation.

The evaluation of prior academic work is done through the academic dean's office of the candidate's undergraduate college. Evaluations are normally completed during the spring and summer months once the final transcript has been received and the candidate has been approved for admission to the University. Transcript evaluations 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.

Admission of Special Students (Non-degree)

Candidates who present satisfactory academic evidence to benefit from the work of a college curriculum may be admitted to the University as a special student to enroll in daytime courses. Special students are not candidates for degree status but will be registered in the undergraduate college where the principal courses in their program of study are taught. The special student application may be obtained from the Director of Admissions. Registration of Special Students is done on a course available basis. Candidates enrolled as Special Students are not eligible for financial aid and can not be guaranteed the availability of specific courses.

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 state college or University involved in the regional student program has designated which of its academic majors are to be offered on a regional basis and maintains control over its own courses and programs.

The undergraduate programs begin at the freshman level. Other regional programs are available at the graduate level or for certain professional curricula.

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 Deposits

Students accepted to the University will be requested to submit a confirmation deposit. The deposit of \$150.00 will be credited to the student's account with the University Business Office. The acceptance deposit is due no later than May 1 for the fall semester and no later than January 1 for the spring semester. If notification of withdrawal to the University is made after May 1 and January 1, the deposit is forfeited.

Financial Aid and Scholarships

All applicants for financial aid are required to file the Financial Aid Form (FAF) with the College Scholarship Service. The FAF application is available in each local high school guidance office in the late fall. Requests for aid will be reviewed by the Financial Aid Office after candidates have been approved for admission to the University. The application deadline to file for aid consideration is March 1. Early Decision candidates must file the early version FAF by December 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 GSL (Guaranteed Student Loan) 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. Students applying for financial aid are required to submit the Financial Aid Form (FAF) directly to the College Scholarship Service, designating the University of Maine (college code no. 3916) as one of the recipients. The FAF may be obtained from a local high school or the University Office of Student Aid.

Upperclass students must apply annually during designated periods for all types of financial assistance. Information and FAF forms are available at the Office of Student Aid for Upperclass Students.

A brochure entitled *Financial Assistance 1988-89* is available, upon request, from the Director of Student Aid or from the Admissions Office. Detailed descriptions of all types of financial aid programs are included. FAF forms which are not received at the College Scholarship Service by March 1 will be marked late. Late applicants will be notified after all on-time applications have been reviewed and financial aid resources have been determined.

Academic Entrance Requirements

Academic course requirements for admission to the University are established by each undergraduate college. Outlined are the required minimum courses. Students are expected 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 for the State of Maine.

College of Arts and Sciences

Subject	Units*
English	4
Foreign Language (one language)	2
Algebra (I and II)	2
Plane Geometry	1
History/Social Science	1
Science (Lab)	1
Academic Electives**	6
Total Units	17

*A unit of study is equal to one year of high school preparation.

**One course in computer usage and one course in fine arts are recommended. Chemistry is recommended as an elective for Science, Medical Technology and similar curricula. Trigonometry is recommended for students who plan to major in Mathematics or Science.

The Bangor Campus (University College)

Admission to associate degree programs on the University's Bangor campus varies with academic

programs. Interested candidates should review the University College section of this catalog and request more detailed information from the University Admissions Office.

College of Business Administration

Subject	Units
English	4
Algebra (I and II)	2
Plane Geometry	1
Senior Mathematics*	1
History/Social Science	1
Academic Electives	8
Recommended:	
Computer Science	1
Fine Arts	1
Total Units	19

*A senior year mathematics course is strongly recommended as preparation for students planning to pursue the baccalaureate degree in business administration.

College of Education

Subject	Units
English	4
Three units from one and two units from another of the following:*	5
Foreign Languages	
Mathematics (College Preparatory)	
Natural and Physical Sciences	
History/Social Studies	1
Academic Electives	6
Recommended:	
Computer Science	1
Fine Arts	1
Total Units	18

*Natural and Physical Sciences, two units of College Preparatory Mathematics and Foreign Languages are strongly recommended. Algebra I, II and Plane Geometry are required if you wish to prepare for a teaching career in mathematics or science.

College of Engineering and Science

Subject	Units
English	4
Foreign Language (Recommended in one language, but not required.)	2

Algebra (I and II)	2
Plane Geometry	1
Trigonometry	½
Physics	1
Chemistry	1
History/Social Studies	1
Academic Electives	4
Recommended:	
Computer Science	1
Fine Arts	<u>1</u>
Total Units	18½

Prior to enrollment in analytic geometry and calculus, engineering candidates must 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.

School of Engineering Technology

Subject	Units
English	4
Foreign Language (Recommended in one language, but not required.)	2
Algebra(I and II)	2
Plane Geometry	1
Trigonometry	½
Physics	1
Chemistry (recommended)	1
History/Social Studies	1
Academic Electives	4½
Computer Science	1
Fine Arts	<u>1</u>
Total Units	19

College of Forest Resources

Four-Year Degree Programs

Subject	Units
English	4
Algebra (I and II)	2
Plane Geometry	1
Trigonometry, (or its equivalent) for Forest Engineering candidates	½
Lab Sciences (one of which must be Chemistry or Physics)	2
History/Social Science	1
Academic Electives	5
Recommended:	
Trigonometry	½
Computer Science	1
Fine Arts	<u>1</u>
Total Units	18

Two-Year Degree Programs Forest Management Technology

Subject	Units
English	4
Algebra (I and II)	2
Plane Geometry	1
Laboratory Sciences (Biology strongly recommended)	2
History/Social Studies	1
Electives	<u>5½</u>
Total Units	15½

Students who contemplate continuation in a four-year baccalaureate degree curriculum must first complete the two-year associate degree program at a grade point average of 2.50 or higher, and must satisfy entrance requirements to the desired baccalaureate program.

College of Life Sciences and Agriculture

Division of Life Sciences and Agricultural Sciences:

Subject	Units
English	4
Algebra (I and II)	2
Plane Geometry	1
Trigonometry (Or its equivalent; Agricultural Engineering candidates)	½
Science (one unit must be chemistry or physics)	2
History/Social Science	1
Academic Electives	5½-6
Recommended:	
Computer Science	1
Fine Arts	<u>1</u>
Total Units	18

School of Human Development

Subject	Units
English	4
Mathematics* (at least 1 year of algebra)	2
Science* (chemistry preferred)	1
History/Social Sciences	1
Academic Electives	8
Recommended:	
Computer Science	1
Fine Arts	<u>1</u>
Total Units	18

*Algebra I, II, plane geometry and chemistry required for majors in Food and Nutrition, Health and Family Life Education, and Home Economics Education.

School of Nursing

Subject	Units
English	4
Algebra (I and II)	2
Plane Geometry	1
Biology (Lab)	1
Chemistry (Lab)	1
History/Social Science	1
Academic Electives	4
Recommended:	
Computer Science	1
Fine Arts	1
	1
Total Units	16

**Technical Division of
Life Sciences and Agriculture**

Candidates for admission to a two-year, Technical Division program in the College of Life Sciences and Agriculture must have graduated from high school or have received a GED certificate and completed the College Board Scholastic Aptitude Test. Candidates for Agricultural Mechanization Technology should have completed Algebra I and II and Plane Geometry. One unit of Physics is strongly recommended. Candidates

for all other programs should have two units of high school math, one of which must be algebra. The high school math requirement may be fulfilled by non-credit developmental courses at the University. High school chemistry is recommended but not required of students enrolling in the Animal Medical Technology program. Students who contemplate continuation in a regular four-year, baccalaureate degree curriculum must first complete the two-year, associate degree program with a grade point average of 2.50.

Music Audition (School of Performing Arts)

Candidates seeking admission to music degree programs in the School of Performing Arts will be contacted by the Music Department regarding the music audition once the application for admission has been reviewed and candidates have been approved for admission to the University.

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.



Abbreviations and Symbols

AER Aerospace Studies	EMA/EPT Education - Mathematics
AEN Agricultural Engineering	EDA Education - Measurement and Evaluation
ARE Agricultural and Resource Economics	ERL Education - Methods
ANV Animal and Veterinary Science	ESC Education - Science
ANT Anthropology	EDS Education - Seminar, Research and Thesis
ART Art	ESS Education - Social Studies
AED Art Education	EDV Education - Vocational
ARH Art History	EDW Education - Workshop
AST Astronomy	ELE Electrical Engineering
BCH Biochemistry	EET Electrical Engineering Technology
BIO Biology	ENG English
BOT Botany and Plant Pathology	ENT Entomology
BUS Business Management	FOS Food Science
BUA Business Administration	FOL Foreign Languages
CAN Canadian/American Studies	FOE Forest Engineering
CHE Chemical Engineering	FMT Forest Management Technology
CHY Chemistry	FOR Forest Resources
CHF Child Development and Family Relations	FTY Forestry
CIE Civil Engineering	FRE French
CET Civil Engineering Technology	FSB Freshman Book Course
CLA Classics	FSA Freshman Seminar in Advising
CLD Clothing and Design	GEE General Engineering
COS Computer Science	GET General Engineering Technology
DAN Dance	GEO Geography
DEA Dental Assisting	GES Geological Sciences
DEH Dental Hygiene	GER German
DSE Developmental Studies/English	GRR Graduate Readings
DSI Developmental Studies/Individual	GRE Greek
DSM Developmental Studies/Mathematics	HPR Health, Physical Education and Recreation
DSR Developmental Studies/Reading	HTY History
DSS Developmental Studies/Study Skills	HEC Home Economics
DRA Drama	HON Honors
ECE Early Child Education	HOM Consumer Studies, Housing and Management
EAS Earth Sciences	HUD Human Development
ECY Ecology	HUS Human Services
ECO Economics	HUM Humanities
EDU Education	IND Independent Studies
EAD Education - Administration	INM Instructional Media
EAE Education - Adult Education	INT Interdepartmental Listing
EDB Education - Basic Professional Courses	ITA Italian
EBI Education - Bilingual	JBR Journalism/Broadcasting
CEC Education - Counselor Education	LNM Landscape and Nursery Management
EDC Education - Curriculum and Instructional Materials	LAT Latin
EDG Education - General	LET Legal Technology
EDH/EDL/EDM Education - History and Philosophy	LIB Liberal Studies
EDI Education - Internship	

LSA Life Sciences and Agriculture - General	PHI Philosophy
MAT Mathematics	PHE Physical Education
MEE Mechanical Engineering	PHY Physics
MET Mechanical Engineering Technology	PSS Plant and Soil Sciences
MRT Medical Records Technology	POS Political Science
MCB Microbiology	PSY Psychology
MIS Military Science	PAA Public Administration
MOY Modern Society	PPA Pulp and Paper
MUS Music	QUS Quaternary Studies
MUE Music - Education	RPM Recreation and Park Management
MUH Music - History	RUS Russian
MUL Music - Literature	SCI Science
MUO Music - Organizations	SSC Social Science
MUP Music - Performance	SWK Social Welfare
MUY Music - Theory	SOC Sociology
NAV Navy	SPA Spanish
NUR Nursing	SED Special Education
HNF Nutrition and Food Science (LSA)	SPS Special Seminars
NFS Nutrition and Food Science (UC)	SPE Speech
OCE Oceanography	SPC Speech Communication
ONE Onward - English	STT Student Teaching
ONI Onward - Independent	SVE Surveying Engineering
ONM Onward - Mathematics	TSO Technology and Society Project
ONO Onward - Orientation	THE Theatre
ONR Onward - Reading	WLM Wildlife Management
ONS Onward - Science	WTY Wood Technology
MHE Our Environment	ZOL Zoology



College of Arts and Sciences

Michael C. Gemignani, Dean

Elaine S. Gershman, Associate Dean

Raymie E. McKerrow, Associate Dean

General Information

The College of Arts and Sciences is fundamentally dedicated to two major goals: To provide a quality education in the liberal arts, and to impart the specific knowledge and skills required for careers in one of its many representative disciplines. These goals are met by the general requirements of the College and by the specialized opportunities incorporated in each major, the interdisciplinary concentrations and the double-major options. Through the intensive study of human society and heritage, of the physical world and the human spirit, students are better able to understand and evaluate their surroundings, are more capable of identifying the problems which confront them, and become more enlightened and more effective citizens. In addition, understanding the natural and social sciences, mathematics, and the humanities and fine and performing arts provides one with the background for a more enriched and productive life.

There are 20 departments within the College of Arts and Sciences, offering a total of 32 undergraduate degree options, as follows:

(B.A., unless otherwise indicated)

Anthropology: Anthropology, International Affairs

Art: Art(Studio, Art History)

Computer Science: Computer Science

Economics: Economics, International Affairs

English: English

Foreign Languages and Classics: French, German, Latin, Modern Languages, Romance Languages, Spanish, International Affairs

Geological Sciences: Geological Sciences

History: History, International Affairs

Journalism/Broadcasting: Broadcasting, Journalism

Mathematics: Mathematics

Music: Music (B.A., B.M. Perf., B.M. Ed.)

Philosophy: Philosophy

Physics and Astronomy: Physics

Political Science: Political Science, International Affairs

Psychology: Psychology

Public Administration: Public Management

Sociology and Social Work: Sociology, Social Work

Speech Communication: Speech Communication*

Theatre/Dance: Theatre

Zoology: Biology, Medical Technology, Zoology

In addition, students may elect to satisfy Arts and Sciences requirements leading to a B.A. in Chemistry, although the Department is located administratively in the College of Engineering and Science.

Academic Advising

The College of Arts and Sciences is committed to fostering and maintaining a positive relationship between students and their academic advisors. To facilitate the freshman advising experience, the college has established an advising program for both residential and off-campus students. Residential freshmen will have an opportunity, through their registration for FSA 199 (Freshman Seminar in Advising), to meet on

*A concentration in Communication Disorders is available through the B.A. in Speech Communication.

a regular basis with their advisors and with their own student advising assistants in their respective residential halls. Nonresidential freshmen also will enroll in FSA 199 and will meet on a regular basis with their advisors and their student advising assistants. Students will normally continue with the same advisors during their sophomore year.

All freshmen 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 her or his 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 requirements 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 Professor Eugene A. Mawhinney, Pre-Law Advisor, 13B 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 freshman year with the Health Professions Committee, Chairperson Howard Patterson, 285 or 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 in the section on degree options.

Requirements

Entrance Requirements

Information on requirements for admission to the University, as well as specific academic preparation necessary for entrance into the College of Arts and Sciences, 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 the College of Arts and Sciences, 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.

Basic Arts and Sciences Requirements

The college 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 freshmen 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 required for graduation;
3. Students whose examinations indicate that they do not meet minimum entrance stan-

dards 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. The college is divided into three general areas: Social Sciences, Arts (visual and performing) and Humanities, and Sciences and Mathematics. Students must distribute some of their course work among each of these areas.

Area I

Social Sciences 12

Area II

Arts (visual and performing) and Humanities 15

Area III

Natural Sciences and Mathematics 11

38

ENG 101 College Composition 3

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 within the College are designated as fulfilling a requirement in one of the three areas indicated above. Students are advised to meet their area distribution requirements by taking courses *outside* their own major and as widely distributed as possible throughout

the College. Courses offered by the student's major department do *not* meet the area requirements for areas other than that in which the major department is located. A complete listing of courses by area requirement is available in the Dean's Office, 110 Stevens Hall.

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 (e.g., sociology/social work) 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 Arts and Sciences 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 the 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

Several departments in the College of Arts and Sciences have special language requirements or recommendations, 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 strongly recommended for students contemplating graduate study 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/BROADCASTING: Proficiency at the intermediate level;

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

MUSIC(B.A.): One year of a foreign language which can be either the continuation of the language taken in high school or a new language; (B.M. Performance): One year of study in either French, German or Italian, or pass a proficiency examination at the intermediate level in one of these languages.

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

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

SOCIOLOGY and 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 College's 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 freshmen 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 (see following table) 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	550-670	680 and above
German	560-670	680 and above
Latin	560-670	680 and above
Russian	560-690	700 and above
Spanish	550-710	720 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 the College of Arts and Sciences 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; no outstanding deficiencies (check student handbook for specific details). In addition, the following requirements must be satisfied before the faculty of the College will vote on granting the student a Bachelor's degree;

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 requirements within the three basic areas of the College.
5. Satisfactory completion of requirements for the major.

Rules Pertaining to Degree Credit

The following is a listing of college rules and regulations which pertain to the granting of credit

towards the required 120 degree hours (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 the college's Student Information Center, 110 Stevens). Course equivalencies should be determined *prior* to registration. For further details, check the Student Handbook.

Before students of the College of Arts and Sciences 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. A prior approval form is available in the Student Information Center (110 Stevens).

Military Science

Students in the College of Arts and Sciences 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 enrolled in the College of Arts and Sciences 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 by the college 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

The College of Arts and Sciences accepts credits for PHE 101 and PHE 102 (Physical Education)

as an elective course. Students may earn up to two credits in Physical Education (HPR/PHE) skills courses applicable towards the 120 total needed for graduation. Physical Education is *not* required for graduation. NOTE: Many Physical Education courses are designated as HPR (Health and Physical 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 College of Arts and Sciences 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 College of Arts and Sciences.

The College of Arts and Sciences has entered into a number of formalized agreements with other institutions for the acceptance of transfer degree credit. One example is the *Bangor Theological Seminary*. Regularly enrolled students in the College of Arts and Sciences may register for courses at the Bangor Theological Seminary, not to exceed six credit hours per semester, without payment of additional fees. The College of Arts and Sciences extends a like privilege to students regularly enrolled at the Bangor Theological Seminary. Such registrations must have the approval of the academic deans of both institutions and the instructors involved. Credit for courses so taken will be considered a part of the student's program at the institution where enrolled.

While enrolled at the Bangor Theological Seminary a student may, with the approval of the dean and the admissions office of the University, also register as a Special Student in the College of Arts and Sciences on the established fee basis for such courses. Work so taken, if it does not substitute for or duplicate courses taken in the Seminary program, may be counted as

advanced standing credit toward the degree in the event a student later registers for a degree program at the University.

Examples of other institutions where formalized agreements exist 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 College of Arts and Sciences Dean's Office, 100 Stevens Hall.

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 in the College of Arts and Sciences. 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.

Dual Degree Program in Arts and Sciences/Engineering Technology (ASSET)

Arts and Sciences and Engineering Technology faculty have explored ways to integrate studies in the humanities, social sciences, science, and technology at UM. The objective is to provide opportunities for students to develop expertise in technology and engineering techniques and to build strong, coherent backgrounds in the liberal arts and sciences, thus enabling students to understand the complex relationships between technology and human affairs. To meet this objective, dual degree programs in Arts and Sciences and Engineering Technology have been instituted. The programs, open to 10-20 highly qualified students (minimum combined SAT score of 1200), will require a major in an Arts and Sciences discipline and a major or minor in a specific area of engineering technology:

1. A five-year program, requiring 150 credit hours, will lead to a baccalaureate degree (B.A.) in an Arts and Sciences discipline and a baccalaureate degree (B.S.) in either Electrical or Mechanical Engineering Technology.
2. A four-year program, requiring 135 credit hours, will lead to a baccalaureate degree (B.A.) in an Arts and Sciences discipline and an associate degree (A.S.) in Civil, Electrical, or Mechanical Engineering Technology.

For further information, contact the Dean's Office at 100 Stevens Hall.

Bachelor of Arts in Special Studies (BASS)

A limited number of students in the College of Arts and Sciences are permitted to construct for themselves special "majors" other than those presently existing. Such students might: (1) be from such groups as the Onward Program; (2) have special backgrounds such as the military, business, the ministry, etc.; (3) be especially gifted in such things as mathematics, computer science, physics, or languages, political experience, law, etc., and for whom the traditional major unduly restricts their unusual and unique abilities. The program is centered in the Office of the Dean of the College, and is administered by a Special Studies Committee appointed by the Dean. It is limited to approximately 50 students, who will declare a BASS major at the usual time in their sophomore year. All College requirements must be met. Additionally, students must have been in the program for their last 28 hours, and at least 60 hours must be taken in upper level courses.

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 nor 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.

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

- Canadian Studies*, Assoc. Prof. Victor Konrad, Canada House
Classical Studies, Asst. Prof. Kristina Nielson, Little Hall
Developmental Disabilities, Asst. Prof. Lucille Zeph, Shibles Hall
Environmental Issues and Ecological Studies, Prof. Melvin Gershman, Hitchner Hall
Franco-American Studies, Asst. Prof. Raymond Pelletier, Little Hall
Geography, Assoc. Prof. Victor Konrad, Canada House
Latin American Studies, Prof. James Acheson, S. Stevens Hall
Legal Studies, Prof. Erling Skorpen, The Maples
Linguistics, Asst. Prof. Henry Munson, S. Stevens Hall
Marine Resources, Prof. Robert Bayer, Hitchner Hall
Marxist-Socialist Studies, Prof. Douglas Allen, The Maples
Medieval Studies, Assoc. Prof. David Ebitz, Carnegie Hall
Peace Studies, Assoc. Prof. Michael Howard, The Maples
Public Relations, Assoc. Prof. Warren Burns, Stevens Hall
Religious Studies, Assoc. Prof. Jay Bregman, Stevens Hall

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

International Affairs

A major in international affairs is available, with concentrations in anthropology, economics, foreign languages, history, or political science. For complete information, refer to "International Affairs" in the index.

Medical Technology

A degree in medical technology is offered by the Zoology Department in the College of Arts and Sciences in cooperation with the Eastern Maine Medical Center, Bangor and the Maine Medical Center, Portland. Students electing this program spend three years at the University of Maine, following which they undergo a period of 12 months in training at one of the previously mentioned hospitals. Students receive the degree of bachelor of arts when they have satisfactorily completed the program.

The work at the University also meets entrance requirements of other schools of medical technology which are not affiliated with the University of Maine. A special examination is given nationally, and a certificate in medical technology issued when this examination is passed.

For further information, see the description of Zoology.

Provisional Certificates for Teachers

Certification for secondary school teaching may be earned by students registered in the College of Arts and Sciences. Twenty-three hours of basic work (EDB 202, EDB 203, EDB 204, SED 300, one methods course and student teaching) meets the professional subject requirements for the General Secondary Provisional Certificate, which must be renewed after five years. Student teaching is required for certification.

In addition to the 23 hours in professional courses, completion of a teaching major of 30 hours in one academic subject commonly taught in secondary schools is required. Candidates for a certificate also are expected to complete at least 18 hours in a second teaching field.

An alternate route to certification is possible by having 50 hours in a teaching area where at least three related academic subjects are represented.

Students planning on teacher certification should ascertain in advance whether their planned combination of major and minor areas 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 either in the College of Arts and Sciences or in the College of Education.

Premedical, Pre dental, 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 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	8
	OR	
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	8
	OR	
PHY 121/122	General Physics	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 freshman 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, pre dental, 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 pro-

gram during the first two years that will allow the greatest possible freedom of choice in later selecting an undergraduate major. The freshman 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 freshman year with the Health Professions Committee (Chairman Howard Patterson, 285 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 flexibility to students in designing their academic curriculum and augmenting their horizons.

Academic Programs in Residence Halls

The College of Arts and Sciences has several academic programs which are based in residence halls:

1. *Freshman Advising Program*: The College of Arts and Sciences has established an advising program for all entering freshmen. Students living on-campus will be housed in residential complexes through registration in FSA 199 (Freshmen Seminar in Advising). Students will be grouped according to general areas of interest and assigned a faculty advisor and a specially trained peer advisor. The advisors' role will be to assist the student in integrating the value of a liberal arts education with career explorations. Students will meet on a regular basis with their

faculty advisor during their freshman year. They normally will continue with the same advisor during their sophomore year.

2. *The Modern Language Center*. The University has established a language living center on 4 west and 4 south Knox Hall, known as the Modern Language Center. Students who demonstrate adequate commitment and interest in either German, French, Spanish, or Russian will be eligible. The program will serve as the focal point for many foreign language activities, including films, speakers, language clubs, and language tables. Students will be encouraged to use the foreign language in daily life situations while living in the center. A Listening Laboratory also is available for use by students living in the Modern Language Center. The lab is equipped with both reel-to-reel and cassette tape players and instructional language tapes, as well as international magazines and dictionaries.

Honors Program

Freshmen of marked academic ability enrolled in the College of Arts and Sciences are invited to apply for admission to the University Honors Program. The work of the freshman 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 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 other colleges within the University. These courses, plus HON 498 and 499, constitute the core of the Honors Program. Formal recognition, the highest offered in the College of Arts and Sciences, 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 the College of Arts and Sciences consists of faculty currently teaching in the program, as well as departmental representatives selected by the Chairs and ratified by the Dean. The principal duty of this committee is to serve on Senior Thesis examinations. Professor C. Bauschatz is Secretary of the Honors Committee.

Modern Society

The college offers an introductory and interdisciplinary course in social science (MOY 101/102), designed to acquaint the student with some of the pivotal ideas in sociology, social psychology, economics and political science, and the contribution of such ideas to the understanding of human behavior. Informal meetings are held to discuss course-related materials and ideas that students may wish to explore beyond the limits of regular classroom lectures and discussions. Participation in such meetings is voluntary. For further information, contact Charles Scontras, Professor of Modern Society.

MOY 101 Modern Society I

An introductory and interdisciplinary course in social science designed to acquaint the student with some of the pivotal ideas in sociology, social psychology, economics and political science and the contribution of such ideas to the understanding of human behavior. Lectures and discussion. Informal meetings are held to discuss course-related materials and ideas that students may wish to explore beyond the limits of regular classroom lectures and discussions. Participation in such meetings is voluntary. **Cr 3**

MOY 102 Modern Society II

An introductory and interdisciplinary course in social science designed to acquaint the student with some of the pivotal ideas in sociology, social psychology, economics and political science and the contribution of such ideas to the understanding of human behavior. Lectures and discussion. Informal meetings are held to discuss course related materials and ideas that students may wish to explore beyond the limits of regular classroom lectures and discussions. Participation in such meetings is voluntary. **Cr 3**

Projects in Learning

Projects-in-Learning consists of several component programs which are experimental in nature, and are designed to offer to qualified students an opportunity to explore in depth subjects not normally dealt with in the curriculum:

1. *Independent Study (IND 200)* is available to students with an accumulative point average of 2.5 or better and with second semester freshman standing or above. Independent study projects are arranged between the instructor and student. An instructor helps the student shape a project, and is available for guidance at all times;

however, emphasis is on the word *independent* and the student is encouraged to work on his or her own. Independent study projects can be used to satisfy requirements with the prior approval of the department head.

2. *Special Seminar (SPS) Program.* Each semester, seminars dealing with topics not covered in depth in regular courses are offered to students who have an accumulative point average of 2.0 or better, and have second semester freshman standing or above. Emphasis is placed on topics of concern to interested students and faculty and range from those dealing with contemporary social problems to those designed to explore the unusual and provocative. Special seminars carry degree credit but do not satisfy any University, college or departmental requirements.

The Projects-in-Learning Program is directed by a supervisory committee which must approve all project work. Students, faculty, and administrators are encouraged to formulate and submit imaginative proposals to the committee which consists of four faculty members and four students. Eligible students may take the freshman seminar and up to four "projects" in their last three and one half years but not more than one each semester. All projects work is graded "Pass" or "Fail."

Information on Projects-in-Learning may be obtained from any Projects-in-Learning Committee member or from the Student Information Office of the College of Arts and Sciences, 110 Stevens Hall.

Study Abroad

The college encourages students in good academic standing to spend a year (preferably the junior year) in study at selected foreign universities. To participate, students should register for "Away Status" and obtain prior permission from their academic advisor and the dean.

Depending on the foreign institution attended and the type of courses taken, academic credit for such study will be determined by the dean and the head of the student's major department upon completion of the program. While evidence of satisfactory performance in the form of grades, certificates, etc., is required to obtain degree credit, such grades will not normally be used in computing the student's accumulative average at the University of Maine.

Examples of specific Study Abroad Programs include Canada Year (contact the Canadian-American Center, 154 College Avenue), the Denmark International Studies Program (contact

Professor William Stone, 352 Little Hall), and the Salzburg Program (contact the Department of Foreign Languages and Classics, Little Hall). For further information on these and other Study Abroad Programs, students should consult the Dean's Office, 100 Stevens Hall.

University Affiliated Program (UAP)

A University Affiliated Program with the Department of Pediatrics at Eastern Maine Medical Center and the Colleges of Arts and Sciences, Education, and Life Sciences and Agriculture 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, and 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.

Interdisciplinary Course Concentrations

Canadian Studies

Interdisciplinary Concentration

Faculty:

- Assoc. Prof. Victor A. Konrad, Anthropology, Coordinator, Canada House
- Prof. Robert Babcock, History, 200 Stevens Hall
- Assoc. Prof. John Battick, History, 275A Stevens Hall
- Assoc. Prof. Cathleen Bauschatz, Foreign Languages, 252 Little Hall
- Assoc. Prof. Robson Bonnichsen, Anthropology, 459 College Avenue
- Prof. Harold Borns, Geology, 304A Boardman Hall
- Prof. Edward Collins, Political Science, 15 N. Stevens Hall
- Assoc. Prof. David Decker, Art, 111 Carnegie Hall
- Prof. Stewart Doty, History, 145 Stevens Hall
- Prof. Richard Emerick, Anthropology, 52A S. Stevens Hall
- Assoc. Prof. Alaric Faulkner, Anthropology, 44 S. Stevens Hall
- Asst. Prof. Jacques Ferland, History, 275C Stevens Hall
- Assoc. Prof. James Gallagher, Sociology, 201 Fernald Hall
- Lecturer James Herlan, Foreign Languages, Canada House
- Prof. Edward Ives, Anthropology, 42 S. Stevens Hall
- Prof. Alan Miller, Journalism, 101B Lord Hall
- Asst. Prof. Kenneth Norris, English, 304 Neville Hall
- Asst. Prof. Michael Palmer, Political Science, 31 N. Stevens Hall
- Asst. Prof. Raymond Pelletier, Foreign Languages, 266 Little Hall
- Prof. Robert Rioux, Foreign Languages, 214 Little Hall
- Prof. David Sanger, Anthropology, 26 S. Stevens Hall
- Asst. Prof. Kathryn Slott, Foreign Languages, 278 Little Hall
- Prof. David Smith, History, 175 Stevens Hall
- Prof. Emerita Alice Stewart, History, Canada House
- Prof. Bernard Yvon, Education, 317 Shibles Hall

Assoc. Prof. Gregory White, Agricultural and Resource Economics, Winslow Hall
 Prof. James Wilson, Economics, 225 Stevens

Rationale

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. For students enrolled in any college at Orono, several options in Canadian Studies are available. In the College of Arts and Sciences, students may enroll in the 18-hour concentration, or one of a series of course "clusters" designated by the college. 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.

Central to the program is CAN 101, Introduction to Canadian Studies. This course provides a general interdisciplinary introduction and prepares students for further study of Canada. It is a prerequisite for the concentrations and the course clusters in the College of Arts and Sciences. Minors or concentrations involve 18 credit hours and course clusters require 12 credit hours. In all cases, at least half the courses, including CAN 101, must be core courses. The remainder may be selected from the related offerings. The clusters may include courses taken at a Canadian university through the Canada Year program sponsored by the Canadian-American Center.

ICC 1—New England and the Atlantic Provinces

CAN 101 Introduction to Canadian Studies*
 CAN 300 Seminar in Canadian Studies
 CAN 401 Readings in Canadian Studies
 ANT 322 Folklore of Maine and the Maritime Provinces
 ANT 570 Seminar in Northeastern North American Prehistory
 ECO 339 International Trade and Commercial Policy
 ECO 345 Regional Economics
 GEO 210 Geography of Maine
 GEO 214 Geography of Canada and the United States
 GES 543 Quaternary History of Northeastern North America
 HON 302 Honors Group Tutorial II: Canadian Studies Topics
 HTY 110 History of Maine

HTY 458 History of French Canada and Franco-Americans
 INT 396 Field Experience (Internship in Canadian Studies)
 POS 387 International Law
 POS 587 Problems in International Law

ICC 2—Canadian Culture

CAN 101 Introduction to Canadian Studies*
 CAN 300 Seminar in Canadian Studies
 CAN 401 Readings in Canadian Studies
 ARH 168 Canadian Art
 ANT 351 North American Indian Ethnology
 ANT 357 North American French Cultures and Societies
 ANT 360 Peoples and Cultures of the Circumpolar Area
 ANT 372 North American Prehistory
 ANT 373 Historic Archeology
 ENG 236 Canadian Literature
 ENG 436 Topics in Canadian Literature
 FRE 254 Popular Culture in French Canada
 FRE 256 French Canadian Civilization
 FRE 452 The Novel of Quebec
 FRE 490 Topics in French
 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
 HON 302 Honors Group Tutorial II: Canadian Studies Topics
 HTY 459 Colonial Canada
 HTY 460 Modern Canada
 INT 396 Field Experience (Internship in Canadian Studies)

ICC 3—Modern Canada

CAN 101 Introduction to Canadian Studies*
 CAN 300 Seminar in Canadian Studies
 CAN 401 Readings in Canadian Studies
 ANT 360 Peoples and Cultures of the Circumpolar Area
 ECO 339 International Trade and Commercial Policy
 ECO 340 Canadian Economics: Issues and Policies
 ECO 345 Regional Economics
 ENG 236 Canadian Literature
 ENG 436 Topics in Canadian Literature
 GEO 214 Geography of Canada and the United States
 GEO 350 Geography of Canada
 HON 302 Honors Group Tutorial II: Canadian Studies Topics
 HTY 482 Canada and the American Economy

- HTY 499 Contemporary Problems in History (20th Century Canada)
 HTY 521 Canada and the United States, 1783-Present
 HTY 522 Canadian Economic History
 INT 396 Field Experience (Internship in Canadian Studies)
 INT 537 Evolution and Development of Canadian Government and Politics
 JBR 214 The Foreign Media
 POS 241 Politics in Contemporary Societies
 POS 387 International Law
 POS 587 Problems in International Law
 SOC 431 Canadian Society
 SOC 442 Population and Society

ICC 4—French Canada

- CAN 101 Introduction to Canadian Studies*
 CAN 300 Seminar in Canadian Studies
 CAN 401 Readings in Canadian Studies
 ANT 357 North American French Cultures and Societies
 ANT 373 Historic Archeology
 FRE 297 French May-Term
 FOL 490 Topics in Foreign Languages (Bilingualism and Biculturalism)
 FRE 254 Popular Culture in French Canada
 FRE 256 French Canadian Civilization
 FRE 440 Franco-American Civilization
 FRE 442 French Language of North America
 FRE 452 The Novel of Quebec
 FRE 456 Seminar in Quebec Studies
 FRE 490 Topics in French
 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
 HON 302 Honors Group Tutorial II. Canadian Studies Topics
 HTY 457 France in America to 1763
 HTY 458 History of French Canada and Franco-Americans
 HTY 459 Colonial Canada
 INT 396 Field Experience (Internship in Canadian Studies)

*Required course for the Canadian Studies cluster. A minimum of three other courses (nine credit hours) is required for the completion of the cluster. Courses at the 500 level are for graduate students and selected undergraduates. CAN 300, Seminar in Canadian Studies, may be substituted for a senior-level course in any of the clusters.

To register for the Canadian Studies clusters, students must consult with their major advisor, the Dean's office in the College of Arts and Sciences at 100 Stevens Hall, and the Canadian-American Center at Canada House, 154 College Avenue.

Classical Studies

Interdisciplinary Concentration

Faculty

- Asst. Prof. Kristina P. Nielson, Co-ordinator, Foreign Language and Classics, 254 Little, (2080)
 Asst. Prof. Karen-edis Barzman, Art, 151 Carnegie (3252)
 Assoc. Prof. Jay Bregmen, History, 200A Stevens (7808)
 Assoc. Prof. David Ebitz, Art, 204 Carnegie (7618)
 Prof. Ralph O. Hjelm, Philosophy, The Maples (3862)
 Assoc. Prof. Michael Howard, Philosophy, The Maples (3864)
 Asst. Prof. Michael Palmer, Political Science, 31 N. Stevens (1879)
 Prof. J. Norman Wilkinson, Theatre, 209 E. Annex (2405)

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 A.D., 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.

Course Offerings:

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 or 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.

Art History:

ARH 251 Classical Art
ARH 253 Early Christian and Byzantine Art
ARH 361 Topics in Art History: Greek Art

Classics:

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

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 101 Classical Civilization
HTY 401 History of Greece
HTY 402 Roman History

Latin:

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

Philosophy:

PHI 410 History of Ancient Philosophy
PHI 482 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

Interdisciplinary Concentration

Faculty

Asst. Prof. Lucille Zeph, Education, Coordinator, 305 Shibles Hall
Asst. Prof. Hector Balcazar, 23 Merrill Hall
Assoc. Prof. Cleo Berkun, Social Work, 201C Fernald Hall
Assoc. Prof. Dana Birnbaum, Child Development, 28 Merrill Hall
Asst. Prof. Phyllis Brazee, Education, 205 Shibles Hall

Asst. Prof. William Bukowski, Psychology, 309 Little Hall
Asst. Prof. Stephen Butterfield, Physical Education, 103 Lengyel
Assoc. Prof. Richard Cook, Nutrition, 20 Merrill Hall
Assoc. Prof. Barbara Csavinsky, Human Development, 32 Merrill Hall
Prof. William Dopheide, Comm. Disorders, 208 E. Annex
Prof. Stanley Freeman, Education, 112 Shibles Hall
Assoc. Dean Elaine Gershman, UAP Coordinator, College of Arts and Sciences, 100 Stevens Hall
Assoc. Prof. Katheryn Grzelkowski, Sociology, 201 Fernald Hall
Prof. Walter Harris, Special Education, 132 Shibles Hall
Assoc. Prof. Donald Hayes, Psychology, 301 Little Hall
Assoc. Prof. Conrad LaRiviere, Audiology/Communication, Conley Speech and Hearing Center
Prof. Michael Lewis, Art, 207 Carnegie Hall
Prof. Shirley Oliver, Child Development, 12 Merrill Hall
Prof. John Pettit, Communication Disorders, Conley Speech and Hearing Center
Assoc. Prof. Marisue Pickering, Communication Disorders, Conley Speech and Hearing Center
Asst. Prof. David Samuelian, Human Services, 107 Caribou Hall, UC
Asst. Prof. Gary Schilmoeller, Child Development, 37 Merrill Hall
Asst. Prof. Pamela Schutz, Education, 301 Shibles
Assoc. Prof. Frank Setter, Human Services, Caribou Hall, UC
Assoc. Prof. Mary Ann Stankiewicz, Art Education/Art, 157 Carnegie Hall
Asst. Prof. Michelle Walker, Social Work, 201 Fernald
Prof. Julia Watkins, Social Work, 201a Fernald 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 affecting 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
 Food and Nutrition
 Health, Physical Education and Recreation
 Human Services
 Nursing
 Psychology
 Social Work/Sociology

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

Course Offerings

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

CHF 201 Introduction to Lifespan Development I

PSY 323 Psychology of Childhood

B. CORE: Choose at least one course—Three credits.

SED 300 Survey of Exceptionality

PSY 428 Psychology of the Exceptional Child

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

AED 171 The Teaching of Art

CHF 331 Cognition Development

CHF 352 Strategies for Family Intervention

CHF 433 Adolescence

CHF 434 The Older Adult

CHF 435 Developmental Assessment

HNF 101 Introduction to Food and Nutrition

HNF 301 Nutrition and Growth

HPR 256 Elementary School Physical Education

HPR 270 Motor Development and Learning

HPR 367 Mainstreaming in Physical Education/Recreation

MUS 298 Special Subjects in Music: Introduction to Music Therapy

PSY 308 Theories of Personality

PSY 312 Abnormal Psychology

PSY 324 Psychology of Adolescence

SED 301 Introduction to Education of Severely Handicapped

SOC 313 Deviant Behavior

SOC 318 Sociology of the Family

SOC 329 Sociology of Sex Roles

SOC 337 Sociology of Mental Illness

SOC 339 Sociology of Medicine

SPC 130 Introduction to Communication Disorders

SPC 354 Communication Development in Children

SPC 380 Language and Speech Development

SPC 388 Hearing Impairment

SWE 320 Introduction to Social Work and Social Welfare

SWE 340 Social Welfare Policy and Issues

SWE 350 Human Behavior and the Social Environment

D. PRACTICUM: Choose three to six credit hours of work.

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.

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

Environmental Issues and Ecological Studies

Interdisciplinary Concentration

Faculty

Prof. Melvin Gershman, Microbiology and Animal and Veterinary Sciences, Coordinator, 302 Hitchner Hall

Asst. Prof. Michael Brody, Education, 206 Shibles Hall

Asst. Prof. Patrick Brown, Wildlife, 222 Nutting 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, Plants and Soils, 115 Deering Hall

Prof. Bradford Hall, Geological Sciences, 110 Boardman Hall
 Assoc. Prof. Edward Huff, Agricultural Engineering, Agricultural Engineering Building
 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. Fred Knight, Forestry, 208 Nutting Hall
 Assoc. Prof. Irving Kornfield, Zoology, 215 Murray Hall
 Assoc. Prof. Bernard McAlice, Botany and Oceanography, 9 Deering Hall
 Assoc. Prof. Stephen Reiling, Agricultural Economics, 207 Winslow Hall
 Assoc. Prof. Chet Rock, Civil Engineering, 457 Aubert Hall
 Asst. Prof. Paul Roscoe, Anthropology, 40 S. Stevens Hall
 Assoc. Prof. Edward Schriver, History, 115 Stevens Hall
 Prof. Malcolm Shick, Zoology, 211 Murray Hall
 Assoc. Prof. William TeBrake, History, 275B Stevens 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 MHE 250 (Our Environment) and ARE 171 (Economics of Environmental Quality) or INT 219 (Introduction to Ecology). Science majors may substitute INT 419 (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

Agricultural Engineering:

AEN 241 Energy and Society

Anthropology:

ANT 364 Cultural Ecology

Biology:

BIO 468 Limnology

Civil Engineering:

CIE 331 Fundamentals of Environmental Engineering

Education:

ESC 344 Basic Field Ecology

Forestry:

FTY 349 Principles of Forest Management

Geological Sciences:

GES 101-102 Aspects of the Natural Environment

History:

HTY 317 Environmental History of Europe

HTY 477 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

Plants and Soils:

PSS 144 Soil and Water Conservation

Wildlife:

WLM 210 The Development of Wildlife Conservation

WLM 310 Wildlife Management

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

Interdisciplinary Concentration

Faculty

Asst. 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, Canada House

Assoc. Prof. Victor Konrad, Anthropology, Canada House

Dir. Yvon Labbe, Franco-American Affairs, 126 College Avenue

Professor Robert Rioux, Foreign Languages, 214 Little Hall

Professor Bernard Yvon, Education, 317 Shibles

Rationale

The past decade 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 357 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 322 Folklore of Maine and the Maritime Provinces
- ANT 323 Folksong
- ANT 324 Narrative
- ANT 325 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
- HTY 475 American Social History I
- HTY 476 American Social History II

Language:

- INT 310 Introduction to the Study of Linguistics
- ANT 380 Sociolinguistics
- ANT 381 Language and Culture

Society and Culture:

- SOC 338 Race and Culture Conflict
 ANT 339 Psychological Anthropology
 ANT 368 Social Anthropology of Complex Societies

Geography**Interdisciplinary Concentration***Faculty*

- Assoc. Prof. Victor Konrad, Anthropology, Coordinator, Canada House
 Asst. Prof. Charles Adelberg, Agricultural & Resource Economics, Winslow Hall
 Professor Marshall Ashley, Forestry, 208 Nutting Hall
 Professor Richard Blanke, History, 115C Stevens Hall
 Assoc. Prof. Robson Bonnichsen, Anthropology, 38 S. Stevens Hall
 Professor Melvin Gershman, Animal and Veterinary Sciences and Microbiology, 302 Hitchner Hall
 Professor Abul Huq, Economics, 240 Stevens Hall
 Assoc. Prof. Irving Kornfield, Zoology, 215 Murray Hall
 Assoc. Prof. Stephen Reiling, Agricultural and Resource Economics, 207 Winslow Hall
 Professor Walter Schoenberger, Political Science, 33 N. Stevens Hall
 Assoc. Prof. Edward Schriver, History, 115A Stevens Hall
 Prof. Thomas Taylor, Public Administration, 39 N. Stevens Hall
 Assoc. Prof. William TeBrake, History, 275B Stevens Hall
 Assoc. Prof. David Tyler, Civil Engineering, 120 Boardman Hall
 Professor Claude Westfall, Engineering Technology, 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, man-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 freshman or sophomore year. The student is also urged to discuss and plan course selection with the Coordinator, Associate Professor Victor Konrad (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 397 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
 ECO 344 Urban Economics
 ECO 345 Regional Economics
 GEO 350 The Geography of Canada
 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 364 Cultural Ecology
 ANT 375 Paleoenvironmental Archeology
 HTY 477 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 350 The Geography of Canada

Students may also include up to six credit hours of regional anthropology (ANT 322, ANT 341, ANT 342, ANT 351, ANT 353, ANT 354, ANT 360, ANT 371, ANT 372) and regional history (HTY 401, HTY 402, HTY 409, HTY 422, HTY 423, HTY 424, HTY 425, HTY 426, HTY 435, HTY 436, HTY 437, 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
 MHE 250 Our Environment
 PSS 144 Soil and Water Conservation
 BIO 260 Interaction Between Humans and Their Environment
 ANT 375 Paleoenvironmental Archaeology
 HTY 317 Environmental History of Europe
 HTY 477 History of the Treatment of the American Environment
 INT 419 General Ecology
 ARE 171 Economics of Environmental Quality
 ARE 474 Land Use Planning
 PSS 428 Landscape Design Problems
 FTY 357 Forest Watershed Management
 INT 500 Seminar on Quarternary Studies
 RPM 554 Forest Recreation Planning
 ARE 572 Resource Use 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
 PSS 144 Soil and Water Conservation
 ARE 171 Economics of Environmental Quality
 INT 324 Contemporary Rural Problems
 INT 329 The Individual and the Community
 ARE 471 Resource Economics
 ARE 474 Land Use Planning
 ARE 386 Government Policies Affecting Rural America
 RPM 554 Forest Recreation Planning
 ARE 572 Resource Use 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 344 Urban Economics

ECO 345 Regional Economics

ARE 171 Economics of Environmental Quality

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 386 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 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

Interdisciplinary Concentration

Faculty

Prof. James Acheson, Anthropology, Coordinator, 40B S. Stevens Hall

Professor Melvin Burke, Economics, 220 Stevens Hall

Asst. Prof. Eugene DelVeccio, Foreign Languages, 250 Little Hall

Assoc. Prof. Laura Luszczynska, Foreign Languages, 216 Little Hall

Assoc. Prof. Kathleen N. March, Foreign Languages, 201 Little Hall

Assoc. Prof. James Troiano, Foreign Languages, 274 Little Hall

Asst. Prof. Stephanie G. Wood, History, 170 Stevens 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 Honduras and El Salvador. 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 Portuguese may be taught.)

B. Social Sciences and Literature.

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

History

HTY 447 Hispanic America I

HTY 448 Hispanic America II

HTY 452 Problems of Latin America

Anthropology

ANT 353 Peoples and Cultures of Mesoamerica

ANT 367 Peasant Studies

Economics

ECO 338 Economic Development

ECO 336 Marxian Economics

Literature

SPA 207 Spanish Readings

SPA 208 Introduction to Spanish 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

Interdisciplinary Concentration

Faculty

Prof. Erling Skorpen, Philosophy, Coordinator,
The Maples

Assoc. Prof. Steven Barkan, Sociology, 212
Fernald Hall

Professor Edward Collins, Political Science, 5
N. Stevens Hall

Assoc. Prof. R. Brucher, English, 415 Neville
Hall

Instructor Richard C. Devor, Business, S. Stevens Hall

Assoc. Prof. Edward Laverty, Public Administration, 1 N. Stevens Hall

Professor Eugene Mawhinney, Political Science,
138 N. Stevens Hall

Professor William Pease, History, 150 Stevens
Hall

Professor Jefferson White, Philosophy, 11 The
Maples

Rationale

Socrates in antiquity held that the laws were his "true parent." For then and as now laws help to constitute and regulate family, church, commercial, and governmental institutions. They affect the lives of human beings throughout, though conversely human beings make the law. Consequently, legal foundations, developments, and effects are of intrinsic interest to many disciplines and their students. Accordingly, this interdisciplinary concentration is designed not so much for the pre-law student, as for any student whose liberal education seeks to understand the formative influences of human civilization and culture.

Course Offerings

The Legal Studies Curriculum is divided up to this point into two clusters as follows:

A. Courses "About" Law (three to be selected for nine credits)

ENG 229 Topics in Literature (Law)

HTY 499 Contemporary Problems in History
(Law and American Society)

PHI 444/445 Philosophy of Law

POS 382 Introduction to Law

SOC 314 Law and Society

B. Courses "In" Law (two to be selected for six credits)

BUA 220 The Legal Environment of Business

JBR 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

Linguistics

Interdisciplinary Concentration

Faculty

Asst. 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

Asst. Prof. Rex Pyles, Foreign Languages, 270 Little Hall

Assoc. Prof. Conrad LaRiviere, Speech Communication, 345 Stevens 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 310 Introduction to the Study of Linguistics

2. Language Structure

FOL 453 Phonology

ENG 477 Modern Grammars

3. Language in Context

ANT 380 Sociolinguistics

ANT 381 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 the English Language

GER 403 History of the German Language

FRE 420 French Phonetics

FRE 500 History of the French Language

FRE 520 French Linguistics

COS 220 Introduction to Computer Science I

COS 300 Introduction to Computer Science II

COS 301 Programming Languages

MAT 241 Mathematical Logic

PHI 260 Philosophy of Language

PHI 450 Logic

SPC 484 Introduction to Speech Science

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 Arts and Sciences requirements are represented among the courses listed for this concentration. Working towards a concentration in linguistics is, therefore, compatible with satisfying area requirements.

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

Marine Resources

Interdisciplinary Concentration

Faculty

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

The Interdisciplinary Course Concentration in Marine Resources is an option available to students in the College of Arts and Sciences and the College of Life Sciences and Agriculture. It 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:

ANV 220 Topics in Marine Resources

OCE 370 Introduction to Oceanography (Permission)

ARE 471 Resource Economics (ECO 110)

OR

INT 360 Economics and the Biology Marine Fish Management (ECO 373, ZOL 204 or permission)

MARINE RESOURCE UTILIZATION:

INT 419 General Ecology (1 year of college chemistry and 1 year of college biological science)

ARE 171 Economics of Environmental Quality

ARE 577 Economics of Public Choice (ECO 373)

MCB 515 Marine Bacteriology (General Chem., Gen. Micro.)

MCB 520 Fish Diseases (ZOL 204, MCB 300, 301 or permission)

ANV 212 Maine Mariculture (permission)*

ZOL 470 Fishery Biology (ZOL 329, INT 419 or WLM 200)

ANV 211 Aquaculture

ANV 409 Shellfisheries Biology (ZOL 443, or permission)
 ZOL 573 Fisheries Science (ZOL 471 or permission)
 BOT 473 Biology of Algae (BIO 100, BOT 203)
 BOT 474 Aquatic Flowering Plants (BOT 464 or permission)
 BOT 475 Algal Growth and Seaweed Mariculture (BIO 100, 1 yr Biology and 1 yr Chemistry)
 BOT 503 Natural History and Ecology of Marine Algae (INT 419 or Bot 473 or equivalent)

*Offered during the summer session only.

MARINE TECHNOLOGY:

AEN 469 Agricultural Process Engineering (MEE 230, 360, or CIE 350)
 AEN 550 Simulation of Biological and Physical Systems (MAT 126, Fortran)
 CIE 458 Coastal Engineering (CIE 350)
 CIE 558 Advanced Coastal Engineering (MAT 259)
 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

Interdisciplinary Concentration

Faculty

Prof. Douglas Allen, Philosophy, Coordinator, The Maples
 Prof. Robert Babcock, History, 200B Stevens Hall
 Assoc. Prof. Steven Barkan, Sociology, 212 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
 Asst. Prof. Jacques Ferland, History, 275C Stevens Hall
 Asst. Prof. Alexander Grab, History, 265A Stevens Hall

Professor Burton Hatlen, English, 309 Neville Hall
 Assoc. Prof. Michael Howard, Philosophy, The Maples
 Professor Abul Huq, Economics, 240 Stevens Hall
 Asst. Prof. Ngo Vinh Long, History, 170 Stevens Hall
 Prof. Mark A. Lutz, Economics, 250 Stevens Hall
 Professor Kyriacos Markides, Sociology, 201 Fernald Hall
 Assoc. Prof. Virginia Nees-Hatlen, English, 311 Neville Hall
 Assoc. Prof. Jana Sawicki, Philosophy, The Maples
 Professor Howard Schonberger, History, 265C Stevens Hall
 Prof. Charles Scontras, Modern Society, 111 East Annex
 Asst. 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 442, Marxist Philosophy: From Marx to Mao, 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 110 Introduction to Economics
- ECO 331 Contemporary Alternatives in Political Economy
- ECO 336 Marxian Economics
- ECO 338 Economic Development
- ECO 570 Alternative Approaches to Economic Theory and Policy

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 442 Marxist Philosophy: From Marx to Mao
- PHI 443 Twentieth Century Marxist Philosophy

Sociology

- SOC 343 Sociology of Work and Labor
- SOC 460 Major Ideas in Sociology

ELECTIVE COURSES:

Economics

- ECO 335 History of Economic Thought
- ECO 337 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

History

- HTY 172 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

Modern Society

- MOY 102 Modern Society

Philosophy

- PHI 439 Feminist Theory
- PHI 441 Philosophical Foundations of Social and Political Institutions: Hobbes to Marx
- 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

Medieval Studies

Interdisciplinary Concentration

Faculty

- Assoc. Prof. David Ebitz, Art, Coordinator, 104 Carnegie Hall
- Assoc. Prof. Cathleen Bauschatz, Foreign Languages, 252 Little Hall
- Assoc. Prof. Paul Bauschatz, English, 304A Neville Hall
- Prof. Jacob Bennett, English, 313 Neville Hall
- Assoc. Prof. Jay Bregman, History, 200A Stevens Hall
- Prof. Ralph Hjelm, Philosophy, The Maples
- Asst. Prof. Kristina Nielson, Classics, 254 Little Hall
- Prof. Robert Rioux, Foreign Languages, 214 Little Hall

Assoc. Prof. William TeBrake, History, 275B
Stevens Hall

Assoc. Prof. Reinhard Zollitsch, Foreign Languages, 266 Little 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 102 or HTY 105, 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 253 Early Christian and Byzantine Art
ARH 254 Medieval Art in the West
ARH 266 Islamic Art

English

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

History

HTY 102 Medieval Civilization
HTY 105 History of European Civilization I
HTY 402 Roman History
HTY 403 Early Middle Ages
HTY 404 Late Middle Ages
HTY 427 European Intellectual History I

Philosophy

PHI 411 Medieval Philosophy
PHI 482 The New Testament and Early Christianity

Peace Studies

Interdisciplinary Concentration

Faculty

Assoc. Prof. Michael Howard, Philosophy
 Coordinator, The Maples
Prof. Douglas Allen, Philosophy The Maples
Assoc. Prof. Christina Baker, English, Dow
Assoc. Prof. John Battick, History, 275A Stevens
Prof. Edward Collins, Political Science, 15 North Stevens
Assoc. Prof. Kathryn Grzelkowski, Sociology,
 201B Fernald
Prof. Abul M. Huq, Economics, 240 Stevens
Asst. Prof. Naomi Jacobs, English, 215 Neville
Prof. Peter Kleban, Physics, 222 Bennett
Prof. Mark Lutz, Economics, 250 Stevens
Prof. Kyriacos Markides, Sociology, 210 Fernald
Prof. Ruth Nadelhaft, English, 115 Dow
Asst. Prof. Michael Palmer, Political Science, 31
 North Stevens
Prof. Walter Schoenberger, Political Science, 33
 North Stevens
Prof. Howard Schonberger, History, 265A Stevens
Prof. David Smith, History, 175 Stevens
Prof. Robert Wendzel, Political Science, 11 North
 Stevens
Inst. Robert Whelan, English, 209 Alumni
Assoc. Prof. William Whitaker, Sociology and
 Social Work, 201F Fernald
Asst. Prof. Stephanie Wood, History, 170 Stevens

Rationale

What peace is, how it is related to justice, to well-being, to wealth and poverty, to the pursuit of knowledge, to power, and how peace can be achieved are important subjects in most of the social sciences and humanities. The purpose of

the peace studies concentration is to enable students to organize their studies around the topic of peace, drawing upon a diversity of disciplinary approaches.

Course Offerings:

The Peace Studies concentration consists of a minimum of 18 credits or 6 courses. At least 4 of the courses must be among those designated "core" courses, and must be chosen from at least 3 distinct departments. No more than 3 of the 6 minimum courses can be from the same department. Core courses are those that make the meaning, criteria, or conditions of peace the central theme. Courses which are important for an understanding of peace, but in which peace is not central, may be included in the course concentration, but are not core courses.

Core Courses

English

ENG 429 Literature of the Vietnam War (R. Whelen)

History

HTY 473 U.S. Diplomacy to 1914 (H. Schonberger)

HTY 474 U.S. Diplomacy 1914 to the Present (H. Schonberger)

Interdisciplinary

INT 290 Nuclear War (P. Kleban, et al) (1 cr.)

Political Science

POS 373 International Relations (W. Schoenberger/R. Wendzel)

POS 387 International Law (E. Collins)

POS 388 World Order Through International Organization and Law (E. Collins)

Sociology

SOC 338 Race and Culture Conflict (Whitaker)

SOC 308 Problems of Violence and Terrorism (Markides)

Elective Courses

Economics

ECO 320 Humanistic Economics (M. Lutz)

English

ENG 429 Utopian Literature (N. Jacobs)

History

HTY 467 U.S. From 1914 to 1945 (D. Smith)

HTY 448 Latin America: Reform and Revolution (S. Wood)

HTY 480 Naval History (J. Battick)

Philosophy

PHI 106 Social Issues in Recent Religious and Philosophical Thought (D. Allen)

PHI 443 Twentieth Century Marxism (D. Allen)

Political Science

POS 121-122 Current World Problems (W. Schoenberger)

POS 573 Problems in International Politics (Schoenberger)

POS 587 Problems in International Law (Collins)

POS 594 Thucydides (Palmer)

Sociology and Social Work

SWK 375 Hunger as an Issue in Social Welfare (Whitaker)

SOC 369 Social Movements as Protest, Dissent and Rebellion

SOC 465 Evolution, Revolution and the Future (K. Grzelkowski)

Students enrolled in the University College Liberal Studies program may initiate course work toward a Peace Studies Concentration by taking the following courses (not available to students enrolled in the College of Arts and Sciences):

Core Course

Eng 185 Introduction to Mythology (Nadelhaft/Baker)

Elective Courses

HUM 201 Literature and the Exploration of Human Values (Nadelhaft)

ENG 255 Women and Literature (Nadelhaft)

To complete the concentration, students will need to transfer from Liberal Studies to Arts and Sciences or one of the other colleges. The above Liberal Studies courses will be evaluated on the basis of transfer policies of the college in which they are enrolled for a Bachelor's degree. If the courses are accepted by the college, they will count toward the completion of the concentration.

Public Relations

Interdisciplinary Concentration

Faculty

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

Assoc. Prof. Richard Brucher, English, 415 Neville Hall

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

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

Inst. Sheila Pechinski, Business Administration, 6B South Stevens

Rationale

Through the Interdisciplinary Course Clusters program of the College of Arts and Sciences, 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 has 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 (SPC 102, 103 or 106)
SPC 267 Public Relations: Oral Communication Strategies (SPC 257 or permission)
2. Journalism in Public Relations
JBR 231 Reporting and Newswriting
JBR 250 Introduction to Advertising
3. English in Public Relations
ENG 317 Advanced Professional Exposition (ENG 101)
ENG 417 Technical Writing and Editing (ENG 317 or permission)

B. 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 JBR 250)
- ENG 301 Advanced Composition (ENG 212 or permission)
- ENG 496 English Apprenticeship (Field Experience; 24 credits in ENG including ENG 212 or 317 and permission)
- JBR 355 Advertising Copywriting and Layout (JBR 250)
- JBR 489 Seminar in Journalism (Senior JBR majors, or permission)
- PAA 200 Introduction to Public Management
- POS 358 Public Opinion (POS 100, Junior standing)
- SPC 277 Interviewing (SPC 102, 103 or 106)
- SPC 496 Field Experience in Speech Communication (15 credits in SPC and permission)
- 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

Interdisciplinary Concentration

Faculty

- Assoc. Prof. Jay Bregman, History, Coordinator, 200A Stevens Hall
- Prof. Douglas Allen, Philosophy, The Maples
- Assoc. Prof. David Ebitz, Art, 104 Carnegie Hall
- Prof. Richard G. Emerick, Anthropology, 52A S. Stevens Hall
- Prof. Burton N. Hatlen, English, 309 Neville Hall
- Prof. Ralph O. Hjelm, Philosophy, The Maples
- Asst. 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 Biblical Thought
 PHI 411 Medieval Philosophy
 PHI 482 The New Testament and Early Christianity
 PHI 483 The Reformation and the Enlightenment
 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

ARH 253 Early Christian and Byzantine Art
 ARH 254 Medieval Art in the West

B. Theoretical Perspectives on Religion

PHI 481 The Nature of Religious Experience
 PHI 490 Topics in Religious Studies
 ENG 429 Topics in Literature: The Traditional Theory of Literature

C. Religion in the Non-Western World

PHI 486 Religions and Philosophies of the East: Hinduism
 PHI 487 Religions and Philosophies of the East: Buddhism
 HTY 435/436 History of China
 HTY 437 History of Modern Japan
 ANT 341 People and Cultures of the Pacific Islands
 ANT 351 North American Indian Ethnology
 ANT 353 Peoples and Cultures of Mesoamerica
 ANT 354 Cultures and Societies of the Middle East
 ANT 360 Peoples and Cultures of the Circumpolar Area
 ANT 361 Islamic Fundamentalism
 ARH 266 Islamic Art

D. Religion in the Contemporary World

PHI 106 Social Issues in Recent Religious and Philosophical Thought
 PHI 485 Recent Religious Thought
 ENG 429 Topics in Literature: Tolkien and Modern Fantasy



Anthropology

Professors Ives (Chairperson), Acheson, Emerick, Sanger; Associate Professors Bonnichsen, Faulkner, Konrad; Assistant Professors Munson, Roscoe

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. 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 499 Current Issues in Modern Anthropology

and any two of the following:

ANT 217 Introduction to Archaeology

ANT 221 Introduction to Folklore

INT 310 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 499 and any two of the following: ANT 217, ANT 221, INT 310. 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 program 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, and education.

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 Early Man. A number of faculty work closely 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 Africa, the Middle East, Oceania, the Arctic, and Latin America, 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

The development of man as a bio-cultural phenomenon. Special emphasis on human paleontology, race biology, human prehistory and the development of culture. **Cr 3.**

ANT 102 Introduction to Anthropology II

The study of man as a bio-cultural phenomenon. Emphasis on cultural anthropology with a special consideration of the nature of culture and of such human institutions as social organization, marriage, family, religion, economics and culture change, etc. The approach is crosscultural. **Cr 3.**

ANT 210 Physical Anthropology

A lecture course which 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

Methods of archaeological research. Techniques of excavation and analysis; 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. A one-day compulsory field trip on a weekend to visit local archaeological sites. Weekly lab sessions. Lec 3, Lab 2. **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

A lecture course presenting 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 of instructor. **Cr 3.**

ANT 305 Nutritional Anthropology

Lecture course presenting the 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 of instructor. **Cr 3.**

ANT 315 Advanced Social Anthropology

The basic concepts and principles of modern social anthropology. Taught in conjunction with ANT 215 (Social Anthropology). It is designed for graduate students or advanced undergraduate students in other departments who wish to gain knowledge of social anthropology rapidly. Students in ANT 315 will be required to attend the ANT 215 lectures. In addition they will be required to attend another seminar a week. Prerequisite: By permission only. Students who have been given credit for ANT 215 will not be given credit for ANT 315. **Cr 4.**

ANT 322 Folklore of Maine and The Maritime Provinces

A survey of some of the genres of folklore as found in the major linguistic traditions (English, French, Indian) of the Northeast, with emphasis on Maine as the nexus of New England and Maritimes cultures. Special attention given to the occupational traditions of farming, fishing and lumbering. **Cr 3.**

ANT 323 Folksong

The place of music in human culture, its forms, functions, uses, methods of composition, manner of performance, esthetic theories, etc. Illustrative material chiefly drawn from Euro- and Afro-American folksongs (ballads, blues, work-songs, etc.). Emphasis on listening to and analysis of field recordings. No musical background or training required. Prerequisite: Permission of instructor. **Cr 3.**

ANT 324 Narrative

Narrative and storytelling as universals in human culture. 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 of instructor. **Cr 3.**

ANT 325 Oral History and Folklore: Fieldwork

Training and experience in collecting materials of folklore, folklife and oral history, especially through use of tape recorders. Advance preparations, interviewing techniques, processing of transcripts, and utilization of materials so gathered in writing and research. Tape and equipment provided. Prerequisite: Permission of instructor. **Cr 4.**

ANT 333 Anthropology of Art

A general survey of anthropological approaches to the aesthetic and stylistic aspects of material culture. The study of 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 of instructor. **Cr 3.**

ANT 337 Medical Anthropology

Health systems in western and non-western societies from ethnomedical and medical ecological perspectives; focus is 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 of instructor. **Cr 3.**

ANT 339 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 of instructor. **Cr 3.**

ANT 341 People and Cultures of the Pacific Islands

Overview of the Pacific, its prehistory and history. 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 and warfare. 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 of instructor. **Cr 3.**

ANT 342 Mediterranean Ethnology

Designed to consider various anthropological approaches to the Mediterranean culture area.

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 of instructor. Cr 3.

ANT 344 Maritime Ethnology

A general anthropological survey of Man's 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 of instructor. Cr 3.

ANT 350 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. Unique and common problems. Emphasis on ethnohistorical, environmental, and acculturation factors. Prerequisite: ANT 102 or ANT 215 or permission of instructor. Cr 3.

ANT 351 North American Indian Ethnology

A survey and analysis of native American peoples north of Mexico, covering 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 of instructor. Cr 3.

ANT 353 People and Cultures of Mesoamerica

Contemporary peasant societies of Mexico and Guatemala. Short history of these communities 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 of the instructor. Cr 3.

ANT 354 Cultures and Societies of the Middle East

Cultures and societies of the Middle East. Emphasis on Arab world, Turkey, Iran and Afghanistan. Religious organization, kinship, political organization, and economics. Contemporary life and the current problems in the ethnography. Prerequisite: ANT 102 or ANT 215 or permission of instructor. Cr 3.

ANT 355 Peoples and Cultures of Sub-Saharan Africa

Contemporary societies and cultures south of the Sahara. Brief overview of African history and ecology; focus on social, political, econom-

ic, 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 of instructor. Cr 3.

ANT 357 North American French Cultures and Societies

Contemporary French communities and cultures in New England, Canada, and Louisiana. Emphasis on social, political, economic, and religious institutions. Application of current anthropological perspectives on ethnicity, social stratification, pluralism, and culture change to French North America. Prerequisites: ANT 102 or ANT 215 or permission. Cr 3.

ANT 360 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. Problems of economics, social structure, and cultural organization. Prerequisite: ANT 102 or ANT 215 or permission of instructor. Cr 3.

ANT 361 Islamic Fundamentalism

A comparative survey of the distinctive ideological and social features of Islamic fundamentalist movements of the twentieth century. Comparisons with other religious revitalization movements will be considered. Prerequisite: one course in Anthropology or Sociology, or the permission of the instructor. Cr 3.

ANT 363 Systems of Kinship and Descent

A study of the basic concepts of kinship and descent in small-scale and complex societies; examination of specific systems; critical examination of the different approaches to the study of them. Emphasis on the relationship between kinship and other aspects of social structure. Prerequisite: ANT 102 or ANT 215 or permission of instructor. Cr 3.

ANT 364 Cultural Ecology

Comparative study of human populations in ecosystems. 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 of instructor. Cr 3.

ANT 365 Political Anthropology

Mechanisms and institutions for mediating disputes and allocating public power in selected

non-Western societies. Prerequisite: ANT 102 or ANT 215 or permission of the instructor.

Cr 3.

ANT 366 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 of instructor.

Cr 3.

ANT 367 Peasant Studies

Peasants, neither primitive nor modern, are the majority of humanity. Study of the similarities and differences among and between peasant societies in various parts of the world. A critical examination of the body of anthropological theory concerning peasantry. Prerequisite: ANT 102 or ANT 215 or permission of the instructor.

Cr 3.

ANT 368 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 of instructor.

Cr 3.

ANT 369 Magic, Witchcraft, and Religion

Designed to consider various anthropological approaches to religion. These include evolutionary, historical, psychological, functional, structural, and symbolic approaches. Emphasis on the appropriateness of these theories for the wide range of cross-cultural material available. Prerequisite: ANT 102 or ANT 215 or permission of instructor.

Cr 3.

ANT 370 Religion and Politics

The course will focus on the kinds of relationships that have existed between religion and politics in a wide variety of human societies, both past and present. We shall be especially concerned with 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 371 Old World Prehistory

The prehistory of man in the eastern hemisphere from the beginnings of culture through the development of agriculture and urbanism. The development and elaboration of human society

as inferred from material remains. Prerequisite: ANT 217 or permission of the instructor.

Cr 3.

ANT 372 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 of the instructor.

Cr 3.

ANT 373 Historic Archaeology

A review of methods employed in historic archaeology, covering documentary research, excavation, and analysis. Emphasis is on the archaeology of Colonial North America. No prerequisites.

Cr 3.

ANT 374 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. No prerequisites. Lec 3, Lab 2.

Cr 4.

ANT 375 Paleoenvironmental Archaeology

An introduction is provided to historical and current theoretical literature which is used to explain cultural environmental relationships in prehistoric contexts. Emphasis on outlining the kinds of environmental data that survive in the historical record, e.g. 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 377 Field Research in Archaeology

Introduction to archaeological field techniques by 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 of instructor. Summer only.

Cr 2-6.

ANT 378 Faunal Analytic Techniques in Archaeology

A laboratory course covering techniques for analyses and interpretation of osteological remains from archaeological sites. Prerequisite:

ANT 217 or permission of instructor. Rec 2, Lab 2. Cr 3.

ANT 379 Advanced Laboratory Techniques in Archaeology

A 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 380 Sociolinguistics

Relationships between language and society, emphasizing societal rules or norms that explain or constrain language behavior and functions played by language in human societies. Speech styles and dialects, languages in contact, bilingualism, and the language problems of developing nations. Prerequisite: ANT 102 or SOC 101 and INT 310 or permission of instructor. Cr 3.

ANT 381 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 310 or permission of instructor. Cr 3.

ANT 390 Topics in Anthropology

An advanced course dealing with specialized problems in anthropology; emphasis on analysis in frontier areas of anthropological research. Topics will vary and course may be repeated for credit. Prerequisite: permission of instructor. Cr 3.

ANT 391 Intercultural Understanding

A human relations workshop. The point of view of anthropology, as well as some of the other social and behavioral sciences, is brought to bear upon cultural, ethnic, racial, religious and intergroup conflict in contemporary life. Participants and other resources people will also draw upon their own background and experiences in an attempt to achieve understanding of and adjustment to such human relations problems. No prerequisites. Summer only. Cr 3.

ANT 397 Department Projects

A special project course in Anthropology initially proposed by the students to the instructor and agreed upon by both of them as to content, scheduling and number of credits. Maximum of 3 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 315 or permission of instructor. Cr 3.

ANT 570 Seminar in Northeastern North American Prehistory

The prehistory of Northeastern North America viewed from an interdisciplinary perspective. Prerequisite: ANT 372 or equivalent and permission. Cr 3.

ANT 573 Advanced Methods in Historic Archaeology

A seminar devoted to researching American lifestyles of historic periods using archaeological and historical data. Emphasis given to interpreting current UM excavations. Prerequisite: ANT 374 or ANT 377. Cr 3.

ANT 576 Models in Archaeology

A seminar designed to consider current theoretical approaches to prehistoric archaeology. Prerequisite: ANT 372 or equivalent and permission of instructor. Cr 3.

ANT 597 Advanced Topics in Anthropology

An opportunity for advanced students to study selected topics in anthropology 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.

Courses in Geography

GEO 201 Introduction to Human Geography

An introduction to the theory and practice of human geography. Principles of spatial analysis, land and resource use, regionalization, settlement and environmental perception explained in historical, economic, political and behavioral terms. No prerequisite. Cr 3.

GEO 210 Geography of Maine

A survey of the spatial relationships and characteristics of places in Maine. After a brief study of the development of Maine's landscapes, attention is focused on land use change and conflict, regional inequalities, locational decision-mak-

ing, environmental management and planning, and the personality of places. No prerequisite.

Cr 3.

GEO 214 Geography of Canada and the United States

Regional geography of Canada and the United States with an integrative approach. 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. To be offered every other year in rotation with GEO 350.

Cr 3.

GEO 215 Cultural Geography

A survey of the impact of culture on the land. After exploration of the nature of cultural geography and its global patterns, attention is focused 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 finally the urban mosaic. No prerequisite.

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 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 focusing on current problems and future potentialities.

Cr 3.

Interdisciplinary Courses

INT 310 (ANT, ENG, FOL) Introduction to the Study of Linguistics

A survey of language structure and its socio-cultural, psychological and historical aspects. It

provides the student with conceptual and technical tools for understanding the phenomenon of language. No previous training in languages or linguistics is required.

Cr 3.

INT 314 (ANT) Women in Society

An interdisciplinary analysis of women's roles from an anthropological-sociological, psychological and historical perspective. Analysis of sex role formation and maintenance in Western industrial and more traditional societies. Changes in women's roles in the 19th and 20th centuries. Prerequisite: junior standing or permission. PSY 100 recommended.

Cr 3.

INT 358 (ANT, ECO) Culture and Economic Change

The interface between cultural anthropology and economics, especially as these disciplines shed light on problems of economic change in the societies of the Third World. Prerequisite: ECO 120, ECO 121 and ANT 102 or ANT 215 or permission of instructor.

Cr 3.

INT 500 (ANT, BOT, GES, PSS) Seminar in Quaternary Studies

A multidisciplinary seminar concerned with selected areas of study, physical, biological and anthropological, related to the Quaternary Period. Subject areas will vary each semester; may be taken more than once for credit. One weekend field trip required. Prerequisite: consent of instructor. Rec 2. (Offered Spring and Fall Semesters).

Cr 2.

INT 539 (ANT, BOT, QUS) Ice Ages and Mankind

Introduction to the physical, biological, and human environments of the Quaternary Period (roughly the past 1.5 million years), with greatest 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 of instructor. Lec 3. (Offered Fall semester only).

Cr 3.

Art

Professors Lewis (Chairperson), Hartgen (Emeritus); Associate Professors Decker, De Moulpied, Ghiz, Groce, Linehan; Assistant Professor Barzman

The B.A. Degree

The Art Department, as part of the College of Arts and Sciences, 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

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, graphics, and sculpture. Elective studio work occasionally is available in photography and commercial art. 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 on the history of art. Through study of the chief artistic achievements of the human race from ancient times to the present in introductory and intermediate survey courses, the concentration develops insight into the nature of architecture, sculpture, painting, and other arts, their interconnections, and relation to their social context. Advanced courses develop a critical understanding of art, explore methodologies for its interpretation and evaluation in the historical context, and offer the exploration of special problems. Recognizing that art is essentially a visual rather than verbal experience, two studio courses are required in order to provide insight into the artist's point of view and special problems confronting the artist in the making of art. The concentration is part of

an appropriate preparation for a career in museums, galleries, art libraries, art education, journalism and other art related contexts, and for further study of art at the graduate level.

The concentration in art history consists of 30 credit hours in art history (ARH) and 6 credit hours in studio art (ART). The following courses are required:

ARH 155/156	Art Appreciation and History I and II	6
ARH 352	Materials and Methods in Art History	3
ART 101	Drawing I	3
ART 121	Basic 3-D Design	<u>3</u>
		15

Seven additional elective courses in art history (ARH)* are required, at least one of which must be at the ARH 300 level or higher. In addition, the seven courses must be selected from at least five of the following six divisions in the history of art: Classical, Medieval, Renaissance, Baroque and 18th Century, 19th Century, and 20th Century. 21

TOTAL CREDITS 36

It is also highly recommended that the major acquire intermediate level proficiency in a foreign language, preferably German or French.

*ARH 151 and 152 may not be included here among art history electives.

The B.S. Degree:

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; 27 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 18 hours of liberal arts electives.

Options in Art Education

Art education today is a field of study and practice which has expanded beyond public school art teaching. Undergraduate study in art education not only prepares a student for certification, but also for graduate work in art education or a related field such as art therapy. Some art education majors choose careers in museum education, community arts education, 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 Developmental Disabilities concentration requires 15 hours of courses in both normal and abnormal development and a three credit hour practicum at EMMC or a cooperating agency. These courses are counted as liberal arts electives.

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 27 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.

Specimen Curriculum for B.S. Degree in Art Education

Freshman 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 Appreciation and History I	3	ARH 156	Art Appreciation and History II	3
HTY 105	History of European Civilization I	3	HTY 106	History of European Civilization II	3
ENG 101	Freshman Composition	3	ENG	English Elective	3
		15			15

Sophomore Year

First Semester			Second Semester		
ART 233	Basic Painting*	3	ART 234	Basic Painting**	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		Theater or Music Course	3
ENG	English Elective	3	SPC 102	Fundamentals of Interpersonal Communication	3
		15		OR	
			SPC 103	Fundamentals of Public Communication	3
					15

*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 351	Art Theory and Criticism	3	ART 262	Modern Art	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
		15		OR	
			PSY 324	Adolescent Psychology	
					15

*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	3	SST 494	Full Day Student Teaching***	12
ART	Art Elective*	3			
	Electives (Liberal Arts)	9			
		15			

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).

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 35,000 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 Art Collection.

ART 101 Drawing I

The fundamentals of drawing: creative exercises exploring the principles of line, value, texture, space, and form. Various media and their relationship to expression and composition are also stressed. 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. Analysis of design, their relationships and organization and basic perceptual and aesthetic aspects of color. Lab 6. **Cr 3.**

ART 121 Basic 3-D Design

Study of 3-D design principles. Learning fundamentals through studio exercises in form and space utilizing basic media and techniques. 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. Studio and outdoor subjects, all media. Prerequisite: ART 131 or permission. (not open to art majors). Lab 6. **Cr 3.**

ART 201 Intermediate Drawing

Advanced study of the unique characteristics of various drawing media charcoal, conte, pencil, ink, silverpoint. Stress will be on the ability to create imaginative and expressive compositions. Prerequisite: ART 102. Lab 6. **Cr 3.**

ART 202 Figure Drawing

Creative drawing based on the human figure. Stress is 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. (Given on sufficient demand.) **Cr 3.**

ART 212 Graphic Design II

The design of booklets, catalogs, magazines, newspaper, posters etc. Exercises in lettering and layout. 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. In addition, the 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

Exploration of various painting concepts stress on composition, color technical mastery of media, and creative imagination. 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 will

be 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. Emphasis is on technical and conceptual advancement. Concentration in either intaglio or lithography (student's choice). Prerequisite: ART 241. Lab 6. **Cr 3.**

ART 281 Art Materials and Techniques

Materials, methods, and techniques for the professional artist-craftsman. 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 function, 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

Elementary techniques of filmmaking as an expressive art form. Study of the camera and its function, lighting, editing, composition, sounds, 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 321 Advanced Studio Problems in Sculpture I

Advanced, guided study, for the student who has completed introductory and secondary level courses in a 3-D media. Special problems in technique and creative production. Understanding interdependency of thought and material in artistic expression. Prerequisite: ART 221. Lab 6. **Cr 3.**

ART 333 Advanced Studio Problems in Painting

Advanced, guided study for the student who has completed introductory and secondary level courses in painting. Special problems in technique and creative production. Understanding

interdependency 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 either intaglio or lithography (student's choice) 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 academic major 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 only. Cr Ar.

Courses in Art Education

AED 171 The Teaching of Art

Current methods and materials for the teaching of art in the elementary grades. Theory and actual experience with various two- and three-dimensional art projects. Junior or senior elementary education majors only; or permission. (Not open to art education majors.) Lec 1, Lab 2. Cr 3.

AED 271 Teaching Materials for Art Education

Exploration of educational materials for use in art curricula; design and construction of art education packages; introduction to use of instructional media in art education, including cameras and tape recorders. 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

History and philosophy of art education; critical examination of goals in art education; theories of child art; introduction to curriculum development for art education; observation of art classes in schools; researching and teaching workshops to peers. Art education majors only. Lec 2, Lab 1. Cr 3.

AED 373 Curriculum and Methods in Art Education

Curriculum design for developing responsiveness to art and personal expression through studio activities; planning and teaching an after-school art program for small groups of children; evaluation of curricula, teaching, and learning for art education. 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 or 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 for credit once if a different topic is treated. Prerequisite: Art teaching experience. Cr 3.

Courses in Art History

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 Appreciation and 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 Appreciation and 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 161 Western Architecture to the Eighteenth Century
Survey of the materials, structure, function, expression, and meaning of western architecture in its various contexts, from the Egyptian pyramid and Greek temple to the Baroque palace and Rococo church. Lec 3. Cr 3.

ARH 162 Modern Architecture and Design
A broad survey of modern European and American architecture and design. Historical building systems and decorations are investigated in terms of their relationship to 20th century achievements in building and engineering. The aesthetic and social ideas of structures, spaces and design are stressed. Key monuments, schools, and major figures are focused on in slides, films and lectures. Special emphasis on urban planning and environmental design. Lec 3. Cr 3.

ARH 165 American Art I
A broad survey of painting, architecture, sculpture, graphics, and domestic arts in America from the colonial period to the 19th century. Lec 3. Cr 3.

ARH 166 American Art II
A broad survey of painting, architecture, sculpture, graphics, and domestic arts in America from the late 19th century to the present. Lec 3. Cr 3.

ARH 168 Canadian Art
Survey of Canadian art and architecture from the Indian 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 253 Early Christian and Byzantine Art
Survey of the art and architecture of the Middle Ages in their historical context from the Christianization of the Roman Empire under Constantine to the fall of Constantinople in the Eastern Mediterranean. Prerequisite: ARH 155 or permission. Lec 3. Cr 3.

ARH 254 Medieval Art in the West
Survey of the art and architecture of the Middle Ages in their historical context from the dark ages to the waning of the Middle Ages in Western Europe. 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 258 Baroque Art
Survey of the painting and sculpture in historical context of the major masters of the Baroque in Italy, Flanders, France, Spain, Germany, Holland, and England. Prerequisite: ARH 156 or permission. Lec 3. Cr 3.

ARH 260 Eighteenth Century Art
Survey of the painting, sculpture, architecture, and decorative arts of the 18th century in Western Europe, from the late Baroque and Rococo

to the emergence of Neoclassicism. Prerequisite: 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 Romanticism 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 266 Islamic Art

Survey of the arts of the Muslim world in their historical context from the Umayyads of the 7th century to the Safavids of the 17th century. The decorative arts will be considered along with Muslim architecture, painting and sculpture in Persia, the Near East, Asia Minor, Egypt, North Africa, and Spain. Prerequisite: ARH 155 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 appli-

cation 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 to be announced. It will vary from semester to semester depending on special interest of faculty member teaching it. The course may be repeated for credit if a different topic is treated. 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, and 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, and permission. Cr Ar.

ARH 496 Field Experience in Art History

Students engaged in professional activities related to their academic major area of study may apply for supervision and credit for the project. Prerequisite: Juniors and seniors only and permission. Cr Ar.

ARH 497 Independent Study in Art History

Advanced independent study or research and writing projects in the history of art and related areas. Prerequisite: Juniors and seniors only and permission. Cr Ar.

ARH 498 Directed Study in Art History

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

Chemistry

Professors Fort (Chairperson), Bentley, Dunlap, Goodfriend, Green, Patterson, Rasaiah; Associate Professors Anderegg, Jensen, Russ; Assistant Professors Amar, Carlin, Cole; Professor Emeritus Wolfhagen

The Department of Chemistry offers programs of study leading to the degree of Bachelor of Arts in Chemistry in the College of Arts and

Sciences and to the degree of Bachelor of Science in Chemistry in the College of Engineering and Science.

Because a knowledge of chemistry is fundamental to successful work in so many fields, the chemistry curriculum affords an unusual opportunity for a wide choice of electives so the chemistry major may adapt his or her program to individual interests and goals.

The chemistry major must take a minimum of 40 credit hours of chemistry courses: CHY 111/112 or CHY 113/114; CHY 242; CHY 251/252; CHY 253; CHY 371/372; CHY 373; CHY 461; either CHY 443, or CHY 254 and CHY 374; and CHY 393 three times. Additional requirements are: Twelve credit hours of mathematics (MAT 126, MAT 127, and MAT 228); eight credit hours of physics (PHY 111/112 or PHY 121/122); a college composition course (ENG 101 or equivalent); a course in computer programming (COS 215, GEE 207, or GEE 118); and at least one year of study of a major foreign language designated by the department. French, German, or Russian is strongly recommended if the student plans to enter graduate school. A speech communications course (SPC 103) and at least one course in literature (ENG 122 or ENG 123) shall be included in the College of Arts and Sciences General Area Requirements.

In addition to the 27 credit hours of social sciences and humanities electives required by the college, the chemistry major has up to 22 credit hours of additional electives while remaining within the normal 16 credit hours per

semester load. The proper choice of electives will enable the student to enter related fields of industrial management, technical sales and service, teaching, or may qualify him or her for medical school or graduate work in chemistry, or in an interdisciplinary field such as biochemistry, chemical engineering, oceanography, geology, or chemical physics. The prospective chemistry major should discuss his or her educational goals with Departmental advisors as early as possible. For example, chemistry majors who are planning to enter medical school should plan to take ZOL 204, Animal Biology, during the first year.

Course descriptions are listed under the College of Engineering and Science. Chemistry courses offered during the summer are listed in the Summer Session Catalog. Course descriptions for biochemistry courses are listed under the College of Life Sciences and Agriculture.

The specimen curriculum listed below is a suggested one, and indicates the minimum requirements for certification to the Committee on Professional Training of the American Chemical Society.

Specimen Curriculum

Freshman Year

Fall Semester			Spring Semester		
CHY 113	Chemical Principles I OR	4	CHY 114	Chemical Principles II OR	4
CHY 111	General Chemistry I	(4)	CHY 112	General Chemistry II	(4)
MAT 126	Analytic Geometry and Calculus	4	MAT 127	Analytic Geometry and Calculus	4
PHY 121	General Physics I OR	4	PHY 122	General Physics II OR	4
PHY 111	General Physics I	(4)	PHY 112	General Physics II	(4)
ENG 101	College Composition	3	SPC 103	Fundamentals of Public Communication	3
		15			15

Sophomore Year

First Semester			Second Semester		
CHY 242	Principles of Quantitative Analysis	4	CHY 252	Organic Chemistry	3
CHY 251	Organic Chemistry	3	CHY 254	Organic Chemistry Labo- ratory	2
CHY 253	Organic Chemistry Labo- ratory	2	CHY 393	Undergrad Seminar	1
MAT 228	Analytic Geometry and Calculus	4	MAT 259	Differential Equations	4
	Elective	3	COS 215	Computer Programming*	3
		16		Elective	3
					16

*GEE 118 or GEE 207 may be substituted for COS 215

Junior Year

First Semester			Second Semester		
CHY 371	Physical Chemistry	4	CHY 372	Physical Chemistry	4
CHY 373	Physical Chemistry Laboratory	2	CHY 374	Physical Chemistry Laboratory	2
CHY 385	Chemical Literature	2	CHY 393	Undergrad Seminar	1
GER 101	Elementary German**	4	CHY 453	Intermediate Organic Chemistry Laboratory	3
	Electives	3-6	GER 102	Elementary German**	4
		15-18	ENG 123	Introduction to Fiction	3
					17

Senior Year

First Semester			Second Semester		
CHY 461	Advanced Inorganic Chemistry	3	CHY 443	Instrumental Analysis	4
GER 203	Intermediate German**	3	GER 207	Scientific German**	3
	Electives	9-12	CHY 393	Undergrad Seminar	1
		15-18		Electives	8-11
					16-19

**Not required for certification, but strongly recommended.

Computer Science

Professors Markowsky (Chairperson), Gemignani, Haggard, Northam; Associate Professors Byther, Dube, Ferguson; Assistant Professors Kopec, Latour, Ramer; Instructor Shea

The computer science major is designed to prepare students to be effective computer professionals. Students must complete course work in computer science and a concentration area. Concentration areas are business, 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 are required, including COS 220 with a grade of "C" or better, COS 250, COS 300 with a grade of "C" or better, COS 301, COS 310 OR COS 315, COS 330, COS 331, and COS 450. Furthermore, at least 12 additional hours of COS courses numbered 398 or above are required.

At least 18 hours of courses numbered 300 or above must be taken at Orono. (COS 300 and COS 330 do not count toward these 18 hours.) All courses taken elsewhere for the degree must be approved in advance by the department.

Concentrations

A business concentration student must take:
BUA 201, ECO 120/121, BUA 325, BUA 337, BUA 350, BUA 370, ECO 373

and at least two of the following:
BUA 305, BUA 326, BUA 353, BUA 378, BUA 384, ECO 375

An economics concentration student must take:
ECO 120/121, BUA 201, ECO 332, BUA 350, ECO 373, ECO 385

and at least four of the following:
ECO 333, ECO 337, ECO 338, ECO 339, ECO 344, ECO 353, ECO 370, ECO 371, ECO 375, ECO 380

An electrical engineering concentration student must take:

PHY 121/122, MAT 126/127, MAT 228, ELE 171, ELE 172, ELE 210, ELE 224, ELE 471

and either:

ELE 475 or another ELE course in microcomputer application engineering

A mathematics concentration student must take: MAT 126/127, MAT 228, MAT 262, MAT 334

and at least four courses from three different categories:

Differential Equations:

MAT 259, MAT 353 OR MAT 359 (one only), MAT 354;

Statistics:

MAT 337 or MAT 439 (one only), MAT 338, MAT 435;

Operations Research:

MAT 355, MAT 356;

Numerical Analysis:

MAT 387;

Simulation:

MAT 357, MAT 358;

Pure Mathematics:

MAT 425, MAT 463;

Discrete Mathematics:

MAT 381, MAT 388.

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 334.

Master of Science Degree Program

The Department offers a Master of Science degree. For details see the graduate catalog.

Courses in Computer Science

COS 100 Introduction to Personal Computers

This covers the basics of using a personal computer, and the concepts behind its operation. Topics covered include: types, care and maintenance of equipment; types of programs; introduction to DOS (disk operating systems); programming using BASIC; word processing using a particular word processor; use of a spreadsheet using a particular spreadsheet. A goal of this course is to prepare students sufficiently well so they can operate a personal computer with a minimum of outside help. **Cr 2**

COS 198 Topics in Computer Science

Topics in computer science at the survey or introductory level not regularly covered in other courses. Content is not fixed, but can be varied

to suit current needs. The course may, with permission, be taken more than once. Prerequisite: permission. **Cr 1-3**

COS 210 Introduction to Computing Using COBOL

Programming logic and techniques using COBOL. Introductory hardware concepts are covered as needed. A service course. Students are assigned programs from various areas of application and these programs are run on the University's computer. **Cr 3**

COS 211 Principles of Data Processing

Basic concepts in data processing are presented using a microcomputer database system and a mainframe statistical analysis system. A service course. Students are assigned programs from various areas of application and these programs are run using facilities at the University. **Cr 3**

COS 215 Introduction to Computing Using FORTRAN

Programming logic and techniques using FORTRAN. Introductory hardware concepts are covered as needed. A service course. Students are assigned programs from various areas of application and these programs are run on the University's computer. **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. These programs are run on the University's computer. **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. The topics will be presented in a framework useful for further study in computer science. Prerequisites: MAT 114 or MAT 127. Corequisite: COS 300. **Cr 3**

COS 298 Topics in Computer Science

Topics in computer science at the survey or introductory level not regularly covered in other courses. The content is not fixed, but can be varied to suit current needs. The course may, with permission, be taken more than once. Prerequisite: permission. **Cr 1-3**

COS 300 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 301 Programming Languages

Formal description of programming languages including specification of syntax and semantics. Discussion of infix, prefix, and postfix notation with translation techniques. Topics include branching, grouping of statements, storage allocation, list and string processing, relation of language design to efficiency. Prerequisite: COS 250 and COS 300 or equivalent. 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 301. (Credit will not be given for both COS 310 and COS 315). Cr 4

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 in this course will use the FORTRAN language. Prerequisite: COS 301. (Credit will not be given for both COS 310 and COS 315). Cr 4

COS 330 Computer Architecture and Assembly Language

Introduction to concepts of modern computers, instruction formats, addressing techniques. 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 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 300, COS 330 or permission. Cr 3

COS 398 Topics in Computer Science

Topics not regularly covered in other courses. Content is not fixed, but can be varied to suit current needs. May be taken more than once. Prerequisite: permission. Cr 1-3

COS 401 Introduction to Compiler Construction

This covers the basic concepts of programming language translation, compiler design and construction. Topics include the compilation process; language definition; lexical analysis; syntax analysis and error detection and error recovery; grammars; compiler design issues; symbol tables; storage allocation, code generation and machine-independent code improvement. Programming projects to illustrate the various concepts are used. Prerequisites: COS 301 and COS 450. Cr 3

COS 410 Computing Management

Introduces and correlates the diverse executive and administrative techniques which are used in making managerial decisions in a computing environment. Prerequisite: COS 310. Cr 3

COS 440 Computer Networks

This course covers data and computer communications using ISO model as a basis of presentation. Discussion of physical media, communication protocols, and network architectures including wide area and local area networks. Examples of networks currently in use are included. Prerequisite: COS 331. Cr 3

COS 450 Data Structures

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 460 Interactive Computer Graphics

Topics include graphic I/O devices; plotter, CRT, light pen, etc.; 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 220 or equivalent. 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

This course will survey a number of the fundamental areas of research in and techniques employed in Artificial Intelligence. Some of the former include knowledge representation, vision, planning, logic, learning, expert systems, and natural language comprehension. Examples of

techniques covered will include predicate calculus, backtracking, tree searching, and semantic networks amongst others. A segment of the course will cover LISP, a principle Artificial Intelligence programming language. Prerequisites: COS 250 and COS 450 or by approval.

Cr 3

COS 480 Database Management Systems

Provides the knowledge necessary to understand and use existing DBMS technology. The data model approach will be followed, with heavy emphasis on the relational model. Topics will include DBMS architecture and underlying file organization, integrity, relational algebra and calculus, query optimization, and normalization. Students will design and manipulate a system using an existing DBMS. Prerequisite: COS 450.

Cr 3

COS 495 Field Experience

A pre-planned work experience of ten to twelve weeks in a commercial environment, with faculty supervision. This is 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 is not fixed, but can be varied to suit current needs. May be taken more than once. Prerequisite: permission.

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. Prerequisite: permission only.

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 450 and COS 331.

Cr 3

COS 521 Software Engineering II

Continuation of COS 520, focusing on highly concurrent systems. Topics include: architectures of concurrent subsystems, control flow vs. data flow design strategies, and layered systems. Prerequisite: COS 520.

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 Theoretical Computer Science II

Continuation of COS 550. Prerequisite: COS 550.

Cr 3

COS 554 Algorithms

Important algorithms and their application to solving problems. Prerequisite: COS 450.

Cr 3

COS 560 Advanced Graphics-Light and Color

Theories of light and color and their application in computer graphics. Topics include diffuse reflection, specular reflection, refraction, shading models and algorithms, halftoning, color perception, physical theories of color, and color models. Emphasis on three dimensional images. Prerequisite: COS 461 or permission.

Cr 3

COS 570 Advanced Artificial Intelligence

Advanced natural language parsing, natural language comprehension, memory organization, expert systems, and Prolog. Detailed study of MYCIN, DENTRAL, ALIX, AQ/11 plus other successful and noteworthy expert systems. Prerequisites: COS 470 or equivalent.

Cr 3

COS 580 Advanced Database Management Systems

Issues paralleling, but largely independent of the choice of data model, including recovery, integrity, concurrency control, security, distributed DBMSs, and database machines. The relationship between first order logic and the relational model. Case studies of distributed DBMSs. Prerequisite: COS 480 or equivalent.

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

Interdisciplinary Course**INT 405 (COS) Computers and Society**

Consideration of the human and social consequences of the technological development and application of computers as viewed from the standpoints of the computer customer, the computer specialist, and the public. Prerequisite: junior standing.

Cr 3

Economics

Professors Duchesneau (Chairperson), Burke, Clark, Coupe (Director, Balanced Growth Project), Devino (Dean, College of Business Administration), Huq, Lutz, Wilson; Associate Professors Townsend, Wihry; Assistant Professors Breece, Hill, Isenberg; Lecturer Wheaton

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 Arts and 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, or the equivalent with Department permission. The equivalent is defined as ECO 110, Introduction to Economics and either ECO 120 or ECO 121. Students taking ECO 120 and ECO 121 may not receive credit for ECO 110.
 - ECO 332 Intermediate Macroeconomics
 - ECO 373 Intermediate Microeconomics
- ECO 332 and ECO 373 should be taken early in the student program of study.
- B. Twenty-one additional credit hours of courses in economics. ECO 335, 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 113, Mathematics for Business and Economics I, 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 334, 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. Introductory courses are designed to respond to several needs. ECO 110, Introduction to Economics, 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 Arts and Sciences and complete the following requirements:

A. Economics Courses

ECO 120, Principles of Microeconomics, and ECO 121, Principles of Macroeconomics, or the equivalent; ECO 332, Intermediate Macroeconomics; ECO 373, Intermediate Microeconomics; ECO 337, Comparative Economic Systems; ECO 338, Economic Development; ECO 339, 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

Introductory

ECO 110 Introduction to Economics

Analysis of the fundamental characteristics and institutions of modern economic society. Problems analyzed include: inflation, unemployment, poverty, resource allocation, international economic interrelationships, economic growth and development. **Cr 3.**

ECO 120 Principles of Microeconomics

Principles of microeconomics and their application to economic issues and problems. Analysis of the economic decision-making of individuals and firms; markets and pricing; monopoly power; income distribution; the role of government intervention in markets. **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, unemploy-

ment, and growth; and international aspects of macroeconomic performance. **Cr 3.**

Economic Theory

ECO 332 Intermediate Macroeconomics

Analysis of the basic forces that cause fluctuations in economic activity. The effects on employment, investment, and business firms. Stabilization proposals examined and evaluated. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission of department. **Cr 3.**

ECO 335 History of Economic Thought

Survey of the development 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 of department. **Cr 3.**

ECO 373 Intermediate Microeconomics

The theory of consumer behavior, markets, the firm, and distribution. Prerequisite: ECO 120 and ECO 121, or equivalent with permission of department. **Cr 3.**

Contemporary Perspectives in Economics

ECO 320 Humanistic Economics

Introduction to the history and nature of humanistic economics. Interrelationships between economic institutions and basic human need satisfaction. Analysis of concepts such as economic justice and economic freedom. Comparison of humanistic economics with neoclassical economics and Marxian political economy. Prerequisite: ECO 373. **Cr 3.**

ECO 328 Foundations of Economic Science and Method

Contemporary and historical aspects concerning the nature of economics as a science. Positive economics is compared with more traditional theories of knowledge and science. The scientific nature of the Marginal and Keynesian Revolutions. Economics and positive economics reviewed in light of recent developments in science and philosophy of science. Prerequisite: ECO 373 or ECO 335. **Cr 3.**

ECO 331 Contemporary Alternatives in Political Economy

Development and critique of alternative contemporary theories of political economy. Alter-

native political economic paradigms, including, among others, the Chicago School, the Cambridge School, Neo-Marxian Economics and Radical Political Economy. Prerequisite: ECO 373. Cr 3.

ECO 336 Marxian Economics

Introduction to scientific socialism. A dynamic macro-analytical critique of the functioning of a capitalist society. Theoretical 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 of department. Cr 3.

Economic Policy

ECO 333 Labor Markets and Human Resource Development

Labor and manpower in the American economy: 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 373. Cr 3.

ECO 334 Economics of Labor Unions

Labor in an industrial society: 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 373. Cr 3.

ECO 344 Urban Economics

Patterns and processes of growth and structural change within urban areas. The nature and causes of the contemporary crises of urbanized society as reflected in poverty, slum housing, and crime, urban sprawl, traffic congestion, and the pollution of air, soil, and water. Application of tools of economic analysis to public issues such as urban renewal, environmental control, urban housing, urban transportation, financing of urban public services and so on. Prerequisite: ECO 373. Cr 3.

ECO 345 Regional Economics

Analysis of a region (country, state, county, city, etc.) as an economic unit. The economics of location, agglomeration, and interregional trade. Empirical tools such as cost benefit analysis, base studies, input-output tables, and regional accounts. Prerequisite: ECO 120 and ECO 121, or the equivalent with permission of department. Cr 3.

ECO 353 Money and Banking

The American banking and financial system: monetary theory and policy and a detailed study of selected subjects in money and banking. Prerequisite: ECO 120 and ECO 121, or the equivalent with permission of department. Cr 3.

ECO 367 Health Care Economics

Economic analysis of the health care industry. 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 markets that comprise 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 the equivalent with permission of department. Cr 3.

ECO 368 Antitrust, Regulation, and Consumer Protection

Examination of the institutions and economic issues related to public utility regulation, antitrust laws, and consumer protection laws in the United States. Prerequisite: ECO 120 and ECO 121, or the equivalent with permission of department. Cr 3.

ECO 371 Public Finance and Fiscal Policy

Public expenditure theory; principles of taxation; the federal budget and alternative budget policies; federal tax policy; fiscal policy for stabilization; federal debt. Prerequisite: ECO 373. Cr 3.

ECO 372 State and Local Government Finance

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 the equivalent with permission of department. Cr 3.

ECO 375 Industrial Organization

Relationship between market structure, conduct and performance. Development of a general analytical framework to permit an assessment of performance in existing markets. Current public policy in this area evaluated in the framework of the above analysis. Prerequisite: ECO 373. Cr 3.

ECO 376 Economics of Technological Change

The manner in which new products and processes are created and adopted and their impact on the United States economy. 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 the equivalent with permission of department.

Cr 3.

Interdisciplinary Course**INT 360 (ECO, ZOL) Economics and Biology of Marine Fisheries Management**

Introduces students to 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 373, ZOL 204 or permission of instructor.

Cr 3.

International Economic Affairs**ECO 313 The Economics of Southeast Asia**

Survey of the current economic situation in the region and the economic systems in which these results are obtained. Countries included are Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission of department.

Cr 3.

ECO 337 Comparative Economic Systems

Examination, evaluation and comparison of socio-economic structures and operating principles of the major contemporary economic systems. Special emphasis given to 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. This course meets Area 1 Social Science at the upper level.

Cr 3.

ECO 338 Economic Development

Theories and practices of interregional and international economic development. Development problems of emerging nations. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission of department.

Cr 3.

ECO 339 International Trade and Commercial Policy

Principles and practices of international trade and finance. Current trends in the international economy and United States commercial policy. Prerequisite: ECO 332 or ECO 373.

Cr 3.

ECO 340 Canadian Economics: Issues and Policies

Survey of the structure and functioning of the Canadian economic system, its problems and the policies used to solve them. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission of department.

Cr 3.

Interdisciplinary Course**INT 358 (ANT, ECO) Culture and Economic Change**

The interface between cultural anthropology and economics, especially as these disciplines shed light on problems of economic change in the societies of the Third World. Prerequisite: ECO 120, ECO 121 and ANT 102 or ANT 215 or permission of instructor.

Cr 3.

Topics and Applications**ECO 370 Topics in Economics**

Readings, research, and discussions relating to selected topics in economics. Topics will vary depending on faculty and student interests. Prerequisite: ECO 120 and ECO 121 and permission of instructor.

Cr 1-3.

ECO 396 Field Experience in Economics

Supervised employment with relevance to the study of economics in either the public or private sector. Supervision by instructor of student's choosing. Requirements include initial proposal showing relevance of job to economics and final report or paper. Prerequisite: 300-level economics course in relevant area of work.

Cr 3.

ECO 399 Readings in Economics

Supervised readings or research in economics. Course intended to supplement regular course offerings when outstanding students request closely supervised individual readings or research. Subject matter cannot normally duplicate that of a course regularly offered by the department. Junior or senior standing required. Prerequisite: ECO 120 and ECO 121 and permission of instructor.

Cr 3.

Analytical Tools**ECO 380 Introduction to Mathematical Economics**

Mathematics used as a language in presenting concepts of economic theory. Prerequisite: ECO 332, ECO 373, MAT 114 or MAT 126.

Cr 3.

ECO 385 Introduction to Economic Statistics and Econometrics

Surveys the application of probability and statistics to economic problems. Emphasizes the 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 332 or ECO 373, MAT 215. **Cr 3.**

Graduate Courses**ECO 510 Microeconomic Theory**

An examination of the development of modern economic analysis with regard to the consumer, the firm and market structures. Prerequisite: permission. **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 529 Readings in Economics

Specialized topics in economics can be pursued by the student on an independent basis. Prerequisite: permission. **Cr 3.**

ECO 533 Economics of Human Capital

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 510 or equivalent or 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 will be followed by selected applications to currently significant policy issues including such issues as: income maintenance, health, education and training, housing and transportation. Specific policy areas to be treated will vary from year to year. Prerequisite: permission. **Cr 3.**

ECO 560 Seminar in Common Property Economics

A market economy of the sort found in the United States depends upon scarce resources being the object of private ownership. When resources are not owned, or are common property, a market economic system also automatically leads to the degradation and depletion of those resources. Consequently, common property gives rise to many difficult and important questions of public policy. This course will address these problems as they occur in the management of fisheries and other common property 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. The seminar emphasizes applied research with appropriate analysis of issues along with regular oral and written reports of the results. Prerequisite: permission. **Cr 3.**

ECO 570 Alternative Approaches to Economic Theory and Policy

This course will focus on developments in economics applied and theoretical other than what is usually covered within the framework of neo-classical economics. Alternative contemporary economic theories and their policy implications will be discussed and compared. In the process, the seminar will focus primarily on such policy related issues as: the market and planning; economic welfare; growth and development; alternative incentive structures and the distribution of income and wealth; wage-price controls. Prerequisite: permission. **Cr 3.**

Interdisciplinary Course**INT 530 (ARE, ECO) Econometrics**

An introduction to economic concepts and relationships expressed in quantitative terms. Problems of ordinary least squares, generalized least squares, estimation and use of multiequation models and forecasting. Prerequisite: ECO 385 or permission. **Cr 3.**

English

Professor Hatlen (Chairperson); Associate Professor Burnes (Director of Graduate Studies); Associate Professor Nees-Hatlen (Director of College Composition); Professors Bennett, Urbanski; Associate Professors Bauschatz, Brinkley, Brogunier, Brucher, Donovan, Evans, Kail, MacKnight, Wicks, J. Wilson; Assistant Professors Andersen, Cowan, Everman, Ford, Jacobs, Mooney, Norris, Rogers, Vaughan, Young, Youra; Instructors Callaway, Hakola, M. Wilson; Lecturer Hunting; Cooperating Lecturer Whelan

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 are outlined below:

Regular Major

1. Writing courses (exclusive of ENG 101) including ENG 301 (for regular majors only)	6
2. Introduction to the Study of Literature (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 at the 400-level or above (exclusive of writing courses)	18
5. At least three additional hours	3
TOTALCREDITS	36

Concentration in Writing

1. Writing courses (exclusive of ENG 101) (see item 4 under additional requirements)	12
2. Introduction to the Study of Literature (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 at the 400-level or above (exclusive of writing courses)	15
TOTALCREDITS	36

Additional Requirements and Considerations:

1. The major requires a minimum of 36 hours in English. Students may, however, take up to 48 hours of ENG courses.
2. The major requires proficiency in a foreign language at the intermediate level. Normally, "intermediate proficiency" means the equivalent of four semesters of college work.
3. Courses in language and linguistics with INT designation may count as ENG courses.
4. Majors in the Concentration in Writing may chose a creative writing track, a technical writing track, or an expository writing track. Creative writing students should take either ENG 205 or 206, ENG 307 or 308, ENG 405 and at least three additional credits of writing. Technical writing students should take ENG 317, 417, and 496, plus at least three additional credits of writing. Expository writing students should take ENG 212, 301, and 405, plus at least three additional credits of writing. Because ENG 405 may be repeated for credit, many students take a second semester of this course to fulfill the requirement for three additional credits of writing.
5. Majors in the creative writing track submit a full-length manuscript as part of their graduation requirements.

A typical four-year program in English

Freshman Year

Regular Major

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 Freshmen.

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 Freshmen.

Sophomore Year

Regular Major

1. The year-long survey: ENG 231 and ENG 232, or ENG 251 and ENG 252, or ENG 241 and ENG 242.
2. ENG 220 either fall or spring semester.
3. ENG 212 (Intermediate Composition).

Concentration in Writing

1. The year-long survey: ENG 231 and ENG 232, or ENG 251 and ENG 252, or ENG 241 and ENG 242.
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

Three to four 400-level English courses.

Concentration in Writing

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 (for students in the Expository Writing track).
2. Two to three 400-level English courses, exclusive of writing courses.

Senior Year

Regular Major

1. Three to four 400-level English courses.
2. ENG 301 (Advanced Composition).

Concentration in Writing

1. ENG 405 (at least one semester); ENG 496 (for students in Technical Writing track).
2. Two to three 400-level English courses, exclusive of writing courses.

Graduate Study

The Department of English offers the Master of Arts degree in English. Candidates for this degree may choose a concentration in composition, a concentration in creative writing, or a literature concentration. Creative writing students must take 9 hours of course work in writing courses and 15 hours of course work in literature, and must complete a creative thesis. Students in the literature concentration may choose either a thesis program of 30 hours (24 in course work and six of thesis,) or a non-thesis program

of not less than 30 hours of course work. 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 is required for all students registering in ENG 101, College Com-

position. All entering freshmen should test during New Student Orientation. Students whose test results indicate readiness for ENG 101 should register for a division of ENG 101 in the appropriate semester. Some students may earn credit-by-examination for ENG 101 through the test and will be so informed by their academic advisors at registration. 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 3 semester credit hours.

Courses in English

ENG 001 Writing Workshop

The Writing Workshop is a course for students who need to develop and to practice the basic writing habits necessary for successful University-level writing. The course is taught largely on an individual basis in the English department's writing center. Students will be selected on the basis of their English Achievement scores and a written diagnostic essay, or on the recommendation of faculty members. See the paragraph "Placement in Writing Courses" above. Successful completion of the course will qualify the students for enrollment in ENG 101, 3 semester credit hours (do not count towards graduation). (Pass/Fail Grade Only). **Cr 3.**

ENG 101 College Composition

An introductory course in college writing in which students practice the ways in which writing serves to expand, clarify, and order experience and knowledge. Particular attention is given to analytic and persuasive writing. Satisfactory completion of the course depends upon quality of weekly writing assignments as well as passage of a proficiency examination in college-level writing. See the paragraph "Placement in Writing Courses" above. **Cr 3.**

ENG 102 College Composition, Advanced

An honors course in college writing in which students learn through practice the principles of analytic and persuasive writing. Entrance by placement essay only: See the paragraph "Placement in Writing Courses" above. This course may be taken instead of ENG 101. **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 such traditional modes as poetry and fiction as well as such contemporary ones as advertising, film, and the political essay and by frequent writing of imitations and analyses of modes studied. ENG 120 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 freshmen; no senior Arts and Science English majors; ENG 101 is strongly recommended, though not a prerequisite. **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 freshmen; no Arts and Science Senior English majors; ENG 101 is strongly recommended, though not a prerequisite. **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 freshmen; no Arts and Science senior English majors; ENG 101 is strongly recommended, though not a prerequisite. **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 102. **Cr 3.**

ENG 129 Freshman Seminar in English

An intensive study of texts that have been selected to focus on a common theme. Specific topics will vary from semester to semester. Special attention will be given to strategies for reading and writing about literary works. Prerequisites: Freshmen Only. Exemption from ENG 101 (College Composition) or permission of the instructor. (Area II, Writing Intensive). **Cr 3.**

ENG 205 An Introduction to Creative Writing

An introductory course in creative writing, offering 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

A course in the writing of descriptive and narrative prose with special emphasis on the informal, autobiographical essay. Prerequisite: ENG 101 or equivalent. Cr 3.

ENG 212 Intermediate Composition

An intermediate course in composition 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. Ordinarily students will be encouraged to 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

Topics are announced well in advance when the course is to be offered. Recent topics have included: science fiction, utopian fiction, literature and the law and literature of the third world and literature of the Vietnam war. Prerequisite: 3 hours of literature or permission. 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

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 literature. Some attention also to the history of the 20th century and to the music, visual arts, social thought, and science of the contemporary epoch. Prerequisite: ENG 101 is strongly recommended. Cr 3.

ENG 236 Canadian Literature

An examination of the development of Canadian literature from 1850 to the present. Interpre-

tation 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 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 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 300 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 will cover the primary books of the Old Testament; the second half of the semester will focus on the New Testament. Students will read most of the New and about two-thirds of the Old Testament. 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. Students working on manuscripts are welcome, but prior commitment to a project is not a requirement. Required of English majors. Prerequisites: ENG 101 and ENG 212 or permission of instructor. 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 of instructor. 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 of instructor. Cr 3.

ENG 317 Advanced Professional Exposition

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. Not recommended for graduate credit. Cr 3.

ENG 395 English Internship

An advanced course in writing and in tutoring writing. Students first experience collaborative work in essay writing, critical reading of peers' essays, and rigorous practice in written and oral criticism. The second phase of the course involves 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 317), a recommendation from a UMO faculty member, and submission of a writing sample. Not recommended for graduate credit.

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 9 credit hours.

Cr 3.

ENG 417 Technical Writing and Editing

Offers students advanced experience applying the principles of editing and writing such documents as instruction manuals, brochures, proposals, for analyzing, revising, and editing samples of student and professional writing, with special emphasis on style, organization, graphics, and formats. Written work includes editing exercises, group writing projects, and an independent project that defines and solves a communication problem faced by an on-or off-campus organization. Prerequisites: 6 credits in writing beyond ENG 101 (including ENG 317) and permission of instructor. Cr 3.

ENG 429 Topics in Literature

Topics are announced well in advance when the course is offered. Recent topics have included Virginia Woolf and the Bloomsbury Group, Tolkien and Modern Fantasy, and Women's Literature. Prerequisite: 6 hours of literature or permission. Cr 3.

ENG 430 Studies 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. The specific topic will vary 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 transnation-

al 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

This course enables the student to study in depth some major American writer or writers, from the 18th century to the present, during a semester. Depending on the professor and the semester offered, the class will study from one to three major American novelists, poets, or dramatists for their achievements in and contributions to literature. 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, with particular focus on *The Canterbury Tales*. Additional readings from other works, such as Medieval lyrics and romances, among others. Focus on understanding the nature of the Medieval world and how it is expressed in the literature of the time. Additional focus 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 legitimization 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

This course offers in-depth study of major British authors. Depending on the semester and the professor, the class will study from one to three major poets, novelists, or dramatists. May be repeated for credit when the authors differ. Prerequisite: 6 hours of literature or permission.

Cr 3.

ENG 470 Literary Criticism

Selected readings in literary theory and criticism from Aristotle to the present. Prerequisite: 6 hours of literature or permission. (This course is identical with FOL 473.)

Cr 3.

ENG 472 The Teaching of English in the Secondary School

Principles and practices in the teaching of literature, language, and composition, with exercises in theme correction. Prerequisite: 15 hours of literature. INT 310 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 310 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 310 or equivalent.

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. 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 529 Studies in Literature

This course, like ENG 229 and ENG 429, is 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, 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 551 Medieval English Literature

The major works of the Medieval period, with emphasis on such masterpieces as *Beowulf*, *Sir Gawain and the Green Knight*, *Piers Plowman*, and Chaucer's *Troilus and Criseyde*.

Cr 3.

ENG 553 Shakespeare and His Contemporaries

Selected dramatic and lyric works by Shakespeare and works by other authors of his times, studied collaterally. The topic varies whenever the course is offered.

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

The course invites the student to investigate unique features of 18th-century literature: e.g., prose satire, the gothic novel, domestic tragedy, the biography, periodical literature, etc. The topic varies each time the course is given. **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 course in the form and function of written language, including recent developments in linguistic, psycholinguistic, and rhetorical theory. (This course is identical with SPC 579). **Cr 3.**

Interdisciplinary Course

INT 310 (ANT, ENG, FOL) Introduction to the Study of Linguistics

A survey of language structure and its socio-cultural, psychological and historical aspects. It provides the student with 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

Professor Small, (Chairperson); Professors Delphendahl, Rioux, Roggenbauer; Associate Professors Bauschatz, L. Luszczynska, R. Luszczynski, March, Troiano, Zollitsch; Assistant Professors Brimmer, DelVecchio, Hall, Nielson, Pelletier, Pyles, Sears, Slott; Lecturer Herlan.

Several departments of the College of Arts and Sciences have special language requirements or recommendations.

Several departments of the College of Arts and Sciences require successful completion of six credit hours of a foreign language proficiency at the intermediate level. Listed below are the departments and their foreign language requirements or recommendations:

Anthropology: Intermediate language proficiency strongly recommended.

Art: Intermediate level French or German is strongly recommended for students contemplating graduate study 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: Proficiency at the intermediate level.

Mathematics: The intermediate level of a foreign language is strongly recommended.

Music: B.A. Music—One year of a foreign language which can be either the continuation of a language taken in high school or a new language. B.M. Performance—One year of study in either French, German or Italian, or pass a proficiency examination at the intermediate level in one of these languages.

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 and 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, students may elect to fulfill one or more of the college's distribution require-

ments 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 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. All incoming Arts and Sciences freshmen *must* take the Language Placement Examination.

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 580 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. *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	550-670	680 and above
German	560-670	680 and above
Latin	560-670	680 and above
Russian	560-690	700 and above
Spanish	550-710	720 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 NO CREDIT, followed by the intermediate course for credit.

Alternatively, he or she may elect to start a new language for credit.

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.

B. 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 310 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 425/426 (History of Germany) is highly recommended.

Spanish: 18 hours of 400 level Spanish courses, HTY 105/106 (History of European Civilization) or HTY 447/448 (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 the subject matter field 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 Arts and Sciences, including other languages and courses in translation offered by the Department. Students intending to pursue Classical Studies 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 322, 357, 380, GEO 350

History: HTY 458, 459, 460, 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 310 Introduction to Linguistics
2. Language Structure
FOL 453 Phonology
ENG 477 Modern Grammar
3. Language in Context
ANT 380 Socio linguistics
ANT 381 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
- GER 403 History of German Language
- FRE 500 History of French Language
- FRE 420 French Phonetics
- FRE 520 French Linguistics
- COS 220 Introduction to Computer Science I
- COS 300 Introduction to Computer Science II
- COS 301 Programming Languages
- MAT 241 Mathematical Logic
- PHI 260 Philosophy of Language
- PHI 450/451 Logic I and II
- SPC 484 Introduction to Speech Science

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 College of Arts and Sciences-Humanities and Fine and Visual 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 college distribution requirements.

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

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. Eighteen hours, including the introductory course, in a second subject commonly taught in high schools
2. An advanced grammar course (FRE 400, GER 400, SPA 400, RUS 467)
3. A civilization course (FRE 457, GER 402, SPA 457/458)
4. FOL 466 The Teaching of Foreign Languages
5. EDB 202, EDB 203, EDB 204, STT 491 (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.

Study Abroad

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 freshmen (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 Quebec, 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 Quebec, 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 sought through attendance at Summer Session.

Courses in Foreign Languages

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 students from Arts and Sciences and will serve as electives for any other students.

Courses in Foreign Languages: English**CLA 101 Greek Literature in English Translation**

A survey of Greek literature. No knowledge of Greek is necessary. No prerequisite required for this course. **Cr 3.**

CLA 102 Latin Literature in English Translation.

A survey of Latin literature. No knowledge of Latin is necessary. No prerequisite required for this course. **Cr 3.**

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

The purpose of this course designation is to permit the granting of foreign language credit for courses taken abroad for which there is no exact University of Maine catalog equivalent. May be repeated for credit. **Cr 1-6.**

FOL 410 Contemporary French Novel

Existentialism of the New Novel; selected works in English translation of leading contemporary French novelists. (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 in English translation of the political, social, and philosophical writings of Montesquieu, Voltaire, Diderot, Rousseau, and other French writers of the 18th century. May be elected by juniors, seniors, and sophomores with permission. (This course 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 the 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 Studies 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

Principles and practice of teaching foreign languages. 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 audio-visual devices, including closed-circuit television, and other modern media of instruction and demonstration. For students seeking certification in foreign language teaching. **Cr 3.**

FOL 473 Literary Criticism

Selected readings in literary theory and criticism from Aristotle to the present. 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

The cultural contributions of European language groups to the development of America. The roots of many American traditions, tracing origins of characteristic (place) names and words to early immigrants; investigating ways in which groups or individuals dealt with the new environment in accordance with their own heritage. In order to study documentary evidence a reading knowledge of a foreign language is recommended. **Cr 3.**

FOL 480 Introduction to Dante's Divine Comedy

Dante's Divine Comedy: Introduction to literary structure, theology, cosmology, and philosophy of the work. **Cr 3.**

FOL 490 Topics in Foreign Languages.

The course may be repeated for credit if a different topic is treated. **Cr 1-3.**

FOL 493 Study Abroad

(Foreign course title here.) The purpose of this course designation is to permit the granting of foreign language credit for courses taken abroad for which there is 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. Credits will be arranged upon acceptance of the proposal. Prerequisites: an appropriate level of fluency as determined by the department. **Cr 1-12.**

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 writ-

ing skills. For students with no previous study of French or fewer than two years in high school.

Cr 4.

FRE 102 Elementary French II

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 121 Elementary French (Accelerated) I

For students with no previous study of French or fewer than two years in high school. This course 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. This course 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, as well as audio-visual materials, will be employed to strengthen reading, writing and especially speaking and comprehension skills. Also includes a systematic but gradual review of the essentials of French grammar. Prerequisite: FRE 102 or equivalent.

Cr 4.

FRE 204 Intermediate French II

An integrated approach. Reading texts of a literary and/or cultural nature, as well as audio-visual materials, will be employed to strengthen reading, writing and especially speaking and comprehension skills. Also includes a systematic but gradual review of the essentials of French grammar. 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

Systematic training in the correct usage of spoken and written French through a broad range of conversational situations and writing topics.

Cr 3.

FRE 207 French Diction

The pronunciation of French, with some attention also to the rudiments of structure of the language. 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. This course may be repeated for credit another year.

Cr 3.

FRE 209 Readings in French Literature I

For students who wish practice in reading in French. This course 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

For students who wish practice in reading in French. This course also prepares students for literature and civilization courses at the 400 level. 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

For students who have completed FRE 102 or FRE 121, 122 or equivalent in high school. This course 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 on French Canada which will examine 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. FRE 209 or 210 (or permission) are prerequisites for the study of literature and civilization at the 400 level. **Cr 3.**

FRE 404 Medieval and Renaissance French Literature

Origin, formation and development of a national literature as seen through the prose, poetry and theater from the beginnings 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. **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 and Zola, Balzac, Stendhal, Sand, 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, in poetry or in theater (content varies). May be taken over for credit, with permission of instructor. **Cr 3.**

FRE 409 French Critical Methodology

Examination of cases of European critical methods from 19th century to present. Special at-

tention 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

An historical 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. Competencies in the 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, Guevrement, Ringuet, Roy, Hebert and Aquin. Prerequisite: FRE 204 or equivalent. **Cr 3.**

FRE 456 Seminar in Quebec Studies

An advanced course which will examine some of the more complex issues which Quebec has had to confront. Student 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

Projected course topics in French and French-Canadian literature include: contemporary cinema, surrealism, contemporary French thought, modern French critical theory, semiotics, symbolism, literature of commitment, images of

women, women writers. The content of this course will change every semester for credit if a different topic is treated. 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, Nerval. 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. Course may be repeated for credit. Cr 3.

FRE 509 Seminar in Poetry
Movements in French poetry. The genres, 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 and selected areas of French grammar are analyzed. Attention given to historical development of the language in relation to its present structure. Prerequisite: INT 310 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, 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
A study of contemporary films and video dramas of French Canada. The visual dramas will be compared with the literary works from which they evolved. In addition, 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
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. 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 of 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) II

A systematic study of the basics of the German language. For students with no previous study of German of fewer than two years in high school. This course 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. The course also includes a systematic, but gradual review of the essentials of German grammar. **Cr 4.**

GER 204 Intermediate German II

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 German grammar. **Cr 4.**

GER 205 Practical German I

A third year conversational 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

A third year conversational 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 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. This course may be repeated for credit another year. Prerequisite: Permission of the instructor. **Cr 1-3.**

GER 209 German Diction

The pronunciation of German, with some attention also to the rudiments of structure of the language. Primarily a service course for the Departments of Theatre/Dance, Music and Speech, e.g., vocalists, actors, and television announcers. No prerequisites. **Cr 1.**

GER 210 Business German

Primarily for students who wish to develop skills in the specialized branch of the German language through reading and some writing of business correspondence, and through 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. Will be offered every other year, alternating with GER 207. **Cr 3.**

GER 211 Introduction to German Literature I

An introduction to the important periods of German literature from medieval times to the 20th century, with representative readings. Prerequisite: GER 204 or equivalent. **Cr 3.**

GER 212 Introduction to German Literature II

An introduction to the important periods of German literature from medieval times to the 20th century, with representative readings. Prerequisite: GER 204 or equivalent. **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. This course 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
For students who have completed GER 102 or GER 121, GER 122 or the equivalent in high school as determined by a placement test. This course 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 400 Advanced German Grammar

Designed to provide a summary in German grammar and syntax, especially for prospective teachers. **Cr 3.**

GER 401 German Civilization

Readings, discussions, lectures, oral and written reports on Germany, its people, institutions, and culture to provide the background essential to an understanding of German literature, thought, and artistic expression. Prerequisite: GER 204 or the equivalent. **Cr 3.**

GER 402 Contemporary Germany

Political, social and intellectual development of Germany from 1945 to present. A course in modern German Civilization and Landeskunde. Prerequisite: GER 204 or the equivalent. **Cr 3.**

GER 403 History of the German Language

A systematic study of the development of the German language from Indoeuropean times to the present. The goal of this course is to put present day German in its linguistic perspective, to make the speaker of modern German more aware of the reasons and origins of specific forms, patterns and usages and to furnish 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, with lectures on 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 will be 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 will be 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. **Cr 3.**

GER 490 Topics in German

Specific topics to be announced. It will vary from semester to semester depending on special interest of faculty member teaching it. The course may be repeated for credit if a different topic is treated. **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 to be announced. It will vary from semester to semester depending on the needs of the graduate student and the skills of the faculty member. The course may be repeated for credit if a different project is treated. **Cr 3.**

GER 598 Projects in German II

Specific projects to be announced. It will vary from semester to semester depending on the needs of the graduate student and the skills of the faculty member. The course may be repeated for credit if a different project is treated.

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 Greek 101 or equivalent.

Cr 4.

GRE 203 Readings in Greek Literature I

Selections from Xenophon, Plato, and the Tragedians. One prose author and one playwright will be read.

Cr 3.

GRE 204 Readings in Greek Literature II

Selected readings from the works of Homer and Hesiod.

Cr 3.

Course in Italian**ITA 215 Italian Diction**

The pronunciation of Italian, with some attention to the rudiments of structure of the language. 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.

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.

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. This course, which is required for majors, should be taken in the junior year or earlier, if possible.

Cr 3.

LAT 248 Latin Prose Composition and Stylistic II

Review of grammar and syntax, with particular attention to Cicero and Tacitus. The writing of prose, especially in the style of Cicero. This course, which is required for majors, should be taken in the junior year or earlier, if possible.

Cr 3.

LAT 451 Roman Comedy: Plautus and Terence

One play of each dramatist will be read. The source of Roman comedy, its literary features, and influence upon later literature. Given every three years.

Cr 3.

LAT 452 Roman Philosophical Thought

Selections from Lucretius, *De Rerum Natura*, and Cicero's philosophical essays. The three major philosophical schools: Academic, Stoic, Epicurean, and their influence on Roman thought. Given every three years.

Cr 3.

LAT 453 Poetry of the Republic and Early Empire

The lyric poetry of Catullus, the Odes of Horace. The origin and development of satire, with selections from the satires of Horace and Juvenal. Given every three years.

Cr 3.

LAT 454 Prose of the Republic and of Early Empire

Selections from Cicero's letters, Pliny's letters, and Tacitus' *Annals*. Given every three years.

Cr 3.

LAT 481 Virgil: The Eclogues, Georgics, Aeneid

The poet's background achievement, and influence upon later literature. Given every three years.

Cr 3.

LAT 482 Medieval Latin

Introduction to a variety of Latin prose and texts from the Middle Ages. Emphasis will be upon stylistic and thematic continuities with and differences from classical Latin prose and poetry. Given upon sufficient demand.

Cr 3.

LAT 497 Projects in Latin I

Individual work on a project of the student's selection. Prerequisite: consent of the department head. (maximum: 3 hrs).

Cr Ar.

LAT 498 Projects in Latin II

Individual work on a project of the student's selection. Prerequisite: consent of the department head. (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 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 121 Elementary Russian-(Accelerated) I

For students with no previous study of Russian or fewer than two years in high school. This course 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. This course 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

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 205 Practical Russian I

Systematic training in correct pronunciation, intonation and usage, and in vocabulary building, with written and oral practice. Prerequisite: RUS 204 (or the equivalent) and permission of the instructor. This course is conducted entirely in Russian. **Cr 3.**

RUS 206 Practical Russian II

Systematic training in correct pronunciation, intonation and usage, and in vocabulary building, with written and oral practice. Prerequisite: RUS 204 (or the equivalent) and permission of the instructor. This 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. This course 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

For students who have completed RUS 102 or RUS 121, RUS 122 or equivalent in high school. This course must be taken in combination with RUS 223 in one semester. A full year's work covered in one semester. **Cr 6.**

RUS 409 Introduction to Russian Literature I

A survey of major periods in Russian and Soviet literatures; readings of representative works, major works and general discussions in English, short representative works in Russian. Course satisfies the humanities requirement. Prerequisite: RUS 204 or permission of instructor. Offered upon sufficient demand. **Cr 3.**

RUS 410 Introduction to Russian Literature II

A survey of major periods in Russian and Soviet literatures; readings of representative works, major works and general discussions in English, short representative works in Russian. Course satisfies the humanities requirement. Prerequisite: RUS 204 or permission of instructor. Offered upon sufficient demand. **Cr 3.**

RUS 467 Advanced Russian Grammar, Composition and Stylistics I

Provides an adequate foundation in Russian grammar, composition and stylistics for majors and prospective teachers. An intensive analysis and review of advanced grammar and syntax. Prerequisite: RUS 204 or permission. Offered upon sufficient demand. **Cr 3.**

RUS 468 Advanced Russian Grammar, Composition and Stylistics II

Provides an adequate foundation in Russian grammar, composition and stylistics for majors and prospective teachers. A systematic study of the problem of style as seen through composition and translation. Prerequisite: RUS 204 or permission. Offered upon sufficient demand. **Cr 3.**

Courses in Spanish

SPA 101 Elementary Spanish I

A systematic study of the basics of the Spanish language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of Spanish or fewer than two years in high school.

Cr 4.

SPA 102 Elementary Spanish II

A systematic study of the basics of the Spanish language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of Spanish or fewer than two years in high school.

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 writing 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 systematic study of the basics of the Spanish language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of Spanish or fewer than two years in high school. (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. This course 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. This course 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. The course also includes a systematic, but gradual review of the essentials

of Spanish grammar. Prerequisite: SPA 102 or equivalent.

Cr 4.

SPA 204 Intermediate Spanish II

An integrated approach. Reading texts as well as other materials will be employed to strengthen reading, writing and especially speaking and comprehension skills. The course includes a systematic, but gradual review of the essentials of Spanish grammar. Prerequisite: SPA 203 or equivalent.

Cr 4.

SPA 205 Spanish Conversation and Composition I

A systematic attempt to increase the student's fluency in spoken Spanish and to improve his command of writing through selected vocabulary and grammar exercises, discussions, skits, speeches, and compositions. Classes are conducted in Spanish. Need not be taken in sequence. Prerequisite: SPA 204 or equivalent.

Cr 3.

SPA 206 Spanish Conversation and Composition II

A systematic attempt to increase the student's fluency in spoken Spanish and to improve his command of writing through selected vocabulary and grammar exercises, discussion, skits, speeches, and compositions. Classes are conducted in Spanish. Need not be taken in sequence. Prerequisite: SPA 204 or equivalent.

Cr 3.

SPA 207 Spanish Readings

Selections are oriented to current events and contemporary literary texts. For students in all disciplines, as well as for students who wish further practice in reading before beginning 400 level Spanish course. Prerequisite: SPA 204 or equivalent.

Cr 3.

SPA 208 Introduction to Spanish Literature

A retrospective survey of the important works in Spanish literature beginning with the 20th century and proceeding to medieval times. A brief introduction to genres, trends, and literary techniques to prepare the students for upper level literature courses. Prerequisite: SPA 204 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. The course also 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)

An integrated approach. Reading texts as well as other 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 Spanish grammar. Prerequisite: SPA 203, 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. Course may be repeated for credit another year with permission of the instructor.

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. This course 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

For students who have completed SPA 102 or SPA 121, SPA 122 or the equivalent in high school as determined by a placement test. This course 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 of instructor.

Cr 3.

For all 400 level literature courses, there is a prerequisite of SPA 207 or SPA 208 or permission of the instructor.

SPA 400 Advanced Spanish Grammar, Composition, and Stylistics

Designed to provide an adequate foundation in Spanish grammar, syntax, and composition for prospective teachers. Also applied stylistics for those with certain proficiency of expression interested in creative writing. Prerequisite: SPA 205 or SPA 206 or permission of instructor.

Cr 3.

SPA 401 Golden Age

Masterpieces of poetry and prose from the 16th and 17th centuries. The aim is to give an overview of the period and to refine the student's critical abilities. Poetry by Garcilaso, Fray Luis,

San Juan, Gongora, and Quevedo. Prose readings include Lazarillo de Tormes, Diana, Suenos y discursos, and Novelas ejemplares.

Cr 3.

SPA 402 Comedia

Theater of the 16th and 17th centuries. Authors include Lope de Vega, Tirso de Molina, and Calderon de la Barca.

Cr 3.

SPA 403 Cervantes

A careful reading of the Spanish masterpiece, Don Quixote, with class discussions and lectures on its historical background and continuing influence.

Cr 3.

SPA 405 Spanish Literature of the Nineteenth Century

The Romantic Movements: between tradition and revolt. The novel from "costumbrismo" to "realismo". Spanish naturalism: a compromise.

Cr 3.

SPA 406 Spanish Literature of the Twentieth Century

Selections from the poetry, essays, and novels of the pre and Civil War period focused through readings in the history and thought of the times.

Cr 3.

SPA 407 Contemporary Spanish Novel

Experimental Novel of the Twentieth Century.

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.

Cr 3.

SPA 409 Contemporary Latin-American Short Story

A study of some of the major short story writers from Latin America. Background lectures, reading and analysis, class discussion. Included in this course will be a study of such significant contemporary concerns as: poverty, politics, religion, and such themes as the interplay of fantasy and reality and the relativity of madness.

Cr 3.

SPA 410 Latin American Novel

The contemporary novel in Spanish America, with special attention on the novelists of the BOOM: among them Cortazar, Garc a Marquez, Vargas Llosa and Fuentes.

Cr 3.

SPA 411 Contemporary Latin American Theater

A study of some of the major playwrights from Spain and Latin America of the 20th century. Reading and analysis of plays; class discussion.

Cr 3.

SPA 412 Contemporary Peninsular Theater

A study of some major playwrights from Spain of the 20th Century. Reading and analysis of plays; class discussion. **Cr 3.**

SPA 413 Hispanic Women Writers

A critical study of the major literary texts produced by some Spanish and Spanish American women writers since the XVIIth century to the present, both in the field of poetry and of prose. Using a cultural approach, the class will focus on the discourse of these women as it confronts a male oriented and a male controlled field. The specific area of study will be indicated in the schedule of classes pertinent to the semester it is being taught. Prerequisites: SPA 207 or SPA 208, or permission of the instructor. **Cr 3.**

SPA 457 Spanish Civilization

Readings, discussions, lectures and written reports on Spain, its people, institutions and culture for the purpose of providing the background essential to an understanding of Spanish literature, thought and artistic expression. **Cr 3.**

SPA 458 Spanish American Civilization

Readings, discussions, lectures and written reports on Latin America, its people, institutions, and culture for the purpose of providing the background essential to an understanding of Latin America literature, thought and artistic expression. **Cr 3.**

SPA 490 Topics and Individual Authors in Spanish

Content of course will change from semester to semester. The course may be repeated for credit if a different topic is treated. **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 to be announced. It will vary from semester to semester depending on the needs of the graduate student and the skills of the faculty member. The course may be repeated for credit if a different project is treated. **Cr 3.**

SPA 598 Projects in Spanish II

Specific projects to be announced. It will vary from semester to semester depending on the needs of the graduate student and the skills of the faculty member. The course may be repeated for credit if a different project is treated. **Cr 3.**

Interdisciplinary Course**INT 310 (ANT, ENG, FOL) Introduction to the Study of Linguistics**

A survey of language structure and its socio-cultural, psychological and historical aspects. It provides the student with conceptual and technical tools for understanding the phenomenon of language. No previous training in languages or linguistics is required. **Cr 3.**

Geological Sciences

Professors Hall (Chairperson), Borns, Decker, Denton, Guidotti, Hughes, Norton, Osberg, Schnitker; Associate Professors Belknap, Chernosky, Fink, Grew, Howd, Kelley, T. Kellogg, Lux, Mayer; Assistant Professor D. Kellogg; Faculty Associates Anderson, Forbes, Hussey, Stanley, Stuckenrath, Thompson, Tolman

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 organic inhabitants. The curriculum provides for a basic understanding of the geological sciences and is sufficiently flexible to allow students with interests in geo-

chemistry, 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; geology field camp; and MAT 232, MAT 126 and 127, CHE 111/112 or 113/114, PHY 111/112 or 121/122, and COS

215 or COS 220. For students contemplating graduate work in geology, mathematics through MAT 228 and attainment of proficiency in French, German, or Russian is recommended.

An approved summer field camp is required between the junior and senior years.

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.

Specimen Curriculum

Freshman 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)	<u>4</u>			
		15			

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	General Physics I	(4)	PHY 122	General Physics II	(4)
MAT 126	Analytical Geometry and Calculus	4	MAT 127	Calculus	4
	Elective	<u>3</u>		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 15
	Elective	3 or 4			
	Elective	<u>3 or 4</u>			
		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

Courses in Geological Sciences

GES 101 Aspects of the Natural Environment I

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.**

GES 102 Aspects of the Natural Environment II

The Structure and composition of the interior of the earth, mountain building processes: The origin and use of paleomagnetic data in the continental drift question; The origin and evolution of the atmosphere, the hydrosphere, and life; mechanisms and patterns of biological evolution. Man's place in and utilization of his environment. Laboratory work includes preparation for two compulsory field trips in April and May. Prerequisite: GES 101. Lec 3, Rec, Lab and field trips. **Cr 4.**

GES 106 Geology for Engineers

A study of general physical geology to provide a basis for civil engineering applications. Emphasis is on topics related to the understanding of physical properties and behavior of surficial 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 consent of instructor. **Cr 3.**

GES 221 Geologic Problems I

The study of and report upon some original investigation. Time to be arranged. Prerequisite: consent of instructor. May not normally be used

as a required geology elective. May be taken more than once. **Cr 1 or 2.**

GES 222 Geologic Problems II

The study of and report upon some original investigation. Time to be arranged. Prerequisite: Consent of instructor. May not normally be used as a required geology elective. May be taken more than once. **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 the geologic features of National Parks selected to represent 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, paleoecologic, 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

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 Topic

One to two week intensive treatment of specialized geologic topics by scientists from Government and other Institutions. Topics will vary and when offered will be indicated by title in the appropriate University Time Schedule. May be taken more than once if topics differ. 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 treated 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 its application to petrology. Study of geologically relevant heterogeneous equilibria at elevated pressure and temperature emphasized. 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 treated will 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 geological relevant heterogeneous equilibria. Research techniques will be discussed and demonstrated but emphasis will be placed on the evaluation and interpretation of experimental results. Prerequisite: GES 523, may be taken concurrently. Not given every year.

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

Principles of sedimentary processes in the coastal zone, and the resultant coastal geomorphology, three-dimensional sedimentary bodies, stra-

tigraphic sequences and evolution of coastal systems through geologic history. Emphasis will be 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

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 best known example, the U.S. east coast. Prerequisite: GES 315 or OCE 560 or permission of instructor. Lec 3, Lab 2. **Cr 4.**

GES 541 Glacial Geology

Study of 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 man. One weekend field trip. Prerequisite: GES 541 or permission. Lec 2, Lab 2, **Cr 3.**

GES 543 Quaternary History of Northeastern North America

the Quaternary history of Northeastern North America viewed from an interdisciplinary perspective. Emphasis upon glacial and nonglacial episodes with discussion of associated climatic and biologic changes. One week-end field trip. Prerequisite: GES 541 or permission. Rec 2. **Cr 3.**

GES 545 Glaciology

The dynamics of ice sheets. 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 is 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. The course 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

Classification methods, mapping procedures and techniques to study 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 as an example. Field emphasis requires several field trips. Prerequisite: OCE 370, GES 101, GES 102 and consent of instructor. **Cr 3.**

GES 559 Seminar in Mountain Building Processes

Cover various topics of orogenesis. Topics will vary from year to year; course 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; their use in ecologic and stratigraphic interpretation. Prerequisite: GES 314 or ZOL 453 plus GES 101, 102. Rec 3, Lab 2, **Cr 4.**

GES 567 Actiopaleontology

Study of living and fossil organisms and relationships to their sedimentary environment. Course conducted in four full-weekend field investigations at the Darling Center. Prerequisite: GES 101, 102, GES 314 or ZOL 453. (Same course as OCE 567). **Cr 2.**

GES 569 Biostratigraphy of Foraminifers and Diatoms

The study of planktonic foraminifers and Neogene diatoms, their morphology, taxonomy and evolution. 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

Sample preparation techniques; practice of foraminiferal taxonomy; age determination of many samples from different ages and different provenances. **Cr 1.**

GES 571 Diatom Stratigraphy Laboratory

Sample preparation techniques; practice of diatom taxonomy; age determination of many samples from different ages and different provenance. **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

The origin of silicate melts and the processes which lead to their evolution and eventual crystallization will be investigated. 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

This course will develop the concepts required for determining the genesis of metamorphic rocks. Particular emphasis will be placed on approaches which aid in developing and understanding of 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 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 are

extensively used in a problem solving approach to indirect studies of the Earth's interior. Prerequisites: GES 101, 102, PHY 112 or PHY 122, MAT 228, MAT 259, PHY 238, MAT 353, COS 210 (FORTRAN) desirable. Consent of instructor. Offered every year. Lec 3. **Cr 3.**

GES 582 Advanced Topics in Geophysics

Advanced treatments of geo-thermal, gravity, or seismological studies of the earth. Offered every Spring, with topics rotating. Prerequisite: GES 581, MAT 352, MAT 254, PHY 238 or PHY 462, PHY 475, or permission. May be repeated for different topics. **Cr 3.**

GES 583 Advanced Structural Geology

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 Geologic Equation of State to crustal tectonic processes. Prerequisites: MAT 128 or permission. MAT 259 recommended. **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 and OCE 560 and permission. **Cr 3.**

GES 589 Numerical Methods in Geology

Integrated approach to statistical and numerical methods in geological, geophysical and geochemical studies and research. Computer programming of exercises required. Prerequisite: Permission. **Cr 3.**

Interdisciplinary Course**INT 500 (ANT, BOT, GES, PSS) Seminar in Quaternary Studies**

A multidisciplinary seminar concerned with selected areas of study, physical, biological and anthropological, related to the Quaternary Period. Subject areas will vary each semester; may be taken more than once for credit. One weekend field trip required. Prerequisite: consent of instructor. Rec 2. (Offered Spring and Fall Semesters). **Cr 2.**

History

Professors Doty (Chairperson), Babcock, Baker, Blanke, Nadelhaft, J.H. Pease, W.H. Pease, Schonberger, Smith; Associate Professors Battick, Bregman, Schriver, TeBrake; Assistant Professors Ferland, Grab, Judd, Long, Segal, Wood

The department offers courses at the introductory (HTY 101-199), intermediate (HTY 317-499), and advanced (HTY 501-599) levels. Majors must complete at least 12 three-hour courses in history, including:

- A. 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.
- B. 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.
- C. 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 101 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 102 Medieval Civilization

Investigation of the cultural development of Europe during the Middle Ages, from late Roman times through the 15th century, developing a broad overview of the distinctively European civilization that emerged during the period.

Cr 3.

HTY 103 United States History I

The historical experience of the American people through the major ideas and forces that have shaped the Republic: The exploration of America through post-Civil War Reconstruction.

Cr 3.

HTY 104 United States History II

The historical experience of the American people through the major ideas and forces that have shaped the Republic: 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 the medieval period to the Treaty of Utrecht, emphasizing those features which help to explain our present-day civilization.

Cr 3.

HTY 106 History of European Civilization II

Political, economic, social, and intellectual developments in Europe from Treaty of Utrecht 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 prehistoric times to the present. Whenever applicable, Korea and Vietnam will be discussed. Emphasis on key periods in each country, especially changes in the 19th and 20th centuries.

Cr 3.

HTY 108 South and Southeast Asia

A survey of the social, economic, cultural and political life of India and some Southeast Asian countries from prehistoric times to the present. Key periods, especially the 19th and 20th centuries, and main themes will be emphasized.

Cr 3.

HTY 110 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.

Cr 3.

HTY 115 The World in the Twentieth Century I

The response of world leaders and ordinary people to the events of the 20th Century: Two World Wars and a Cold War, competitive ideologies of fascism, communism and democracy, the rise of Asian, African and Mideast powers, the impact of the Great Depression and technology, and popular culture and morality from the age of the flapper to today. Lectures, films, and discussions. **Cr 3.**

HTY 116 The World in the Twentieth Century II

The response of world leaders and ordinary people to the events of the 20th century: two World Wars and a Cold War, competitive ideologies of fascism, communism and democracy, the rise of Asian, African and Mideast powers, the impact of the Great Depression and technology, and popular culture and morality from the age of the flapper to today. Lectures, films, discussions. **Cr 3.**

HTY 150 History as People: The American Experience as Biography

An exploration of the American experience from the colonial period to the present. Major facets of American life 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 172 The Industrial Worker in America

Beginning with the artisan "republic" of the Revolutionary War, this course examines changes in the world of work during successive phases of industrial capitalist development. The focus is upon the evolving factory system, worker responses to technological change, and effects of ethnicity, race, and gender on those responses. The concluding portion emphasizes 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 176 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 199 Problems in History

An analysis of a selected controversial or contemporary historical problem. In some cases the topic to be studied and the method of approaching it may be chosen jointly by interested students and an instructor. No prerequisites. **Cr 3.**

HTY 317 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 401 History of Greece

Ancient Greece from the "Heroic Age" to Alexander the Great. 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 101 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: failure of a city-state republic to rule a vast empire; triumph of Caesarism. The establishment of the "Roman Peace" under the emperors; problem of the "Decline and Fall of the Roman Empire." Prerequisite: HTY 101 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, 106 or permission. **Cr 3.**

HTY 406 The Age of Monarchs 1600-1789

The socio-economic, political as well as cultural developments of Europe in the Early Modern period, emphasizing the history of several major countries such as, France, Prussia, the Austrian Empire and Russia. Prerequisite: HTY 105, HTY 106 or permission. **Cr 3.**

HTY 407 The Age of Revolution, 1789-1860

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; 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, 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 under 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

Europe and her peoples since 1919, challenged by fascism, communism, economic crises, the loss of empire, intellectual uncertainty, world war, and Cold War division into East and West, together with post-1945 attempts to regain a position of world influence through economic and political integration, modernization, and renewed cultural vitality. Prerequisite: HTY 105, 106 or permission. **Cr 3.**

HTY 419 Science and Society Until 1800

Development of science from antiquity to the European scientific revolution. Examination of the history of science both 'internally'—as ideas and experiments—which they in turn have had impact. Not open to freshmen. **Cr 3.**

HTY 420 Science and Society Since 1800

Development of science since the Scientific Revolution, with emphasis on America. Examination of the history of science 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 freshmen. **Cr 3.**

HTY 422 Modern France

French history since Napoleon. 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, 106 or permission. **Cr 3.**

HTY 423 History of Russia I

Russian history from the earliest times to the mid-19th century, including the political, social, economic, and intellectual development of Tsarist Russia to the end of the Crimean War. Prerequisite: HTY 105, 106 or permission. **Cr 3.**

HTY 424 History of Russia II

Russian history from the Crimean War to the present, emphasizing the decay of the Tsardom, the Bolshevik Revolution, and the subsequent internal development and expansion of the Soviet Union. Prerequisite: HTY 105, 106 or permission. **Cr 3.**

HTY 425 History of Germany I

German history from the decline of the Holy Roman Empire through the rise of Prussia and the Napoleonic impact to the Revolutions of 1848, emphasizing political, social, economic, and intellectual developments. Prerequisite: HTY 106 or permission. **Cr 3.**

HTY 426 History of Germany II

German history from the unification through the Weimar and National Socialist periods to the Federal republic, emphasizing political, social, economic, and intellectual developments. Prerequisite: HTY 106 or permission. **Cr 3.**

HTY 427 European Intellectual History I

Interaction of ideas with society and politics in succeeding historical periods from late antiquity to 1700, emphasizing changing views toward man, society, science, literature, arts, religion and government. Prerequisite: HTY 101 or HTY 103 or HTY 105. **Cr 3.**

HTY 428 European Intellectual History II

Interaction of ideas with society and politics in succeeding historical periods 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

The course will cover the economic, social, political and cultural developments of the Italian people from 1815 to the present. It also explore the Italian migration to the U.S. Prerequisite: Six hours of history or permission. This course will be offered once every two years. **Cr 3.**

HTY 430 Industry and European Society

How European plain people and businessmen began an Industrial Revolution in the 18th century and continued it to the present. How changing industrialization modified people's lives and living standards, their perception of work and property, moral and religious values, family life

and leisure, the status of women and children, violence and law and order, the nature and organization of capitalism, and protest movements. Prerequisite: HTY 105, 106 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, 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. Discussion of the major theories explaining myths and the use of modern psychology and anthropology to show how the myths reveal secrets of our emotional and intellectual lives. Prerequisites: HTY 101 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, and others. Prerequisites: any one course from the following HTY 101-106; PHI 101; LAT 101, 102; GRE 101, 102; ARH 251, 253, POS 389 or permission of the instructor.

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, 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, 108 or six hours of history, or permission.

Cr 3.

HTY 437 History of Modern Japan

The history of Japan during the past century. 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, 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 will be on the relationship between popular uprisings (White Lotus, Muslim Nian, Taiping, Boxers, Red Spears, etc.) and the Communist Revolution. In addition, the Chinese case will be compared against those of other East Asian countries as well as against general theories of peasant revolt. Prerequisites: HTY 107, HTY 435 or HTY 436.

Cr 3.

HTY 442 The United States and Vietnam: A History

This course will trace the history of the 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. Prerequisites: HTY 103 or HTY 104 or permission.

Cr 3.

HTY 446 History of Modern Middle East (1800-Present)

The economic, social and political transformations that the Middle East experienced in the nineteenth and twentieth centuries. Particular focus is given to 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. Readings, discussions, research paper. 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, 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, 106 or six hours of history.

Cr 3.**HTY 457 France in America to 1763**

French empire in St. Lawrence Valley, Acadia, Louisiana, and sugar islands from exploration to loss of her main American holdings. Emphasis on political and social institutions; French colonial life compared to France and to the English colonies. Prerequisite: HTY 103, 104 or HTY 105, 106 or permission.

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, and the separate development of French Canadians and Franco-Americans after that. Prerequisite: Six 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: CAN 100, or six hours of history, 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: CAN 100, or six hours of history, or permission.

Cr 3.**HTY 461 America Takes Shape: The Colonies to 1740**

The founding and development of the American colonies. The expropriation of Indian lands, enslavement of blacks, the role of women, the American family, and internal conflicts will be emphasized. 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 463 Creating and Testing the American Nation, 1789-1840**

Problems and processes involved in establishing a viable society. Major events, issues, and institutions political, economic, and cultural with particular emphasis on the interrelationship between ideas and actions. 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 466 Industrialization, Urbanization, and Reform, 1877-1916**

The transformation of the United States to a predominately industrial, urban society. Business growth, farm problems, immigration, labor organization, regular and reform politics, and imperialism. Prerequisite: HTY 104 or permission.

Cr 3.**HTY 467 Early 20th Century America, 1914-1945**

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. Changes in American politics, economics, society, and culture. Prerequisite: HTY 104 or permission.

Cr 3.**HTY 468 America Since 1945**

The Cold War and McCarthyism, affluence and poverty in the 1950s, protest movements of the 1960s, Watergate, the energy crisis and economic recession. Changes in American politics, economics, society, and culture. Prerequisite: HTY 104 or permission.

Cr 3.**HTY 469 American Ideas I**

Major ideas emerging from and shaping the American experience. Formal ideas as well as broad social movements considered, e.g. transcendentalism, pragmatism, and reform. Interrelationships between ideas and actions, conceptualizations and structures. Prerequisite: HTY 103, 104 or permission.

Cr 3.

HTY 470 American Ideas II

Major ideas emerging from and shaping the American experience. Formal ideas as well as broad social movements considered, e.g. transcendentalism, pragmatism, and reform. Interrelationships between ideas and actions, conceptualizations, and structures. Prerequisite: HTY 103, 104 or permission. **Cr 3.**

HTY 471 Economic History of the United States I

The development of the American economy from the colonial period to 1865, including agriculture, trade and commerce, industrialization, transportation, money and banking, changing concepts of business enterprise and American capitalism, the US in a world economy and the growth of governmental involvement in the economy. Prerequisite: HTY 103, 104 or permission. **Cr 3.**

HTY 472 Economic History of the United States II

The development of the American economy from 1865 to the present, including agriculture, trade and commerce, industrialization, transportation, money and banking, changing concepts of business enterprise and American capitalism, the US in a world economy and the growth of governmental involvement in the economy. Prerequisite: HTY 103, 104 or permission. **Cr 3.**

HTY 473 American Diplomatic History I

American diplomatic history from the revolution to the Civil War, emphasizing the formation and application of America's major foreign policies. Prerequisite: HTY 103, 104 or permission. **Cr 3.**

HTY 474 American Diplomatic History II

American diplomatic history from the Civil War to the present, emphasizing the formation and application of America's major foreign policies. Prerequisite: HTY 103, 104 or permission. **Cr 3.**

HTY 475 American Social History I

Analysis of the ways in which social values, practices, and institutions have changed or persisted as the US evolved from an agrarian to an industrialized society, concentrating on work patterns, ethnic and racial variations, family function, class structure, religious and educational institutions, distinctive roles determined by age and sex, and the means employed for community service and social control in the United States from 1607 to 1850. Prerequisite: HTY 103, 104 or permission. **Cr 3.**

HTY 476 American Social History II

Analysis of the ways in which social values, practices, and institutions have changed or persisted as the US evolved from an agrarian to an industrialized society, concentrating on work patterns, ethnic and racial variations, family function, class structure, religious and educational institutions, distinctive roles determined by age and sex, and the means employed for community service and social control in the United States from 1850 to the present. Prerequisite: HTY 103, 104 or permission. **Cr 3.**

HTY 477 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. Prerequisite: HTY 103, 104 or two one-semester courses in natural sciences or permission. **Cr 3.**

HTY 478 American Military History

America's experience with warfare, beginning with 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. No freshmen. **Cr 3.**

HTY 480 Naval History

The history of navies in the modern period (c. 1500 to the present): The use of naval forces in the achievement of national goals, the development of naval technology and tactics, effects of naval construction and manning upon society, the sociology of navies, comparison of naval policies in various states, the current balance sheet of navies. Prerequisite: HTY 103, 104 or 105, 106 or permission. **Cr 3.**

HTY 482 Canada and the American Economy

Role and impact of the 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, HTY 460 or HTY 471, HTY 472 or ECO 338 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. The approach will be through exposure to the music, especially as played by

the major innovators and the different styles they represent. Prerequisite: HTY 103, 104 or permission. **Cr 3.**

HTY 485 World Maritime History I

The growth of human understanding, use and interaction with the seas from prehistory to 1800. 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 freshmen. **Cr 3.**

HTY 486 World Maritime History II

The growth of human understanding, use and interaction with the seas from 1800 to the present. 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 freshmen. **Cr 3.**

HTY 491 Technology and Society Until 1800

Development of technology from earliest times through the English Industrial Revolution. Examination of the history of technology 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 freshmen. **Cr 3.**

HTY 492 Technology and Society Since 1800

Development of technology since the English Industrial Revolution, with emphasis on America. Examination of the history of technology 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 freshmen. **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

An analysis in depth of a selected controversial and contemporary historical problem. The topic to be studied and the method of approaching it will be chosen jointly by interested students and the staff. Prerequisite: permission. **Cr 1-3.**

HTY 501 American Diplomatic History

Advanced reading seminar. Problems, interpretations, and issues in American diplomacy such as maritime neutral rights, expansion, role of military and naval powers. Content varies.

Seminar discussion, reports and papers. 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. Seminar discussion, reports and papers. Prerequisites: graduate students, senior history majors and others by permission. **Cr 3.**

HTY 503 American Regional History

Advanced reading seminar. Emphasis upon various historically discrete areas, such as the South, West, New England; their distinctive development and interrelationship to broader American history. Content varies. Seminar discussion, reports, and papers. Prerequisites: graduate students, senior history majors and others by permission. **Cr 3.**

HTY 504 American Economic History

Advanced reading seminar. Development of American economics in its historical setting. Major economic theories and their impacts. Government business relationships. Content varies. Seminar discussion, reports and papers. Prerequisites: graduate students, senior history majors and others by permission. **Cr 3.**

HTY 505 American Political History

Advanced reading seminar. Major political ideas; constitutional and legal development; political issues and their impact on American society; political party evolution. Content varies. Seminar discussion, reports, and papers. Prerequisite: graduate students, senior history majors and others by permission. **Cr 3.**

HTY 506 American Social History

Advanced reading seminar. Emphasis, among others, on the problems and issues of family, urban, ethnic, and labor history and historical utilization of social science methods. Content varies. Seminar discussion, reports, and papers. Prerequisites: graduate students, senior history majors and others by permission. **Cr 3.**

HTY 517 Early Modern England and Europe

Problems, ideas, institutions and developments in the early modern period. Readings, reports and research papers in politics, religion, economic and social change, colonial foreign policy. Prerequisites: graduate students, senior history majors, and others by permission. **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. Among areas treated are the gradual democratization of British government, continuing industrial revolution, and impact of two world wars on English social, cultural and political life. Lectures, readings, class reports, research papers. Prerequisites: graduate students, senior history majors, and others by permission. **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, 460, or HTY 473, 474 or POS 474 or permission. **Cr 3.**

HTY 522 Canadian Economic History

History and theory of Canadian staple development; political influences on land, resources, and industrialization policy; the social context shaping Canadian business elites and laboring classes; contemporary trends. Prerequisite: HTY 459, 460 or HTY 471, 472, 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 cen-

tury to the present. Lectures, readings, class reports, and research reports. 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. Lectures, readings, class reports, and research papers. 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. Instruction will involve 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

This course introduces graduate students in history to the various stages and procedures involved in editing and producing a scholarly journal in history, including editorial revisions, layout, graphics, proofreading, and printing. In format, the course is a practicum associated with the publication of the Maine Historical Society Quarterly (MHSQ). Prerequisite: graduate standing. **Cr 1-3.**

HTY 599 Special Topics in History

A flexible course designed to explore and analyze 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 basic requirements of the College of Arts and Sciences. 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 advisers 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. Other courses which might be taken:

- ANT 341 People and Cultures of the Pacific Islands
- ANT 342 Mediterranean Ethnology
- ANT 353 People and Cultures of Mesoamerica
- ANT 354 Cultures and Societies of the Middle East
- ANT 355 Peoples and Cultures of Sub-Saharan Africa
- ANT 361 Islamic Fundamentalism
- ANT 364 Cultural Ecology
- ANT 365 Political Anthropology
- ANT 366 Economic Anthropology
- ANT 367 Peasant Studies
- ANT 368 Social Anthropology of Complex Societies
- ANT 381 Language and Culture
- ANT 391 Intercultural Understanding
- INT 310 Introduction to the Study of Linguistics

- INT 358 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 335 History of Economic Thought
 - ECO 336 Marxian Economics
 - ECO 337 Comparative Economic Systems
 - ECO 338 Economic Development
 - ECO 339 International Trade and Commercial Policy
2. History
 - HTY 107/108 Asian Civilization
 - HTY 115/116 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 Modern History of 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 449 Argentina, Brazil, and Chile
 - HTY 450 Mexico
 - 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 335 Democratic Governments of Europe

- POS 336 The Communist Government of the Soviet Union
 - POS 373 International Relations
 - POS 374 United States Foreign Policy
 - POS 387 International Law
 - POS 388 World Order Through International Organization and Law
 - POS 465 Governments of South Asia
 - POS 466 Governments of East Asia
 - POS 467 African Politics
 - POS 468 Government in 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 332 Intermediate Macroeconomics
 - ECO 373 Intermediate Microeconomics
 - ECO 337 Comparative Economic Systems
 - ECO 339 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 334, 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).

*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.

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 and 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 adviser. 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 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.)

- 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, University of Maine, Orono, Maine 04469.

Journalism and Broadcasting

Associate Professor Craig (Chairperson); Professors Hamilton (Emeritus), Miller; Associate Professor Guesman; Assistant Professors Olmstead, Steele, Wallace-Whitaker

The chief objective of the Department of Journalism and Broadcasting is to provide a sound academic foundation for the student who intends to make a career in some phase of professional journalism, advertising or broadcasting. It seeks to achieve this goal by offering the student a comprehensive study program that combines superior professional instruction with a broad education in the liberal arts.

It is a corollary aim of the department to be of service to the communications media of Maine and elsewhere, to other educational institutions of the state (including the high schools), and to the public at large. Within the limits of space and other facilities upon which journalism and broadcasting majors properly have first claim, the Department endeavors to make its course of instruction available to all students.

Career Opportunities

The world of journalism and broadcasting today is broader in scope than ever before. It includes newspapers and magazines, radio and television, advertising, public relations, industrial editing, and video production. Journalism talent and skills find application in many other fields; government service and teaching are examples.

The Department of Journalism and Broadcasting assists in placement of graduates. Employment requests are received from newspapers, news services, magazines, radio and television stations, advertising agencies, public relations agencies and offices, and from secondary schools.

High Standards

Broad scholarship is emphasized because the successful graduate must be competent to deal with communications in virtually every form of human endeavor. Professional journalism and broadcasting programs at the University have been developed in response to public and professional needs. These programs, as described by the American Council of Education for Journalism, are distinguished by the following characteristics:

1. They maintain a professional curriculum with one or more sequences leading to a bachelor's degree.
2. They carry on the professional training of general practitioners for the field of journalism and broadcasting while giving due consideration to services to the profession and to research.
3. They strive to serve national media as well as media of their own states.
4. They are committed to a liberal philosophy of professional training that places strong emphasis on liberal arts studies.
5. They provide close relationships between students and teachers.

Pursuing Courses of Study

College of Arts and Sciences students declare their major at the end of the sophomore year. Freshmen and sophomores with a wide variety of interests may find professional satisfaction in a journalistic or broadcasting career and should seek an advisor in the Department early to develop the most useful interdisciplinary program of study.

The undergraduate program offers advertising, broadcast news, and news-editorial se-

quences leading to a bachelor of arts degree in journalism and a broadcast production sequence leading to a bachelor of arts degree in broadcasting.

All majors, both broadcasting and journalism, must demonstrate intermediate proficiency in a foreign language, and must satisfy the minimum requirements of the College of Arts and Sciences.

A student must earn a grade of 2.0 in any course which is a prerequisite for a journalism or broadcasting course within the core and the chosen sequence.

A grade of 2.0 or better is required in all journalism or broadcasting courses required for graduation and in all courses submitted to satisfy department requirements.

Students in the College of Life Sciences and Agriculture also are offered a minor in journalism as a second field of study.

Prospective majors are expected to be able to type. All departmental course papers must be typewritten.

General Skills and Education Requirements

All students in the Department of Journalism and Broadcasting must complete a curriculum of general education and skills courses. This curriculum is designed to provide the student with a broad and varied liberal arts program in conjunction with their area of concentration within the department. A grade of 2.0 or better is required in courses taken to fulfill the general education and skills requirements.

General Education

History: 6 credits

Choose one sequence:

HTY 103/104 United States History

HTY 105/106 History of European Civilization

Behavioral Science: 6 credits

Required:

PSY 100 General Psychology

Choose one:

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

Choose one:

POS 110 An Introduction to Politics

POS 212 Introduction to Political Theory

Economics: 6 credits

Required:

ECO 120 Principles of Microeconomics

ECO 121 Principles of Macroeconomics

Arts and Humanities: 15 credits

Required:

1 survey level course in Philosophy

1 survey level course in Literature

2 additional Philosophy or Literature courses above the survey level

1 course from visual or performing arts list

Science and Mathematics: 11 credits minimum

Required:

MAT 232 Principles of Statistical Inference

1 Science course with associated laboratory

Students must complete a two-semester sequence in a single discipline (of which either of the above may constitute a part).

Computer Skills: 2 credits minimum

Required:

COS 100 Introduction to Personal Computers

(or any other 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

The Journalism Major

A student selecting the journalism major will receive a B.A. in journalism upon completion of the required program.

Journalism majors must select and complete one or more of the sequences indicated (advertising, broadcast news or news-editorial), and must complete a minimum of 24 credit hours in journalism. A maximum of 33 credit hours in journalism or broadcasting courses is allowed within the 120 credit graduation requirement.

Advertising Sequence: Required Courses

JBR 100	Introduction to Mass Communication	3
JBR 250	Introduction to Advertising	3
JBR 251	Media Operation and Management	3
JBR 355	Advertising Copywriting and Layout	3
JBR 356	Advertising Media	3

JBR 357	Newspaper Advertising Lab	3
	OR	
JBR 358	Advanced Copywriting	(3)
JBR 459	Advertising Campaigns	3
JBR 375	Mass Media Law and Ethics	3
ENG 317	Advanced Professional Exposition	3
	OR	
Approved upper level writing course		<hr/>
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Broadcast Journalism News Sequence: Required Courses

JBR 100	Introduction to Mass 'Communication	3
JBR 231	Reporting and Newswriting	3
JBR 233	Broadcast Reporting and Newsgathering	3
JBR 241	Audio Production Techniques	3
JBR 242	Video Production Techniques	3
JBR 370	Law and Ethics: Telecommunication	3
JBR 433	Electronic News Laboratory	3
	Journalism or Broadcasting Elective	<hr/>
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News Editorial Sequence: Required Courses

JBR 100	Introduction to Mass Communication	3
JBR 231	Reporting and Newswriting	3
JBR 232	Public Affairs Reporting	3
JBR 375	Mass Media Law and Ethics	3
JBR 430	Copy Editing	3
JBR 431	Newspaper Laboratory I	3
JBR 432	Newspaper Laboratory II	3
JBR 489	Seminar in Journalism	3
		<hr/>
		24

The student should also consider the many electives offered in both journalism and broadcasting to round out the program.

Option Requirements—News Editorial Sequence Only

All news-editorial majors must complete an 18-hour option approved by an academic advisor by the first semester of the senior year. This requirement is in addition to the General Education Requirements, the General Skills require-

ment, and the News-Editorial Sequence requirement. All courses used to satisfy the option requirement must be above introductory and survey level. The option consists of courses outside the Department of Journalism and Broadcasting usually clustered in areas of concentration that pertain to journalism. Students are strongly encouraged to seek advice from an advisor in the department in which most of the option courses will be taken. Independent and cross-disciplinary options must also have the approval of the news-editorial sequence committee. A grade of 2.0 or better is required for courses used to satisfy the option requirement.

Options available include:

Public Affairs. Students should concentrate in political science, history or economics. A double major with any of these disciplines is easily obtainable, as well.

Foreign Affairs. Students must complete level eight in a foreign language plus 18 hours of international and comparative courses in history, political science, or economics.

Humanities. Students must take eighteen hours of upper level courses in art, music, theater, literature, philosophy or in a combination of these fields.

Science and Mathematics. Students should take the introductory courses for majors and 18 upper level hours. The introductory courses can fulfill the general education and the Arts and Sciences requirements as well.

Environmental Studies. Students should take 18 hours in the Environmental Issues and Ecological Studies interdisciplinary course concentration above survey and introductory level.

Business and Finance. Students should take 18 hours of upper level courses in the College of Business Administration, concentrating on courses required for Finance, Management, and Marketing majors.

Behavioral Science. Students should take eighteen hours of courses in the upper level in anthropology, sociology or psychology.

The Broadcasting Major

The Broadcasting area in the Journalism and Broadcasting Department offers a specialized program of study designed for those students seeking to enter the Broadcasting field at the small and medium market levels. The academic program leads to the degree of Bachelor of Arts in Broadcasting. Courses are also open to gener-

al students who seek to deepen their understanding of these media and to gain working knowledge of creative skills and methods.

Specific Requirements in the Broadcasting Major

The broadcast major must take a minimum of 24 credit hours of course work in the department.

All students are invited to apply for staff positions or program assignments with radio station WMEB-FM, which is operated by the department as a year-round radio service for the University community and the general public. Work-study opportunities and internships with local and regional radio, TV, and film facilities are available to major students on a selective basis.

Core Courses Required—All Broadcast Production Majors

JBR 100	Introduction to Mass Communication	3
JBR 212	Survey of Telecommunication	3
JBR 236	Introduction to Writing for the Electronic Media	3
JBR 241	Audio Production Techniques	3
JBR 242	Video Production Techniques	3
JBR 370	Law and Ethics: Telecommunication	3
JBR 376	Programming and Criticism of Electronic Media	3
JBR 440	Electronic Media Production Laboratory	3
	OR	
JBR 442	Advanced Video Production Techniques	(3)
	OR	
JBR 497	Problems in Telecommunications	(3)
		24

The student should also consider the many electives offered in both journalism and broadcasting to round out the program. Students also may receive credit for working at WMEB-FM by registering for JBR 144, Radio Laboratory, a one-credit course repeatable up to a maximum of three credits.

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 the major many opportunities to work with the city's daily newspaper, *The Bangor Daily News*, with weekly newspapers, or with the several commercial radio stations and three commercial television stations in the area.

Facilities

Associated with the program is the daily student newspaper, *The Daily Maine Campus*, which has editorial and business offices, a photography darkroom, and production rooms. *The Daily Maine Campus* is equipped with personal computers for word processing, and photocomposition typesetting and processing equipment.

Students associated with *The Daily Maine Campus*, which serves as the newspaper laboratory, have access to Associated Press wire services.

Newswriting and editing are taught in the department's personal computer lab, a facility shared with Sociology and Music. A number of these micro-computers are also linked to the University of Maine IBM mainframe.

Broadcasting facilities include the campus radio station, WMEB-FM, a 380-watt, non-commercial outlet. Television facilities include portable video cameras and recorders for field production and electronic editing suites for video editing. A new television studio is currently planned in renovated space in Alumni Hall. It is hoped construction will be completed during the 1987-88 academic year.

Courses in Journalism

JBR 100 Introduction to Mass Communication

An introductory course in the structure and operation of mass media and the social, political and economic implications of their activities. Open to all freshmen and sophomores. Cr 3.

JBR 144 Radio or Maine Campus Laboratory

Section I of this course provides hands-on experience in running the student radio station, as staff of WMEB-FM. Section II of this course provides hands-on experience in the production of *The Daily Maine Campus*, the student newspaper. The course will not count toward the maximum credit hours permissible for JBR majors. Repeatable up to 3 credits. Cr 1.

JBR 211 History of American Journalism

A review of the newspaper's role in American history, the development of modern mass communications

Cr 3.

JBR 212 Survey of Telecommunication

Survey of broadcast and non-broadcast communications services as they function in the United States. History, industrial structure, systems of content and dissemination, and social, political and technological influences will be examined.

Cr 3.

JBR 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.

JBR 216 Introduction to Photojournalism

For students desiring an understanding of photography as an effective medium of communications. Classroom and darkroom instruction. Basic principles of processing, composition, and the uses of photography in various media.

Cr 3.

JBR 231 Newswriting and Reporting

A basic course in newswriting and reporting, intensive practice in developing newswriting techniques, accuracy, style, judgment and responsibility. Open to Freshmen. Prerequisite: ENG 101 with a C or better.

Cr 3.

JBR 232 Public Affairs Reporting

A course in public affairs reporting, with an emphasis on local and state government. Students report weekly on a beat and produce an in-depth investigative article. Prerequisite: JBR 231 with C or better.

Cr 3.

JBR 233 Broadcast Reporting and Newsgathering

Development of news gathering and reporting techniques for radio with emphasis on newswriting and producing reports and newscasts for the campus radio station. Prerequisite: JBR 231 and JBR 241.

Cr 3.

JBR 236 Introduction to Writing for the Electronic Media

Basic writing skills for the broadcast media. Exercises in commercial and public service copywriting, continuities and promotion, newswriting, editorial copy and short features.

Cr 3.

JBR 241 Audio Production Techniques

The creative application of audio techniques as applied to radio and television. Prerequisite: BR 236 or JBR 231.

Cr 3.

JBR 242 Video Production Techniques

Creation, production and direction of television and video presentations concentrating on imaginative and original uses of television and video techniques. Prerequisite: JBR 241.

Cr 3.

JBR 250 Introduction to Advertising

Social and economic roles of advertising. Rate structure, agency practices, effective use of media. Advertising principles analyzed and discussed from the media point of view.

Cr 3.

JBR 251 Media Operation and Management

Basic principles and methods of operation and management applied to the mass media. Emphasis on comparison and contrast among the media in circulation, advertising, business, and editorial operations. Prerequisite: JBR 100.

Cr 3.

JBR 355 Advertising Copywriting and Layout

Theory and basic practice in creating advertising for print, direct mail and electronic media, with emphasis on the unique limitations of each, and the responsibilities of the advertising practitioner. Prerequisite: JBR 250 with C or better; JBR majors with at least junior standing.

Cr 3.

JBR 356 Advertising Media

Problems and procedures of the advertising industry as they pertain to media selection, support, promotion, research, organization, and consumer understanding. Prerequisite: JBR 250 with C or better; or BUA 370; JBR majors with at least junior standing.

Cr 3.

JBR 357 Retail Advertising

Lectures and basic practice in the problems and forms of retail advertising. An alternative requirement for all majors. Prerequisite: Majors only, JBR 355 or JBR 356.

Cr 3.

JBR 358 Advanced Copywriting

Further development of effective writing styles for specific forms of advertising: Print media, including direct mail, will be emphasized. Through writing assignments, students will explore visualization techniques, product analysis, questions of taste, stereotypes, and the impact of typography on words. Prerequisite: JBR 355 with grade of B or better.

Cr 3.

JBR 370 Law and Ethics: Telecommunications

The relationship between station operation and governmental policy and regulation. Special emphasis on the licensee's public service responsibilities as established by legislative and judicial precedents. Prerequisite: JBR 212.

Cr 3.

JBR 375 Mass Media Law and Ethics

A study of the legal and ethical issues affecting the publishing and broadcasting worlds. Topics include libel, privacy, contempt, copyright, obscenity, censorship, prejudicial pre-trial publicity, and others as they develop within the society. Prerequisite: JBR 100. **Cr 3.**

JBR 376 Programming and Criticism of Electronic Media

Programming practices, strategies and conventions in terms of broadcast history, economics and socio-cultural factors. Critical analysis of contemporary program trends in television and radio. Prerequisite: JBR 212. **Cr 3.**

JBR 398 Special Topics Lab

A variety of lab topics offered on a non-regular basis. **Cr 3.**

JBR 410 Newspaper Design

An advanced course explaining and applying the elements and philosophy of newspaper design. Prerequisite: 9 credits of journalism. **Cr 3.**

JBR 430 Copy Editing

A lab course, centered on operation of the modern news desk, aimed at developing editorial judgment and skills in preparing news for publication. Prerequisite: JBR 232 or JBR 233. **Cr 3.**

JBR 431 Newspaper Laboratory I

Designed to give students a variety of practical experiences as staff members of the Maine Campus. The two labs must be taken in consecutive semesters. Prerequisite: JBR 232. **Cr 3.**

JBR 432 Newspaper Laboratory II

Continuation of JBR 431. **Cr 3.**

JBR 433 Electronic News Laboratory

An advanced course in radio field reporting and newscast producing for the campus radio station. Includes an introduction to television reporting. Prerequisite: JBR 233 and JBR 241 or equivalent. **Cr 3.**

JBR 434 Editorial and Opinion Writing

A course in writing persuasively and argumentatively, but with disciplined logic and upon adequate factual knowledge of other opinions and of the subject. Prerequisite: at least 12 hours of Journalism, including JBR 232. **Cr 3.**

JBR 435 Feature Writing

An advanced course in developing style and proficiency in writing non-fiction newspaper and magazine articles. Prerequisite: JBR 232 or permission of instructor. **Cr 3.**

JBR 436 Advanced Writing for the Electronic Media

Writing experience for advanced students in the design of original dramatic scripts, adaptations and documentaries for radio and television. Students will concentrate on the development of one script project for the entire semester, from initial idea through finished script. Prerequisite: JBR 236. **Cr 3.**

JBR 440 Electronic Media Production Laboratory

Production experiences for advanced students providing the opportunity to work on the planning, creation and execution of sophisticated audio or video projects. Prerequisite: JBR 241, JBR 242. **Cr 3.**

JBR 442 Advanced Video Production Techniques

An advanced course in creating, developing, and directing video productions. Emphasis on fixed studio television production. Develop creative and organizational skills, as well as leadership and responsibility. Prerequisite: JBR 242. **Cr 3.**

JBR 459 Advertising Campaigns

A study of the advertising campaign, with emphasis on both practical and theoretical aspects of marketing and promotional strategy, creative effort, media selection, and advertising research. Prerequisite: JBR 250, JBR 355, JBR 356 with C or better. **Cr 3.**

JBR 489 Seminar - Media Ethics and Issues

A seminar in media ethics, economics, and socio-political effects. Prerequisite: Senior JBR major only or permission. **Cr 3.**

JBR 495 Internship

Practical professional experience with selected mass communications media, approved by the department and under the direction of a qualified supervisor. Work performed must provide meaningful relationship between communications media and academic program. Prerequisite: Permission only. **Cr 3.**

JBR 497 Problems in Telecommunication

Special topics and problems in Broadcasting and Cable, including criticism and analysis. Prerequisite: permission. **Cr 3.**

Mathematics

Professor Murphy (Chairperson); Professors Balakrishnan, Beard, Bresinsky, Dodge, Farlow, Feichtinger, R. Gupta, Mairhuber, Pogorzelski, Puri, Wohlgemuth; Associate Professors Bray, Geiger, P. Gupta, Hannula, Locke, Snyder, Soule, Stearns, J. Toole; Assistant Professors Franzosa, Fuentes, Halteman, Ozluk, Slavin; Instructors B. Toole, Twitchell; Lecturer Van Steenberghe; Graduate Assistants Butler, Fogler, Morin, Nichols, Wang

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: Freshman and Sophomore Years (19 Math Hours)

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

Basic Core Courses: Junior and Senior Years (13/14 Math Hours)

MAT 259 Differential Equations

OR

MAT 381 Discrete Mathematics

MAT 334 Introduction to Statistics

MAT 425 Advanced Calculus I

MAT 463 Introduction to Abstract Algebra I

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 352 Introduction to Complex Variables

MAT 365 Theory of Numbers

MAT 374 Projective Geometry

MAT 375 Higher Geometry I

MAT 426 Advanced Calculus II*

MAT 464 Introduction to Abstract Algebra II*

MAT 471 Differential Geometry

B. Continuous Applied Mathematics

MAT 352 Introduction to Complex Variables

MAT 353 Partial Differential Equations I*

MAT 354 Partial Differential Equations II

MAT 387 Numerical Analysis*

In addition to three of the above four mathematics courses, PHY 121, General Physics I and PHY 122, General Physics II must be taken for the Continuous Applied Mathematics Option.

C. Discrete Applied Mathematics

MAT 355 Introduction to Operations Research I*

MAT 356 Introduction to Operations Research II

MAT 357 Introduction to Mathematical Modeling

MAT 388 Graph Theory

D. Statistics

MAT 435 Introduction to Mathematical Statistics*

MAT 439 Regression and Analysis of Variance*

MAT 436 Nonparametric Statistics

E. Mathematics Education

MAT 305 Mathematics for Teachers*

MAT 345 History of Mathematics—Before the 17th Century

OR

MAT 346 History of Mathematics—The 17th Century and After

MAT 365 Theory of Numbers

MAT 372 Complex Numbers

OR

MAT 374 Projective Geometry

OR

MAT 375 Higher Geometry I

MAT 505 Selected Topics in Mathematics for High School Teachers of Mathematics

F. Optional

Three courses generally numbered 300 or above, which provide a mathematical concentration approved in advance by the Department chairperson.

G. 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 provides a combination which enhances employment prospects.

Courses in Mathematics

MAT 105 Elements of College Mathematics I

Introduction to significant structures and theorems, at a level suitable for non-science majors. Content varies with the instructor and may include topics such as logic, number theory and foundations of computer science. **Cr 3.**

MAT 106 Elements of College Mathematics II

A continuation of the material in MAT 105. Prerequisite: MAT 105 or permission. **Cr 3.**

MAT 107 The Structure of Arithmetic I

A development of the real number system beginning with the sub-system of natural numbers and generalizing through the systems of integers, rational numbers, and real numbers. Properties of numbers, relations, and operations. Details of numeration systems. Primarily for the elementary school teacher. (Note: MAT 107, MAT 108, MAT 209 and MAT 210 may not be taken for credit by Arts and Science students). **Cr 3.**

MAT 108 The Structure of Arithmetic II

A continuation of the material in MAT 107. Prerequisite: MAT 107. Introduction to geometry, probability and statistics. **Cr 3.**

MAT 111 College Algebra

The algebraic material of MAT 122 offered in a format that allows a slightly more extensive treatment. The course provides the transition from high school algebra necessary for some students. Prerequisite: two units of high school algebra and one unit high school geometry (knowledge should be current). Admission to course depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class.

(May not be used to satisfy the Arts and Sciences Area III requirement.) A maximum of four credits is allowed for MAT 111, MAT 112, and MAT 122. Rec 3. **Cr 2.**

MAT 112 Transcendental Functions (Trigonometry)

The transcendental function material of MAT 122 offered in a format that allows a slightly extended time schedule. Prerequisites: two units of high school algebra and one unit of high school geometry (knowledge must be current), MAT 111. Admission to the course depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class or successful completion of MAT 111. A maximum of four credits is allowed for MAT 111, MAT 112, and MAT 122. Rec 3. **Cr 2.**

MAT 113 Mathematics for Business and Economics I

Elementary college mathematics with applications to business and economics. Mathematical models, elementary functions, systems of equations and inequalities, linear programming, matrix algebra. Prerequisite: three years of high school mathematics (knowledge should be current). Admission to the course depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class. **Cr 3.**

MAT 114 Mathematics for Business and Economics II

Introduction to differential and integral calculus with applications to business and economics. Prerequisite: MAT 113 or permission. **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 as required for further work in mathematics, in particular for calculus. Prerequisite: two units of high school algebra and one unit of high school geometry (knowledge should be current). Admission depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class. A maximum of four credits is allowed for MAT 111, MAT 112 and MAT 122. **Cr 4.**

MAT 123 Enriched Calculus and Analytic Geometry I

Topics covered are essentially those covered in 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. Admission depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class. **Cr 4.**

MAT 124 Enriched Calculus and Analytic Geometry II

Topics covered are essentially those covered in MAT 127 but theoretical concepts receive greater stress, and problems of greater depth and scope are considered. Prerequisite: MAT 123 or MAT 126. **Cr 4.**

MAT 126 Analytic Geometry and Calculus

Equations and graphs, differentiation and integration, applications. Prerequisites: the equivalent of MAT 122. Admission to course requires passing departmental examination. **Cr 4.**

MAT 127 Analytic Geometry and Calculus

Differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions; applications, infinite series. Prerequisite: MAT 126 or MAT 123 or permission. **Cr 4.**

MAT 151 Calculus for the Life Sciences I

An introduction to differential and integral calculus and its applications to the life sciences. Prerequisites: MAT 122 or equivalent. **Cr 4.**

MAT 152 Calculus for the Life Sciences II

More advanced topics in calculus with applications to the life sciences will be examined. Integration techniques, first order differentials equations, Taylor polynomials, vectors, functions of several variables, and double integral. Prerequisite: MAT 151. **Cr 4.**

MAT 162 Matrices and Linear Programming

The aim of the course is to introduce elementary concepts in linear algebra and linear programming to computer science majors with business concentration. Prerequisite: MAT 126 or permission. **Cr 3.**

MAT 209 Informal Geometry

Sets, points, lines, planes, and other configurations of one, two, and three dimensional geometry. Congruences, measurement, and constructions. Primarily for the elementary school teacher. 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. 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. Major topics covered are sampling, estimation, testing. Prerequisite: MAT 114 or MAT 126. **Cr 3.**

MAT 225 Enriched Calculus and Analytic Geometry III

Topics covered are essentially those covered 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

Vector algebra, geometry and calculus, multivariable differential and integral calculus, applications. Prerequisite: MAT 127 or MAT 124. **Cr 4.**

MAT 229 Freshman-Sophomore Mathematics Seminar

A discussion of topics usually not covered in a usual calculus course, such as application of calculus to various physical and social sciences and to other branches of mathematics. Material will include the publications of the UMAP Project. Class will be in a lecture/discussion format. Prerequisite: MAT 126 or MAT 123. May be repeated for credit. Offered spring semester. **Cr 1.**

MAT 232 Principles of Statistical Inference

An introductory course including such topics as data description, sampling variability, estimation, hypothesis testing and regression. **Cr 3.**

MAT 241 Mathematical Logic

Sentential calculi, deduction theorem and completeness theorem. Prerequisite: One year college mathematics. **Cr 3.**

MAT 242 Analytic Thinking

A course designed to develop logical reasoning, a facility in algebraic computations and insights into problems through geometric interpretation. A twofold objective is to overcome mathematics apprehensions while increasing quantitative thinking abilities. **Cr 3.**

MAT 259 Differential Equations

An introduction to ordinary differential equations; applications. Prerequisite: MAT 228 or MAT 225. **Cr 4.**

MAT 261 Introduction to Abstract Mathematics

Topics from elementary set theory, number theory and mathematical induction, relations and functions, sequences and limits. The aim of the course is to develop the student's ability to write mathematical proofs in preparation for courses like advanced calculus and abstract algebra. Prerequisites: 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 is not fixed, but can be varied to suit current needs. The course may, with permission of the department, be taken more than once. Prerequisite: consent of the department. **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 will be on problem-solving in various areas of mathematics, with material taken from various problem books, competitions, and mathematical periodicals. Prerequisite: MAT 127 or MAT 124 or permission. May be repeated for credit. Offered fall semester. **Cr 1.**

MAT 334 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 337 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 334 or permission. **Cr 3.**

MAT 338 Design of Experiments

Continuation of MAT 337, with consideration of nonorthogonal designs in analysis of variance, and an introduction to other experimental design techniques which are widely applicable. Prerequisite: MAT 337. **Cr 3.**

MAT 345 History of Mathematics-Before the 17th Century

Basic developments in mathematics from its origins up to the 17th century. **Cr 3.**

MAT 346 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 347 Foundations of Mathematics I

Fundamental concepts and methods of mathematics; viewpoints on the foundation of mathematics. Not given every year. Prerequisite: MAT 228 or permission. **Cr 3.**

MAT 348 Foundations of Mathematics II

Fundamental concepts and methods of methods of mathematics; viewpoints on the foundation of mathematics. Not given every year. Prerequisite: MAT 228 or permission. **Cr 3.**

MAT 351 Introduction to Vector and Tensor Analysis

Scalar and vector fields; Newtonian kinematics and Kepler's laws of planetary motion. Gradient, divergence, and curl; the theorems of Green, Stokes, and Gauss; curvilinear coordinates; contravariant and covariant tensors; absolute derivative of a tensor field; geodesics; Riemannian curvature. Prerequisite: MAT 228. **Cr 3.**

MAT 352 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 353 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 354 Partial Differential Equations II

A continuation of the material in MAT 353. Prerequisite: MAT 353. **Cr 3.**

MAT 355 Introduction to Operations Research I

Introduction to linear programming, including various algorithms, transportation and assignment problems, duality. Network and game theory. Emphasis on modelling problems arising in business and industry. Prerequisite: COS 210 or equivalent. **Cr 3.**

MAT 356 Introduction to Operations Research II

A continuation of the material in MAT 355. Prerequisite: MAT 355. **Cr 3.**

MAT 357 Introduction to Mathematical Modeling

A hands-on approach. Students will be expected to formulate, analyze and criticize mathematical models. The models will be chosen from biological and managerial sciences as well as the physical sciences. Students will be encouraged to report on particular models of their choosing. Prerequisite: MAT 215 or MAT 127 or MAT 124. Offered in the fall. **Cr 3.**

MAT 358 Seminar in Mathematical Modeling

Students will be expected to report on models in their own disciplines. Prerequisite: MAT 357. **Cr 1.**

MAT 359 Methods of Applied Mathematics I

Intensive study of methods for solving problems in the physical sciences: vector and tensor analysis, series solution of differential equations near singular points, linear algebra and determinants. Prerequisite: MAT 259 or permission. **Cr 3.**

MAT 365 Theory of Numbers

Elementary properties of integers: divisibility, uniqueness of prime factorization. Prerequisite: One year of college mathematics. **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. Offered in spring of alternate years. Prerequisite: MAT 127 or MAT 124 or one year college mathematics and permission. **Cr 3.**

MAT 374 Projective Geometry

Incidence axioms, duality, perspectivities, and projectivities, Desargues' Theorem, Pappus' Theorem, Fundamental Theorem, coordinatization, finite geometries. Prerequisite: MAT 262. **Cr 3.**

MAT 375 Higher Geometry I

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 376 Higher Geometry II

A continuation of the material in MAT 375. Prerequisite: MAT 375. **Cr 3.**

MAT 381 Discrete Mathematics

The aim of the course is to introduce algebraic structures such as formal languages and finite state machines to mathematics and computer science majors. Prerequisite: MAT 261. **Cr 3.**

MAT 387 Numerical Analysis

Computational methods for electronic computers; exercises on the IBM 370 for interpolation, simultaneous linear algebraic equations, nonlinear and polynomial equations, numerical integration, ordinary and partial differential equations. Prerequisite: MAT 228 or MAT 225 and COS 220. **Cr 3.**

MAT 388 Graph Theory

General survey of a number of topics in graph theory. Topics include: 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 4-0 Selected Topics in Mathematics

Advanced topics in mathematics not regularly covered in other courses. The content is not fixed but can be varied to suit current needs. The course may, with permission of the department, be taken more than once. Prerequisite: permission. **Cr 2 or 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 the material in MAT 425. Prerequisite: MAT 425. **Cr 3.**

MAT 435 Introduction to Mathematical Statistics

Topics include moment generating functions, distributions of functions of random variables including sampling distributions, principles of estimation and hypothesis testing, limit theorems, order statistics. Prerequisite: MAT 334. **Cr 3.**

MAT 436 Nonparametric Statistics

The course will survey the nonparametric alternatives to the standard parametric techniques found in a first course in statistics. The emphasis will be on situations in which the use of a parametric technique is incorrect or, at best, marginal. Prerequisite: MAT 334 or MAT 337. **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 334. 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 the material in MAT 463, with emphasis on properties of rings and fields. Prerequisite: MAT 463. Cr 3.

MAT 471 Differential Geometry

Applications of calculus to the study of space curves and surfaces. Not given every year. Prerequisite: MAT 228 or MAT 225. Cr 3.

MAT 5-0 Advanced Topics in Mathematics

The ten digit specifies the area. Topics not regularly covered in other courses. Course may be taken more than once. Prerequisite: Permission. Cr 2 or 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. Not given every year. Cr 3.

MAT 523 Functions of a Real Variable I

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 material in 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 material in MAT 527. Prerequisite: MAT 527. Cr 3.

MAT 531 Mathematical Statistics I

Axioms of probability, random variables, continuous and discrete distributions, moment generating functions, distributions of functions of random variables, sampling distributions. Prerequisite: MAT 334, MAT 425 or permission. Cr 3.

MAT 532 Mathematical Statistics II

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 arising in business and industry. Prerequisite: MAT 334. Cr 3.

MAT 554 Topics in Operations Research

Course designed to cover recent developments in O.R. Topics vary according to interests of the class. Prerequisites: MAT 355. 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. Prerequisite: MAT 262 and either MAT 425 or MAT 356. Cr 3.

MAT 558 Mathematical Programming II

A continuation of the material in MAT 557 with emphasis on linear and dynamic programming. Prerequisite: MAT 557. Cr 3.

MAT 559 Methods of Applied Mathematics II

Continuation of MAT 359. Complex variables, including conformal mapping and transform analysis, Sturm-Liouville theory, variational calculus, stability, theory and asymptotics. Prerequisite: MAT 359 or permission. Cr 3.

MAT 563 Abstract Algebra I

Basic structure theorems for groups, rings, fields and modules. Prerequisite: Two courses from among MAT 262, 463 and 464. Cr 3.

MAT 564 Abstract Algebra II

A continuation of the material in 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 the material in 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. Spring semester, odd years. Prerequisite: MAT 387 or equivalent. **Cr 3.**

Program in Oceanography

(Not an Undergraduate Degree Program)

Professors Pearce, Puri, Schnitker (Graduate Coordinator), Vadas; Associate Professors Fink (Coordinator), Belknap, Kelley, King, Mayer, McAlice, Watling; Assistant Professor Steneck

Oceanography is an interdisciplinary area of science concerned with the study of the air-sea interface, the bottom and margins of the sea, the sea water itself, the inhabitants of the sea, and the interactions among these subjects. Because oceanography is not a single science, but a combination of sciences, 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 each 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 program offers courses leading to M.S. and Ph.D. degrees. The program requirements are set forth in the Graduate School Catalog.

Specific fields of research include planktology, benthic and polar ecology, marine fishes, phycology, pollution, micropaleontology, sedimentology, coastal processes and benthic biogeochemistry.

The program office is located at 6 Coburn Hall on the Orono campus. In addition, the research facilities of the Darling Center (100 miles south on the Damariscotta River estuary) are utilized by the faculty and students for projects. Many of the graduate courses are available to interested and prepared 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 current areas of research areas in the Oceans, 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 419 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 will be 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, emphasizing 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, emphasizing

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 334. 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 the material in MAT 463, with emphasis on properties of rings and fields. Prerequisite: MAT 463. Cr 3.

MAT 471 Differential Geometry

Applications of calculus to the study of space curves and surfaces. Not given every year. Prerequisite: MAT 228 or MAT 225. Cr 3.

MAT 5-0 Advanced Topics in Mathematics

The ten digit specifies the area. Topics not regularly covered in other courses. Course may be taken more than once. Prerequisite: Permission. Cr 2 or 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. Not given every year. Cr 3.

MAT 523 Functions of a Real Variable I

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.

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Biology and ecology of marine zooplankton, particularly of the Gulf of Maine, emphasizing

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, MAT 228. 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 1.

OCE 541 (OCE, CIE) Physical Oceanography

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 560 (OCE, GES) Marine Geology

Current theories dealing with 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 of instructor. Rec 3. Cr 3.

OCE 567 Actinopaleontology

Study of living and fossil organisms and relationships to their sedimentary environment. Course normally conducted in four full-week-end field investigations at the Darling Center. Prerequisite: GES 101, GES 102, GES 314 or ZOL 453. (Same course as GES 567). Cr 2.

OCE 568 Deep Sea Stratigraphy and Paleooceanography

The 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 (BOT, FOR, OCE, ZOL) Field Studies in Ecology

A field trip of one to several weeks to an area of ecologic interest; details announced in time for registration each year course is offered. Trips may be scheduled during Christmas, midyear, spring recess or summer. An intensive ecology field course; field and living conditions will often be rigorous and/or primitive. Prerequisite: a course in ecology. Other preparation and/or recommended prerequisites announced for each trip. Credit will differ, depending upon trip. Cr Ar.

INT 510 (OCE) Marine Invertebrate Zoology

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 453 or equivalent. Rec 2, Lab 6. Cr 5.

INT 563 (BOT, OCE, ZOL) Marine Benthic Ecology

An advanced course emphasizing ecological studies on benthic intertidal and subtidal marine organisms. Includes discussions on limiting factors, distributions, zonation, biotic interactions, food webs, succession, productivity, community structure and organization. Prerequisite: a course in ecology, Lec 2, Rec 1. Cr 3.

School of Performing Arts

Music

Associate Professor Hallman (Chair); Professor Jacobs; Associate Professors Cox, Foley, Hall, F. Heath, Nesbit, Roscetti, Stratton, Voronietzky; Assistant Professors Farnham, Grindel, Marrs, Ogle, Wieck; Instructors Chickering, Cox, Crook, Garwood, S. Heath, Hwalek, MacDonald, Mummé, Whidden, Worley

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	17
Music History and Literature	10
Performance Emphasis (seven semesters)	7
Senior Project	1
Music Organization	4
Music Electives (theory or history)	9
	48
Liberal Arts	72
Total Credits	120

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	14
Music Organization	7
Instrumental concentration	18
OR	
Vocal/Keyboard concentration	(18)
Music Education Sequence	10
	81
Professional Education	12
Liberal Arts	27
Total Credits	120

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, 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
Performance Minor	4
Music Organization	8
Conducting	6
Electives in Music	9
	87
Liberal Arts	33
Total Credits	120

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.

All entering students are required to take placement examinations in music theory and piano.

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 major will be allowed to study private piano until completion of MUP 216, successful completion of the equivalent piano proficiency exam or permission.
2. Achieve a grade of "C" or better in any sequential music course.

Candidates for the B.A. degree in Music must successfully pass the sophomore level jury examination on their applied major instrument or voice.

Candidates for the B.M.Ed. degree must present an approved half-hour public recital in their junior year.

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 the Music Major no fees will be charged for required private instruction.

For the non-music major and for private instruction not required of music majors, a fee of \$90 per semester will be charged for one one-half hour lesson per week, a fee of \$180 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. 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 pos-

sible, 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 for 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 enroll for one hour of credit.

B.Mus., B.M. in Mus. Educ. candidates

First level	MUS 210-220
Second level	MUS 230-240
Third level	MUS 350-360
Fourth level	MUS 370-380

B.A. (Major in Music) candidates

All others	
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. Students will be reviewed at the end of their sophomore year 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	F. Heath
02 bass	Chickering
03 bassoon	MacDonald
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, Voronietzky
14 saxophone	Worley



15 trombone	F. Heath
16 trumpet	Stratton
17 tuba	F. Heath
18 violin	Wieck
19 viola	Wieck
20 voice	Hallman, Ogle, Whidden

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 with an 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 with an emphasis on the continuation of materials, concepts and skill development from MUE 105. 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 equivalent. 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 equivalent. Lab 4. **Cr 2.**

MUE 210 Introduction to Music Education

Exposure to classrooms in primary and secondary music settings. Philosophies of music education. Programming and evaluation. Open to all music majors. **Cr 2.**

MUE 213 Woodwind Class

Basic performance and pedagogical skills pertaining to the woodwind instruments. Prerequisite: MUY 101 or equivalent. Lab 4. **Cr 2.**

MUE 215 Early Music Teaching Field Experience

Visitations to public school classrooms for observation and teaching experience. Approximately five weeks will be spent in each of three areas: elementary, junior high and high school. Open to freshman or sophomore music education majors. No prerequisites. **Cr 2.**

MUE 217 Brass Class

Basic performance and pedagogical skills pertaining to the brass instruments. Prerequisites: MUY 101 or equivalent. Lab 4. **Cr 2.**

MUE 222 Percussion Class

Basic performance and pedagogical skills pertaining to the percussion instruments. Prerequisite: MUY 101 or equivalent. Lab 4. **Cr 2.**

MUE 320 Teaching of General Music in the Elementary School

Methods, materials, organization and administration of the music curriculum in the public schools. Prerequisite: MUY 212 and MUL 222. **Cr 3.**

MUE 321 Teaching of General Music in the Junior High School

Organization and teaching of general music classes in the junior high school. Prerequisite: MUE 320 or equivalent. **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 Advanced Instrumental Methods and Pedagogy

A culmination of prior skills in a laboratory setting dealing with issues and techniques relative to instrumental music teaching. Prerequisites: MUP 345, MUE 209, MUE 213, MUE 217, MUE 222. Offered every fall. **Cr 2.**

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 freshman 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 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 of the instructor. **Cr 3.**

MUH 202 History of Western Music II

The history of music from antiquity 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 of the instructor. **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 of the instructor. **Cr 3.**

MUH 519 Music of the Classical Period

The changing style in form and content as evolved by Haydn, Mozart and Beethoven viewed against the background of social and political conditions of the time. 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. Study and detailed analysis of representative works from Beethoven through Debussy. Prerequisite: MUH 202 or permission of the instructor. **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 of the instructor. **Cr 3.**

Courses in Music Literature

MUL 101 The Art of Listening to Music I

The nature of music, and the basic elements necessary for intelligent listening exemplified in representative works of the great composers. **Cr 3.**

MUL 102 The Art of Listening to Music II

The nature of music, and the basic elements necessary for intelligent listening exemplified in representative works of the great composers. **Cr 3.**

MUL 203 Vocal Literature

A survey through discussion and performance of vocal literature from the 18th century to the present day to include classic Italian songs, German Lieder, French art songs, and contemporary American and British songs. **Cr 1.**

MUL 205 Woodwind Literature

A survey through discussion and performance of woodwind literature to familiarize the student with the standard repertory. **Cr 1.**

MUL 207 Brass Literature

A survey through discussion and performance of brass literature to familiarize the student with the standard repertory. **Cr 1.**

MUL 209 String Literature

A survey through discussion and performance of string literature to familiarize the student with the standard repertory to include that composed for string quartet. **Cr 1.**

MUL 211 Piano Literature

A survey through performance and discussion of standard literature for piano. **Cr 1.**

MUL 213 Organ Literature

A survey through discussion and performance of standard literature for organ. **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 541 Band Literature and Performance Practices

Survey of Band literature. Prerequisite: Permission. **Cr 3.**

MUL 542 Orchestral Literature and Performance Practice

Survey of orchestral 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. Membership through audition requires sight reading ability. Extended concert tours. Four hours of rehearsal a week. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 5. Cr 1.

MUO 103 Oratorio Society

Rehearsal and performance of major choral works. Membership through audition. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 2. Cr 1.

MUO 109 University Chorus

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

Marches at home and occasional off-campus football games. Begins four days prior to opening of classes. Rehearses concert music on limited schedule during final weeks of semester. Attendance required at rehearsals and performances. Membership by permission of director. May be repeated for credit. (Fall semester only). Lab 4. Cr 1.

MUO 112 Concert Band

Rehearses and performs a variety of concert band literature appropriate for the general University instrumentalist. Attendance required at rehearsals and performances. Performs both on and off campus. May be repeated for credit. Membership by permission of director. (Spring semester only). Lab 3. Cr 1.

MUO 113 Pep Band

Prepares and performs band music appropriate for athletic events including current marching band selections. Attendance required at rehearsals and performances. May be repeated for credit. Prerequisite: Permission of director. Lab 2. Cr 1.

MUO 114 Symphonic Band

Rehearses and performs the most challenging and significant band literature. Attendance required at rehearsals and performances. Occa-

sional touring on class days. Membership by audition. May be repeated for credit. Lab 3. Cr 1.

MUO 121 University Orchestra

Rehearsal and performance of standard orchestral repertoire. Membership through audition. Attendance at all rehearsals and public performances required. May be repeated for credit. 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 repertory. Acceptance by audition. May be repeated for credit. 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 of instructor. 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 of instructor. Lab 2. Cr 1.

MUO 501 Performance Organization

Participation and a leadership role in major performance organization under the guidance of a

graduate faculty member. May be repeated for credit. Prerequisite: Permission of instructor. Cr 1-2.

Courses in Performance Techniques

MUP 205 Piano Class I

Designed to give 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

Designed to give 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 215 Piano Class I

A continuation of MUP 205, 206 designed to complete the proficiency examination in secondary piano. Prerequisite: MUP 205, 206 or permission of the instructor. Music majors only. Lab 2. Cr 1.

MUP 216 Piano Class II

A continuation of MUP 205, 206 designed to complete the proficiency examination in secondary piano. Prerequisite: MUP 205, 206 or permission of the instructor. Music majors only. Lab 2. Cr 1.

MUP 220 Masterclass

Supplements work done in private lessons and emphasizes the importance of preparing correctly to perform by providing frequent chances to do so, for students in the same studio. Open to all students studying that instrument or voice with a music department faculty member through the university for credit. Offered at the discretion of the studio teacher or permission of the instructor. Not for beginners. Cr 1.

MUP 251 Accompanying I

Fulfilled through accompanying students in lessons and recital or as accompanist for major performing organization. Required of all piano majors. Lab 2. Cr 1.

MUP 252 Accompanying II

Fulfilled through accompanying students in lessons and recital or as accompanist for major

performing organization. Required of all piano majors. Lab 2. Cr 1.

MUP 340 Basic Conducting

Conducting techniques; emphasis on practical application to vocal and instrumental groups. Prerequisite: MUY 212. Lab 3. Cr 2.

MUP 341 Choral Conducting and Literature

Basic choral conducting and study of problems in the organization and training of choral groups. Prerequisite: MUP 340. Cr 3.

MUP 345 Instrumental Conducting and Literature

Basic instrumental conducting, and study of problems in the organization and training of bands and orchestras. Prerequisite: MUP 340. Cr 3.

MUP 401 Performance-Secondary Instrument I

Applied study in voice, keyboard, strings, winds and percussion instruments as a secondary applied area for the graduate student. May be repeated for credit. Prerequisite: Consent of advisor and instructor. (Lab fee of \$180.). Cr 2.

MUP 402 Performance-Secondary Instrument II

Applied study in voice, keyboard, strings, winds, and percussion instruments as a secondary applied area for the graduate student. May be repeated for credit. Prerequisite: 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 comprehensive application of the study of harmony to the keyboard, directed towards the development of sight-reading and accompanying skills, keyboard score-reading, transposition, harmonization at sight, improvisation and the realization of figured bass or other chording schemes. Prerequisite: MUY 212, MUY 214, MUP 216 or equivalent level, including completion of Piano Proficiency requirements. Cr 2.

MUP 511 Advanced Chamber Music I

The study and performance of the standard ensemble literature for string instruments, wind instruments, and piano. Prerequisite: Permission. Cr 2.

MUP 512 Advanced Chamber Music II

The study and performance of the standard ensemble literature for string instruments, wind instruments, and piano. Prerequisite: Permission. **Cr 2.**

MUP 530 Advanced Choral Conducting

Applied choral conducting in laboratory setting. Works conducted will be selected from the Renaissance through the present. Prerequisite: MUP 341 or equivalent. **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 equivalent. **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

Voice class required for freshman voice majors in the B.M.Ed. and B.M. Performance degrees. Emphasis on diction in the standard languages (French, German, Italian and English) with an introduction to the international phonetic alphabet and to classical literature, technique and performance practice. Weekly private instruction arranged through the class. Open to others by permission of the instructor. **Cr 3.**

MUS 122 Principles of Singing II

Voice class required for freshman voice majors in the B.M.Ed. and B.M. Performance degrees. Emphasis on diction in the standard languages (French, German, Italian and English) with an introduction to the international phonetic alphabet and to classical literature, technique and performance practice. Weekly private instruction arranged through the class. Open to others by permission of the instructor. **Cr 3.**

MUS 298 Special Subjects in Music

The special subjects to be studied and the method of approaching it 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. 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

The special subjects to be studied and the method of approaching it 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. 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 equivalent. **Cr 3.**

MUY 111 Elementary Harmony I

Diatonic chordal relationships through written work, analysis, and keyboard application. To be taken concurrently with MUY 113. Primarily for music majors. Prerequisites: MUY 101 or equivalent. **Cr 2.**

MUY 112 Elementary Harmony II

Diatonic chordal relationships through written work, analysis, and keyboard application. To be taken concurrently with MUY 114. 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 equivalent. Lab 3.

Cr 2.

MUY 114 Elementary Sight Singing and Ear Training II

Sight singing, ear training and dictation. To be taken concurrently with MUY 112. 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. To be taken concurrently with MUY 213. Prerequisite: MUY 112.

Cr 2.

MUY 212 Advanced Harmony II

A continuation of MUY 112. Chromatic chordal relationships and 20th century harmonic practice. To be taken concurrently with MUY 214. Prerequisite: MUY 211.

Cr 2.

MUY 213 Advanced Sight Singing and Ear Training I

A continuation of MUY 114. To be taken concurrently with MUY 211. Prerequisite: MUY 114. Lab 3.

Cr 2.

MUY 214 Advanced Sight Singing and Ear Training II

A continuation of MUY 114. To be taken concurrently with MUY 212. Prerequisite: MUY 213. Lab 3.

Cr 2.

MUY 421 Modal Counterpoint

Contrapuntal techniques as practiced by composers of the 16th and 17th centuries. Written exercises and analysis. Prerequisite: MUY 112, or permission of instructor.

Cr 2.

MUY 422 Tonal Counterpoint

Contrapuntal techniques as practiced by composers of the 18th and 19th centuries. Written exercises and analysis. 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 Ssong Forms, including AB, ABA, song form with trio, the rondo forms and a setting for voice. Prerequisite: MUY 461.

Cr 2.

Theatre/Dance

Theatre

Professors Cyrus (Chairperson), Bost, Wilkin-son; Associate Professor Snider; Staff

The major in Theatre leads to a B.A. degree in Theatre. In addition to the general major, one may develop a concentration in (1) Acting; (2) Directing; (3) Design and Technical Production; (4) Literature, history and criticism; or (5) Dance. Specific requirements for the degree and concentrations are available at the office of the Department of Theatre/Dance, 270 Stevens 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, School of Performing Arts offers courses for graduate credit leading to 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 four to five 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 3/4-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

The nature of the theatre medium, its basic 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

Greek drama through 16th century tudor. World drama as literature and as theatre. Stress on dramatic form and content, and on the uniqueness of the drama to reflect the philosophical, social, and political environment. Fall semester. **Cr 3.**

THE 113 Masterpieces of World Drama II

French, Spanish, Italian and English drama, 16th through 19th century. World drama as literature and as theatre. Stress on dramatic form and content, and on the uniqueness of the drama to reflect the philosophical, social, and political environment. Spring Semester. **Cr 3.**

THE 114 Stagecraft (Technical Theatre Practice)

Introduction to practice in the practical aspects of technical theatre: scenery construction and painting, properties, costuming, lighting and sound. Emphasis on procedures and technique. Lab 2. Shop hours required in addition to lectures and readings. **Cr 3.** (Will not satisfy the Arts and Sciences Humanities requirement.)

THE 116 Play Production

The responsibilities of the director in the basic principles of stage directing, including choosing and analyzing plays, scheduling rehearsals, blocking action, and determining stage business. Backstage work on major and laboratory theatre production is recommended. Lec 3. **Cr 3.**

THE 117 Fundamentals of Acting

The basic skills of acting, including the actor's internal preparation for playing a role and the developing of his external techniques for projecting the role to an audience. Lec 2, Lab 2. **Cr 3.**

THE 118 Stage Makeup

Study of principles and techniques of stage makeup. Practical application in class, production, experience opportunities. **Cr 3.**

(Will not fulfill the Arts and Sciences Humanities requirement.)

THE 215 Stagecraft (A Scenographic Approach to Design)

Team taught approach to philosophy and methodology of design in terms of a unified production approach. Prerequisite: THE 114 or permission. Lec 2, Lab 2. **Cr 3.**

THE 265 Costume I

Apparel survey from ancient civilizations to present day, with accompanying design projects. **Cr 3.**

THE 268 Theatre Practicum, Technical

Supervised experience in the Theatre Division productions in the areas of stage managing, publicity, scenery, lighting, and costumes. Prerequisite: 6 hours of theatre courses and permission of instructor. May be repeated for a maximum of six hours. **Cr 1-3.**

THE 269 Theatre Practicum in Acting

Laboratory work in acting, credit assigned contractually by agreement of advisor and show director, based on learning opportunities of role in which student is cast. 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 401 Fundamentals of Characterization

Intermediate level studies in scene analysis and performance of modern theatre. This is primarily a studio course devoted to helping student actors develop a methodology and technique for analyzing and performing roles from the modern theatre repertoire. Prerequisite: THE 117 or permission. **Cr 3.**

THE 402 Movement Training for Actors

A course in developing techniques and methods of physical expressiveness, bodily control, concentration and relaxation, thru physical means. Prerequisite: THE 117. **Cr 3.**

THE 403 Styles and Techniques of Acting

The course will concentrate on technical problems in acting, such as verse, non-modern language, historical styles and theatre conventions, thru lectures, discussion, performance assignments, and exercises. Prerequisite: THE 117, THE 401. Juniors and Seniors. **Cr 3.**

THE 419 Advanced Theatre Technology

Detailed examination of techniques, materials and methodology for scenery and lighting. Preparation for professional work. Prerequisite: THE 114, 215. Not offered every year. 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 463 Scene Designing

Principles, methods, and materials used in scene designing. Laboratory projects in preparing the complete design for a particular production, including drawing and plans. Prerequisite: THE 114 and THE 215. Cr 3.

THE 464 Stage Lighting

Principles, methods, and materials used in stage lighting, including their artistic and technical applications. Projects include problems in lighting particular productions. Shop work required. Prerequisite: THE 114, and 215. Cr 3.

THE 465 Costume II

Principles, methods and materials used in creating costumes for the stage. Emphasis on drafting and construction, with an introduction to specialized construction such as mask making. Cr 3.

THE 466 Stage Directing

The translation of all aspects of the theatre production into an artistic unity. Emphasis on theatre aesthetics. Practice in the directing of short plays, with particular attention to the director's work with the actor. Prerequisite: THE 116. Limited to juniors and seniors. Lec 2, Lab 2. Cr 3.

THE 468 Theatre Management

Principles and practices in selecting and selling a season, in running the box office, in budgeting, in graphic arts production, in advertising and publicity in the media, in audience development and public relations. Prerequisite: THE 111 and permission. (Alternate years). Cr 3.

THE 497 Independent Study in Theatre I Cr 1-3.**THE 498 Independent Study in Theatre II Cr 1-3.****THE 502 Non-naturalistic Acting Techniques**

A study of methods of acting based on non-naturalistic approaches, which may include mime,

puppetry, mask work, circus and clown technique; guerrilla theatre, street theatre, choral expression, or other appropriate topics. Prerequisites: THE 117, THE 401. Cr 3.

THE 560 Production of Pre-Modern Drama

Investigation of problems involved in the production of selected pre-modern dramas, from Aeschylus to Ibsen. Prerequisite: permission. Cr 3.

THE 561 Production of Modern Drama

Investigation of the problems involved in the production of selected examples of modern drama, from Ibsen to the more recent forms. Prerequisite: permission. Cr 3.

THE 563 American Theatre

A study of the development of the American Theatre from its beginning to the present day. Prerequisite: permission. Cr 3.

THE 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 the successive composites of these with Western forms. Prerequisite: permission. (Not offered every year). Cr 3.

THE 565 Dramatic Theory

An analysis of major theories of dramatic writing and dramatic production from Aristotle to the present day, with consideration of their influence on the theatre and drama. Prerequisite: THE 461, 462 or permission. Cr 3.

THE 566 Directing III: The Literature of Directing

A seminar dealing with published books, articles, rehearsal journals, prompt books, and other records of productions and production techniques by directors and others on stage directing. Prerequisites: THE 116 and THE 466 or permission. Cr 3.

THE 567 Drama Colloquium

Study, in depth, of a play presented by the Maine Masque Theatre during the semester in which the colloquium is offered, and examination of selected works by the author. Participation in the production required. Prerequisite: permission. Cr 3.

THE 574 Aesthetics of Modern Scene Design

Approaches to modern scene design, using intensive practice in rendering and visual design techniques as well as the study of techniques and theories of modern scenic designers. Prerequisites: THE 114, THE 215 and THE 463 or acceptable portfolio. Cr 3.

THE 596 Field Services in Theatre Production
Experience in producing theatre in the field, through stage directing, designing scenery and/or lighting, building scenery, stage managing, costuming, handling publicity, etc. within a local elementary or secondary school, community or resident theatre. Prerequisite: Senior theatre majors and Graduate students with permission of the Coordinator. Credit depends on length and complexity of assignment. **Cr 1-3.**

Dance

Assistant Professor, Coordinator, Division of Dance Arrow; Part-Time Instructor Cooke; Lecturer Torkanowsky

The Dance Program of the Department of Theatre/Dance provides a sound foundation for the student interested in a thorough technique for teaching or for the student interested in pursuing dance as a profession.

The many aspects of dance taught (ballet, jazz, flamenco (dances of Spain), and modern, at the beginner, intermediate/advanced levels) prepare the student for a better understanding of dance and its technique.

Repertory classes, rehearsals, and performances offer the student a thorough comprehension of professional dance and theatre. Many dance residencies are presented by renowned companies visiting our campus which offer the student performances and master classes. Students may also participate in the University Dance Company.

The Dance Film Festival, sponsored by the Dance Program, serves to expand the student's awareness of the great dancers of the past and present.

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 1.

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. As a tool for the performing artist or general student, technique is geared to finding

the physical freedom made possible within the discipline. **Cr 1.**

DAN 103 Beginner Jazz

Fundamentals of jazz dance technique. Emphasis on body alignment, coordination and movement vocabulary, preparing the student for an awareness of freedom of expressive movement in relation to modern jazz music. **Cr 1.**

DAN 104 Beginner Flamenco

Developing fundamentals of movement as a basis for various aspects of dance, the building of energy, strength, control, rhythmic awareness, coordination, taught via Flamenco dancing, an art form of tremendous excitement, thus allowing the beginner student a continued and growing uplifting experience while learning the basics needed for dance, the appropriate focal points for a dancer, and a solid basic technique of freedom of movement. **Cr 1.**

DAN 112 Dance Workshop

Dance performance with emphasis on professional repertory, costuming, lighting in relation to choreography, staging mechanisms and needs for the dance, rehearsals and public concerts. A limited tour will be scheduled during the spring semester. Attendance at all rehearsals and public performances required. May be repeated for credit. Membership through audition or previous participation. **Cr 1.**

DAN 201 Intermediate Modern Dance

Continuation of techniques in DAN 101, with an emphasis on solving more complex movement problems within a context of space time and force. An enhanced movement vocabulary and further principles of body alignment, stretch/strengthening and musicality will be explored. May be repeated for credit. Prerequisite: DAN 101 or permission of instructor. **Cr 2-3.**

DAN 202 Intermediate Ballet

A detailed study of ballet form for the student with some previous training. Steadily mastering the execution of exercises and steps with speed, clarity and grace brings a fuller kinesthetic awareness that 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 250 Dance Composition I

Study of the principles and elements of choreography. Guided practice in the construction of movement phrases, followed by longer studies for solo and group dances. This course will consist of student studies and compositions explor-

ing phrasing, timing, and rhythm, space, shape, design and form; dynamics and emotional content in theater dance. The contribution of music, props, costumes, lighting and makeup to the total effect of a dance will be analyzed in relation to student works. An informal studio presentation of student pieces will evolve out of this course. Prerequisite: Prior dance experience or permission of instructor. **Cr 3.**

DAN 251 Intermediate Flamenco

Having acquired a solid, firm technique, the student fully develops this technique and works on a professional level, performance level, and may decide to entertain a professional career, teach, or simply enjoy the stimulation of this cultural experience. Student has the option of participating in dance presentation rehearsals. May be repeated for credit. Prerequisite: DAN 101 or permission. **Cr 2.**

DAN 252 Intermediate Jazz

With acquired discipline, dance technique, and rhythmic adaptation, the student can now explore and develop musical themes in conjunction with the command and knowledge of body movement, and exercise total free expression of technique combined with motion. The student has the option of participating in dance presentation rehearsals. Prerequisite: DAN 102, prior training in jazz, modern or ballet, or permission. **Cr 2.**

DAN 261 Advanced Flamenco

Working on a professional level, the students mastery of this ethnic dance form is broadened by an in depth study of the folk dancing, customs and traditions of Spain's 49 regions and the traditional costumes and instruments of each region and of the influence of Greek, Jewish, and Arabic elements on the Flamenco and Classical Spanish dances. May be repeated for credit. Prerequisite: DAN 251 or permission. **Cr 3.**

DAN 262 Advanced Jazz

The mastery of jazz dance technique combined with preparation for professional performances and the study of the influence of European and African tradition and Black culture on American Jazz Dance on stage-in musical shows in Jazz music, improvisations and musical instruments used in jazz. May be repeated for credit. Prerequisite: DAN 252 or permission. **Cr 3.**

DAN 266 Dance History

Religious, social and cultural aspects of dance from primitive ritual to the present century. No prerequisite. **Cr 3.**

DAN 268 Elementary Dance Notation (Labanotation)

Analysis of directions, levels, timing and dynamics of movement. 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 253, or DAN 263 or previous dance experience. **Cr 3.**

DAN 301 Advanced Modern Dance

A development of principles established in DAN 201. Emphasis on performance quality, phrasing, musicality, and choreographic retention. An opportunity is provided for the advanced dancer to 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 development of principles of balletic style established in 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 375 Dance in the Twentieth Century

An analysis of the changes and growth of the dance in the 20th century with specific attention to ballet and American Modern Dance and including The Popular Dance: Social Stage and Cinema. Dance developments related to concurrent achievements in 20th century art, music, psychology, literature, architecture, education and the theatre. This is a writing experience class. 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 is designed by the student and instructor to give the student more independent responsibility within the class structure and an opportunity to expand his or her academic and/or technical proficiency at the intermediate level. Prerequisite: 2 semester Intermediate level technique. **Cr 2.**

DAN 498 Dance Project/Thesis

A supervised practicum in choreographic process and/or performance and a written analysis of this practicum or, alternately, an advanced level research topic, designed jointly by the student and the instructor. Prerequisite: Advanced level technique or permission. **Cr 3.**

Philosophy

Professors Skorpen (Chair), Allen, Hjelm, White; Associate Professors Howard, Sawicki

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.

The Humanities Requirement

The majority of courses taken in Philosophy may be used toward fulfilling the Arts and Sciences Humanities Requirement. Philosophy courses open without prerequisite are: PHI 101, History and Problem of Self-Understanding in Philosophy; 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, Biblical Thought; PHI 410, History of Ancient Philosophy; PHI 412, History of Modern Philosophy; PHI 430, Ethics; PHI 440, Philosophical Foundations of Social and Political Institutions: Plato to Machiavelli; PHI 450, Logic I; PHI 482, The New Testament and Early Christianity; PHI 486, Religions and Philosophies of the East: Hinduism; and PHI 487, Religions and Philosophies of the East: Buddhism. 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 18 hours (six courses) in philosophy must be upper level courses, i.e., courses above the 100 level;
3. Six hours in the History of Philosophy sequence (PHI 410-PHI 422), including PHI 410;
4. One three-hour course specifically designated as "Seminar for Philosophy majors."

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, especially when the decision for this comes late in a student's undergraduate career. Accordingly, the department will accept petitions for the waiver

of any of the above requirements. Each petition will be assessed individually.

Concentration in Religious Studies

The concentration in religious studies is designed to provide students with the critical tools and scholarly background required for an informed understanding of the influential traditions of religion that have developed in human culture.

Students graduating with a Concentration in Religious Studies will fulfill the departmental requirements as well as: 1) PHI 108; 2) either PHI 486 or PHI 487; 3) one of the following upper-level courses: 481, 485, 489, 490.

Courses in Philosophy

PHI 101 History and Problem of Human Self-Understanding in Philosophy

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

Contemporary works such as Foucault's Discipline and Punishment and deBeauvoir's The Second Sex comment on issues which have concerned philosophers for centuries. This course brings together such contemporary statements and 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. Topics include: the nature of thought, uses of language, recognition of arguments, informal fallacies, purposes and types of definition, deduction and induction. Emphasis is given to understanding and mastering (through practice including computer assisted instruction) some fundamental techniques for testing the soundness of many different kinds of reasoning including the student's own. **Cr 3.**

PHI 105 Introduction to Religious Studies

An analysis of religion as an expression of human culture past and present. Subjects considered are: 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. This course 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 Biblical Thought

A critical examination of the historical, literary and theological development of the Biblical tradition from the time of its Hebraic origins to Jesus of Nazareth. **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. **Cr 3.**

PHI 410 History of Ancient Philosophy

An analysis of Hellenic philosophy with emphasis on Plato and Aristotle, including Presocratic philosophy, Platonism, Aristotelianism, Stoicism and Epicureanism. **Cr 3.**

PHI 411 Medieval Philosophy

A study of the principle developments of Western thought from the Hellenistic era to the fourteenth century: Neo-Platonism, Augustine, Medieval scholasticism, the Thomist synthesis and its aftermath. Prerequisite: one course in philosophy or permission of instructor. **Cr 3.**

PHI 412 History of Modern Philosophy

An interpretation of modern philosophy beginning with Bacon and Descartes in the 17th century, developing through rationalism and empiricism during the 18th century and culminating in the system of Kant. **Cr 3.**

PHI 413 Nineteenth Century Philosophy

A critical study of the major thinkers of the nineteenth century. Particular attention will

be directed to Hegel, Feuerbach, Marx, and Nietzsche. Kant, Kierkegaard, and Dilthey will also be considered. Prerequisite: one course in philosophy (PHI 412 recommended). **Cr 3.**

PHI 420 Recent Continental Philosophy

A critical study of some of the major movements and thinkers in continental philosophy since the turn of the century. Readings include works by such thinkers as Husserl, Heidegger, Sartre, Merleau-Ponty, Levi-Strauss, Derrida, Foucault, Habermas, and Gadamer. Prerequisite: one course in philosophy. **Cr 3.**

PHI 421 American Philosophy

A brief examination of colonial and early 19th-century American contributions to the development of present-day philosophy. Particular emphasis is given to the philosophical views of Royce, Peirce, James, Dewey and Santayana. Prerequisite: one course in philosophy. **Cr 3.**

PHI 422 Philosophical Classics

An intensive study of the works of a major philosopher or school. This course is conducted as a seminar. May be repeated for credit when different philosophers or problems are studied. **Cr 3.**

PHI 430 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. **Cr 3.**

PHI 435 Meta-ethics

An analysis of particular concepts and issues in traditional moral systems. These include the meanings of justice, equality, and happiness, and the nature of first principles, practice, and summary rules. Prerequisite: PHI 430 or one other course in philosophy or permission of instructor. **Cr 3.**

PHI 439 Feminist 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. Sophomore standing. (Area II, Above Introductory Level). **Cr 3.**

PHI 440 Philosophical Foundations of Social and Political Institutions: Plato to Machiavelli

A critical study of the development of social and political philosophy from Plato through Machiavelli in light of their ethical and metaphysical systems. Topics discussed include the problem

of justice, the nature of the state and its relationship to other social institutions, and the individual. The primary focus will be on normative rather than descriptive theory. **Cr 3.**

PHI 441 Philosophical Foundations of Social and Political Institutions: Hobbes to Marx

A critical study of the development of social and political philosophy from Hobbes through Marx in light of their ethical and metaphysical systems. Topics include the problem of justice, the nature of the state and its relationship to social institutions, and the individual. The primary focus will be on normative rather than descriptive theory. **Cr 3.**

PHI 442 Marxist Philosophy: From Marx to Mao

An analysis of Marxist political philosophy, with special attention to the Marxist theory of knowledge, ethics, and social philosophy. Major focus is on the philosophy of Karl Marx, with considerable readings from Friedrich Engels and Mao Zedong. Prerequisite: one course in philosophy. **Cr 3.**

PHI 443 Twentieth Century Marxist Philosophy

An examination of major works in twentieth century Marxism. Emphasized are the writings of such thinkers as Lenin, Luxemburg, Lukacs, Trotsky, Mao, Gramsci, and Braverman. Prerequisite: PHI 442 or permission of instructor. **Cr 3.**

PHI 444 Philosophy of Law I

An introduction to legal philosophy. Topics include the nature of law, the limits of law, and legal responsibility. Special emphasis on the law of torts. Authors studied include Hart, Mill, Dworkin, Raz, and Feinberg among others. **Cr 3.**

PHI 445 Philosophy of Law II

An introduction to legal philosophy. Topics include the nature of justice and the problem of punishment. Special emphasis on contract law. Authors studied include Rawls, Posner, Mill, Dworkin, and Fried, among others. **Cr 3.**

PHI 446 Philosophy of History

A critical study of historical knowledge and its significance. Topics include the nature of historical facts, what counts as historical explanation, whether "objectivity" is possible in history, and whether there is progress in history. Idealist, empiricist, Marxist, and phenomenological approaches will be considered. **Cr 3.**

PHI 450 Logic I

An introductory course in modern symbolic logic. Techniques of deductive inference, includ-

ing decision procedures and axiomatization, are studied in developing the propositional and predicative logics. Some attention is given to metalogic and the philosophy of logic. **Cr 3.**

PHI 451 Logic II

Advanced topics in symbolic logic. Prerequisite: PHI 450 or permission of instructor. **Cr 3.**

PHI 452 Philosophy of Natural Science

A critical study of scientific knowledge and how it is developed. Relations between theory and experiment, the scientist and the scientific community, and contemporary science and its historical background, will receive particular attention. The last part of the course is reserved for a discussion of science and public policy. Prerequisite: 6 hours of natural science or permission of instructor. **Cr 3.**

PHI 453 Philosophy of Behavioral Science

A critical examination of the conceptual foundations of modern behavioral science from behavioristic, ordinary language, and phenomenological standpoints. Among issues discussed are reinforcement versus role-rule explanations and the relevance of law-like regularities versus generative principles. Prerequisite: 6 hours of philosophy, behavioral science, or permission of instructor. **Cr 3.**

PHI 461 Existentialism and Literature

A critical study of the philosophical significance of individual choices and actions involving questions of personal identity, responsibility and authenticity as these themes are developed in existentialist literature. Special attention will be given to existentialist literary techniques. (Area II, Writing Experience, Above Introductory Level). **Cr 3.**

PHI 462 Philosophy of Art

An investigation of the nature and importance of aesthetic experience and its objects, of the possibility of standards of art and taste, and the relation of art to other areas of experience. Topics considered include art and morality, art and science, art and the environment. Readings from primary sources by Tolstoy, Hume, Dewey, Langer, Bell, Dante, Dickie and Beardsley, among others. **Cr 3.**

PHI 463 Theory of Knowledge

An examination of recent philosophical studies in epistemology. The last half of the course will apply the methods of modern philosophical analysis to some theory outside philosophy, e.g., a theory in psychology, literature, biology or history, emphasizing the usefulness of philosophies of sensation, belief, truth, meaning,

memory and imagination for theory construction. **Cr 3.**

PHI 465 Topics in Philosophy

Individual and small group study of problems or systems of philosophical concern. The course is a seminar relying on careful use of major philosophical resources, as well as attempts at fresh exploration of fundamental topics. May be repeated for credit when different philosophers or problems are studied. Prerequisite: permission of instructor. **Cr 3.**

PHI 466 Readings in Philosophy

Individual study of a selected topic, agreed upon by the student and the instructor. This offering is designed to address advanced issues not covered in normal offerings. Prerequisite: 9 hours and permission of department and instructor. **Cr 1-3.**

PHI 481 The Nature of Religious Experience

A study of different methodological approaches to religious experience, with primary emphasis on the phenomenology of religion. A major concern is a description of religious phenomena and an interpretation of their meaning by analyzing the nature of religious symbolism. Prerequisite: one course in philosophy or permission of instructor. **Cr 3.**

PHI 482 The New Testament and Early Christianity

An examination of the growth of the New Testament in its religious, social, and philosophical context, and an historical-theological analysis of the cult of Christ from the second century to the fifth century councils. Special attention is given to primary theological texts. **Cr 3.**

PHI 483 The Reformation and the Enlightenment

An analysis of theological developments from the sixteenth to the eighteenth century with special attention to Luther, Calvin, Erasmus, Pascal, and Jonathan Edwards. Prerequisite: one course in philosophy or permission of instructor. **Cr 3.**

PHI 485 Recent Religious Thought

The major developments in Western theology from World War I to the present: Buber, Barth, Reinhold Niebuhr, Tillich, Bonhoeffer, Teilhard de Chardin as influences on current philosophical theology and modern understandings of humanity and society. Prerequisite: one course in religious thought or SOC 482. **Cr 3.**

PHI 486 Religions and Philosophies of the East: Hinduism

The religious and philosophical foundations of Hinduism. Readings include the Vedas, the Bhagavad-Gita, the Upanishads, Yoga and Vedanta. **Cr 3.**

PHI 487 Religions and Philosophies of the East: Buddhism

The religious and philosophical foundations of Buddhism: 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. **Cr 3.**

PHI 489 Nature in Philosophy and Religion

An examination of the meaning of nature and human involvement in nature from a theological and philosophical perspective as seen in major texts from the Classical, Hellenistic, Medieval, Enlightenment, and Modern periods. Prerequisite: one course in philosophy or permission of instructor. **Cr 3.**

PHI 490 Topics in Religious Studies

Small class study of a theme, thinker or fundamental problem in religious thought. The course may be repeated for credit when different topics are considered. Prerequisite: permission of the instructor. **Cr 1-3.**

Interdisciplinary Course

INT 290 (PHI, PHY, ZOL) Nuclear War

An introduction to the effects of nuclear war and related issues. **Cr 1.**

Physics and Astronomy

Professors Smith (Chairperson), Brownstein, Camp, Carr, Csavinszky, Grunze, Hess, Kleban, Krueger, Morrow, Tarr, Unertl; Associate Professors Comins, Harmon, Mountcastle, Vietti; Assistant Professors Cook, McKay.

The department offers major work leading to the degree of bachelor of arts in Physics in the College of Arts and Sciences, and also major work leading to the degree of bachelor of science in Engineering Physics in the College of Engineering and Science.

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 300 or 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 347, PHY 351, 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 300 or 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 259 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 an industrial 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 496, Field Experience in Physics.



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.

Freshman Year

First Semester			Second Semester		
PHY 111	General Physics I OR	4	PHY 112	General Physics II OR	4
PHY 121	General Physics I	(4)	PHY 122	General Physics II	(4)
MAT 126	Analytic Geometry and Calculus	4	MAT 127	Analytic Geometry and Calculus	4
	Electives**	6		Electives	9
		14			17

Sophomore Year

First Semester			Second Semester		
PHY 229	Intermediate Physics Lab- oratory I	1	PHY 238	Mechanics	3
PHY 236	Introductory Modern Physics	3	PHY 230	Intermediate Physics Lab- oratory II	1
MAT 228	Analytic Geometry and Calculus	4	CHY 114	Chemical Principles II*	4
CHY 113	Chemical Principles I*	4	MAT 259	Differential Equations Elective	3
	Electives	3			15
		15			

Junior Year

First Semester			Second Semester		
PHY 454	Electricity and Magnetism I	3	PHY 455	Electricity and Magnetism II	3
PHY 341	Electrical Measurements	2	PHY 472	Optics	3
MAT 353	Partial Differential Equa- tions I	3	PHY 342	Physical Measurements	2
	Electives	6	MAT 354	Partial Differential Equa- tions II	3
		14		Elective	3
					14

Senior Year

First Semester			Second Semester		
PHY 469	Atomic Physics	3	PHY 488	Physics Seminar I	1
PHY 488	Physics Seminar I	0		Physics Elective	3
	Physics elective	3		Electives	12
	Electives	9			16
		15			

*Taken in the freshman, sophomore, or junior year.

**The student must include among elective courses those courses needed to satisfy the basic area requirements of the College of Arts and 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 or senior year; PHY 462, Heat and Thermodynamics; PHY 463, Thermal Physics; PHY 480, Physics of Materials; PHY 470, Nuclear Physics; as well as additional courses in mathematics.

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.

Freshman Year

In each semester of the Freshman 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 basic Area Requirements of the College of Arts and Sciences.

Sophomore Year

First Semester			Second Semester		
PHY 111	General Physics I OR	4	PHY 112	General Physics II OR	4
PHY 121	General Physics I	(4)	PHY 122	General Physics II	(4)
MAT 126	Analytic Geometry and Calculus	4	MAT 127	Analytic Geometry and Calculus	4
	Electives	9		Electives	9
		17			17

Junior Year

First Semester			Second Semester		
PHY 229	Intermediate Physics Lab- oratory I	1	PHY 238	Mechanics	3
PHY 236	Introductory Modern Physics	3	PHY 230	Intermediate Physics Lab- oratory II	1
MAT 228	Analytic Geometry and Calculus	4	PHY 472	Optics	3
	Electives	6	MAT 259	Differential Equations Elective	4 3
		14			14

Senior Year

First Semester			Second Semester		
PHY 454	Electricity and Magnetism I	3	PHY 455	Electricity and Magnetism II	3
PHY 341	Electrical Measurements	2	PHY 342	Physical Measurements	2
PHY 488	Physics Seminar I	0	PHY 489	Physics Seminar II	1
	Physics elective	3		Physics elective	3
	Electives	6		Electives	6
		14			15

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 Astronomy

AST 109 Introduction to Astronomy

A descriptive survey of astronomy, designed to give the student an appreciation of contemporary views of the universe. Topics include the solar system, stars, galaxies, black holes, quasars, and cosmology. May be taken without AST 110. No prerequisites. Lec 3. **Cr 3.**

AST 110 Introduction to Astronomy Laboratory

Laboratory exercises to accompany AST 109, Introduction to Astronomy, which is a corequisite. Lab 2. **Cr 1.**

AST 114 Navigation

Piloting, dead reckoning, and celestial navigation. A working knowledge of trigonometry is required. Not given every year. Rec 3. **Cr 3.**

AST 215 General Astronomy I

An introductory course in astronomy and astrophysics, the material being discussed in more detail than in AST 109. Solar system astronomy (including celestial mechanics, astronomical coordinate systems, Kepler's laws, and the sun) is treated. Not given every year. Prerequisites: MAT 127, PHY 112 or PHY 122, or permission of instructor. Lec 3. **Cr 3.**

AST 216 General Astronomy II

A continuation of AST 215. AST 216 treats stars, galaxies, quasars, and cosmology. Not given every year. Prerequisite: AST 215. 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 353 or permission of instructor. Rec 3. **Cr 1-3.**

AST 452 Astrophysics II

A continuation of AST 451, which is a prerequisite. **Cr 1-3.**

Courses in Physics

PHY 103 Fundamental 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. No Prerequisites: Lec with dem 3. **Cr 3.**

PHY 104 Fundamental Physics Laboratory

Laboratory exercises to accompany PHY 103 Fundamental Physics, which is a corequisite. 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 how these problems relate to environmental pollution. Not given every year. No prerequisite. Rec 3. **Cr 3.**

PHY 110 Meteorology

A descriptive course treating the physics involved in the weather. Topics include 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. Similar to PHY 121, but does not use calculus. Meets the needs of students majoring in the sciences as well as students in premedical and pre dental curricula. A working knowledge of algebra and trigonometry is required. Lec with dem 2, Rec 1, Problem Workshop 1, Lab 2. **Cr 4.**

PHY 112 General Physics II

A continuation of PHY 111. An introduction to the principles of 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 General Physics I

An introductory calculus-based physics course, primarily serving students majoring in engineering or the physical sciences. Treating mechanics, acoustics, and thermodynamics. Corequisite: MAT 126. Lec with dem. 2, Rec 1, Problem Workshop 1, Lab 2. **Cr 4.**

PHY 122 General Physics II

A continuation of PHY 121. PHY 122 treats electricity, magnetism, and optics. Prerequisites

PHY 121, MAT 126. Lec with dem 2, Rec 1, Problem Workshop 1, Lab 2. **Cr 4.**

PHY 229 Intermediate Physics 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 Intermediate Physics Laboratory II

Primarily electrical measurements. 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 of 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 more advanced treatment of Newtonian mechanics than in PHY 121. Topics may include 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 341 Electrical Measurements

A laboratory course covering 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 342 Physical Measurements

Experiments selected from various branches of physics. Typical experiments may involve x-ray diffraction, microwaves, the photoelectric effect, Hall effect, etc. Normally taken by junior physics and engineering physics majors. Students are encouraged to develop their own procedures in performing the assigned experiments. Prerequisite: PHY 236, MAT 228. **Cr 2.**

PHY 347 Biophysics

An introduction to physical properties of biological macromolecules including proteins, nucleic acids and membranes. Solution thermodynamics is developed as needed; some statistical mechanics is 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 of instructor. **Cr 3.**

PHY 351 Advanced Meteorology

Selected topics of interest in cloud microphysics, radiation processes, and how they apply to the atmosphere. Details of atmospheric motion. Not given every year. Prerequisite: PHY 112 or PHY 122. Corequisite: MAT 353. Rec 3. **Cr 3.**

PHY 454 Electricity and Magnetism I

An intermediate level course in the fundamentals of the theory of electricity and magnetism. Treating 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 Heat and Thermodynamics

The laws of thermodynamics. Thermodynamic description of the properties of matter. Normally taken as a junior or senior elective by students in the sciences or engineering. A theoretical course dealing with the structure and concepts of thermodynamics. Not given every year. Prerequisite: PHY 111 or PHY 121, MAT 259. Rec 3. **Cr 3.**

PHY 463 Thermal Physics

An introduction to the fundamentals of 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 Atomic Physics

Introductory quantum mechanics applied to simple atoms and molecules. Radiation, Schrodinger theory. Normally taken by senior physics majors. Prerequisites: PHY 236, MAT 353 or permission. Rec 3. **Cr 3.**

PHY 470 Nuclear Physics

Properties of the nucleus, nuclear reactions, radioactive decay, nuclear models, nuclear reactors. Prerequisite: PHY 236 Corequisite: MAT 353 or permission. May be taken without the laboratory for two credits only. Rec 2, Lab 2. **Cr 2-3.**

PHY 472 Optics

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 475 Methods of Mathematical Physics

Methods and special functions of mathematical physics. Examples from continuum mechanics, electricity and magnetism, heat flow and diffusion. Suitable for seniors and graduate students. Prerequisite: MAT 353 or permission of instructor. 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 Advanced Laboratory Physics I

Selected projects for senior physics and engineering physics majors. Students are expected to develop original ideas and to design and construct novel apparatus under the guidance and approval of a faculty member. Open to senior physics and engineering physics majors, and other students by permission. Lab 6. Cr 3.

PHY 482 Advanced Laboratory Physics II

Completion of the project begun in PHY 481. Prerequisites: PHY 481. Lab 6. Cr 3.

PHY 488 Physics Seminar I

A senior level course required of all physics and engineering physics majors. Students are required to prepare written reports on scientific topics of their own selection. Formal talks on this material are given 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, which is a prerequisite. Letter grade. Cr 1.

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 months' duration. Prior approval of the department chairman is required. Prerequisite: completion of 16 hours of physics. Cr 1-6.

PHY 497 Topics in Physics

Primarily for undergraduates. Deals with selected topics in areas not already covered by regular course offerings in the department. Given on demand. 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

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

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

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 to acquaint students with several 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

Macroscopic behavior of matter derived from a statistical consideration of microscopic properties of systems. Relationships to Thermodynamics and Kinetic Theory. Prerequisite: PHY 462; corequisite: PHY 503. Cr 3.

PHY 513 Physical Measurement and Data Analysis With Microcomputers

Microcomputer architecture; analog and digital data collection; A/D and D/A converters; synchronization, timing and triggers; data manipulation and display. Prerequisite: PHY 341 or permission. Lec 2, Lab 2. Cr 3.

PHY 574 Methods of Theoretical Physics I

Infinite series, infinite products, matrices, coordinate systems. Theory of differential equations. Special functions. Applications from physics. Prerequisite: Permission of instructor. **Cr 3.**

PHY 575 Methods of Theoretical Physics II

Advanced topics in mathematical physics of special interest. May include chaos, complex analysis, theory of integral equations, 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

Subjects under this heading depend upon current interests of students and staff. Ordinarily in areas for which no formal courses are offered.

Given on demand with approval of the Department Chairperson. **Cr Ar.**

Interdisciplinary Courses**INT 290 (PHI, PHY, ZOL) Nuclear War**

An introduction to the effects of nuclear war and related issues. **Cr 1.**

INT 454 (ELE, PHY) Optical Communications

Theory of optical dielectric waveguides; light propagation, attenuation, pulse broadening, and mode coupling in fiber-optic waveguides. 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 of instructor. Lec 3. **Cr 3.**

Political Science

Professors Collins (Chairperson), Hayes, Horan, Mawhinney, K. Palmer, Schoenberger, Wendzel*; Assistant Professors Bakhtiari, Cody, Moen, M. Palmer*, Warhola

Specific Requirements for Majors

Students may major in Political Science or in International Affairs (Political Science).

Political Science**A. Basic Requirements**

1. A minimum of 36 hours of credit in courses designated "POS".
2. POS 100, American Government.
3. A minimum grade point average of 2.0 in Political Science Department courses.

B. Sub-Field Requirements

All majors are required to satisfy the following sub-field distribution requirement:

- 9 credit hours in Sub-field A (United States Politics)
- 6 credit hours in Sub-field B (International Relations)
- 6 credit hours in Sub-field C (Comparative Politics)
- 3 credit hours in Sub-field D. (Political Theory)

1. United States Politics

- 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.

2. International Relations

- POS 223 Political Geography
- POS 224 Applied Political Geography
- POS 373 International Relations
- POS 374 U.S. Foreign Policy
- POS 387 International Law
- POS 388 World Order Through International Organization and Law

*On leave of absence 1987/88

- 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.

- 3. Comparative Politics
 - 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 456 Canadian Political Parties
 - POS 465 Governments of South Asia
 - POS 466 Governments of East Asia
 - POS 467 African Politics
 - POS 468 Government in Latin America
 - POS 531 Topics in Comparative Politics
 - POS 537 The Evolution and Development of Canadian Government and Politics
- 4. Political Theory
 - 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 492 American Political Ideas
 - POS 589 Topics in the History of Political Philosophy
 - POS 594 Topics in Political Theory
 - POS 595 Methods of Political Science

C. Related Area Requirement

Fifteen hours from at least two related fields, as follows: Anthropology, Computer Science, Economics, Foreign Language (intermediate and beyond), Journalism and Broadcasting, 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. (See International Affairs in the Index.)

Courses in Political Science

POS 100 American Government

An introductory study of the major principles, structures, processes and policies of United States government. 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

The structure and functions of subnational government in the United States. Attention to legal structures, political processes, and relations among governments. Freshmen and sophomores only. **Cr 3.**

POS 110 An Introduction to Politics

A study of the scientific development of political science; of such key concepts as power, influence and authority; and of the relationship of politics to such contemporary problems as racism, poverty, threats to the environment, and international conflict. Freshmen and sophomores only. **Cr 3.**

POS 121 Current World Problems: The United States and Soviet Union

Contemporary international politics, focusing on the factors that condition the choice of foreign policies by the United States and the Soviet Union. The course reviews, from the point of view of each, their respective policies from World War II until the present. **Cr 3.**

POS 122 Current World Problems: Contemporary Foreign Policies

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 addressed by the major political philosophers — 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

The study of the geographic and demographic factors that condition national foreign policy and international politics. **Cr 3.**

POS 224 Applied Political Geography

An application of geopolitical analysis to the foreign policies of a number of states in various regions of the world. Prerequisite: POS 223. **Cr 3.**

POS 233 Urban Politics

Urban environment; political behavior of local parties and interest groups, city councils, urban executives and the bureaucracy; intergovernmental relations; governmental alternatives considered. Prerequisite: POS 100. **Cr 3.**

POS 241 Politics in Contemporary Societies

An introduction to comparative politics, surveying politics in the three "worlds" of modern societies: advanced industrialized mass democracies, the communist world, and the developing, or Third, world. Major themes are comparative historical experiences, modernization, comparative governmental institutions, political parties and interest groups, and the policy process in different systems. Attention is devoted to the problems of establishing and maintaining democratic order. **Cr 3.**

POS 243 Canadian Government and Politics

This course provides an historical background to the development of the Canadian political system; an introduction to the institutions and processes of Canadian government, federalism, political parties, and interest groups; analyses of major public policy issues in contemporary Canada. **Cr 3.**

POS 335 Democratic Governments of Europe

The political traditions, parties, governmental structures, and special political problems of Great Britain, France and West Germany. Prerequisite: POS 100, juniors and seniors only. **Cr 3.**

POS 336 The Communist Government of the Soviet Union

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 356 Political Parties

Development and present organization and operation of the American party system. 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; 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

An examination of basic problems of American national government. 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 state, with special attention to their role in the evolving federal system. 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: Six hours of political science. **Cr 3.**

POS 361 The American Legislative Process

A treatment of the legislative process in Congress and the states. Attention is 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

An examination of contemporary Maine politics, with emphasis on the changes in institutions and policies that have occurred in the last two decades. Case studies in such areas as Maine's role in the federal system, legislative and judicial reforms, executive branch re-organization, and social and environmental policies. Prerequisite: 6 hours of political science. **Cr 3.**

POS 373 International Relations

The international system of states; the impact of nationalism; the restraints imposed on the unilateral actions of governments; and the possibility of peace resulting from war, disarmament, functionalism, and diplomacy. Prerequisite: junior standing and six hours of Political Science. **Cr 3.**

POS 374 U.S. Foreign Policy

The formulation and implementation of United States foreign policy. Analysis of such topics as:

conceptual framework for study, structures and processes, factors shaping, alternative strategies, and problems. Prerequisite: six hours of Political Science. **Cr 3.**

POS 382 Introduction to Law

The focus of the course is on the nature and functions of law in the modern world; on law as part of the study of society. Not a technical course in law. Prerequisite: junior or senior standing, no freshmen. **Cr 3.**

POS 383 Constitutional Law

The political development of the Constitution through Supreme Court decisions. Cases in judicial, legislative and executive power and federalism. Prerequisite: POS 100. Junior or senior standing. **Cr 3.**

POS 384 Constitutional Law: Civil Liberties

The social and economic development of the Constitution through Supreme Court decisions. Cases in civil liberties: Bill of Rights and Fourteenth Amendment. Prerequisite: POS 100; junior or senior standing. **Cr 3.**

POS 387 International Law

Introduction to the law that governs relations among states; 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: six hours of Political Science or permission of the professor. **Cr 3.**

POS 388 World Order Through International Organization and Law

A problem-solving approach to the study of world order. Emphasis is placed on promoting human rights and economic development and on limiting violence and environmental pollution. Prerequisite: six hours of Political Science or permission of the professor. **Cr 3.**

POS 389 Classical Political Thought

A survey of ancient and medieval political philosophy through detailed study of selected writings of such thinkers as 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 such thinkers as 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 such thinkers as Rousseau, Hegel, Marx, Mill, Nietzsche, and contemporary authors. Prerequisite: POS 212 or junior or senior standing. **Cr 3.**

POS 395 Congressional Internship

A 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 about February 1 to the end of 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 for internship within the department. **Cr 9.**

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 federalism, geography, ethnicity and personality upon the Party in the electorate and the political system. Discussion of the role of party in a parliamentary system. Prerequisite: 6 hours of political science. **Cr 3.**

POS 462 Executive Leadership in American Politics

Focuses on theories of leadership and then examines political behavior of American presidents, governors, and/or local executives. Emphasis is on problems, historical changes, styles, and performances of individual political executives. Prerequisite: POS 100. **Cr 3.**

POS 465 Governments of South Asia

The governments and politics of selected countries of South and Southeast Asia. Emphasis on common problems of emergent nations of the area. Prerequisite: six hours of Political Science. **Cr 3.**

POS 466 Governments of East Asia

A study of the contemporary political systems of China and Japan. Prerequisite: six 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 poli-

tics, and neo-colonialism. Prerequisite: six hours of Political Science. Cr 3.

POS 468 Government in Latin America

Concentration on "political styles," the contemporary struggle between tradition and revolution, political elites, economic and political problems. Selected case studies, not necessarily the same each year. Prerequisite: six 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

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

The scope and nature of the study of politics; power and society; basic descriptive political theory and the role of political institutions. Prerequisite: open to senior Political Science majors or with 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 492 American Political Ideas

The development of political ideas in America from the founding period to the present as expounded in the writings (and speeches) of American statesmen and political theorists, and foreign commentators such as Tocqueville. Prerequisite:

junior or senior standing or permission of the professor. Cr 3.

POS 493 State Government Internship I

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 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 3.

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 396 (PAA, POS) Field Experience

Enables a student to participate in a political or governmental organization. Readings and reports required in addition to meetings with faculty sponsor and/or other field experience participants. Prerequisites will be determined in

each case based upon the nature of the field experience proposed. 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, Hammer, Martindale, Pliskoff, Ryckman, Stone, Stubbs; Associate Professors Frey, Hayes, Lenney, Thorpe; Assistant Professors Bukowski, Fisher, Gershman, O'Donahue, Rosenwasser, Smith; Clinical Professor Lhamon; Cooperating Professor Collins; Clinical Associate Professors Butler, DeSisto, Grant, Hess, Homann; Adjunct Professor Allen; Clinical Associates Acker, Bohnet, Brezeale, Chemelski, Elliott, Gripp, McLean Peddicord, Pierce, Rogers, Sattin, Stahl, 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. (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)
- Three courses selected from the following alternatives:
- Psy 307 Animal Behavior

PSY 350 Cognition

PSY 351 Psychology of Motivation

PSY 352 Learning and Motivation

PSY 356 Theories of Learning

PSY 361 Sensation and Perception

PSY 365 Physiological Psychology

- 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.
- G. PSY 310 is a P/F course, but counts as a 3-credit course in meeting requirements for a psychology major.

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.

For ease of reference, the course offerings of the Department of Psychology have been categorized. A brief description of each category precedes it. These descriptions are meant to provide the student with information that may be of importance in deciding which psychology courses will be of most benefit to her or his program.

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 re-

quire permission of the instructor to register for 500-level courses.

Courses in Psychology

General Psychology Background

This category consists of PSY 100, General Psychology, which is a prerequisite for all advanced courses in the department, and required for the psychology major.

PSY 100 General Psychology

A survey of psychology as the science of behavior. 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.**

Topics in Psychology

This category includes courses that are of interest both to students majoring in psychology and to students who are majoring in other fields. PSY 100 is a prerequisite for all courses in this category.

PSY 302 Psychology of Literature

Psychological approaches to the study of art and literature. 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. **Cr 3.**

PSY 303 Applications of Behavior Principles

Methods employed in the experimental analysis of behavior; principles of respondent (classical) and operant (instrumental) conditioning; applications of principles to the understanding and control of behavior in everyday life situations. **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. Offered every other year. **Cr 3.**

PSY 305 Psychological Aesthetics

Topics covered include psychological factors related to the creation of art and to the perception and appreciation of aesthetic objects of all types. Psychological bases of historical change

in the content and style of the arts are also covered. **Cr 3.**

PSY 307 Animal Behavior

Several topics in comparative animal psychology, including learning, motivation, sensory processes, behavior genetics, innate behavior, social behavior, and the development of behavior. Various methods of investigating and classifying animal behavior are critically evaluated. Prerequisite: A basic course in zoology or biology or permission. **Cr 3.**

PSY 308 Theories of Personality

The chief contemporary approaches to the study of personality. Critical issues in personality are covered, in addition to a consideration of assessment techniques and research methods. Prerequisite: PSY 100. **Cr 3.**

PSY 309 Psychology of Consciousness

A discussion of the scientific approach to the study of consciousness and altered states of consciousness. Topics include the nature of normal consciousness, cerebral hemispheric differences and the bimodal model of consciousness, day dreaming, stages of sleep, meditation, marijuana intoxication and hypnosis. Emphasis on research methods and results and theoretical interpretations. **Cr 3.**

PSY 310 Psychology of Personal Growth

A discussion of the basic principles of mental health; also is designed to enhance the personal growth and mental health of the student. Mental health exercises and open-group discussions utilized to help the student come to better understand himself and to learn to communicate with others more meaningfully. (Pass/Fail Grade Only). Counts toward requirements for a psychology major. Prerequisite: PSY 100. **Cr 3.**

PSY 312 Abnormal Psychology

The origin, development, and manifestations of the psychoneuroses and major psychoses with a view to a better understanding of deviant behavior in our society; emphasis on the biological, social, and psychological determinants of deviant behavior. Prerequisite: PSY 100. **Cr 3.**

PSY 503 Behavior Therapy

The study of behavior therapy as an approach to the treatment or management of undesired or dysfunctional behavior, thoughts, and feelings; description and origins of therapeutic techniques, and the results of experimental studies. Prerequisites: PSY 312 and PSY 303 or PSY 354 or permission. **Cr 3.**

PSY 536 Introduction to Psychodrama

Analysis through psychodramatic situations of the interaction between individual personality and group forces. Exploration through the dramatization of concrete situations of different ways of handling personal and interpersonal problems, whether in the field of education, family relations, industry, etc. Prerequisite: PSY 100 or permission of instructor. Cr 3.

PSY 537 Advanced Psychodrama

An experimental course that deals more deeply with aspects considered in Introductory Psychodrama, such as, development of self, relations to others, and psychodrama and sociometry as a profession. It offers opportunity to experience directing Psychodrama sessions in the classroom and to become better acquainted with the literature in the field. Prerequisite: PSY 536. Cr 3.

Developmental Psychology

This category contains courses intended to introduce the student to the various subdisciplines of developmental psychology. In addition, it contains courses intended to provide students who plan to enter vocations focusing on children with a specialized background for that work. PSY 100 is a prerequisite for all courses in this category.

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.)

PSY 323 Psychology of Childhood

A systematic study of the child's behavior and psychological development. Emphasis upon principles underlying development, methods of child study and practical implications. Prerequisite: PSY 100. Cr 3.

PSY 324 Psychology of Adolescence

Adolescent development in the physical, intellectual, emotional, and social spheres. Adolescent personality and problems of adjustment in relation to the family, the school and the community, and the world of work. Delinquency and abnormality in adolescents. Cr 3.

PSY 420 Child Study Laboratory I

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 social development during early childhood. It is

recommended that the student take PSY 323 before enrolling. 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 education, the effects of poverty, teacher expectancy effects. Prerequisites: PSY 100, 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. Special emphasis on the 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 522 Social Development in Children

An advanced survey of current theories and research pertaining to social behavior in children. Topics will 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 pertaining to children's cognitive processes. Topics will include perceptual development, children's learning and memory functioning, and language acquisition. Prerequisite: PSY 323, PSY 345 or equivalent. Lec 3 or Lec 2, Lab 2. Cr 3 or 5.

PSY 525 Theories and Paradigms of Developmental Psychology

Major models of developmental change and human growth. Structural, 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

The study of the psychology of aging and the aged with an emphasis on research methods and changes in learning, memory, intelligence etc. in relationship to biological changes and health status. Prerequisite: Permission of Instructor. **Cr 3.**

PSY 527 Life-span Developmental Neuropsychology

This course provides a background necessary for understanding the nervous system in relationship 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. **Cr 3.**

Social Psychology

This category contains courses intended to introduce the student to the various subdisciplines of social psychology. In addition, it contains courses intended to provide students with theory and research in several areas of current professional interest. PSY 100 is a prerequisite for all courses in this category.

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-related 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 crowd-

ing, personal space, privacy, architectural design of space and self-control and development phenomena. **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

An introduction to the psychological origins of political attitudes and behavior. Political socialization, motivation, social-psychological, and personality factors affecting political ideology, participation and leadership. Prerequisite: PSY 100 or POS 100. **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. **Cr 3.**

PSY 563 Group Processes

Concepts, methods and findings in the group process. Problems of methodology and conceptualization considered preliminary to formulation of proposals for individual or collective research projects. Prerequisite: PSY 561 or PSY 330 or permission. **Cr 3.**

PSY 565 Attitudes and Opinions

Nature, development, and measurement of social attitudes. Applications to understanding, prejudice, intergroup conflict, political and religious behavior. Prerequisite: PSY 330. **Cr 3.**

Psychological Methodology

This category includes courses which are crucial to students' understanding of psychology as a science. PSY 341, Statistics in Psychology I, and PSY 345, Principles of Psychological Research, are required for the psychology major. Students who have any intention of pursuing graduate study in psychology or a related field should be especially concerned with this category of courses and should probably take all of them. In terms of prerequisites, the sequence would be PSY 341, PSY 345, PSY 342. A minimum grade of "B" in these courses is indicative of ability to do graduate work. PSY 100 is a prerequisite for all courses in this category.

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

A consideration of 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

Techniques of psychological research. Applications of general methodology and specific techniques to major problem areas in behavioral research. Prerequisite: PSY 100, PSY 341. Cr 3.

PSY 540 Advanced Psychological Statistics and Methods I

A two semester advanced-level course in statistical methods used in psychology. Includes 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 in statistical methods used in psychology. Includes 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 level of 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

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

The use of analysis of variance in the context of behavioral investigations in which more than one dependent variable is used. Multivariate Analysis of Variance 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 541. Cr 3.

General Experimental Psychology

This category includes courses intended to introduce students to basic psychological theory and research. Students who plan to pursue graduate study in psychology should take several of these courses. PSY 100 is a prerequisite for all of the courses in this category.

PSY 350 Cognition

An introduction to the psychological study of human information processing and thinking. Representative topics include: 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. Cr 3.

PSY 352 Learning and Motivation

Fundamental principles of classical conditioning and operant conditioning, including interrelations between learning and motivation. Research data discussed in relation to various theories of learning. Laboratory work emphasizes demonstrations of fundamental learning phenomena in animal subjects. Cr 3.

PSY 353 Learning and Motivation Laboratory

(Optional) Prerequisite: Concurrent with PSY 352. Lab 2. Cr 1.

PSY 354 Human Learning

Basic principles that underlie the discovery, fixation and retention of new modes of human behavior. Verbal learning, retention, transfer of learning, and concept formation. Cr 3.

PSY 355 Human Learning Laboratory

(Optional) Prerequisite: Concurrent with PSY 354. Lab 2. Cr 1.

PSY 356 Theories of Learning

The most important psychological theories of the nature of learning including the positions of

the functional behaviorists (Thorndike, Skinner, Hull), associationists (Pavlov, Guthrie, Estes) and cognitivists (the Gestaltists, Piaget, and Tolman). 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 365 Physiological Psychology

Physiological bases of behavior with emphasis upon the development and function of the nervous system and the sense organs; the relation between psychological processes and psychological activity. Prerequisite: a basic course in zoology; PSY 345 is recommended. Cr 3.

PSY 462 Perception and the Perceptual System

A survey of research on issues about, and theories of perception. Topics include perception of space, form, events, and representations. Prerequisite: PSY 361. Cr 3.

PSY 526 Psychology of Aging

The study of the psychology of aging and the aged with an emphasis on research methods and changes in learning, memory, intelligence etc. in relationship to biological changes and health status. Prerequisite: Permission of Instructor. 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 of Instructor. 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 issues that divide important theories of 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 556 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 with 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 356 or permission. Cr 3.

PSY 559 Advanced Experimental Analysis of Behavior and Its

Application Consideration of operant and respondent conditioning. Topics include: reinforcement and reinforcement schedules, chaining and condition reinforcement, stimulus control and discrimination, punishment and avoidance. Applications to human behavior are discussed. Prerequisite: PSY 556 or equivalent. Cr 3.

PSY 567 Advanced Cognitive Psychology

An advanced survey of cognitive psychology. Representative topics include a comparison of the cognitive or information processing paradigm as contrasted 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 course on disease and psychopathology as it relates to the psychology of aging. Effects of cerebral vascular disease, heart disease, hypertension, degenerative central nervous diseases etc. on changes in behavior with advancing age are discussed. Related topics of mental illness, depression, and anxiety in the elderly are also discussed. Prerequisite: PSY 341 and PSY 480 or permission. Cr 3.

Advanced Undergraduate Psychology

This category contains courses which are generally reserved for upperlevel psychology majors, although some of these courses may be of interest to students in related fields. PSY 470, History and Systems of Psychology, is required for the psychology major. PSY 492, Problems in Psychology, affords students an opportunity to pursue psychological research in conjunction with one or more faculty members. Students who plan to apply for graduate study should attempt to become involved in research if possible. Only six hours of PSY 492 credit will count toward the psychology major. PSY 100 is prerequisite for all courses in this category.

PSY 470 History and Systems of Psychology
 Surveys the development of psychology as an experimental science. It begins with the earliest (Greek) views on the nature of man and traces the evolution of such views through Christian theology, the Renaissance and British Associationism. A consideration of Scottish and German Faculty Psychology is followed by a survey of 19th century developments in physiology that led directly to the birth of experimental psychology. The 20th century is touched upon only briefly: Gestalt Psychology and Behaviorism. Also considered are such special topics as vitalism in the life sciences and the mind-body problem in psychology. Cr 3.

PSY 490 Seminar in Issues in Contemporary Psychology
 A review of some of the current theoretical issues and research findings in the general areas of psychology. Cr 3.

PSY 492 Problems in Psychology
 Opportunity to carry out a particular research problem under supervision. Only 6 hours of

credit in PSY 492 will count toward the psychology major. Prerequisite: PSY 345 and permission. Cr Ar.

PSY 493 Field Experience in Psychology
 Complements formal classroom education by offering practical experiences in a wide variety of applied settings in which psychologists function, 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 of a faculty supervisor. Cr 1-3.

PSY 592 Directed Readings:(area)
 Opportunity to read in a particular area of psychology under faculty direction. Prerequisite: permission. Cr not to exceed 6.

Public Administration

Professor Taylor (Chairperson); Associate Professors Ahn, Laverty, Thai; Assistant Professors Blunt, Ott

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. Housed within the department, the *Bureau of Public Administration* provides applied research on public policy/program issues, management training and development programs, and consultation services to 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 policymakers. Department faculty and students work with members of the Bureau professional staff in the areas of applied research and public service.

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, 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.), 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 which 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 Presque Isle and 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 was one of only forty-five programs from over two hundred throughout the country that was included in the 1980 roster of approved programs. 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 program requires a minimum of 36 credit hours, in addition to prerequisites and electives.

A. Prerequisites 9 hours

1. Choose two of the following:
POS 100 American Government
PAA 200 Introduction to Public Management and Bureaucracy
2. ECO 110 Principles of Economics

Of the 45 credit hour minimum described below, at least 27 credit hours should be in Public Administration (PAA) or Political Science (POS)

B. Skills Component (12 hours)

Choose at least one course from each of the following four subareas:

1. Communication Skills
ENG 317 Advanced Professional Exposition
SPC 245 Small Group Communication
SPC 257 Business and Professional Communication
2. Accounting Skills
PAA 240 Introduction to Governmental Accounting

OR

3. Statistical Knowledge
BUA 201 Principles of Accounting I
PAA 315 Methods and Computers for Public Management and Policy Analysis

OR

MAT 232 Principles of Statistical Inference

OR

PSY 341 Statistics in Psychology

4. Computer Knowledge
COS 100 Introduction to Personal Computers

OR

COS 210 Introduction to Computing Using COBOL

PAA 315 Methods and Computers for Public Management and Policy Analysis

- 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
2. Urban Context
POS 233 Urban Politics*
OR
ECO 344 Urban Economics
3. Local, State and Federal Context
PAA 370 Urban Policy and Management*
OR
POS 360 The States and the Federal System**

- D. *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
ECO 372 State and Local Government Finance
3. Organization Behavior and Management

*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).

PAA 430 Public Organization and Management

BUA 326 Dynamics of Organization and Behavior

4. Law and Management

PAA 405 Administrative Law

PAA 410 Local Government Law

E. *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

F. *Electives* (a total of 9 hours and at least 3 outside of the department)

Any POS or PAA courses from Parts B-E above, that were not selected to meet core requirements.

PAA 498 Independent Readings in Public Administration

PAA 580 City and Regional Planning***

PAA 585 Comparative Administrative Systems***

PAA 560 State Administration***

PAA 515 Computer Applications in Public Administration and Policy***

PAA 505 Intergovernmental Relations***

PAA 520 Policy Studies***

PAA 550 Seminar in Public Personnel Management***

PAA 540 Seminar in Public Financial Management I***

POS 361 American Legislative Process

POS 462 American Executive Process

ARE 386 Government Policies Affecting Rural America

ARE 473 Land Economics

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 110 Materials

CIE 325 Transportation Engineering

CIE 331 Environmental Quality Control

ECO 332 Macroeconomics

ECO 334 Economics of Labor Unions

ECO 371 Public Finance and Fiscal Policy

ECO 367 Health Economics

IBR 100 Introduction to Mass Communication

IBR 211 History of American Broadcasting

PHI 430 Ethics

PSY 330 Social Psychology

SPC 267 Public Relations: Oral Communications

SPC 410 Mass Communication and Human Behavior

SWE 320 Introduction to Social Work and Social Welfare

SWE 340 Social Welfare Policy and Issues

INT 224 Sociology of Rural Life

SOC 314 Law and Society

SOC 316 Sociology of Aging

SOC 337 Sociology of Mental Illness

SOC 370 Small Group Analysis

All departments within the College of Arts and Sciences are required to develop and administer an English proficiency examination for its 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 370, Pos 233, PAA 405, PAA 315, 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, innovations, 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.

Cr 3.

***Graduate courses at the 500-level may be advised for a few senior students with at least a 3.0 grade point average.

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 200. **Cr 3.**

PAA 398 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 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 6.**

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 6.**

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. 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. 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 396 (PAA, POS) Field Experience

Enables a student to participate in a political or governmental organization. Readings and reports required in addition to meetings with faculty sponsor and/or other field experience participants. Prerequisites will be determined in each case based upon the nature of the field experience proposed. 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 and Social Work

Professor Watkins (Chairperson); Professors Cohn, Markides; Associate Professors Barkan, Berkun (Coordinator, Social Work Program), Gallagher, Grzelkowski, Marks, Whitaker; Assistant Professors Carter, Gardner; Lecturer Walker

The Department of Sociology and Social Work offers two degree programs: general sociology, and social work. The department also offers an option in applied sociology. Students wishing to explore a possible major or professional career in any of these areas should consult the depart-

mental secretary (201 Fernald 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 of additional departmental course work, including the following required courses:

SOC 301 Social Organization: The Micro-picture
 SOC 302 Social Organization: The Macro-picture
 SOC 410 The Nature of Social Order
 OR
 SOC 460 Major Ideas in Sociology
 SOC 490 Logic of Sociological Inquiry
 SOC 491 Practicum in Sociological Research

A typical sequence of courses would be to take SOC 101 as a freshman; SOC 301 in the fall of the sophomore year; SOC 302, and either SOC 410 or SOC 460 in the spring of the sophomore year; SOC 490 in the fall of the junior year; and SOC 491 in the spring of the junior year. Along with these basic courses, an additional eighteen hours of electives in sociology and/or social work are required of all sociology majors.

The Applied Sociology Option

The purpose of the applied sociology option is to educate sociology students to develop and apply their skills within organizations, agencies, schools, hospitals, businesses, governmental units, and other groups. The heart of the program is a year-long internship through which the student will integrate academic learning with practical application in some organization in the local community. Courses in the Logic of Applied Sociology and Applied Research Methods will supplement the internship experience. Students who want more information should consult the departmental secretary.

A grade of "C" or better is mandatory in all required courses (including PSY 100, PSY 323 or CHF 201, and ZOL 208, SOC 490 and SOC 491 in the social work major), with a 2.0 grade point average in the major.

The Junior English Proficiency requirement, which must be completed during the junior year by all sociology and social work majors, is met by passing, with a "C" grade or better, ENG 212, Intermediate Composition, or ENG 317, Advanced Professional Exposition.

The Social Work Major

The social work major is designed to prepare students for beginning-level professional social work practice in a broad range of social work settings. The program has been certified by the Council on Social Work Education as having met accreditation standards for baccalaureate social work education. It leads to the degree of Bachelor of Arts in Social Work.

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 in a strong liberal arts background, through the social work program, 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 both theory 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 the academic knowledge and practice skills they have been developing in the classroom. Prior to the field practicum, students engage in a volunteer experience unless they have had other appropriate social work experience. However, paid work or life experience may not be substituted for any course required in the major.

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, educational systems, nursing homes, correctional institutions, medical facilities and many others. Additionally, 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, stu-

dents must have at least a 2.0 grade point average, be of sophomore standing, enrolled in the College of Arts and Sciences, and submit a Personal Statement Form to the Social Work Program Coordinator prior to or at the time they submit the declaration of the major in social work to the College of Arts and Sciences. The Personal Statement Form is available in the departmental office (201 Fernald Hall). 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. They will be expected to enroll in the College of Arts and Sciences and meet its distribution requirements.

Requirements for the Social Work Major

Students interested in the social work major should begin by taking SOC 101 - Introduction to Sociology, and SWE 320 - Introduction to Social Work and Social Welfare.

Other required social work courses include:
 SWE 340 Social Welfare Policy and Issues
 SWE 350 Human Behavior and the Social Environment
 SWE 361 Social Work Methods I
 SWE 462 Social Work Methods II
 SWE 463 Social Work Methods III
 SWE 495 Field Practicum in Social Work (2 semesters)

In addition to the above, each social work major is required to complete:

PSY 100 General Psychology
 ZOL 208 Anatomy and Physiology
 PSY 323 Psychology of Childhood
 OR
 CHF 201 Introduction to Life Span Development
 SOC 338 Race and Culture Conflict
 SOC 490 Logic of Sociological Inquiry
 SOC 491 Practicum in Sociological Research

Correct course sequencing is essential for the social work major. Detailed information about requirements and course sequencing are in the social work *Program Guide*. The *Program Guide* may be obtained in the departmental office. Early review of the guide is recommended.

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 developmentally delayed children, 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).

Courses in Sociology

SOC 101 Introduction to Sociology

The fundamental concepts, principles, and methods of sociology; analyzes the influence of social and cultural factors upon human behavior; 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. Economic inequality, the issue of poverty, social inequity and social stigma, the connections between wealth and power, societal priorities. Prerequisite: SOC 101 or permission of instructor. **Cr 3.**

SOC 301 Social Organization: The Micro Picture I

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 freshmen. **Cr 3.**

SOC 302 Social Organization: The Macro Picture II

An examination of the structure and dynamics of large scale social organizations. Particular emphasis on institutional, formal or bureaucratic and community structures that are characteristic of the industrialized and post-industrialized world. Prerequisite: SOC 301 or permission of instructor; not open to freshmen. **Cr 3.**

SOC 308 Problems of Violence and Terrorism

The nature and causes of violence, terror and assassination in America, modern and pre-modern societies. The social structure of terrorist organizations. The institutionalization of terror as an instrument of policy by national states.

Prerequisite: SOC 101 or permission of instructor. Cr 3.

SOC 312 Political Sociology

The application of sociological conceptual frameworks and theories in the interpretation and explanation of political phenomena like voting behavior, power systems, and political processes. An introduction to the literature and issues of political sociology. Prerequisite: Any of the following: SOC 101, POS 100, POS 110, POS 212 or permission of instructor. 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 of instructor. Cr 3.

SOC 314 Law and Society

Explores law in its social context. Focuses largely on the modern American scene; presents a sociological perspective on law and the legal system. 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 of instructor. 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, and the aged. Prerequisite: SOC 101 or permission of instructor. 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 of instructor. 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 con-

tribute to and reinforce this behavior. Incidence, processes and consequences of domestic violence are explored as well as strategies for social change. Prerequisites: SOC 101 or permission of instructor; not open to freshmen. Cr 3.

SOC 329 Sociology of Sex Roles

Analysis of contemporary definitions of femininity and masculinity within American culture. Emphasis upon the interpersonal and institutional dimensions of these phenomena. The desirability and sources of social change. Prerequisite: SOC 101 or permission of instructor. Cr 3.

SOC 330 Perspectives on Women

Multi-disciplinary analysis of the personal, interpersonal and institutional dimensions of women's experience. Examination of both common experiences and cultural variations among women. The desirability and means of social change. Prerequisite: Sophomore standing or permission of instructor. 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 that have taken place and continue between identifiable groups, and the effects of oppression on people. Examines culture, values and societal position of several minority groups in this country. Prerequisite: SOC 101 or permission of instructor. Cr 3.

SOC 339 Sociology of Medicine

The relationship between sociocultural factors and the occurrence of disease and the social systems which are developed in the treatment and prevention thereof. Prerequisite: SOC 101 or permission of instructor. 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. Prerequisites: SOC 101 or permission of instructor. 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 of instructor. 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 of instructor. Cr 3.

SOC 369 Collective Behavior and Social Movements

The causes, dynamics and consequences of crowds, mobs, riots, fads, mass hysteria and rumors. The impact of disasters on individual behavior and social structures. Special emphasis placed on social movements as collective efforts to bring about or prevent social change. Prerequisite: SOC 101 or permission of instructor. Cr 3.

SOC 370 Small Group Analysis

Communication and interaction patterns within small groups identified and analyzed. Course involves participation in and observation of such interaction. Prerequisite: SOC 101 or permission of instructor. 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. Prerequisites: SOC 101 or permission of instructor. 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 of instructor. 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 of instructor. 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 of instructor. 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 of instructor. 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 of instructor. Cr 3.

SOC 465 Evolution, Revolution and the Future

Review and analysis of major principles in social change such as social evolution and revolution, their relevance in understanding contemporary social processes in American, Western, Communist and developing societies. Problems of the future society. Prerequisite: SOC 101 or permission of instructor. Cr 3.

SOC 482 The Sociology of Religion

Problems in the description and explanation of religious beliefs and practices. Marx, Weber, Freud, Durkheim. The religious dimensions of social theory; the social construction of religious beliefs. Definitions and measurements of religious phenomena. Religion in primitive and modern societies. The future of illusions. Prerequisite: SOC 101 or permission of instructor. Cr 3.

SOC 490 Logic of Sociological Inquiry

The relationship between theory and research. Specific topics will include the nature of scientific

ic 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: SOC 101 or permission of instructor. Cr 3.

SOC 491 Practicum in Sociological Research

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 of instructor. Cr 4.

SOC 497 Departmental Projects I

By permission of an instructor only. Cr 1-3.

SOC 498 Departmental Projects II

By permission of an instructor only. Cr 1-3.

Courses in Social Work

SWK 320 Introduction to Social Work and Social Welfare

The introductory course in the social welfare sequence. 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 freshman or sophomore level. Prerequisite: SOC 101. Cr 3.

SWK 340 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 of instructor. 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, ZOL 208, SOC 101 and PSY 323 or CHF 201, or permission of the instructor Cr 3.

SWK 361 Social Work Methods I

An introductory course in social work theory and methods. The functions and roles of the

social worker, the value base of social work practice, and the processes of providing service are explored. Prerequisite: SWK 340 and SWK 350 or permission of instructor. 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 of instructor. To be offered once each year. Cr 3.

SWK 397 Independent Projects in Social Welfare I

By permission of a social welfare instructor only. Cr 1-3.

SWK 398 Independent Projects in Social Welfare II

By permission of a social welfare instructor only. Cr 1-3.

SWK 462 Social Work Methods II

Focuses on the development of knowledge, values and skills necessary for provision of social services for individuals, families and small groups. Includes knowledge and skill building in interpersonal communication, planning and carrying out interventions, and in evaluating interventions within the context of generalist social work practice. Provides integration of the classroom and field instruction experiences. Prerequisite: SWK 361. Limited to 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. Provides integration of the classroom and field instruction experience. Prerequisite: SWK 462. Limited to senior social work majors. Cr 3.

SWK 495 Field Practicum in Social Work

Generalist social work practice in community agencies designed to provide students the opportunity to apply social work knowledge and skills directed toward planned intervention and change efforts. Prerequisite: Senior social work majors only. Twelve credit hours required; six per semester for two semesters, variable by permission only. Cr 1-6.

Interdisciplinary Courses

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

INT 324 (ARE, SSW) 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, SSW) The Individual and the Community
Analysis of functioning and structure of the community. Emphasis on ways in which individuals and groups are affected by community dynamics. Community project. Prerequisite: INT 224 or permission. Rec 3. **Cr 3.**

Speech Communication

Associate Professor LaRiviere (Interim Chairperson); Professors Dopheide, McKerrow, Pettit; Associate Professors Burns, Langellier, Pickering; Assistant Professors Kertoy, Kuhn, Peterson, Sherblom; Lecturer/Staff Speech Pathologist Riley; Faculty Associates Curtis, Henri, Kerr, Olsen, Pronovost

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.

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 three of four core courses within the department: Communication and Human Behavior (SPC 409), Communication and Society (SPC 411), Language and Speech Development (SPC

380), and Introduction to Speech Science (SPC 484). 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 college as well as departmental requirements (A list of acceptable courses for meeting College distribution requirements is available in the Dean's Office, 100 Stevens Hall). Students taking department courses to satisfy requirements within the speech major must have a C (2.0) or better in each course. The policy is in effect for undergraduates declaring majors in the spring of 1988.

Program in Communication Studies

In this program, students develop a concentration in Communication Theory and Analysis, Communication Behavior in Organizations, or Communication Education. Students create their programs of study from courses within the Department of Speech Communication as well as from complementary courses outside the department.

Students concentrating in the area of Communication Theory and Analysis develop a broad understanding of communication theories and research techniques and are prepared for careers that emphasize communication or for continued study at the graduate level. By concentrating in the area of Communication Behavior in Organizations, persons can prepare

themselves to enter businesses, corporations, or service agencies as communication specialists in positions such as those in management, personnel, and public relations. Students may specialize in Communication Education if they plan to become elementary or secondary teachers or to develop a more general educationally focused career, such as working in state or federal education departments.

Program in Communication Disorders

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.

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 is 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. Permission of coordinator, Conley Speech and Hearing Center. (Pass/Fail Grade Only). **Cr 1.**

SPC 109 Parliamentary Procedure

The principles and methods by which groups organize themselves and transact business with efficiency and fairness. **Cr 1.**

SPC 110 Introduction to Human Communication

The theory and practice of human communication, with specific attention to its function in personal, organizational, and sociocultural systems. **Cr 3.**

SPC 112 Forensic Practicum

Supervised experience in the University Forensic Program in such communicative activities as public debating, discussing, speaking, and oral reading. Prerequisite: SPC 103 or 106, or prior experience in forensics. May be repeated. **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. No 1st semester freshmen. **Cr 3.**

SPC 245 Small Group Communication

An introduction to the principles of the small group process involved in the area of discussion and group inquiry as a means of solving problems. Practical application of these principles through classroom experiences. Prerequisite: SPC 102, 103 or 106. **Cr 3.**

SPC 247 Argumentation and Public Advocacy

An introduction to the principles of the decision-making process involved in the area of debate and advocacy, with emphasis on the use of reason in controversy. Practical application of these principles through classroom experience. Prerequisite: SPC 103 or permission. **Cr 3.**

SPC 256 The Social Process of Interpretation

More advanced study in the oral communication of literature to an audience. Emphasis is on the social process of oral interpretation and its application to audiences outside the classroom. Prerequisite: SPC 102, 103 or 106. 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 scientific and professional presentations. Prerequisite: SPC 102, 103 or 106. Junior or Senior standing. Cr 3.

SPC 266 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. Prerequisite: SPC 102, 103, 106, or 110. 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. The course is approached from the speech communication viewpoint, emphasizing various aspects of direct personal contact. Prerequisite: SPC 257 or permission. Junior or senior standing. 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: SPC 102, 103 or 106. Junior or senior standing. Cr 3.

SPC 301 Persuasive Communication

The principles involved in influencing an audience, with emphasis on the means by which speakers try to influence the attitudes, beliefs, values, and actions of others. Experience in creating and evaluating persuasive messages and campaigns. Prerequisite: SPC 102, 103, 106 or 110. Cr 3.

SPC 303 Criticism of Public Discourse

An examination of the principle elements involved in the criticism of public discourse, with emphasis on the primacy of the audience, identification strategies, rational argument, and style. Prerequisite: SPC 102, 103 or 106. Cr 3.

SPC 324 Interpersonal Communication in Helping Relationships

Advanced study of interpersonal communication as it functions in helping relationships, de-

signed for speech-language clinicians, teachers, nurses, social workers, and others in helping professions. Examines perspectives, theories and research on communication and helping relationships. Analysis and development of communicative behaviors approached through a training model. Prerequisite: SPC 102, or SPC 110 or permission. Cr 3.

SPC 354 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 366 Ensemble Interpretation

An advanced examination of theories, methods of analysis, and styles in the oral communication of literature with specific application to the problems of group performance. Emphasis is on exploring communicative possibilities of the ensemble interpretation of literature. Students will also present an original production to public audience. Prerequisite: SPC 106 or permission. Cr 3.

SPC 368 Teaching of Speech Communication

Study of contemporary teaching methods. Practical application through such activities as construction of course outlines and units, micro-teaching, and evaluations. Some attention to co-curricular activities and professional organizations. Prerequisite: 12 hours of departmental courses. Cr 3.

SPC 380 Language and Speech Development

The psychological and sociological foundations of language development and the sequential aspects of speech development. The interrelationships of the natural and behavioral sciences in understanding the speech and language processes. Prerequisite: No Freshman. Recommended for teachers. Cr 3.

SPC 381 Fundamentals of Speech Pathology I

The diagnosis and treatment of speech disorders presented by children and adults. Emphasis on the interpersonal therapeutic experience and the basic procedures followed by the speech and hearing clinician. Not recommended for classroom teachers. Prerequisite: permission. Limited to junior or senior majors. Lec 2, Lab 2. Cr 3.

SPC 382 Fundamentals of Speech Pathology II

The diagnosis and treatment of speech disorders presented by children and adults. Emphasis on

the interpersonal therapeutic experience and the basic procedures followed by the speech and hearing clinician. Not recommended for classroom teachers. Prerequisite: Permission. Limited to junior or senior majors. Lec 2, Lab 2.

Cr 3.

SPC 388 Hearing Impairment

An introduction to normal auditory function as a basis for understanding disorders of hearing. Procedures for hearing assessment and rehabilitation methods used with the hearing-impaired person. Prerequisite: SPC 130.

Cr 3.

SPC 389 Introduction to Audiology

The field and profession of audiology. A study of the methods of hearing assessment, including their administration and interpretation. Audiometric identification of hearing loss and rehabilitation of the hearing-impaired person. Prerequisite: SPC 388.

Cr 3.

SPC 405 Women and Communication

This course will systematically study research by and about women with regard to language, speech, and communication pragmatics. Topics will be discussed within a variety of communication contexts. No freshmen.

Cr 3.

SPC 409 Communication and Human Behavior

An examination of social and behavioral science approaches to the study of verbal and nonverbal communication; emphasis on the nature, development, and use of theories. Prerequisite: SPC 102, 103, 106 or 110.

Cr 3.

SPC 410 Mass Communication and Human Interaction

The communicative impact of mass media (e.g., television, radio, newspapers), and the 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 102, 103, 106 or 110 or JBR 100.

Cr 3.

SPC 411 Communication and Society

An examination of humanistic approaches to the study of communication; emphasis on classical and contemporary rhetorical theories of communication in society. Prerequisite: SPC 102, 103, 106 or 110.

Cr 3.

SPC 444 Communication Strategies in Political Campaigns

Examines the nature and impact of diverse communication strategies in political campaigns; emphasis on analysis of Congressional and Presidential campaigns. Prerequisite: No freshmen.

Cr 3.

SPC 470 Communication in Organizations

The study of communication behavior in the organizational context. Examination of research and theory 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 483 Anatomy and Physiology of the Speech Mechanism

The structures, the muscular system, and the nervous system underlying breathing, phonation, articulation, and language. Emphasis on normal neurophysiological function; attention to organic pathologies affecting speech and language. Juniors or senior standing.

Cr 3.

SPC 484 Introduction to Speech Science

An introduction to 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. Prerequisite: No freshman.

Cr 3.

SPC 486 Clinical Practicum I

Supervised therapy experience with selected clients in the Conley Speech and Hearing Center. Minimum of four contact hours each week, plus weekly supervisory conference. May be repeated for a maximum of eight credits. Prerequisite: SPC 381, 382. Course fee \$10.00.

Cr 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. Topics may vary with each semester. 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, conference with

faculty supervisor, periodic logs or summaries, plus a final written report. Not more than 12 hours may count toward graduation and not more than 6 hours may count toward the departmental major. Prerequisites: completion of at least 15 hours in speech communication and permission of the departmental field experience committee. **Cr 1-6.**

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 503 Seminar in Rhetorical Criticism
Examination of principal methodological approaches to the criticism of public discourse. Criticism will focus on contemporary public communication. Prerequisite: Permission. **Cr 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 examination of interpersonal communication theory and research. Emphasis will be on the implications of various theories and research traditions for understanding interpersonal traditions. Prerequisite: Permission **Cr 3.**

SPC 555 History of American Public Discourse
Representative American speakers and rhetorical movements from colonial times to the present. A critical analysis of the materials, structure, style, and historical significance of selected speeches. 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. **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 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 483 or permission. **Cr 3.**

SPC 583 Fluency Disorders

Causation, diagnosis, and treatment of stuttering behavior viewed from various theoretical orientations. Clinical management of children and adults who stutter. Prerequisite: SPC 382 or permission. **Cr 3.**

SPC 585 Children's Language Disorders

A study of the language disorders associated with childhood. This course will focus on the procedures for the evaluation and treatment of the semantic and syntactic aspects of childhood disorders. Prerequisite: SPC 380, SPC 382 and/or equivalent, or permission. **Cr 3.**

SPC 586 Current Issues in Clinical Practice

Assists the speech and hearing clinician to keep abreast of theoretical and applied developments in clinical practice with children and adults. Format varies with matter under consideration. Prerequisite: permission. (Offered only in Summer Session or C.E.D.). **Cr 3.**

SPC 588 Aural Rehabilitation

Effects of hearing loss upon the personal and social development of the individual. Principles and procedures of auditory training and speech reading as approaches to language development in the hearing-handicapped person. Prerequisite: SPC 388 or permission. **Cr 3.**

Zoology

Professors J. McCleave (Chairperson), Allen, Chase, Dean, Dearborn, DeWitt, Gilmartin, Haines, C. Major, Roberts, Shick, Valleau; Associate Professors Glanz, Kornfield, Moring, Ringo, Sidell, M. Tyler, S. Tyler, Watling, Wood; Associate Research Professor Revelante; Assistant Professors Dowse, Kass; Instructors B. Cook, M. Major, B. McCleave

Cooperating Faculty:

Vadas (Department of Botany and Plant Pathology), J. R. Cook (Health and Safety Officer)

Affiliated Cooperating Faculty:

Bigelow Laboratory, Boothbay Harbor-Professor Townsend

Mt. Allison University-Professor Driedzic

National Fisheries Contaminant Center (NFCRC)-Professor Haines

Department of Marine Resources, Boothbay Harbor-Professors Langton, Shumway

University of Maine at Farmington-Professors Martin, Parker

Huntsman Marine Laboratory, Bar Harbor-Professor Moon

Jackson Laboratory, Bar Harbor-Professors Bailey, Barker, Birkenmeyer, Eicher, Kozac, Mobraaten

Dahl-Chase Pathology Associates, Bangor-Lecturers Bryant, Chapman, Dahl, Kaiser, Malvesta, O'Callaghan, Wlodarski

Eastern Maine Medical Center, Bangor-Lecturers Beauregard, LaMarche, McGlaufflin

Maine Medical Center, Portland-Lecturers Coriveau, Pusch, Stocks

The Department of Zoology offers a varied program for the study of animal biology. This includes all aspects of animal life, anatomy, physiology, embryology, heredity, ecology, 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, be-

havior 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 foodwebs.

Genetics and Evolutionary Biology

The department offers both undergraduate courses in genetics and evolution and advanced courses in behavioral genetics, population biology, population genetics 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 physiology, morphogenesis, and development. Such a curriculum emphasis prepares the student for further cellular research at

the graduate level, for technical positions in biomedical research, or for further study in cytology.

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 advanced dissection (including human dissection), fish physiology, physiological ecology, and experimental endocrinology are also available to advanced students. These courses are taken by students preparing for careers in biomedical 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.

Medical Technology

The Department of Zoology offers a Bachelor of Arts and a Master of Science degree in medical technology. Students interested in the medical technology program must enroll as pre-medical technology students and apply for admission to the medical technology program upon completion of three semesters of study. Medical technology students are on campus for three years, and spend the senior year in a hospital practicum for twelve months. 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 hospital programs or 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 hospital programs. The hospitals reserve the right to refuse admission to students who in their judgment would not be satisfactory. At the end of the practicum, students are eligible for certification upon satisfactory completion of the registry examination administered by the American Society of Clinical Pathologists.

The Department of Zoology offers work leading to the degrees of Bachelor of Arts in Biology and 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 special 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. Air-conditioned animal quarters are provided for breeding colonies and are maintained by a fulltime attendant. A small general fish collection is maintained for systematic and ecological studies.

Boats for use on inland waters are provided by the department, and boats for use in estuaries and coastal waters by the Darling Center. Ships for ocean research are provided through the National Science Foundation or other granting agencies.

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 by the University under a cooperative agreement with the U. S. Fish and Wildlife Service and the Maine Department of Inland Fisheries and Wildlife. Fishery unit staff members are in 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 programs are underway with members of the staff at Huntsman Laboratory, St. Andrews, New Brunswick, Canada. The Mt. Desert Island Biological Laboratory, Salisbury Cove, Maine, may be available for research.

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
 CHY 252 Organic Chemistry Lecture II
 CHY 254 Organic Chemistry Laboratory II
 OR
 BCH 221 Organic Chemistry
 BCH 322 Biochemistry
 MAT 126 Analytic Geometry and Calculus
 PHY 111/112 General Physics I and II
 Foreign language—one year at the intermediate level.

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 in each case except INT 419. Evolution may be used to satisfy *only one area requirement*.

A. Category I

ZOL 329 Vertebrate Biology I
 ZOL 330 Vertebrate Biology II
 ZOL 331 Vertebrate Biology Lab I
 ZOL 332 Vertebrate Biology Lab II
 ZOL 333 Comparative Anatomy
 ZOL 336 Developmental Biology
 ZOL 453 Invertebrate Zoology
 ZOL 458 Animal Parasitology
 ZOL 459 Animal Parasitology Laboratory

B. Category II

ZOL 462 Principles of Genetics
 ZOL 465 Evolution

C. Category III

ZOL 377 Animal Physiology
 ZOL 378 Animal Physiology Laboratory
 ZOL 480 Cell Physiology
 ZOL 485 Comparative Animal Physiology

D. Category IV

INT 419 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 304 (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.

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. Students can count only six credit hours of research problems (ZOL or Honors) toward the requirements for the major.

Requirements for the Biology Major

The Department of Zoology requires the following courses for the B.A. in Biology:

A. Basic Sciences

BIO 100 Basic Biology
 ZOL 204 Animal Biology
 BOT 203 The Plant Kingdom
 INT 419 General Ecology
 MCB 300 General Microbiology
 MCB 305 General Microbiology Laboratory
 ENT 226 Introductory Entomology
 PHY 111/112 General Physics I and II
 MAT 126 Analytic Geometry and Calculus

B. Basic Chemistry

CHY 111/112 General Chemistry I and II
 OR

CHY 113/114 Chemical Principles I and II

C. Organic and Biological Chemistry

BCH 221 Organic Chemistry

AND

BCH 322 Biochemistry

OR

CHY 251 Organic Chemistry Lecture I

CHY 253 Organic Chemistry Laboratory I

AND

BCH 322 Biochemistry

OR

CHY 252 Organic Chemistry Lecture II

CHY 254 Organic Chemistry Laboratory II

BCH 451 Principles of Biochemistry

D. Genetics/Evolution

ZOL 462 Principles of Genetics

ZOL 465 Evolution

E. Group Electives (four credit hours in each of the following groups)

Physiology

ZOL 377 Animal Physiology

ZOL 378 Animal Physiology Lab

ZOL 480 Cell Physiology

ZOL 485 Comparative Animal Physiology

BOT 452 Plant Physiology

Anatomy

ZOL 333 Comparative Anatomy

OR

ZOL 336 Developmental Biology

OR

BOT 435 Plant Anatomy

Taxonomy

ZOL 329 Vertebrate Biology I
 ZOL 331 Vertebrate Biology Laboratory I
 ZOL 453 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 440 Insect Biology and Taxonomy
 ENT 453 Biology and Taxonomy of Advanced Orders

A G.P.A. of 2.0 must be maintained in the courses above, and any additional zoology courses elected. A foreign language at the intermediate level must be completed. A junior-level *English Proficiency Examination* must be passed.

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-veterinary and others)**

Freshman Year

Foreign Language	CHY 113/114 Chemical Principles I and II
MAT 126 Analytic Geometry and Calculus	BIO 100 Basic Biology
CHY 111/112 General Chemistry I and II	ZOL 204 Animal Biology
OR	ENG 101 College Composition

Sophomore Year

ZOL 333 Comparative Anatomy	CHY 252 Organic Chemistry Lecture II
ZOL 538 Experimental Embryology	CHY 254 Organic Chemistry Laboratory II
CHY 251 Organic Chemistry Lecture I	Electives
CHY 253 Organic Chemistry Laboratory I	

Junior Year

ZOL 377 Animal Physiology	ZOL 462 Principles of Genetics
ZOL 378 Animal Physiology Laboratory	PHY 111/112 General Physics I and II
OR	INT 419 General Ecology
ZOL 480 Cell Physiology	OR
OR	ZOL 465 Evolution
ZOL 485 Comparative Animal Physiology	Zoology Electives

Senior Year

ZOL 451 Histology
 Zoology Electives

Medical Technology**Freshman Year**

MAT 122 Algebra and Trigonometry, Pre-Calculus	CHY 111/112 General Chemistry I and II
OR	OR
MAT 126 Analytic Geometry and Calculus	CHY 113/114 Chemical Principles I and II
BIO 100 Basic Biology	ENG 101 College Composition
ZOL 208 Anatomy and Physiology	ZOL 207 Orientation in Medical Technology

Sophomore Year

BCH 221 Organic Chemistry	MCB 305 General Microbiology Laboratory
BCH 322/322L Biochemistry	MCB 440 Introductory Immunology
MCB 300 General Microbiology	ZOL 458 Animal Parasitology

Junior Year

MCB 420 Pathogenic Bacteriology and Serology	ZOL 327 Biomedical Instrumentation
ZOL 321 Introduction to Clinical Laboratory Methods	ZOL 451 Histology
	ZOL 489 Introduction to Human Pathology

Senior Year

(At affiliated hospital medical technology programs)

ZOL 322 Clinical Hematology	ZOL 325 Clinical Chemistry
ZOL 323 Clinical Microbiology	ZOL 326 Clinical Microscopy
ZOL 324 Clinical Immunohematology	

Environmental/Ecology/Marine**Freshman Year**

Foreign Language	CHY 113/114 Chemical Principles I and II
MAT 126 Analytic Geometry and Calculus	BIO 100 Basic Biology
CHY 111/112 General Chemistry I and II	ZOL 204 Animal Biology
OR	ENG 101 College Composition

Sophomore Year

ZOL 329 Vertebrate Biology I	BCH 221 Organic Chemistry
ZOL 331 Vertebrate Biology Laboratory I	BCH 322 Biochemistry
ZOL 330 Vertebrate Biology II	INT 419 General Ecology
ZOL 332 Vertebrate Biology Laboratory II	Electives

Junior Year

ZOL 377 Animal Physiology	OR
ZOL 378 Animal Physiology Laboratory	ZOL 465 Evolution
OR	PHY 111/112 General Physics I and II
ZOL 480 Cell Physiology	INT 419 General Ecology
OR	ZOL 453 Invertebrate Zoology
ZOL 485 Comparative Animal Physiology	Electives
ZOL 462 Principles of Genetics	

Senior Year

ZOL 433 Mammalogy	ZOL 471 Fishery Biology Laboratory
OR	OR
ZOL 434 Avian Biology and Ecology	ZOL 472 Aquatic Food Webs
OR	Zoology electives

Biology Option

Freshman Year

Foreign language	CHY 113/114 Chemical Principles I and II
MAT 126 Analytic Geometry and Calculus	BIO 100 Basic Biology
CHY 111/112 General Chemistry I and II	ZOL 208 Anatomy and Physiology
OR	ENG 101 College Composition

Sophomore Year

BCH 221 Organic Chemistry	ENT 226 Introductory Entomology
BCH 322 Biochemistry	Electives
BOT 203 The Plant Kingdom	

Junior Year

MCB 300 General Microbiology	Physiology group elective
MCB 305 General Microbiology Laboratory	ZOL 462 Principles of Genetics
Anatomy group elective	PHY 111/112 General Physics I and II

Senior Year

ZOL 465 Evolution	Taxonomy group elective
INT 419 General Ecology	Electives

Graduate Study in Zoology

The department 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 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. Lec 3, Lab 2. Cr 4.

BIO 451 Interpretation of Biological Statistics

A beginning course in univariate statistics dealing with parametric and nonparametric tests. Much emphasis on the interpretation of results

and application of techniques to biological literature. Prerequisite: MAT 122 and BIO 100.

Cr 3.

Courses in Zoology

ZOL 101 Principles of Biology

A non-laboratory treatment of the basic principles of biology, including such topics as ecology, evolution, genetics, and cell theory. Particular emphasis on application of biological principles to problems of modern society. Lec 3. Cr 3.

ZOL 204 Animal Biology

Second semester course includes an introduction to 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 pre-medical technology for second-semester freshman pre-medical technology students. Required. Lec 1. Cr 1.

ZOL 208 Anatomy and Physiology

The general principles of animal life. Emphasis on the structure and functions of the human body. Prerequisite: BIO 100 or ZOL 101. Students completing ZOL 204 can not take ZOL 208. Lec 3, Lab 2. Cr 4.

ZOL 213 An Introduction to Marine Science

A one semester, non-laboratory introduction to the link between man and the sea, including the history of man's interaction with and study of the sea, the organisms that live within and beneath the sea, characteristics of the marine environment, the exploitation and pollution of the sea, military use of sea. Prerequisite: BIO 100 highly recommended. (This course meets Area III Arts and Sciences requirements). Cr 3.

ZOL 296 Zoology Professional Experiences

Students may be engaged 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 301 Natural History of the Maine Coast

An introduction to the ecology and field biology of the Maine coast. Morning and afternoon field trips on the mainland and to coastal islands, as well as evening seminars. For information and application, write directly to: National Audubon Society Ecology Camps, Medomak, ME 04551. Do not apply directly to the University of Maine. Summer course only. Cr 2.

ZOL 303 Pathophysiology

A study of the physiological, genetic biochemical basis of disease. Prerequisite: ZOL 208. Zoology majors cannot receive major credit for this course. Cr 3.

ZOL 304 Fundamentals of Pharmacology

The basic concepts of pharmacology for health professionals, introducing pharmacodynamics and kinetics, concentrating on the clinical pharmacology of the major drug categories, and covering major drug interactions. Prerequisites: A course in physiology (ZOL 208 or 377) and either BCH 107, 108 or BCH 221, 322 or CHY 251, 252 or permission of the instructor. Zo majors cannot receive credit within the zoology major for both ZOL 316 and ZOL 304. Cr 3.

ZOL 305 Medical Parasitology

A study of the medically important parasites, their life cycles, epidemiology and laboratory methods of diagnosis. (Medical Technology students only.) Lec 1, Lab 2. Cr 3.

ZOL 316 Drug Use and Abuse

An introduction to drugs of importance in contemporary society. Emphasis on drugs of biological, medical, and social importance, survey of principles of administration, dose response curves, physiological and pharmacological actions, and toxicity. Prerequisite: BIO 100 or ZOL 204 or ZOL 208. Lec 3. Cr 3.

ZOL 321 Introduction to Clinical Laboratory Methods

An introduction to basic theory and methods in clinical hematology and urinalysis. Required for medical technology students. Prerequisite: ZOL 204, 208, CHY 111, 112, CHY 240. Lec 1, Lab 4. Cr 3.

ZOL 322 Clinical Hematology

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

ZOL 323 Clinical Microbiology

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

ZOL 324 Clinical Immunohematology

Lectures and laboratory practice in the fundamental techniques used in blood grouping and cross-matching proceeding to advanced studies of human blood groups, theory and practice in special problems, and advanced techniques (EMMC, MMC). Cr 7.

ZOL 325 Clinical Chemistry

Lectures and laboratory exercises in basic techniques of clinical chemistry proceeding to advanced theories and methodology and including theory and technique of immunochemistry. (EMMC, MMC). Cr 9.

ZOL 326 Clinical Microscopy

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

ZOL 327 Biomedical Instrumentation

Review of electricity, electronics, and colorimetry; introduction to use and care of basic clinical laboratory instruments. Priority given medical technology students. Prerequisites: PHY 103 or PHY 111, 112 or permission of instructor or equivalent. Lec 2, Lab 3. Cr 3.

ZOL 329 Vertebrate Biology I

An 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. Cr 3.

ZOL 330 Vertebrate Biology II

An introduction to the classes of vertebrates; their characteristics, evolution, physiology, ecology, and behavior. Emphasis on adaptive strategies in the environment. Prerequisite: ZOL 204, ZOL 329. Lec 3. Cr 3.

ZOL 331 Vertebrate Biology Laboratory I

Taxonomy of regional vertebrate fauna; structure and function of representatives of vertebrate classes. Taxonomy of local vertebrates. Prerequisite: ZOL 329 or concurrently. Lab 2. Cr 1.

ZOL 332 Vertebrate Biology Laboratory II

Taxonomy of regional vertebrate fauna; structure and function of representatives of vertebrate classes. 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 of instructor. Lec 2, Lab 4. Cr 4.

ZOL 336 Developmental Biology

The transformation of the fertilized egg into a new adult individual: the concepts of growth and development of organisms. Prerequisite: ZOL 204. Lec 2, Lab 4. Cr 4.

ZOL 338 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 of instructor. Lec 3. Cr 3.

ZOL 341 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 354 Biology of Behavior

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; suitable for nonscience or science majors. Topics include principles of inheritance, the nature of chromosomes, the structure and expression of genes, genetic disorders, and human evolution. 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. Offered fall semesters. This is the pre-professional course for pre-medical, pre-dental, pre-graduate school, nutrition, and exercise physiology students. Prerequisites: BIO 100 and ZOL 204; one year of chemistry. Lec 3. Cr 3.

ZOL 378 Animal Physiology Laboratory

Experimental analysis of physiological processes. Extensive animal surgery is involved. Prerequisites: ZOL 377 (or concurrent with ZOL 377). 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. Admission by permission of department chairman. Cr Ar.

ZOL 388 Problems in Zoology II

Open to juniors and seniors who have special interest and qualifications in some branch of zoology. Admission by permission of department chairman. Cr Ar.

ZOL 400 Zoology Writing Intensive

This course is designed to supplement existing courses in Zoology. Additional writing will be required in conjunction with the regular course work. The rationale for this course is to expose students to an intensive writing experience in their major discipline. This course must be taken concurrently with one of the following courses: (Individual courses and sections will be designated in each time schedule). Prerequisite: Permission of instructor. Cr 1.

ZOL 433 Mammalogy

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 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. Prerequisite: ZOL 204. Lec 2, Lab 4. Cr 4.

ZOL 453 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 458 Animal Parasitology

The life histories, economic importance, methods of control, host necropsy, and the preparation of parasites. Prerequisite: ZOL 204. Lec 2. Cr 2.

ZOL 459 Animal Parasitology Laboratory

Prerequisite: ZOL 458 or concurrently. Lab 4. Cr 2.

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 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 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 419 is recommended. Lec 3. Cr 3.

ZOL 469 Limnology Lab and Field

Laboratory and field studies emphasizing chemistry and biology of lakes. Saturday field trips. Prerequisite: BIO 468 (or concurrently). Lab 4. Cr 2.

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 419 or WLM 200. Recommended: FOR 204 or MAT 232. Lec 3. Cr 3.

ZOL 471 Fishery Biology Laboratory

Field and laboratory exercises providing experience with techniques commonly employed in fishery biology. Data interpretation and report preparation. Two Saturday field trips. Offered fall semester. Prerequisite: ZOL 470 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 or instructor. 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 of instructor. 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. The experimental and comparative approach emphasized. Prerequisite: ZOL 377 and Organic Chemistry. Lec 3, Lab 4. Cr 3.

ZOL 480 Cell Physiology

A physiochemical analysis of cell function and structure. Special emphasis on mechanisms of cellular function common to most living organisms, particularly their implications in the phys-

iology of multicellular animals. Associated laboratory emphasizes experimental techniques employed in modern cell physiology. Prerequisite: ZOL 204, 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. The laboratory will familiarize students 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, year of chemistry and junior standing. Lec 3, Lab 2. **Cr 4.**

ZOL 489 Introduction to Human Pathology

An introduction to the study of diseases. First portion covers general pathologic principles and how they relate to human disease states; second portion deals with specific organ systems and the diseases affecting them. Primarily for medical technology students. Prerequisites: ZOL 451, MCB 300, 301, 402, or their equivalents or permission of instructor. Lec 3. **Cr 3.**

ZOL 520 Larval Biology of Marine Invertebrates

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. At Darling Center, summers only. Prerequisite: ZOL 453 or equivalent. Lec 2, Lab 6. **Cr 5.**

ZOL 521 Polar Ecology

Interrelationships between organisms and their physical and biotic environment in high latitudes. Marine ecosystems emphasized. Prerequisite: ZOL 453 and INT 419 or equivalent or permission. **Cr 3.**

ZOL 523 Taxonomy and Morphology of Crustacea

A comprehensive review of crustacean taxonomy and morphology, including freshwater and

marine, living and fossil forms. Emphasis will be on evolutionary history of the group. Laboratory study will emphasize local forms. Some field trips required. Prerequisite: ZOL 453, INT 510 or equivalent. Lec 3, Lab 3. **Cr 4.**

ZOL 524 Population Biology

A discussion of advanced topics in the ecology and genetics of species and populations: population genetics; population dynamics; population structure; selection, speciation. Prerequisite: INT 419 (or equivalent) and ZOL 462 or ZOL 465, or permission. Lec 3. **Cr 3.**

ZOL 525 Community Ecology

An advanced discussion of the organization of biological communities: community structure, stratification, and patterns, niche division and species diversity; competition; predation; community classification and description; biogeography of communities; succession and climax. Prerequisites: INT 419 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 453 or permission of instructor. 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 453 or permission of instructor. Lec 2, Lab 2. **Cr 3.**

ZOL 530 Fish Physiology

Analysis of the functional biology of fishes; 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 or concurrently and permission. Lab 4. **Cr 2.**

ZOL 532 Behavior and Ecology of Fishes

Locomotion, sensory biology, migration, feeding, growth, reproduction and adaptation to habitats, treated from a behavioral and ecological standpoint. Lectures, laboratory study and field trips. Prerequisite: ZOL 330 or permission. Lec 2, Lab 4. **Cr 4.**

ZOL 538 Experimental Embryology

Analysis of components of development, including growth, morphogenesis, and differentiation. Prerequisites: ZOL 333, 336 or permission. Cr 3.

ZOL 539 Experimental Embryology Laboratory

Experimental techniques used in study of developmental systems. Coordinated with ZOL 538 lectures. Prerequisites: ZOL 333, 336, 538, concurrent, and permission. ZOL 443 is recommended. Lab 4. Cr 2.

ZOL 540 Seminar in Evolutionary Ecology

Seminar series covering the theoretical and applied aspects of ecological and evolutionary principles. Prerequisites: permission of instructor. Cr Ar.

ZOL 541 Electron Microscopy Laboratory

Techniques of transmission and scanning electron microscopy, especially those applicable to biological sciences. Prerequisites: ZOL 341 or concurrently. Permission of instructor. Lab 6. Cr 3.

ZOL 542 Electron Microscopy

Techniques of electron microscopy, particularly those that apply to biological material. Principles of design and operation of transmission electron microscopes and scanning electron microscopes. Prerequisite: Permission of instructor. Lec 2, Lab 6. Cr 5.

ZOL 550 Genetics of Populations

An introduction to the study of 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 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 450, BIO 451 or equivalents. Cr 3.

ZOL 554 Advanced Genetics

Advanced study of hereditary phenomena; 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 350 is recommended. Cr 3.

ZOL 560 Mammalian Genetics

An advanced course in classical and molecular mammalian genetics. Topics include Tools of Mammalian Genetics, Immunogenetics, Cytogenetics, Sex Determination, Gene Structure, Regulation of Gene Expression and DNA Synthesis, and 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. Structures of importance in the taxonomy, feeding and reproduction of cnidarians and echinoderms will be emphasized but some other groups will be considered. Prerequisite: ZOL 453 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 will be 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 in endocrine physiology. Biological and chemical assay procedures are introduced. Prerequisites: ZOL 479, permission of instructor. Lab 4. Cr 2.

ZOL 585 Physiological Ecology

The functions and adaptive responses of animals to environmental variables, with emphasis on marine and estuarine invertebrates. Extensive reading in original literature required. Prerequisite: ZOL 377. Lec 3. Cr 3.

ZOL 586 Physiological Ecology Laboratory

Independent student projects involving field observation and collection, and laboratory analysis of animal responses to marine environ-

mental factors. Prerequisite: ZOL 585 or concurrently and permission. Lab 4. **Cr 2.**

ZOL 587 Problems in Zoology I (Fall)

Individual research problems and research seminars. Research in Zoology laboratories with emphasis on development of scientific skills; also seminar instructional activity. Prerequisite: permission. **Cr 1-3.**

ZOL 588 Problems in Zoology II (Spring)

Individual research problems and research seminars. Research in Zoology laboratories with emphasis on development of scientific skills; also seminar instructional activity. Prerequisite: Permission. **Cr 1-3.**

ZOL 596 Zoology Professional Experiences

The students will work with medical professionals, hospitals, laboratories, state agencies and other organizations approved for this purpose by the Department of Zoology. Students may be engaged in research, clinical determinations, field studies or allied activities. Prerequisite: graduate standing. May be repeated for credit up to a total of 6 credit hours. **Cr 1-3.**

Interdisciplinary Courses

INT 219 (BOT, ZOL) Introduction to Ecology

An introduction to ecology emphasizing ecological principles and their relationships to the natural environment and man. Not open to majors in the biological sciences or resource management areas. Prerequisite: BIO 100. Rec 3. **Cr 3.**

INT 290 (PHI, PHY, ZOL) Nuclear War

An introduction to the effects of nuclear war and related issues. **Cr 1.**

INT 360 (ECO, ZOL) Economics and Biology of Marine Fisheries Management

Introduces students to 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 373, ZOL 204 or permission of instructor. **Cr 3.**

INT 375 (BOT, FOR, OCE, ZOL) Field Studies in Ecology

A field trip of one to several weeks to an area of ecologic interest; details announced in time for registration each year course is offered. Trips may be scheduled during Christmas, midyear, spring recess or summer. An intensive ecology field course; field and living conditions will often be rigorous and/or primitive. Prerequisite: a course in ecology. Other preparation and/or recommended prerequisites announced for each trip. Credit will differ, depending upon trip. **Cr Ar.**

INT 419 (BOT, ZOL) General Ecology

Ecological principles for the science major. 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 420 (ZOL) Ecology Laboratory and Field Course

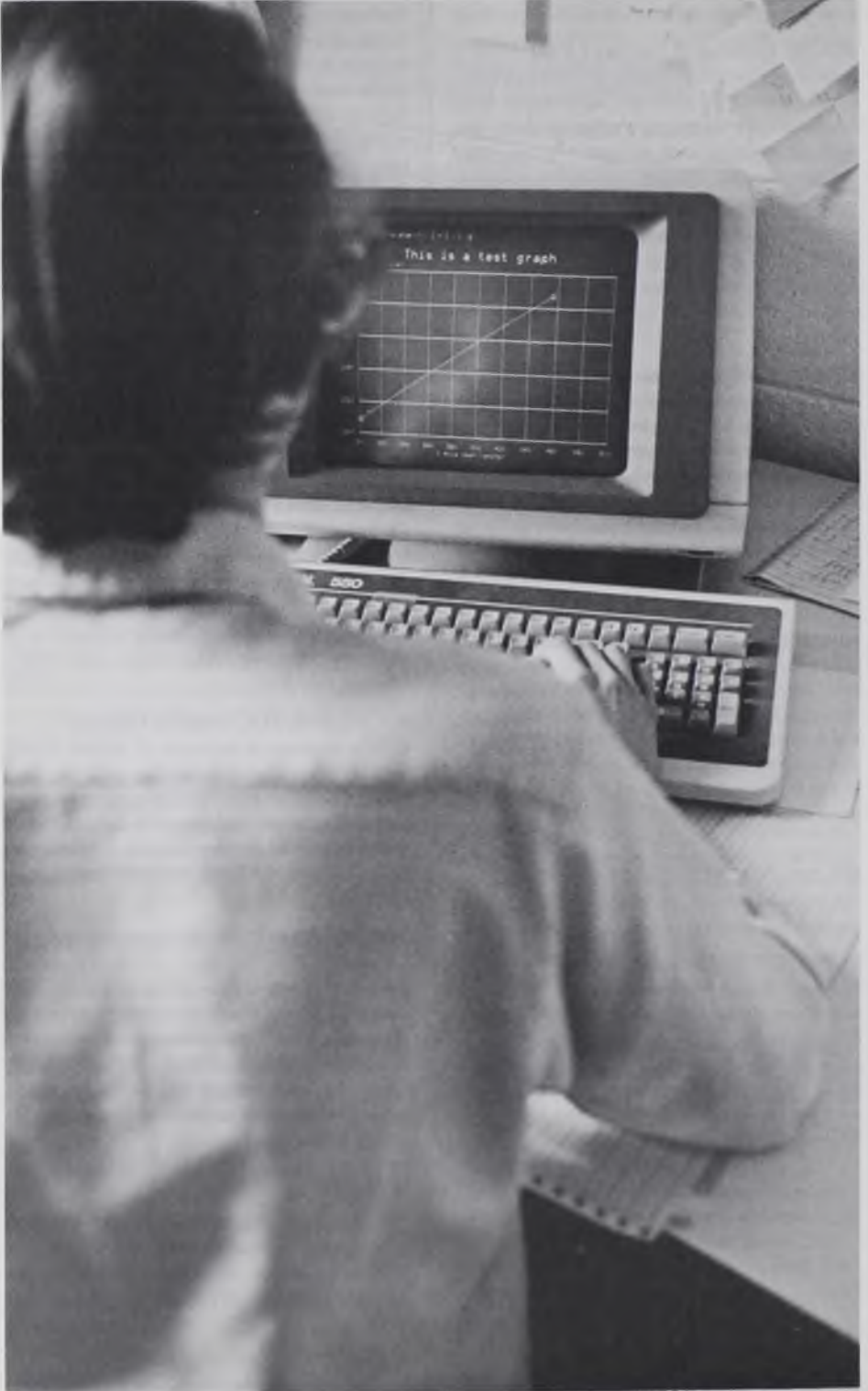
Ecosystems studies in the field, and ecologic experimentation in the laboratory, to illustrate ecologic principles and provide technical experience. Saturday field trips. Prerequisites: INT 419 and a course in statistics (may be concurrent). Lab and field 6. **Cr 3.**

INT 552 (PSY, ZOL) Behavior Genetics

Genetic analysis of behavior in several organisms including *Drosophila*, *Mus* and man. Current literature on behavioral mutants and polygenic behavior will be discussed in depth. Offered in Spring of odd-numbered years. Prerequisite: ZOL 462 and MAT 232 or equivalent. Lec 2, Rec 1. **Cr 3.**

INT 563 (BOT, OCE, ZOL) Marine Benthic Ecology

An advanced course emphasizing ecological studies on benthic intertidal and subtidal marine organisms. Includes discussions on limiting factors, distributions, zonation, biotic interactions, food webs, succession, productivity, community structure and organization. Prerequisite: a course in ecology, Lec 2, Rec 1. **Cr 3.**



College of Business Administration

W. Stanley Devino, *Dean*

Merrill D. Bartlett, *Associate Dean*

Professors Alpander, Devino, Forsgren, Gilmore, Givens, McClure, Naor; Associate Professors Bartlett, Ford, Gibson; Assistant Professors Carter, Dukes, Garsombke, Gehrt, Rauch, Strong; Lecturer Ingalls

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, economics, finance, the legal environment of business, marketing, and general management); third, students undertake to acquire a deeper knowledge of the major field 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 four major fields of concentration in which advanced work may be done are accounting, finance, 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 "Admissions" section. All deficiencies in entrance requirements must be removed before registering for the sophomore 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 freshman and sophomore years, 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 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

(Effective February 9, 1979)

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. (Effective June 28, 1983)

Course Enrollment Policy In Business Administration Courses

(Effective February 9, 1979)

1. First preference is given to College of Business Administration students.
2. Second preference is given to students where the course is required in another program.
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.

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 figured 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") 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 (48 credits)
 1. Humanities and Fine Arts (21 credits)
 - ENG 101 College Composition
 - ENG 317 Advanced Professional Exposition
 - SPC 103 Fundamentals of Public Communication

At least three of the remaining 12 credit hours must have an ENG designation. The remainder may be selected in such fields as: art, the classics, English composition, foreign languages, journalism, literature, music, philosophy, speech, and theatre.

2. Behavioral and Social Sciences (15 credits)

PSY 100 General Psychology

No economics course may be taken to fulfill this requirement. The remaining credits may be taken in such fields as: anthropology, history, modern society, political science, psychology, and sociology.

3. Mathematics and Computer Science (12 credits)

MAT 113/114 Mathematics for Business and Economics*

MAT 215 Introduction to Statistics for Business and Economics**

COS 211 Principles of Data Processing

*MAT 126 may be substituted for 114.

**MAT 334 may be substituted for MAT 215.

B. Core Requirements in Business (33 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 Business Information Systems

BUA 337 Production and Operations Management

BUA 349 Administrative Policy and Business Environment (Seniors only)

BUA 350 Business Finance

BUA 370 Marketing

ECO 120 Principles of Microeconomics

ECO 121 Principles of Macroeconomics

C. Major Field (15 credits)

The major field is composed of 15 credit hours to be required by each functional area subject to approval of the faculty. All courses must carry BUA or ECO designators.

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

Accounting majors 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 301 Intermediate Accounting I

BUA 351 Corporate Treasury Dynamics

BUA 352 Financial Institutions

BUA 353 Investment Strategy

Any one of the following:

BUA 305 Cost Accounting I

BUA 354 Speculative Markets

ECO 371 Public Finance and Fiscal Policy

ECO 372 State and Local Government

Finance

ECO 373 Intermediate Microeconomics

ECO 375 Industrial Organization

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

And any two of the following: (at least one of the two must have a BUA designation).

BUA 331 Labor-Management Relations

BUA 345 International Management

BUA 384 Business Logistics

ECO 333 Labor Markets and Human Resource Development

ECO 339 International Trade and Commercial Policy

ECO 373 Intermediate Microeconomics

4. Marketing (15 credits)

Required:

BUA 372 Advertising

BUA 374 Sales Management

BUA 380 Managerial Marketing

BUA 384 Business Logistics

And any one of the following:

BUA 326 Dynamics of Organization and Behavior

BUA 327 Seminar in Contemporary Management Problems

BUA 330 Personnel Management and Industrial Relations

BUA 352 Financial Institutions

BUA 376 International Marketing

BUA 378 Marketing Research

BUA 382 Consumer Behavior

D. Free Electives (24 credits)

Specimen Curriculum

Freshman Year

Fall Semester	Spring Semester
ECO 120 Principles of Microeconomics	ECO 121 Principles of Macroeconomics
ENG 101 College Composition	MAT 114 Math for Business & Economics
MAT 113 Math for Business & Economics	SPC 103 Fundamentals of Public Communication
PSY 100 General Psychology	English Elective
Free Elective	Social Science Elective

Sophomore Year

Fall Semester	Spring Semester
BUA 201 Principles of Accounting I	BUA 202 Principles of Accounting II
MAT 215 Introduction to Statistics for Business & Economics	BUA 220 The Legal Environment of Business
Humanities Elective	COS 211 Principles of Data Processing
Social Science Elective	Humanities Elective
Free Elective	Social Science Elective

Junior Year

It is recommended that the following courses be completed during the junior year: BUA 325, BUA 335, BUA 337, BUA 350, BUA 370, ENG 317, one humanities elective, one social science elective, and two free electives.

It is possible for the student to take a major field course during the spring semester if he or she has the necessary prerequisite(s). Accounting students are required to take BUA 301 and BUA 305 during the fall semester of their junior year.

It is recommended that the following courses be completed during the junior year: BUA 325, BUA 335, BUA 337, BUA 350, BUA 370, ENG 317, one humanities elective, one social science elective, and two free electives.

It is possible for the student to take a major field course during the spring semester if he or she has the necessary prerequisite(s). Accounting students are required to take BUA 301 and BUA 305 during the fall semester of their junior year.

Senior Year

It is recommended that the following courses be completed during the senior year: Five major field courses, BUA 349, one humanities elective, and three free electives.

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 freshmen).

Honors Program

Robert Strong, Honors Secretary

Freshmen 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 requirements 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.

Courses in Business Administration

BUA 201 Principles of Accounting I

An introductory course in accounting covering the fundamental accounting equation, the basic principles of accounting measurements, the ac

counting cycle, the construction of financial statements, and asset analysis and valuation. Prerequisite: sophomore standing. Cr 3.

BUA 202 Principles of Accounting II

A continuation of introductory accounting, covering analysis and valuation of liabilities and stockholder's equity, basic principles of consolidated statements and the statement of changes in financial position, 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. Among the topics discussed are 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

Principles regarding the valuation and recording of working capital items and noncurrent items; capital stock and surplus; statement analysis. Prerequisites: BUA 201, 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. Prerequisites: BUA 201, 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. 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, consign-

ments, 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

Federal tax laws as they affect individuals, partnerships, corporations, and estates. An opportunity is given the student to become familiar with tax forms. Prerequisites: BUA 201, 202, 305. Cr 3.

BUA 313 International Accounting and Taxation

Financial, managerial and tax accounting and auditing in multinational enterprises. Comparison of 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. Particular emphasis on the organizational and behavioral implications of accounting. Prerequisites: BUA 305, 325. Cr 3.

BUA 319 The Environment of Accounting

This course assists the student in 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. Attention is focused upon concepts, methods, and techniques of planning, organizing, directing, and controlling the functions of the modern manager. The impact of these processes upon effective interpersonal relations will be highlighted. Prerequisites: ECO 120 and 121. (Junior Standing). Cr 3.

BUA 326 Dynamics of Organization and Behavior

An analysis of business organization and the problems of administrators in an interpersonal setting. Primary emphasis is on the findings of behavioral sciences which are particularly relevant to the management of economic enterprises. Also an examination of interdisciplinary

approaches to human relations and adjustment problems in modern organizations. Motivation, leadership, and organization theory as related to work and productivity, and associated topics are also covered. Prerequisite: BUA 325. Cr 3.

BUA 327 Seminar in Contemporary Management Problems

Seminar in developments in the behavioral and management sciences, the development of management thought, and critical issues in organizational theory, with special reference to industrial application. In addition, students will conduct library research, or field work of considerable depth, in select managerial topics. Prerequisite: BUA 326. Cr 3.

BUA 330 Personnel Management and Industrial Relations

The personnel management systems of private and public organizations are surveyed from the interdisciplinary perspective of modern industrial relations. The use of an integrated behavioral, quantitative and systems approach permits an applied synthesis of the social sciences which analyze the employment relationship. Prerequisites: Permission or the equivalent of ECO 120, 121, and PSY 100. (Junior Standing). Cr 3.

BUA 331 Labor-Management Relations

The labor-management systems of the private and public sectors are surveyed from the interdisciplinary perspective of modern industrial relations. The nature and characteristics of labor-management relations are considered from such perspectives as the structural, historical, international, legal, psychological, and economic. Prerequisite: Junior Standing. Cr 3.

BUA 335 Business Information Systems

The role of information system and data processing in business planning and control. Technology of information systems, economics of information, planning, decision making and control in business organizations. Prerequisites: MAT 215 and COS 211. (Junior Standing). Cr 3.

BUA 337 Production and Operations Management

The place of production planning and control in an industrial organization and its relation to the actual production procedure. Problems in design, marketing, forecasting, capacity evaluation and quality control which are interwoven with those of production and inventory management. Prerequisite: BUA 325. (Junior Standing). Cr 3.

BUA 340 Problems of Small Business

Aspects of management uniquely important to small firms. Develops understanding of the economic and social environment in which the small concern functions. Student practice in decision-making on types of problems that small businessmen face. For students who wish to explore opportunities for operating their own small businesses, and to those who expect to have small businesses as customers or suppliers. Problems relevant to small business operations in Maine stressed. Prerequisites: BUA 325, 350, 370 and senior standing with permission. Cr 3.

BUA 341 Dynamics of Small Enterprises

Course assumes a broad management background at the undergraduate level and understanding of basic problems of small business and consulting techniques developed in BUA 340. That background is focused on the special problems of entrepreneurship, venture capital, and growth management provided through the Small Business Administration's Small Business Institute program. Students will work in or manage teams in problem solving. Prerequisite: BUA 340. Cr 3.

BUA 345 International Management

Management problems of organizations whose interests extend across international boundaries. Significance of cultural traditions and social structures for the conduct of business enterprise. International similarities and differences in managerial functions, structure, and processes. Prerequisite: BUA 325 or permission. (Junior Standing). Cr 3.

BUA 349 Administrative Policy and Business Environment

Administrative decision making and policy setting, with consideration of social and political forces and ethical values. Seniors only. Prerequisites: BUA 325, 335, 350, 337, and 370. Cr 3.

BUA 350 Business Finance

This course deals with the promotion, organization, and financing of the single proprietorship, partnership, and corporation. It also utilizes advanced cases and problems related to the above topics. Prerequisites: ECO 120, 121, and BUA 201. (Junior Standing). Cr 3.

BUA 351 Corporate Treasury Dynamics

The counterflows of cash between the corporate unit and the money market due to seasonal, cyclical, and secular demands. Numerous approaches to debt limit determination. Total

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; and governmental agencies. An institutional introduction to the fields of private and public finance. Prerequisites: ECO 120, 121, BUA 350 or permission. (Junior standing). **Cr 3.**

BUA 353 Investment Strategy

Analysis and selection of stocks and bonds as part of the investor's approach to financial security. The relationships between the securities markets, the total money market and the general economy are examined. Prerequisites: ECO 120, 121, BUA 350 or permission. (Junior Standing). **Cr 3.**

BUA 354 Speculative Markets

This course examines the practices and principal participants of major commodity and option markets and the financial opportunities presented by these institutions. Special emphasis is placed 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 370 Marketing

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 121 (Junior Standing). **Cr 3.**

BUA 372 Advertising

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 in managing the sales organization. Prerequisite: BUA 370. **Cr 3.**

BUA 376 International Marketing

Focuses on marketing principles and strategies that will assist in the successful conduct of international business operations. Differing business environments will be examined in order to sensi-

tize students to needed changes in marketing strategies. Prerequisite: BUA 370. **Cr 3.**

BUA 378 Marketing Research

A consideration of marketing research as a tool in solving problems of production and distribution. Emphasis is upon 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

A managerial approach emphasizing the integration of marketing, as an organization activity, with other activities of the business firm. Recognition of and appreciation of the problems encountered by top marketing executives in modern business. Prerequisite: BUA 370. **Cr 3.**

BUA 382 Consumer Behavior

An analysis of consumer purchase decision processes. An exploration of existing consumer behavior models and their role in the formulation and implementation of marketing strategies. The psychological, sociological and cultural dimensions of buyer behavior; 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 elements of the logistical system includes consideration of transportation modes, plant and warehouse location, inventory size determination, etc. Cases and problems are utilized to sharpen analytical techniques. Final attention turns to 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 (1) to six (6) semester hours of degree credit will be granted for field experience in business and managerial fields provided it is relevant to the student's educational development and career goals. Prior approval of the instructor is required and prior approval of the precise number of credits is also necessary. Students will not be granted credit either retroactively or for field experience courses taken at another university or another campus of this university. A detailed written plan concerning the field experience proposal must be presented by the student to the instructor so that a decision can be made on admission to the course. Prerequisite: junior

or senior in the College of Business Administration and permission of instructor. **Cr 1-6.**

BUA 400 Introduction to Accounting

Limited to pre-MBA students, this course is an introduction to the basic principles underlying the preparation of financial statements and the analysis of financial information. Prerequisite: Permission of the Director of the MBA Program. **Cr 3.**

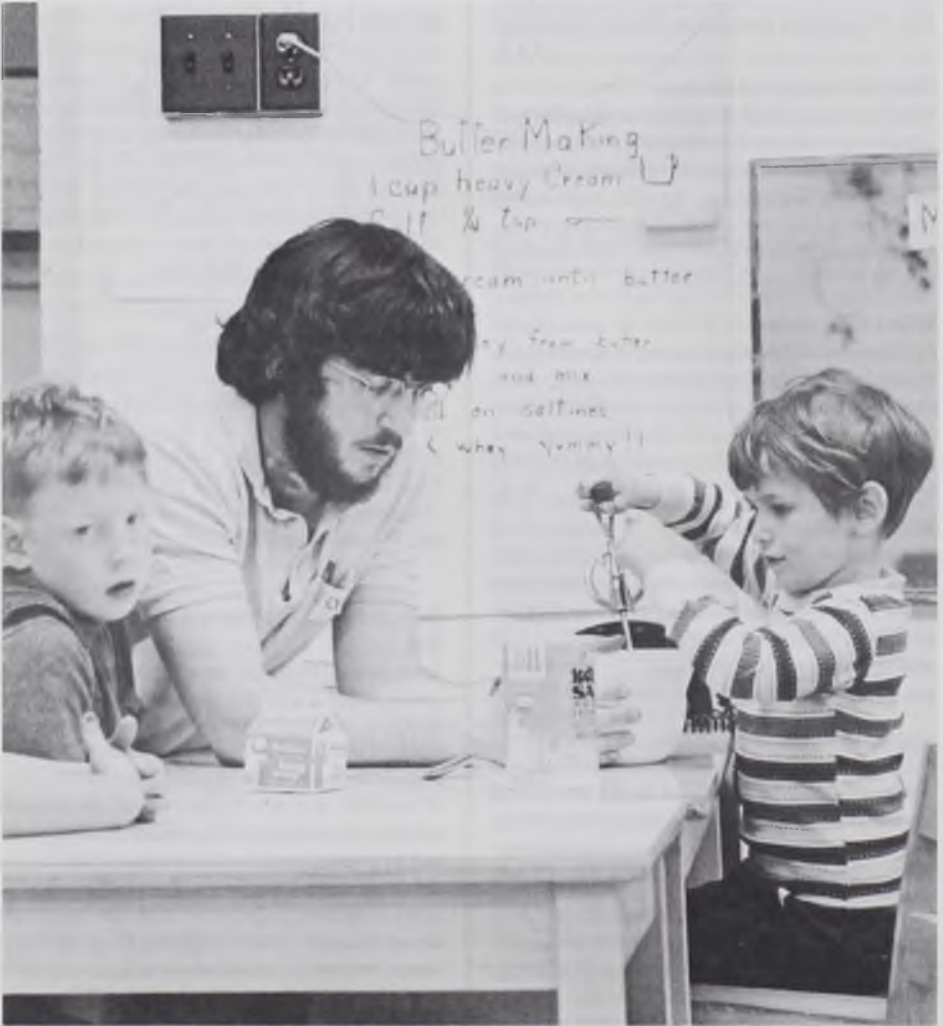
BUA 430 Quantitative Methods for Business

This applied course in quantitative methods for business provides pre-MBA students with an introduction to the elementary mathematical functions, systems of equations and inequalities, elements of analytical geometry, linear programming for business applications, matrix al-

gebra, 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 will be covered in the statistics segment. Prerequisite: Permission of the Director of the MBA Program. **Cr 3.**

BUA 440 Decision Support Systems for Management

This course provides an intensive and accelerated introduction to computerized decision support systems. It is 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*

The College of Education offers four-year programs designed to prepare elementary, junior and senior high school teachers, teachers of physical education and teachers of art. The College also provides instruction, on a service basis, in the professional subjects essential for the certification of teachers to undergraduate students from other divisions of the University and to students registered in graduate programs.

General Information

The College of Education is concerned with those students who are planning a career in the field of education. Undergraduate programs are designed so each student can include a substantial amount of college work in general education and can concentrate in an academic area closely related to that of his or her special teaching interests. Basic professional work in education is included in the programs.

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 "Admissions" section of this catalog. A student admitted with advanced standing must satisfy all basic entrance requirements in the College of Education.

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. Each case will be considered on its own merits. When such students are accepted, they will be given advanced standing in the College of Education for work already completed if it meets the established standards and the specific course requirements of the program to which they are seeking admission.

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.

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.

The college currently is undergoing a redesign of the undergraduate teacher preparation programs. In addition, 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 must meet the current state requirements for a teaching certificate. The state has mandated that individuals will have to 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 are arranged so they culminate in the supervised student teaching experience.

Residence Requirements

A minimum of 30 semester hours of credit must be earned as a student at the University of Maine at Orono 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 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. Off-campus students, before en-

rolling for a course, should ascertain from the Assistant 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 not be permitted except by a vote of the faculty.

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, Edward Hackett, Chadbourne Hall, University of Maine, Orono, Maine 04469.

Double Majors

A student wishing to choose a double major across college lines normally must make a declaration of intent in the sophomore or junior year. The double major 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 majors 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

David W. Bishop, College Honors Secretary

The University of Maine offers its Honors Program to above-average students who are interested in cross- and interdisciplinary courses. The faculty of the College of Education believes that genuine excellence in college-level studies means broad competence in an area outside a major field of specialization as well as excellence within it. The college 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 State Department of Education, 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 certificates.

To provide for the many types of school positions, the State Department issues several types of certificates. However, upon successful completion of his or her program, and the teacher examination determined by the State of Maine, the undergraduate student in the College of Education generally will be eligible for the provisional teaching certificate at either the elementary or secondary school level, whichever is applicable.

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 the State Department of Education.** Additionally, it is very important that individuals who wish to take the appropriate coursework for certification through the College of Education, contact the Assistant Dean for Academic Services to be certain they know what College requirements have to be met.

Placement for Teachers

The University of Maine Career Planning and Placement Bureau includes among its services assistance to prospective teachers in finding teaching positions and in facilitating promotion of teachers in service. Information regarding this service may be obtained from the University of Maine Career Planning and Placement Bureau, Wingate Hall, University of Maine, Orono, Maine 04469.

Bangor Theological Seminary

Regularly enrolled students in the College of Education may register for courses at the Bangor

Theological Seminary, not to exceed six credit hours per semester, without payment of additional fees. The College of Education extends a similar privilege to students regularly enrolled at that institution. Such registrations must have the approval of the deans of both institutions and the instructors involved. Credit for courses so taken will be recorded at the institution where the student is enrolled.

While enrolled at the Bangor Theological Seminary, a student may, with the approval of his or her dean and the Admissions Office of the university, also register as a special student in the College of Education on the established fee basis for such courses. Work so taken, if it does not substitute for or duplicate courses taken in the Seminary program, may be counted as advanced standing credit toward the degree in the event a student later registers for a degree program at the University.

Courses in Education

Professors Bishop, Chiappone, Cobb, Davis, Freeman, Harris, McIntire, Nichols, Pechinski, Roberts, Salesi, Sanford, Work, Yvon; Associate Professors W. Abbott, Coladarci, Donaldson, Estler, Kristo, Perry, Pooler, Rog, Skehan; Assistant Professors Brazee, Brody, Butterfield, Carr, Evans, Hulse-Killacky, King, H. Lehnhard, R. Lehnhard, Schutz, Tomkiewicz, Zeph; Instructor Reif; Lecturers Doughty, Fox, Killacky, Wallace; Cooperating Assistant Professor Stan-kiewicz

Courses numbered 100-299 are associate and/or lower level baccalaureate degree. Courses numbered 300-499 are upper level baccalaureate courses; with appropriate qualification and permission, they 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. Courses numbered 600-699 are graduate level courses.

Counseling

CEC 450 Guidance and the Teacher

Role of the classroom teacher in studying individual pupils and utilizing accumulative records; resources available to the teachers for help in studying individual pupils; teacher's function in homeroom activities. For elementary or secondary school classroom teachers. Particularly designed for certified classroom teacher. **Cr 3.**

CEC 453 Career Education: The Elementary School

Orienting pre- and in-service teachers to Career Education. A general overview, a conceptual model and a rationale for career development through curriculum practices. Classroom application of the career education concept and techniques for infusing career awareness within traditional academic material. Concepts and content of career education presented as a guide for infusing career education within the school. Prerequisites: EDB 202, EDB 203, EDB 204 or permission of instructor. Cr 3.

CEC 454 Career Education: The Secondary School

It is the purpose of this course to introduce the concepts of career education to prospective teachers and/or helping professionals. A major focus will be the examination of the career education concept and its application within the schools. Cr 3.

CEC 510 Effective Communication in Personal Development

Communication skills training for non-counseling majors. Background information in communication training which can be applied to their professional and personal interactions and development. 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. Revised and Wechsler Intelligence Scale Children-Revised. Historical background and current problems in theory and practice of testing. Prerequisite: EDA 523 or permission. Cr 4.

CEC 550 Introduction to Community Counseling

Graduate course for students planning to specialize in community counseling. A survey of various functions of counselors including consulting, workshop techniques, individual and small group counseling. Course emphasizes a holistic approach to preventative, developmental and rehabilitative community 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 Group Work in Human Services

An introduction for non-counseling majors. Provides students with background in group dynamics, group theory, and the group as a means of facilitating individual growth. Includes dynamic process/group development issues. Prerequisite: Permission. Cr 3.

CEC 554 Introduction to Counseling the Young Child

Examination of goals of counseling, counseling philosophy, and operational issues involved. Special attention to counseling young children. The roles in counseling young children among psychologists, psychiatrists, social case workers and school counselors will be examined. Students will study verbal and nonverbal aspects of counseling. Students examine play and activity techniques. Prerequisite: CEC 551. Cr 3.

CEC 555 Introduction to Counseling

Study of the counseling process. Methodology and philosophy of counseling with emphasis on counselor behavior in the one-to-one relationship. Designed for individuals preparing to serve as counselors in educational and community settings. For majors only. Cr 3.

CEC 556 Established Theories of Counseling

Counseling theory and philosophy. Various theories of counseling will be discussed. Prerequisite: CEC 555 or equivalent. Cr 3.

CEC 557 Play Media

A course designed for graduate students preparing to become elementary school counselors, elementary school teachers, child development specialists and special educational specialists. It is designed to provide a background in play media theories, uses and techniques as they relate to child growth and development. Prerequisite: permission of instructor. Cr 3.

CEC 558 Recent Developments in Counseling Techniques

Designed particularly for the practicing counselor in educational and other institutional settings. It emphasizes pragmatic approaches and serve as additional training for the counselor. Focus is on recent applications of the findings of contemporary theories of counseling or emerging new theories. Prerequisite: CEC 555, CEC 556 or equivalent or permission of instructor. Cr 3.

CEC 559 Career Information in Counseling

Sources and nature of information: collection, evaluation, and use of informational materials with individuals and groups. Prerequisite: CEC 551 or equivalent. Cr 3.

CEC 560 Counselor Education Prepracticum

The course is designed to develop the knowledge and skills leading to effective inter and intrapersonal communications as a prerequisite to CEC 658. The Personal Growth and Development Center laboratory with video equipment will be used to provide feedback on skill development. Literature is discussed which examines such basic facilitative skills as empathy, genuineness, and positive regard. Prerequisite: Permission of the Instructor. **Cr 3.**

CEC 561 Introduction to Student Development in Higher Education

Graduate course for students planning to specialize in student affairs in higher education. The course emphasizes student developmental theory as a foundation for student affairs functions. The interdependence of theory and practice will be explored. Prerequisite: permission. **Cr 3.**

CEC 562 Impact of College on Students

Study of the impact of college on students through research findings; development of an empirical frame of reference, particularly as it relates to student affairs. Prerequisite: CEC 561 or equivalent. **Cr 3.**

CEC 568 Reality Therapy As A Counseling Model

This is a graduate course for students in counselor education and other helping professions. Reality Therapy As A Counseling Model is designed to train counselors and others to use the techniques of Reality Therapy in their therapeutic relationships with their various populations such as schools, hospitals, community agencies, religious institutions and as the concerns relate to personal growth, discipline, marriage, the family, etc. **Cr 3.**

Administration**EAD 500 Fundamentals of Administration**

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. A required introductory course in educational administration. **Cr 3.**

EAD 504 The School Administrator and the Pupil Personnel Services

A course designed for pre- and in-service school administrators. The major focus of the course is centered on the study of effective pupil person-

nel programs and the role of the administrator in the planning, implementation and evaluation of such programs. Prerequisite: Graduate standing or permission of the instructor(s). **Cr 3.**

EAD 510 Educational Supervision

Creative supervision; techniques of working with professional staff; improvement of curriculum; observational and evaluation techniques. Prerequisite: EDB 202, EDB 203, EDB 204 or equivalents. **Cr 3.**

EAD 530 Public Relations

Process, human relations and interactions in working with professionals and lay groups. Techniques and practical approaches to develop public relations program. 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 is given to the impact of recent court decisions on the administrative role in Educational settings. **Cr 3.**

EAD 550 Theories of Administration I

Provides an introduction to concepts and research findings in social and behavioral sciences basic to the educational administrator. Administrative problems and organizational behavior analyzed from an interdisciplinary perspective. Prerequisite: EDB 202, EDB 203, EDB 204 or equivalents. **Cr 3.**

Adult Continuing Education**EAE 400 Trends in Adult Education**

Need for and purpose of adult education programs. Consideration of learning, program development, organization, and administration of programs. Emphasis on adult education through the 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 and life span development as related to the education of adults. Focus will be on the psychological, sociological, physiological and environmental factors which make adult learners distinct from earlier developmental levels. The concepts and theories studied will be related to the practice of adult

education. Prerequisite: Permission of Instructor. Cr 3.

EAE 525 The Teaching/Learning Process with Adults

Critical examination of the teaching/learning process with adults. Examples of specific topic areas are characteristics of adult learners; needs assessment; methods; group process; and resource identification and development. Focus will be on individual and group instruction.

Cr 3.

EAE 526 Community Processes and Leadership in Adult/Continuing Education

Exploration of the nature of community and community leadership as it relates to adult/continuing education. The community development process and strategies of community development from an applied point of view will be examined. Prerequisite: EAE 523

Cr 3.

EAE 527 Program Development and Evaluation in the Education of Adults

Theory, principles and concepts in program development and evaluation. Focus will be upon applying this body of knowledge by means of stimulation, case study, role playing or other hypothetical situations to the social, economic and environmental problems of people and communities. 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. Managerial behavior and style will also be explored. Prerequisite: EAE 523.

Cr 3.

EAE 551 Workshop in Adult/Continuing Education

Development of products applicable for utilization by adult education practitioners; administrator, teacher, or counselor. Stress is placed upon the competency of skill development. Projects such as simulation design, grant proposals, instructional design, and staff development will be undertaken. Activity will be designated as part of the course title at registration. Prerequisite: EAE 523 or permission.

Cr 3.

Bilingual Education

EBI 380 Methods and Materials for Bilingual Instruction

This exploratory course provides an overview of bilingual education in the school curriculum

and examines organizational models, methods, strategies and materials appropriate for bilingual education. Prerequisite: EDB 204, junior standing or permission of the instructor. Cr 3.

EBI 390 Introduction to Bilingual Education

This course provides an overview of the many facets of bilingual education. It 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 will provide 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. Areas of focus may include the following topics: cultural pluralism, language planning, language and culture, cognitive and developmental issues in second language learning. Prerequisite: EBI 390 or permission.

Cr 3.

Measurement and Evaluation

EDA 520 Topics in Educational Measurement

Covers special topics in educational measurement, such as: 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

Basic course in evaluation of instruction for elementary and secondary school teachers. Emphasis placed on utilizing various strategies of evaluation in classroom and school. Prerequisite: EDB 202, EDB 203 or permission.

Cr 3.

EDA 523 The Use of Standardized Tests and Inventories

This course will consider the selection, use and interpretation of commonly used standardized group achievement and ability tests, interest inventories and non-clinical assessment of personality and other affective attributes. Prerequisite: Basic knowledge of measurement and statistics.

Cr 3.

EDA 570 Models of Educational Evaluation

The primary purpose of this course is to study the different models of educational evaluation. The basis procedures for designing and implementing both formative and summative evalua-

tion studies will be illustrated. Prerequisite: EDA 520 or equivalent. Cr 3.

Appraisal and Basic Professional Courses

EDB 120 Freshman Early Experience Program
Career-life planning seminar and parallel laboratory (field) experiences in locations off campus. All arrangements, including transportation to laboratory sites, are the responsibility of the College of Education. Cr 4.

EDB 202 The American School
Examines the nature, role, purposes, and curriculum of elementary and secondary schools with special attention to the place and function of the teacher within this social institution. This is one of the courses prerequisite to student teaching in all regular undergraduate programs. Not open to freshman. Cr 3.

EDB 203 Growth-Learning Process
The pupil and his learning processes, including learning theories, pupil growth patterns, and selected techniques for the study of pupil development. This is one of the courses prerequisite to student teaching in all regular undergraduate programs. Not open to freshmen. Cr 3.

EDB 204 The Teaching Process
The procedures of instructional planning, including such items as improved use of small groups, classroom space, and appropriate teaching materials; measurements, evaluation, and reporting of pupil learning. This is one of the courses prerequisite to student teaching in all regular undergraduate programs. Not open to freshmen. Cr 3.

EDB 205 The American School
The first course in educational foundations, examines the nature, role, purposes, and curriculum of public and secondary schools with special attention to the place and function of the teacher within this social institution. The course is offered in conjunction with supervised field experience. Students must enroll concurrently in EDG 398. (1.5 cr hrs per semester. An alternate of EDB 202 for PPT students only). Cr 1.5.

EDB 206 The American School
The first course in educational foundations, examines the nature, role, purposes, and curriculum of public and secondary schools with special attention to the place and function of the teacher within this social institution. The course is offered in conjunction with supervised field experience. Students must enroll concurrently in EDG 398.

(1.5 cr hrs per semester. An alternate of EDB 202 for PPT students only). Cr 1.5.

EDB 207 The Teaching Process
The procedures of instructional planning, including such items as improved use of small groups, classroom space, and appropriate teaching materials; measurements, evaluation, and reporting of pupil learning. This is one of the courses prerequisite of student teaching in all regular undergraduate programs. (1.5 cr hrs per semester. An alternate of EDB 204 for PPT students only). Cr 1.5.

EDB 208 The Teaching Process
The procedures of instructional planning, including such items as improved use of small groups, classroom space, and appropriate teaching materials; measurements, evaluation, and reporting of pupil learning. This is one of the courses prerequisite of student teaching in all regular undergraduate programs. (1.5 cr hrs per semester. An alternate of EDB 204 for PPT students only). Cr 1.5.

EDB 221 Educational Psychology
The scientific study of human development, learning, cognition, and teaching. Emphasis is on theory and research and their application to educational problems. Prerequisite: PSY 100 and Sophomore standing. Cr 3.

EDB 222 Child and Classroom
This course continues and extends the study of human growth and development with attention to both typical and atypical patterns. The study of interactions of children in groups leads to a consideration of such classroom issues as motivation, discipline and evaluation of student performance. A study of the skills of observation and analysis precedes the placement of students in a field experience. Prerequisite: EBA 221. Cr 4.

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.

Curriculum

EDC 313 Principles of Curriculum Construction (Conservation) for Elementary School Teachers
Open to all elementary teachers who have completed a Conservation Education Workshop or its equivalent. Production of instructional materials on natural resource conservation for schools. Opportunities for writing reference and reading materials for children, units of study,

instructional guides, bibliographies, and for making many types of visual aids useful in teaching conservation at the various school levels. **Cr 3.**

EDC 320 Principles of Team Teaching

The Theory and practice of instructional teams. Emphasis on cooperative planning, pupil groupings, and curriculum innovations. Prerequisite: EDB 202, EDB 203 EDB 204 or ther equivalents. **Cr 3.**

EDC 323 Principles of Curriculum Construction (Conservation) for Secondary School Teachers Education Workshop or its equivalent. Production of instructional materials on natural resource conservation for schools. Opportunities for writing reference and reading materials for children, units of study, instructional guides, bibliographies, and for making many types of visual aids useful in teaching conservation at the various school levels. **Cr 3.**

EDC 332 Student Activities in Secondary Schools The place, organization and direction of student activities in the modern secondary school. Prerequisite: EDB 202, EDB 203, EDB 204 or their equivalents. **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. Provides background, methods, and instructional resources to teach about Maine's social life, geography and natural resources, government, and economy. Treats topics from historic to future perspectives and from local, state, national, and global dimensions. **Cr 3.**

EDC 511 Planning the Elementary School Curriculum

Arms and philosophy of elementary education; status of the curriculum; factors affecting curriculum changes, development and modern child psychology. Prerequisite: EDB 202, EDB 203, EDB 204 or equivalents. **Cr 3.**

EDC 521 Planning the Secondary School Curriculum

Plans of curriculum revision and reorganization, special attention to reorganization to bring the curriculum into harmony with needs of modern life. Prerequisite: EDB 202, EDB 203, EDB 204 or equivalents. **Cr 3.**

EDC 524 Curriculum and Organization of Middle Schools and Junior High Schools

A thorough development of the educational program design which emerges from the particular needs presented by pre-adolescents and

adolescents. Included are surveys of the special roles of counseling and the co-curriculum for students between the ages of ten and fifteen, of unique transitional organizations, such as teaching teams and house systems, and of curricular modifications required. Prerequisite: EDM 520 or equivalent. **Cr 3.**

EDC 533 The Dynamics of the Curriculum

Various problems and issues of curriculum development related to all areas of instruction, the nature and scope of educational experiences and opportunities essential for a vital program; the role of administration, supervision, and guidance in the improvement of instruction. Prerequisite: EDB 202, EDB 203, EDB 204, or equivalents. **Cr 3.**

EDC 550 Curriculum and Methods for Economic Education

Basic economic and consumer education concepts and contemporary issues affecting the national economy, with special attention to the Maine economy. Students will examine these concepts and issues and develop teaching materials for implementation in their classrooms applicable to k-12 teaching. Prerequisites: Employment in a public or private school and/or permission. **Cr 3-6.**

General Courses

EDG 398 Problems in Education

Individual work on a problem of the student's own selection. Primarily for majors in education. **Cr Ar.**

EDG 410 Workshop for Cooperative School Personnel (Activity)

A workshop on the nature and scope of the activities of the supervisor, resource teacher, team leader, critic teacher, aides with other school personnel. The literature, research, practices and materials relating to effective utilization of cooperating school personnel as indicated. **Cr 3.**

EDG 462 Workshop in Elementary Education (Activity)

A workshop to increase the competence of the elementary school teacher, supervisor, curriculum director, administrator, and other school personnel. The literature, research and materials concerned with a special aspect of elementary education. **Cr 3-6.**

EDG 500 Field Observation (Activity)

Study of educational programs by visitation, consultation and appraisal of practices in select-

ed schools, instructional centers, clinics, laboratories and community agencies. Analysis of observations with research, theory and practice. Prerequisite: EDB 202, EDB 221, EDB 204 or equivalents and permission. Cr 1-6.

EDG 595 Educational Research

Evaluation of selected research in education. Appropriateness of design to the stated purpose of the study; the selection and presentation of a research problem with special attention to its design and studies related to it. Prerequisite: EDS 521. Cr 3.

History and Philosophy of Education

EDH 102 History of Education

A study of educational thought in its historical bearings with particular emphasis on current modes of thought relative to the values, objectives, purposes, and outcomes of American education. Not open to freshmen. Cr 3.

EDH 145 Education Sociology

Major principles of sociology applied to the institution of education; the culture concept and its use in perceiving and understanding the diversity of the social system in relationship to the school and education; school-community interaction, social groups and patterns of social behavior. Cr 3.

EDH 330 Trends in Education

Discussion of issues in American education as they relate to current and emerging practices in organization curriculum and teaching in the schools. Cr 3.

EDH 351 Education for Intercultural Understanding

Forces of international, racial and religious conflict in contemporary community life; ways in which schools teach understanding of an adjustment to such cultural conflicts. Cr 3.

EDH 410 Foundations of Community Education

Traces the development of community education, as a definitive practice, from its beginnings in the mid-1930 's to the present. Particular attention will be given to community education's relationship to political, economic, social, and educational concerns prevalent among today's citizens. Cr 3.

EDH 499 Seminar in the Foundations of Education

A seminar offered by the faculty in which the nature, role, policies and curriculum of elementary and secondary schools are re-examined.

Special attention given to the place and function of the teacher within this social institution. Prerequisites: STT 490, 491, 494 or concurrent registration. Cr 3.

EDH 500 Advanced Educational Sociology

An analysis of the social processes and social patterns involved in the educational system. Selected problems relevant to educational sociology will be given intensive study. Individual research will be required. Cr 3.

EDH 531 School Law and the Teacher

A study of the legal bases of public education with illustrations drawn from the State of Maine. Prerequisite: EDB 202, EDB 221, EDB 204 or equivalents. Cr 3.

EDH 561 Comparative Education

Analysis of forces that create differences between national systems of education of England, France, U.S.S.R. and the United States. Prerequisite: EDB 202, EDB 203, EDB 204 or equivalents. Cr 3.

EDH 565 History of Higher Education in the United States

History of American higher education, colonial period to the present. The growth of the classical curriculum, university movement, land grant reform, general education movement, and post-World War II expansion. Cr 3.

EDL 420 Changing Roles of Men and Women in Education

This course provides an understanding of the factors creating changing definitions of sex roles in the U.S., the implications of these changes for all levels of the educational system, theories and research related to the schools' role in sex-role socialization, skills in the identification of sex-role stereotyping, and an overview of innovative approaches, programs and practices designed for educational change. Cr 3.

EDM 520 Teaching in Middle School/Junior High School

A review of the unique demands that children in grades five through eight place on teachers as a direct result of normal developmental patterns. The focus will be upon generating specific teaching behaviors that deal effectively with each of these demands, with special attention to problems relating to 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

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

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 is 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 will be on current trends in classroom research methodologics, literature reviews and proposal designs. Cr 3.

EDS 571 Models of Qualitative Research

The primary purpose of this course is to study the types and methods of qualitative and naturalistic research in educational settings. The basic procedures for designing and implementing studies utilizing content analysis, case study techniques, observation, simulation, survey and interview techniques will be illustrated. Prerequisite: EDS 521 or equivalent. Cr 3.

EDU 481 Educational Travel (Area)

A summer session study tour to provide an insight into the social, economic, historical, and geographic aspects of the locale visited. Consideration to those 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 500 The Computer in Education

Introduction to the computer for students majoring in education. Nature and use of the computer and the impact it has had 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 520 Computer Instruction in Education

A basic understanding of 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 will be placed on reviewing, evaluating and selecting microcomputer software which can be used in curriculum. Prerequisites: EDU 500 or permission. Cr 3.

EDU 540 Microcomputer Based Instruction in Special Education

Exploration and application of how microcomputer based instruction can be effectively utilized with handicapped students. Prerequisites: EDU 500, SED 300. Cr 3.

EDU 580 Educational Institute (Activity)

Provides understanding and insight into areas of special concern in education: education of the teacher of the disadvantaged; teaching the retarded; guidance counselor; reading specialist; social studies and the school administrator. Attention given to literature, research, practices and materials relating to an aspect of education. Cr 1-6.

Vocational and Driver Education

EDV 251 Basic Driver Education

A short, basic, intensive course in driver education for teachers has been 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 the basic course in driver education, EDV 251, and have had at least one year's teaching experience in this area. Problems experienced by teachers 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 to effectively utilize driver education simulation as part of the total driver education program. Cr 3.

EDV 254 Basic Motorcycle Driver Education

Trains Maine driver education teachers in motorcycle driver education to prepare them to meet 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

The major purpose of this course is to orient 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 will comprise the essential content of this course. Particular emphasis will be given to the development and implementation of vocational education in Maine. It is imperative that school administrators and personnel directors understand the mission and goals established. Cr 3.

EDW 472 Workshop in Secondary Education (Activity)

Workshop to increase competence of the teacher, administrator, and other school personnel. Attention given to literature, research and materials concerned with a special aspect of secondary education. Cr 3-6.

Mathematics Education**EMA 314 Teaching Mathematics in Elementary School**

Mathematics curriculum in the elementary school; methods and techniques in teaching mathematics; arithmetic readiness program; instructional and evaluation material. An introductory course. Prerequisite: MAT 107 and PSY 100. Cr 3.

EMA 551 Newer Practices in Mathematics Education

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.

Reading/Language Arts**ERL 313 Teaching of Reading in the Elementary School**

General background for teaching reading in the elementary school; early literacy; relationships between reading and writing; comprehension,

word analysis, skills, directed reading lessons, literature based reading and writing programs, recreational reading and evaluation. An introductory course. Prerequisite: PSY 100; open to juniors and seniors. Cr 3.

ERL 317 Children's Literature

An overview of literature written for children between the ages of four and twelve. Emphasis will be placed on developing means of evaluating various types of books and selecting for individual children. Prerequisite: Sophomore standing or with at least one literature course as a prerequisite. 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; Open to juniors and seniors. Cr 3.

ERL 340 Teaching Reading in the Secondary School

An exploratory course for high school teachers who wish to develop competence in teaching reading. 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 the improvement of the teaching of reading; methods and materials used in evaluating the reading program; comparison of current practices in reading instruction. Prerequisite: ERL 313 or ERL 340 or their equivalents. Cr 3.

ERL 460 English and the School Teacher

The study of English as a language and several of its facets: grammars, usage, spellings, for school personnel who wish to develop language arts units and curricula in the elementary and secondary school. Emphasis on the use of findings of contemporary research and literature as the base for language arts instruction. An upperlevel undergraduate course. Prerequisites: ENG 101, ERL 318. Cr 3.

ERL 495 Understanding Reading

Knowledge relating to the processes of (1) learning to read and (2) proficient reading are the concerns of this course. Presents theoretical and empirical information about the following top-

ics: 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 continued examination of literature appropriate for children, including a study of the historical development; principles, techniques and curriculum planning associated with the guidance of children's reading; book selection for the elementary schools and the 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 the literature for adolescents and young adults as it is used in the junior high, secondary school, and public library. Emphasis is on the current publication of 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. Included are 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 languages. 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 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

Presented as need, interest, and research require, including such topics as 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 different topics. Prerequisite: Permission.

Cr 1-3.

Science Education

ESC 316 Teaching Science in the Elementary School

Materials, methods, devices, and activities appropriate to the program of science in the elementary school. Prerequisite: PSY 100, EDB 204 **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 341 Studies in the Physical Sciences II

The course is laboratory-centered and includes investigations in such areas as bonding in crystals, electric charges, atomic models, ions, molecules, non-ionic substances. Prerequisite: ESC 340 and permission of instructor. **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 selected will be those that can be explored through direct observation and study. **Cr 3.**

ESC 343 Studies in the Earth Sciences II

For elementary/middle school teachers who need some introductory information in the earth sciences of geology and soils. Where possible, the studies will be undertaken in a natural setting using equipment and materials appropriate to the learning tasks. **Cr 3.**

ESC 344 Basic Field Ecology

For secondary school science teachers with a broad background in the natural sciences and for qualified elementary school teachers who desire studies beyond introductory natural history courses. Accumulating, interpreting and applying data acquired primarily from the natural environment. Facilities at the Bryant Pond Campus and surrounding areas make possible biotic studies of lower inland elevations to subalpine environments. Intended to serve the needs of teachers conducting studies in the Green Version of BSCS biology. **Cr 3.**

ESC 346 Marine Education for Elementary Teachers

Enhances the ability of elementary teachers (particularly middle and junior high school-teachers) to teach marine-related topics. Topics chosen from a number of academic disciplines, including history, mathematics, biological science, and physical science. Teachers will receive technical subject matter background and insights into curriculum material availability and use. Offered only in Summer Session at Goose Cove, Maine. **Cr 3.**

ESC 347 Marine Education for Secondary Teachers

Enhances the ability of secondary teachers (particularly middle and junior high school teachers) to teach marine-related topics. Topics chosen from a number of academic disciplines, including history, mathematics, biological science, and physical science. Teachers will receive technical subject matter background and insights into curriculum material availability and use. Offered only in Summer Session at Goose Cove, Maine. **Cr 3.**

ESC 348 Natural History-Inland-(Elementary and Secondary)

Introductory field studies of the natural habitats found in areas surrounding the Orono campus. The ecological relationship of plant and animal forms to their physical surroundings will be emphasized. **Cr 3.**

ESC 352 Teaching Science in the Secondary School

Methods and materials in teaching of science; development of the science curriculum, and

equipment, supplies, and supplementary materials for science teaching in the secondary schools. Prerequisite: PSY 100, junior or senior standing. **Cr 3.**

ESC 463 Workshop in Conservation Education For Elementary Teachers

The use of outdoor activities suitable for environmental education. The biotic and physical features of the environment; activities drawn from the Outdoor Biology Instructional Strategies (OBIS) program. Games, simulations, craft activities, experiments, and analyses of data. Designed to meet the needs of Boy and Girl Scout leaders, YW and YMCA personnel, recreation directors, areas both on and off our campus. Most workshop activity revolves around field studies. **Cr 3.**

ESC 473 Workshop in Conservation Education For Secondary Teachers

Same as course ESC 463 except for secondary teachers. **Cr 3.**

ESC 516 Advanced Studies in Science Education (Elementary)

Studies include a critical appraisal of contemporary programs in elementary school science, review of relevant research in educational science at this level, practice in planning and conducting laboratory and field investigations. Prerequisite: ESC 316 or equivalent. **Cr 3.**

ESC 525 Planning the Environmental Curriculum

A course designed to develop skills and abilities of the participant for environmental education curriculum program development. Prerequisite: ESC 350, or teaching experience in science and/or environmental education. **Cr 3.**

ESC 526 Methods of Teaching Environmental Education

Classroom and field-based studies of a broad spectrum of environmental teaching methods. Prerequisites: ESC 352 or teaching experience in science and/or environmental education. **Cr 3.**

ESC 542 Advanced Studies in Science Education (Secondary)

Studies include critical appraisals of curriculum and teaching practices at elementary and secondary school levels. Focus is placed on surveying current literature in science education. Prerequisite: ESC 352, or ESC 316 or equivalents. **Cr 3.**

Social Studies Education

ESS 315 Teaching Social Studies in the Elementary School

Methods and materials for social studies in the elementary school; ways of relating the work of the social studies class to the understanding of practical problems of the community. Not open to freshmen. **Cr 3.**

ESS 320 Teaching Geography in the Elementary School

Materials, methods, devices, activities, and appropriate background information to the program of teaching geography in the school. Not open to freshmen. **Cr 3.**

ESS 341 Teaching Social Studies in the Secondary School

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 freshmen. **Cr 3.**

ESS 343 Teaching Geography in the Secondary School

Materials, methods, devices, activities, and appropriate background information to the program of teaching geography in the school. Not open to freshman. **Cr 3.**

ESS 515 Newer Practices in Social Studies in the Elementary School

Study of literature, research, materials, and emerging curriculum practices in elementary school social studies program. An advanced course. Prerequisite: ESS 315 or equivalent. **Cr 3.**

ESS 541 Newer Practices in Social Studies in the Secondary School

Study of literature, research, materials, and emerging curriculum practices in the secondary school social studies program. An advanced course. Prerequisite: ESS 341 or equivalent. **Cr 3.**

Media

INM 433 Instructional Media

Basic course in the improvement of learning and teaching through the effective use of instructional media and related materials. 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. An advanced course. **Cr 3.**

Special Education

SED 300 Survey of Exceptionality

A general overview of special education to assist the development of an awareness of exceptional children. Study will focus on characteristics, identification procedures, educational provisions, and relevant issues and concerns related to categories of exceptional children. **Cr 3.**

SED 301 Introduction to the Education of Severely Handicapped Students

This course will provide an overview of the severely handicapped child/adolescent and his/her complex educational needs. Included will be: history of education of the severely handicapped; service delivery models; terminology; etiology; the role of other related disciplines; and, health related issues. Prerequisites: Experience with the severely handicapped (professional or volunteer), SED 300. **Cr 3.**

SED 330 Assessing the Learning and Behavior of Exceptional Children

A skills course in which students will have the opportunity to gain knowledge and competencies related to informal assessment of children's academic performance, development, and social behavior. Prerequisite(s): Field experience in special education, SED 300. **Cr 3.**

SED 340 Behavioral Intervention in Educational Settings

Explores various methods of teaching appropriate classroom behaviors. Behavior modification and psycho-social interventions. Students focus on both the behavior of children in classrooms and the environmental factors which affect behavior. Field placement required for course activities. Prerequisite(s): field experience in special education, SED 300. **Cr 3.**

SED 360 Characteristics and Identification of the Gifted and Talented

Offers students an opportunity to explore the history, characteristics and identification procedures of gifted and talented education. The na-

tional perspective and leading state identification models will be studied with special attention directed toward meeting the educational needs of the gifted and talented living in rural communities. Prerequisite: EDB 203. Cr 3.

SED 365 Methods of Teaching the Superior Child
Methods, materials and techniques for teaching the gifted child. Prerequisite: EDB 202, EDB 203, EDB 204 or their equivalents. Cr 3.

SED 370 Methods of Teaching the Retarded Child
Methods, materials, and techniques in teaching retarded children at the special class level. Prerequisite: SED 300. Cr 3.

SED 375 Instructional Strategies for Exceptional Children

An examination of various clinical teaching methods appropriate for children with intellectual, behavioral and/or learning deficiencies. Prerequisite(s): field experience in special education, SED 300. Cr 3.

SED 465 Educational Programming for Exceptional Children

Examines educational, social and vocational planning for the handicapped in both school and the community. Educational curriculum, curriculum development, legal requirements, funding sources and the organization of state and private agencies. Prerequisite(s): Field experience in special education, SED 300, SED 630. Cr 3.

SED 515 Organization and Management of the Special Education Resource Pro

This course will offer students an opportunity to explore 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. Prerequisite: SED 300, and SED 592 or SED 533. Also by permission. Cr 3.

SED 520 Administration and Supervision in Special Education

The preparation of personnel to develop, administer, and supervise special education programs for handicapped individuals at all age levels and with varying degrees of handicapping conditions from mild to severe. Prerequisite: SED 550. Cr 3.

SED 532 Methods of Teaching the Emotionally Disturbed

Course is designed to review the major systems and methods of working with the emotionally

disturbed child in the school setting. Prerequisite: SED 300, SED 592. Cr 3.

SED 534 Learning Disabilities-Educational Methods

Application of major systems and methods of working with school-age children with specific learning disabilities. Development of appropriate programs for individual children. Prerequisite: SED 633 or equivalent. Cr 3.

SED 550 Theories of Exceptionality

Theories related to the cause and treatment of a variety of handicapping conditions. Historical antecedents of theories and resultant issues and trends are also examined. Prerequisite: SED 300. Cr 3.

SED 551 Methods and Curriculum for the Handicapped

Development of instructional strategies for handicapped children and youth. Basic considerations related to educational principles and practices that must be considered in developing effective instructional strategies. Prerequisite: SED 550. Cr 3.

SED 552 Consultation and Families in Special Education

Models for consulting with teachers and parents of handicapped children and youth. Prerequisite: SED 300. Cr 3.

SED 553 Assessment in Special Education I

Provides entry level assessment and consumer level experiences with testing instruments designed to assess educational functioning of students ranging from mildly to severely handicapped. Prerequisite: SED 300. Cr 3.

SED 554 Assessment in Special Education II

Provides advanced training and preparation in psycho-educational test analysis and dissemination of information related to mild to severely handicapped students. Prerequisite: SED 553. Cr 3.

SED 571 Observation and Practice in Special Education

An eight-week full-time student teaching experience in a special educational program for exceptional children. Prerequisite: Permission. Cr 6.

SED 586 Workshop in Special Education (Activity)

Workshop to provide 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 300. Cr 3-6.

SED 590 Nature and Needs of the Retarded

Advanced course emphasizing the social role of the retarded built upon prerequisites and dealing with the total range of mental retardation. Correlations of educational, social, and psychological needs of the retarded relative to degree of retardation. Determination of appropriate social and vocational goals for each individual. Prerequisite: SED 300. Cr 3.

SED 592 Identification of Emotionally Disturbed Children

Advanced course includes the identification and diagnosis of emotional disturbance in school age children. Such areas as incidence, depth, and extent of emotional disturbance covered from an educational viewpoint. Extensive reading and some field work are associated with course content. Prerequisite: SED 300. Cr 3.

Student Teaching

STT 490 Full-Day Student Teaching (Elementary)

A full-day, off-campus internship program in a selected school. Prerequisite: EDB 202, EDB 221, EDB 204 or their equivalents, methods course, and senior standing. Cr 6-12.

STT 491 Full-Day Student Teaching (Secondary)

A full-day, off-campus internship program in a selected school. Prerequisites: EDB 202, EDB 221, EDB 204, or their equivalents, methods course, and senior standing. Cr 6-12.

STT 492 Half-Day Student Teaching (Elementary)

A half-day program of observation and student teaching in a selected school in the University area. The same four consecutive periods must be free daily to schedule course. Conferences and group discussions. Prerequisite: EDB 202, EDB 221, EDB 204 or their equivalents, methods course, and senior standing. Cr 6.

STT 493 Half-Day Student Teaching (Secondary)

A half-day program of observation and student teaching in a selected school in the University area. The same four consecutive periods must be free daily to schedule course. Conferences and group discussions. Prerequisites: EDB 202, EDB 221, EDB 204 or equivalents, methods course, and senior standing. Cr 6.

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 6-12.

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 Student Teaching. (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 Student Teaching. (Pass/Fail Grade Only). Cr 2-6.

Division of 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 will be certified to teach art 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.

Students must qualify for regular admittance to the College of Education. In addition, evidence of a positive and healthy lifestyle, and a genuine interest in serving a broad spectrum of clients and in the subject matter is required.

S. Butterfield, Coordinator; Professor Pechinski; Associate Professor Abbott; Assistant Professors Butterfield, H. Lehnhard, R. Lehnhard; Instructors Reif; Cooperating Personnel from Department of Physical Education and Athletics; Associate Professor Styrna; Assistant Professors Anderson, Carville, Jordan; Lecturers Ames, Ballinger, Chapelle, Dwyer, Dyer, Fox, Gavett, Linder, Mateja, Switzer, Winkin, Wren

Courses in 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. **Cr 2.**

HPR 230 Archery

Instruction to develop skills and teaching techniques in this leisure activity. **Cr 1.**

HPR 231 Badminton

Instruction to develop skills and teaching techniques in this leisure net sport. **Cr 1.**

HPR 232 Golf

Instruction to develop skills and teaching techniques in this leisure activity. **Cr 1.**

HPR 233 Volleyball

Instruction to develop skills and teaching techniques in this leisure net sport. **Cr 1.**

HPR 234 Racquetball

Racquetball skills and teaching techniques along with instructions and rules will be presented. **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. **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. **Cr 1.**

HPR 238 Tennis

Instruction to develop skills and teaching techniques in this leisure net sport. **Cr 1.**

HPR 239 Relaxation

Deals with methods and teaching techniques in relaxation and meeting stress. **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 245 Methods of Teaching and Coaching Wrestling

Develops skills, techniques and understandings for competency in wrestling. Deals with the responsibilities of the prospective wrestling teacher and coach. Prerequisite: sophomore standing.

Cr 2.

HPR 246 Methods of Teaching and Coaching Field Hockey

Develops or improves skills in tumbling, apparatus, rhythmic gymnastics; conditioning, spotting techniques, and unit planning in elementary and secondary schools.

Cr 3.

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.

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.

Cr 3.

HPR 254 Analysis of Basic Skills

To develop the skills to interpret movement patterns in a variety of basic and sport skills and prescribe remediation for movement deficiencies.

Cr 2.

HPR 256 Elementary School Physical Education

Integrates the goals, objectives and concepts of physical education with the curriculum of the elementary school. Emphasis on purposeful, idea-directed movement and the important contribution of physical education to the growth and development of the elementary school child.

Cr 3.

HPR 260 Camp Leadership

Designed for training camp counselors, with emphasis on participation in the varied activities of camping.

Cr 2.

HPR 263 Methods of Modern Dance

The purpose of this course is to prepare the student to teach dance in elementary schools.

Cr 1.

HPR 269 Foundations of Recreation

Fundamental concepts, principles, and practices in the field of recreation, with emphasis on historical and philosophical backgrounds.

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. Laboratory experiences will be provided.

Cr 3.

HPR 271 History and Philosophy of Physical Education and Recreation

Fundamental concepts, principles and practices in the field of physical education and recreation, with emphasis on historical and philosophical backgrounds. Prerequisite: HPR/RPE Major.

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

Stress on elements of services, facilities, and instruction at elementary and secondary school levels as they influence habits of positive health.

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 re-

quired to test their skills in field work. Lab fee will be charged. **Cr 3.**

HPR 340 Outdoor Education and Recreation Education

Develops and evaluates educational experiences which can be pursued beyond the traditional classroom setting. Emphasis on the utilization of the outdoor environment as a laboratory for learning the cognitive, affective and psychomotor domains. **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: Must be of sophomore standing. **Cr 3.**

HPR 345 Community Centers and Playgrounds

Aspects of organization, administration, management, facilities, equipment, and activities of building-centered programs and community playgrounds. **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

To develop skills in teaching gymnastics, games and dance with a focus on movement themes, developmental levels and personalized learning. **Cr 3.**

HPR 355 Philosophy and Organization of Physical Education for Elementary Schools

The philosophical bases for physical education programs at the elementary school level. Contrasting emphases in the curriculum are studied as well as the implications found in perceptual-motor development research. **Cr 3.**

HPR 361 Organization and Administration of Physical Education and Recreation

Develop skills for using administrative principles, decision making, communication, leadership, organizational models for the development of fiscal management, personnel management, facilities management, legal liability and public relations programs. **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 stressed. Teaching theories and principles, developing units of instruction, use of media in teaching, and methods of evaluation. **Cr 3.**

HPR 365 Leadership Organization in the Intra-Extramural Programs

Principles and philosophy, administration, organization, and supervision of intra-extramural activities in the physical education program in elementary, junior, and senior high schools. **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. **Cr 3.**

HPR 376 Kinesiology

Introduction to the analysis of movement patterns based on precepts necessary for the application of basic mechanics and kinesiological principles to the teaching of motor skills. **Cr 3.**

HPR 378 Physiology of Exercise

Develops an understanding of the integration and regulation of physiological functions during physical activity. Through investigation of factors affecting human performance, and coordinated adjustments of body functions, students will become more aware of theoretical and practical application of physical activity. Prerequisites: ZOL 208, HPR 253, HPR 376. **Cr 3.**

HPR 380 Health, Physical Education and Recreation Programs in the Elementary School

Study of skills, progressions in rhythms, sports, and gymnastics. Health programs, including curriculum planning, methods of presentation. Organization and administration of elementary school recreation programs. For elementary classroom teachers. **Cr 3.**

HPR 383 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 curriculum construction. Cr 3.

HPR 384 Practicum in Physical Education

Leadership experiences under staff supervision in the service program. Limited opportunities also exist in local public schools. Consult either Dr. Woodbury or Dr. Cobb before registering. Cr 1-3.

HPR 385 Leadership in Physical Education and Recreation

Develop skills for programming effective educational and community programs which focus on identified needs of the clients being served. Cr 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 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 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 indi-

vidual performance. Prerequisite: EDB 203 and or permission. Cr 3.

HPR 574 Organization and Administration of Recreation Programs Cr 3.

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

Programming, personnel, finance, budgets, equipment, facilities, and administrative aspects of programs of health, physical education and recreation. Cr 3.

HPR 579 Current Studies in the Administration of Athletics Cr 3.

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 Cr 3.

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 Administration of Elementary and Secondary School Health Programs Cr 3.

HPR 584 Evaluative Procedures in Health, Physical Education and Recreation

Analysis of evaluative programs in health, physical education and recreation. Emphasis on test administration and construction. Specific attention to evaluation practices of tests to measure knowledge, attitude, skills, status. 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.**

PHE 101 Physical Education

The instructional program for men and women is designed to provide the student with an opportunity to develop and refine and to add knowledge in a variety of physical activities which the student can use now and in his leisure time in later years. Emphasis is placed on presenting the student with an appreciation and understanding of the body and its movement, of exercise and its role in one's individual life. In an effort to promote and maintain one's individual physical fitness, each woman or man has the opportunity to select those activities in which she or he has an interest. The program will include a choice of activities; dance golf, physical fitness, racquet sports, swim, tennis. From these choices the students may either choose for depth in skill refinement in an activity or breadth in selection of several activities. For each hour of credit, two hours of instructional time per week,

per semester, is required. Each college within the University system accepts credit for PHE 101 as an elective course. (Pass/Fail Grade Only).

Cr 1.**PHE 102 Physical Education**

The instructional program for men and women is designed to provide the student with an opportunity to develop and refine and to add knowledge in a variety of physical activities which the student can use now and in his leisure time in later years. Emphasis is placed on presenting the student with an appreciation and understanding of the body and its movement, of exercise and its role in one's individual life. In an effort to promote and maintain one's individual physical fitness, each woman or man has the opportunity to select those activities in which she or he has an interest. The program will include a choice of activities; dance, golf, physical fitness, racquet sports, swim, tennis. From these choices the students may either choose for depth in skill refinement in an activity or breadth in selection of several activities. For each hour of credit, two hours of instructional time per week, per semester, is required. Each college within the University system accepts credit for PHE 102 as an elective course. (Pass/Fail Grade Only). **Cr 1.**





College of Engineering and Science

Norman Smith, *Dean*

Wayne A. Hamilton, *Associate Dean*

Clinton H. Winne, Jr., *Assistant Dean*

The College of Engineering and Science 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:
 - Electrical Engineering Technology
 - Mechanical Engineering Technology
- C. Four-year bachelor of science degree programs:
 - Agricultural Engineering (jointly with the College of Life Sciences and Agriculture)
 - Chemical Engineering
 - Chemistry
 - 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 four-year programs leading to bachelor of science degrees in Engineering:

All Engineering programs are designed to fulfill the accreditation requirements of the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology. 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*

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 and 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

*The 18 credit humanities and social sciences requirement also applies to the Bachelor of Science degree in Chemistry and Pulp and Paper Technology.

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 and Science. 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 and Science 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 and Science students.

Courses covering the Technology and Society area are:

- AEN 241 Energy and Society
- AEN 242 Metals and Society
- INT 480 Pesticides and the Environment
- HTY 486 Man and Sea: World Maritime History
- HTY 491 Man, Machine and Society I
- HTY 492 Man, Machine and Society II
- 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 251 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 and Science 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 and Science, 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 and Science 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 and Science.

Double Major

Double majors are permitted between most disciplines in the College of Engineering and Science. 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

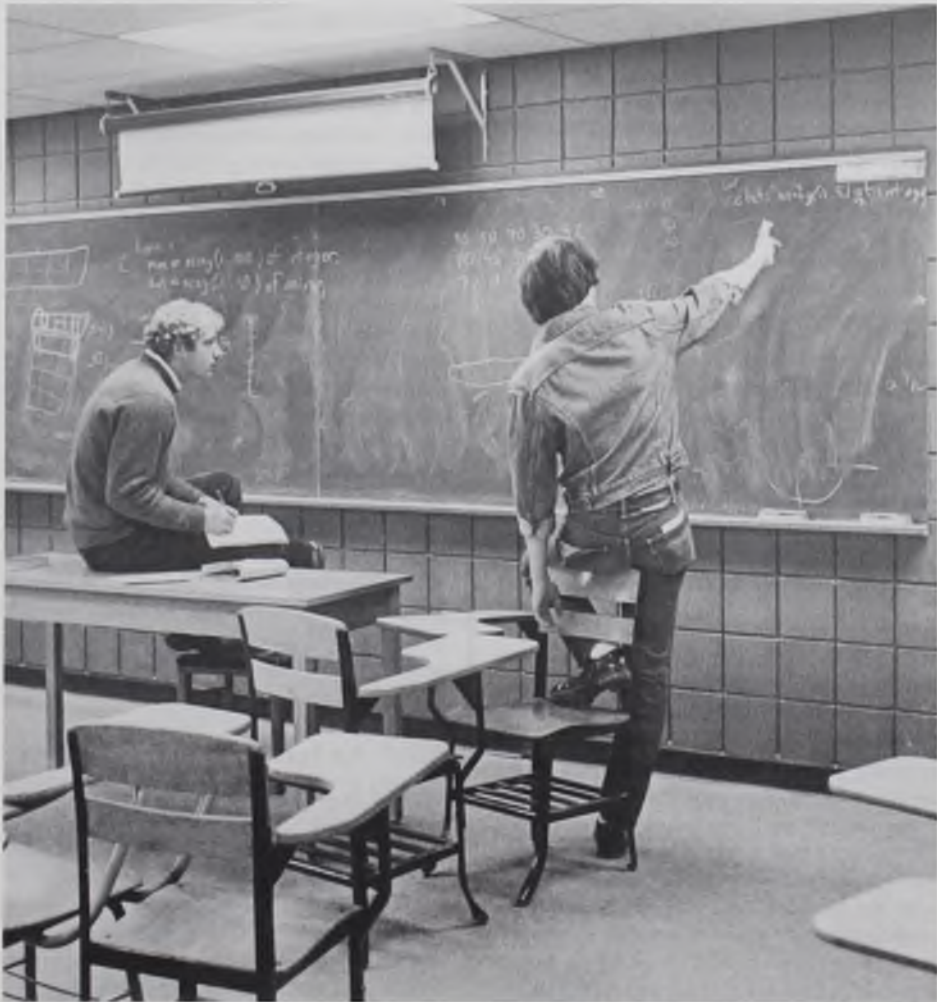
Students wishing to register for "Away" status must be in good academic standing and must

obtain prior approval from their academic advisor and dean. Course equivalencies should be determined prior to registration.

Before students of the College of Engineering and Science 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.

Pass/Fail

Students enrolled in the College of Engineering and Science 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 upperclass 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 Lieutenant Colonel Antoon; Assistant Professors Captain Root, Captain Hawkins, Captain Kaussner; NCO1C Master Sergeant Gagnon; Administrative NCO Technical Sergeant Stauffer

Purpose

Air Force ROTC allows university students to compete for commissions as officers in the United States Air Force. Opportunities exist for well-qualified students from all fields, with scholarship opportunities for especially bright students with scientific, engineering, and mathematics-related majors. The Air Force is also interested in students who are interested in aviation careers, as pilots or navigators. There are both two- and four-year programs.

Four-Year Program

Students register for AER 111 during the fall term of their freshman year and continue throughout the four-year curriculum. The curriculum consists of 16 credit hours in Aerospace Studies (AER 111/112, 211/212, 311/312, 411/412, AER 125, AER 325, and AER 335).

Two-Year Program

This program provides an opportunity for students who did not elect the four-year ROTC program upon entering college. Application normally is made during the fall term of the student's sophomore year. Selectees attend a mandatory six-week summer field training (AER 345) prior to their junior year of college. Applicants must have two years remaining in college after the six-week field training. This may be undergraduate or graduate work or a combination. The curriculum is 12 credit hours, including AER 311/312, 411/412, and AER 325.

Commitments

Cadets in the four-year program incur no obligation during their first two years in AFROTC. The student agrees to accept a commission, if offered, only after enrolling in AER 311. Upon accepting their commissions, pilots incur an obligation of eight years after completion of pilot training; navigators incur a five-year obligation after initial training; all others agree to serve for four years following commissioning.

Scholarships

A limited number of scholarships are available for qualified students. High school seniors interested in applying should consult their high school counselors in their junior year or early in their senior year. University cadets already in the four-year AFROTC program compete at the end of each term in the freshman and sophomore years on the basis of grade-point average and Air Force Officer Qualifying Test scores. Students receiving scholarships must be able to complete the Air Force ROTC program, receive a degree, and be commissioned by age 25 (29 for veterans). Scholarship cadets also must complete two terms of a foreign language, and one term of English composition. Each scholarship covers the cost of tuition, laboratory fees, most textbooks, and an allowance of \$100 a month.

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

Air Force ROTC cadets also must participate in a cadet corps training laboratory which meets once a week. The laboratory simulates a typical Air Force organization, and is largely cadet planned and directed in line with the concept that leadership experience will improve ability to perform as an Air Force officer.

Other Activities

Cadets of the 326th Air Force ROTC Group have the opportunity to participate in a number of other activities. These include: Arnold Air Society, the AFROTC Drill Team, the Air Force ROTC Flight Orientation Program (often on operational aerial refueling missions), and the Advanced Training Program (AER 435).

Field Training

Under either Air Force ROTC program, the student takes only one summer field training session. The two-year program requires six weeks of field training; the four-year program requires four weeks. Students are paid varying amounts for each of these training periods. This pay is in addition to travel pay to and from the field training location.

Flight Screening Program

Cadets who are candidates for pilot training attend a four week Light Aircraft Training for ROTC cadets (LATR) (normally during the summer between their junior and senior years) held at an Air Force contractor flying school. This program consists of approximately 22 flying hours of instruction in the T-41 (military Cessna 172) or equivalent aircraft and is designed to motivate the cadet, introduce him/her to flying and to screen each cadet for suitability for future pilot training on active duty.

Standards

Cadets must be U.S. citizens of sound physical condition and high moral character. Before graduation, cadets must complete a three-credit course in mathematical reasoning. They must complete ROTC and receive a degree in order to be commissioned prior to age 30. Veterans may request an age waiver up to age 35. (Maximum age for entering flying training is 26½, or 27½ for veterans.)

Further Educational Opportunities

After completion of AFROTC requirements, advanced degrees may be sought by delaying active duty commitments. Some commissioned officers continue advanced studies with the Air Force Institute of Technology. Special provisions are available for medical, law, and meteorology students. For further information, contact the Department of Aerospace Studies, 164 College Avenue. Telephone: (207) 581-1384.

General Military Course

The General Military Course (GMC) consists of the freshman and sophomore level courses required to prepare the student for entry into the Professional Officer Course (POC) as a junior. The first year of this course may be waived for students who 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 normally taken consecutively, Leadership Laboratory, AER 125, must be taken by all students in the GMC. Any students not wishing to participate (or not qualified, for physical reasons, for example) may still enroll in any of the AER courses.

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

A survey course designed to give a basic overview of the United States Air Force. Examines the missions, organization and operational concepts of the 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 survey course designed to give an overview of the United States Armed Forces and the U.S. Air Force in particular (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 of 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 in late afternoon. (Pass/Fail Grade Only). **Cr 0.**

AER 211 History Of Military Aviation Through World War II

A survey study of military aviation in the United States and its development into effective air power, 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 survey study continuation of AER 211 (recommended to be taken sequentially, but not mandatory). A study of the development of air power from World War II to the present. Particular emphasis is given to the creation of the U.S. 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 251 Introduction To Aviation (Lab)

A survey course designed to provide insights to aviation and flying as a vocation or avocation. Provides introduction to aerodynamics, aircraft engineering and systems, flight instruments and instrument flying, aviation physiology, meteorology, navigation and Federal Aviation Regulations. Course may not fulfill all requirements for FAA Ground School in time allotted. Meets one afternoon weekly. Spring semester only. Prerequisite: Permission of instructor. **Cr 0.**

AER 311 Introduction to Leadership

The individual as a leader. Study of basic leadership theories and styles. Motivational and behavioral processes with emphasis on individual and group dynamics. Management functions and

responsibilities with emphasis on the relationship between leadership and management. Written and spoken communications systems to include development of basic speaking skills. Prerequisite: AER 335 or 345 or permission of instructor. **Cr 3.**

AER 312 Air Force Management

A study of management and leadership roles in the Air Force. The managerial process involving decision-making in a dynamic environment. Analysis and discussion of the functions of management. The manager's counseling responsibilities to include 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 345 or permission of instructor. **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 in late afternoon. (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. Supplements campus courses in developing leadership and discipline. Mission, organization, and functions of an Air force base; 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 as in AER 355, but designed for students in the two-year program who have not participated in the GMC as freshman and sophomores. In addition to the items covered in AER 335, includes two weeks of course work to cover AER 111/112 and AER 211/212. Prerequisite: Selection for POC entry. **Cr 0.**

AER 411 National Security Policy Issues

The political, social and economic constraints on national defense. U.S. civil-military relations and environment in which defense policy is formulated and implemented. DOD planning, budgeting and management, the mechanics of national decision-making processes relative to defense issues. Examination of how the nature of conflict has changed since WW II and problems associated with nuclear capabilities. Emphasis is also placed on the nature of international

alliance building, international peace-keeping forces and conflict and arms control. Provides an understanding of regional issues and how they impact on American national security. Specific regions examined are Soviet Union, East Asia, the Middle East, Sub-Sahara-Africa and Latin America. National Security priorities of the future. Prerequisite: AER 335 or 345 or permission of instructor **Cr 3.**

AER 412 The Professional Officer

The role of the professional officer in a democratic society; socialization process and value orientation associated with professional military service. Critical examination of the concept of military professionalism by MacArthur,

Huntington, Janowitz, Moskos and others. The moral and ethical standards of military professionalism in a changing world. The military justice system as it applies to military members; the Uniform Code of Military Justice, courts-martial, and appellate and review procedures. Prerequisite: AER 335 or 345 or permission of instructor. **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 and includes specialized motivational orientation in an Air Force specialty area appropriate to the cadet's category for commissioning. **Cr 0.**

Agricultural Engineering

Professors Riley (Chairperson), Klinge, Rhoads, Smith, Rowe; Associate Professors Christensen, Hedstrom, Huff, Soule; Assistant Professor Schaulfer

The agricultural 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.

The basic curriculum is strengthened by elective options which permit students to specialize in one of four areas according to their interests and needs. Areas of specialization are: (1) machinery and power units for the agricultural and forest industries; (2) food and fiber processing systems; (3) design of agricultural structures; and (4) soil and water conservation 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, agricultural engineering graduates are in great demand. Employment opportunities are as diverse as the agricultural industry itself. Graduates in agricultural engineering may be employed as design engineers by machinery and farmstead 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 agricultural engineering is a joint responsibility of the College of Engineering and Science and the College of Life 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.

Specimen Curriculum

Freshman Year

First Semester			Second Semester		
AEN 220	Principles of Mechanization	3	AEN 255	Materials in Agricultural Engineering	3
LSA 117	Issues and Opportunities	1	AEN 257	Computer Applications in Agricultural and Forest Engineering	3
GEE 101	Introduction to Engineering Design	3	MAT 127	Analytic Geometry and Calculus	4
MAT 126	Analytical Geometry and Calculus	4	PHY 122	General Physics	4
PHY 121	General Physics	4		Elective	3
TOTAL HOURS			TOTAL HOURS		
			17		

Curriculum in Agricultural Engineering

Agricultural Engineering

AEN 220	Principles of Mechanization	3	AEN 460	Agricultural Machinery	3
AEN 255	Materials in Agricultural Engineering	3	AEN 463	Farm Structures Design	3
AEN 257	Computer Applications in Agricultural Engineering	3	AEN 464	Instrumentation and Control Systems	3
AEN 268	Computer Aided Drafting & Design	2	AEN 465	Soil and Water Engineering	3
AEN 281	Elementary Plane Surveying	1	AEN 467	Agricultural and Forest Power	3
AEN 282	Introduction to Agricultural Engineering	2	AEN 469	Agricultural Processing Engineering	3
			AEN 480	Senior Seminar	1
			AEN 491	Design Project I	1
			AEN 492	Design Project II	2
			AEN 493	Design Project III	1
MINIMUM HOURS			37		

Basic Engineering

GEE 101	Introduction to Engineering Design	3	MEE 270	Applied Mechanics: Dynamics	3
MEE 150	Applied Mechanics: Statics	3	MEE 360	Fluid Mechanics	3
MEE 230	Thermodynamics	3	MEE 380	Design I	3
MEE 251	Strength of Materials	3	ELE 215	Electrical Circuit Fundamentals	3

MINIMUM HOURS 24

Technical Electives

A group of engineering or science courses selected by the student and approved by the advisor.

MINIMUM HOURS 9

Basic Sciences and Mathematics

CHY 113	Chemical Principles	4	MAT 127	Analytic Geometry and Calculus	4
PHY 121	General Physics	4	MAT 228	Analytical Geometry and Calculus	4
PHY 122	General Physics	4	MAT 259	Differential Equations	4
MAT 126	Analytical Geometry and Calculus	4			

MINIMUM HOURS 28

Agricultural and Biological Science

BIO 100	Basic Biology	4	Electives	3
PSS 140	Soil Science	3		

MINIMUM HOURS 10

Humanities, Social Sciences, and Communications

MINIMUM HOURS 21

Other

LSA 117	Issues and Opportunities	1		
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MINIMUM HOURS REQUIRED FOR GRADUATION: 130

Students transferring to the University of Maine under the Regional Program from the Universities of Massachusetts, New Hampshire, Rhode Island, or Vermont after the sophomore year should check the bulletins of those institutions for curricula for the first two years in Agricultural Engineering.

Graduate Work in Agricultural Engineering

The degrees of Master of Science (Agricultural Engineering) and Master of Engineering (Agricultural 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.

Several research assistantships are available each year. Incumbents devote half time to research work on approved projects of the Agricultural Experiment Station.

Incumbents devote half time to research work on approved projects of the Agricultural Experiment Station.

Chemical Engineering**Including Pulp and Paper Technology**

Professors Stockel (Chairperson), Ceckler, Chase (Emeritus), Genco (Calder Professor of Pulp and Paper Engineering and Science), Hassler, Kiran (Gottesman Research Professor of Chemical Engineering, and Graduate Coordinator), Kraske (Pulp and Paper Laboratory Manager), Mummé (Undergraduate coordinator), Thompson (University of Maine Pulp and Paper Foundation Professor of Chemical Engineering); Associate Professors Co. Hill, Pendse (University of Maine

Pulp and Paper Foundation Faculty Fellow); Assistant Professors Bousfield, Hwalek, Lisius, Woerner

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 envi-

ronment. 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 which transits into 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 that arise in these areas.

The curriculum provides a broad background in the fundamentals of science and engineering, affords opportunities for application of these fundamentals to typical chemical engineering problems to illustrate how comprehensive problems are analyzed and solved, provides the student an opportunity to select a specialized area and develop skills needed to work more effectively in that area, and provides a background in the humanities so that the graduate can understand our society and make decisions which contribute to its development and improvement.

Chemical engineers must have a basic understanding of chemistry; therefore, courses are required in both fundamental and applied chemistry. Because principles of physics and mathematics are used in chemical engineering, courses in these disciplines are required early in the curriculum. Basic knowledge of electricity and mechanics are essential parts of the curriculum. They are provided by courses in the appropriate departments. So that students may gain an early understanding of the significance of their major field, applications-oriented chemical engineering courses are begun during the freshman year and are continued through four years in logical sequence.

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 requirements. In addition, the department requires that the humanities and social studies program contains one nine-hour course sequence in a specific

subject and that that sequence include at least two upper level courses.

During the latter part of the student's academic training, the student must select an area of engineering (technical electives option) within which he or she will receive more specialized chemical engineering or related education. 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 basic 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

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 management 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 program 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 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 in any of several scientific or engineering disciplines 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, and others.

Students at the University of Maine who are enrolled in basic curricula for a B.S. degree in engineering or science can include the fifth-year option. The option can be either an extension of a completed four-year program, or 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. Where the integrated option is selected, 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 Arts & Sciences, the College of Business Administration, the College of Engineering and Science, and the College of Forest Resources. They are selected to enhance the career preparation of the student. A variety of elective course 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. Consult with the chairperson or faculty advisors of the Department of Chemical Engineering for additional details, including procedure for application.

"Co-op" program positions are awarded on a competitive basis, with common 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 60 semester hours of graduate work beyond an M.S. in chemical engineering; these requirements are accounted for by a dissertation, four seminars, and six graduate courses. In addition to completing the course and research requirements, Ph.D. students are required to take 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.

Specimen Curriculum for the Degree of Bachelor of Science in Chemical Engineering

Freshman 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	General Physics I	4	PHY 122	General Physics II	4
CHE 111	Introduction to Chemical Engineering	2	COS 215	Introduction to Computing Using FORTRAN	3
	Humanities/Social Sciences Elective*	3		Humanities/Social Sciences Elective*	3
	TOTAL HOURS	17		TOTAL HOURS	18

Sophomore Year

First Semester			Second Semester		
MAT 228	Analytic Geometry and Calculus	4	MAT 259	Differential Equations	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 330	Topics in Math: Statistics for Engineers	3
	TOTAL HOURS	16		Humanities/Social Sciences Elective	3
				TOTAL HOURS	19

*One must be ENG 101 or equivalent.

Junior Year

First Semester			Second Semester		
CHE 371	Physical Chemistry I	4	CHE 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
	TOTAL HOURS	17		TOTAL HOURS	16

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		TOTAL HOURS	14
	TOTAL HOURS	14			

TOTAL DEGREE HOURS: 131

Specimen Curriculum for the Bachelor of Science in Pulp and Paper Technology

Freshman Year

First Semester			Second Semester		
MAT 126	Analytic Geometry and Calculus	4	MAT 127	Analytic Geometry and Calculus	4
CHE 113	Chemical Principles I	4	CHE 114	Chemical Principles II	4
PHY 121	General Physics I	4	PHY 122	General Physics II	4
CHE 111	Introduction to Chemical Engineering	2	COS 215	Introduction to Computing using FORTRAN	3
	Humanities/Social Sciences Elective (1)	3		Humanities/Social Sciences Elective (1)	3
	TOTAL HOURS	17		TOTAL HOURS	18

Sophomore Year

First Semester			Second Semester		
MAT 228	Analytic Geometry and Calculus	4	MAT 259	Differential Equations	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 330	Topics in Math: Statistics for Engineers	3
TOTAL HOURS		16	TOTAL HOURS		16

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
TOTAL HOURS		18	TOTAL HOURS		17

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		Free Elective (4)	3
TOTAL HOURS		16	TOTAL HOURS		16

TOTAL DEGREE HOURS: 134

NOTES:

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.
4. All Free Electives must be approved by the student's advisor and be in areas which enhance the educational goals of the student.

Courses in Chemical Engineering

CHE 111 Introduction to Chemical Engineering

Introductory topics fundamental to beginning chemical engineering studies. Topics and problems are selected to provide a basis for further study in chemical engineering. Admission: freshman and sophomore only. Rec 2. Cr 2.

CHE 200 Fundamentals of Chemical Engineering

The application of 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

Relationships between structure of matter and functional properties of engineering materials; application of principles to material selection for design, emphasizing principles of materials resistance and costs. 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 to support laboratory practice in application of theory to some specific examples of industrial process control systems. Recommended for students whose major is not chemical engineering. Prerequisites: MAT 259. Rec 2, Lab 2. Cr 3.

CHE 352 Process Control

Process dynamics described by ordinary differential equations and by linearized approximations. Solution of system equations by the use of Laplace transforms. Concepts of feedback control, process dynamics and closed loop system analysis. Prerequisites: 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. Application of these principles to the chemical engineering unit operations. Prerequisite: CHE 200. Rec 4. Cr 4.

CHE 361 Chemical Engineering Laboratory I

Application of the principles of the unit operations and process control in the laboratory, using pilot scale equipment. Emphasis is placed

upon formal reports. Prerequisite: CHE 352, 360. Lab 4. Cr 2.

CHE 362 Elements of Chemical Engineering II

Introduction to rate operations, stage operations, and the principles of molecular and turbulent transport of mass, momentum, and energy. Application of these principles to the chemical engineering unit operations. Prerequisite: CHE 200, 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 view of providing the data for process design. Co-requisite: CHY 372. Rec 3. Cr 3.

CHE 385 Chemical Engineering Thermodynamics I

Application of thermodynamics to the analysis of systems of interest to chemical engineers. Topics include thermodynamic fundamentals (first and second laws) and their applications to pure fluids and heat and power cycles. Applications of thermodynamic principles to chemical engineering process problems will be made with emphasis on heat and power cycles. Prerequisite: CHE 200. Rec 3. Cr 3.

CHE 386 Chemical Engineering Thermodynamics II

Continuation of Thermodynamics I. Emphasis given to 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 natural 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

Structure and properties of polymeric materials. Polymer structure and morphology, transitional phenomena, crystallinity, solution behavior, characterization, and basis rheology and properties related to chain structure are studied. Pre-

requisites: 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. Mathematical modelling of processes and the effects of processing on the products formed emphasized. Prerequisites: CHE 431, 362, 386, CHY 372 or permission. Lec 3. Cr 3.

CHE 454 Introduction to Digital Computer Process Control

Real-time process programming concepts. The z transformation and design of digital controllers using Nyquist and Root Locus methods. Laboratory control project. Prerequisites: CHE 352. Lec 3. Cr 3.

CHE 456 Advanced Process Control I

Examination of dynamic systems in state variable form. 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. Advanced process controller and control law design. 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. Consideration of general principles of design, complex process flow diagrams, heat and material balances, rate equations, and cost estimating techniques. 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. Problems involving feasibility, analysis, design and optimization of chemical processes. Review of methods for estimating thermodynamic and transport properties required in process design. Emphasis will be placed 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. Prerequisite: permission. May be taken more than once until a total of 8 credit hours is accumulated. (Pass/Fail Grade Only). Cr Ar.

CHE 497 Independent Study

Individual and independent study of a specialized topic under staff supervision. Program of study to be designed for each topic individually, with reporting required. Prerequisite: permission. Accumulative credit hours to be 3 or less. 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 taken more than once. Prerequisite: permission. Cr 3.

CHE 499 Undergraduate Thesis

Original investigation of a chemical engineering problem, and reporting of the results. Accumulative credit hours for 2 or more semesters is 3-6. Cr Ar.

CHE 520 Colloid Technology

Chemical and physical factors underlying interfacial phenomena developed and applied. 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

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. Student works on an individual basis. Cr 3.

CHE 523 Economic Balance

Problem course, emphasizing quantitative evaluation of various factors in design and control of chemical plant equipment. Most economic operation of equipment stressed. Cr 3.

CHE 530 Introduction to Polymer Science

Research techniques for synthesis and modification of organic and inorganic macromolecules;

analytical methods to relate molecular and phase structure with solubility, transport and interfacial properties. **Cr 3.**

CHE 531 Advanced Chemical Engineering Kinetics

Theory of homophase and heterophase catalysis. 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. Process identification methods. Dynamics and stability of closed loop systems. **Cr 3.**

CHE 552 Special Problems in Computer Programming and Systems

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

Analysis Digital, analog, and hybrid computers for process control. 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 560 Heat Transfer

Phenomenon of heat transfer in conventional settings. Information on transfer of mass, momentum, and heat from phase boundaries to flowing fluids applied 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

Application of engineering science and mathematical techniques to study comprehensive problems of mass transfer in chemical engineering operations. Non-isothermal and unsteady-state systems. Development of physical models of mass transfer processes. **Cr 3.**

CHE 570 Chemical Engineering of Pulp and Paper Manufacture

Advanced course in operations of importance in the manufacture of pulp and paper; e.g., flow of

fluids, heat transfer, absorption, evaporation, drying. **Cr 3.**

CHE 580 Chemical Engineering Analysis

Modeling and simulation of chemical engineering processes. Emphasis is 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. Suitable for non-technical students. The manufacture of paper is considered starting with fibrous raw materials and concluding with the processing of finished products. Emphasis on papers produced from wood, non-wood, and secondary fibers. **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

A 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 fin-

ishing systems. Prerequisite: PPA 366 (may be taken concurrently). Lab 8. Cr 4.

PPA 475 Mathematical Modeling of Pulp and Paper Systems

A lecture and recitation course giving an introduction to the use of 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. PPA 573 is concerned with extraction of pulp or other chemicals from wood, while PPA 574 emphasizes conversion of pulp and other silvichemical intermediates into useful consumer products. 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. PPA 573 is concerned with extraction of pulp or other chemicals from wood, while PPA 574 emphasizes conversion of pulp and

other silvichemical intermediates into useful consumer products. Prerequisites: (may be taken concurrently) PPA 365, 366. Rec 1. Cr 3.

PPA 584 Decision Techniques in Management of Engineering Projects

Organizing and manipulating information available to management to optimize its usefulness covered in detail. Practice in the techniques by real problems and case studies from the research, production, and marketing base of the paper industries. Prerequisite: MAT 128, MAT 132, or equivalent. Cr 3.

Interdisciplinary Courses

INT 233 (CHE) Introduction to Engineering

Lecture sessions are on computer programming (FORTRAN), pulp and paper processes, and an engineering problem of current topical interest such as energy or ecology. Small group laboratory projects deal with various topics of interest, typically chosen from ecology and environment, pulp and paper processes, analytical instrumentation, energy, materials science, and computer programming and applications. Admission by permission only. Cr 3.

INT 498 (CHE, CHY, ELE) Undergraduate Research Participation

Research topics to be chosen by the students in consultation with faculty members in the departments and programs in the College of Engineering and Science. Students are required to submit a final report describing their research and present an oral seminar. Cr 1-3.

Chemistry

Professors Fort (Chairperson), Bentley, Dunlap, Goodfriend, Green, Patterson, Rasaiah, Associate Professors Anderegg, Jensen, Russ; Assistant Professors Amar, Carlin, Cole; Professor Emeritus Wolfhagen

The chemistry curriculum is designed to give the student a thorough understanding of the fundamental nature of material substances, the changes they undergo and the laws governing such changes. It also aims to develop laboratory skills required to synthesize and analyze substances and to study their properties.

Because a knowledge of chemistry is fundamental to successful work in so many fields, the

chemistry curriculum affords an unusual opportunity for a wide choice of electives so the chemistry major may adapt his or her program to individual interests and needs. The curriculum leading to American Chemical Society certification prepares the student, upon graduation, for employment in the chemical industry in the fields of production and control, development, and research. The specimen curriculum listed below is a suggested one, and indicates the minimum requirements for certification. University of Maine graduates in chemistry who attain better than average levels of proficiency are exceptionally well qualified for graduate study in chemistry.

The proper choice of electives will enable the student to enter related fields of industrial management, technical sales and service, technical writing, computer applications and teaching, or may qualify him or her for medical school or graduate work in chemistry or in an interdisciplinary field such as oceanography. Students interested in these fields, or those who have special interests in the biological sciences, chemical engineering, geology, mathematics, or chemical physics should discuss their goals with departmental advisors who can suggest elective sequences. Up to 30 semester hours of electives may be taken while remaining within a normal 15 hours per semester load. Some variation in the order in which courses are taken is possible.

The chemistry major, in order to qualify for a degree in the College of Engineering and Science, must complete a minimum of 120 degree hours. Superior students should seriously consider continuing their studies at the graduate level and should plan on meeting only minimum ACS requirements so that they can include in the undergraduate program a second language, advanced mathematics, advanced physics, or additional courses in the life sciences.

For chemistry courses in the Summer Session, see the Summer Session catalog.

For a description of courses in biochemistry, see the list of courses given by the Department of Biochemistry.

Cooperative Work Experience Program Option in Chemistry

A program is available which allows students to accept opportunities provided by cooperating

industries for employment under this option. 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 494 and CHY 594. This will be a supervised and paid professional experience.

Consult the Department of Chemistry for details.

Five-Year Combined B.S.—M.S. Program

Selected students may apply for this option, which allows completion of both the bachelor of science and the master of science degrees in five years. Work completed as part of the Honors Program may be included in the five-year program. Application should be made to the department early in the junior year.

Consult with the chairperson of the Department of Chemistry for details.

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 for advanced degrees are described in the general section of the Graduate School catalog. Specific requirements for admission to advanced study in chemistry and information about the programs of study offered are given in the Department of Chemistry section of that catalog.

Specimen Curriculum

Courses are arranged in the recommended sequence. See departmental advisors for variations.

Freshman 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	GEE 118	Fundamentals of Programming for Engineers*	2
MAT 126	Analytic Geometry and Calculus	4	MAT 127	Analytic Geometry and Calculus	4
PHY 121	General Physics I	4	PHY 122	General Physics II	4
	TOTAL HOURS	15		TOTAL HOURS	14

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 259	Differential Equations	4
	Other	3	SPC 103	Fundamentals of Public Communication	3
	TOTAL HOURS	16	Other		3-6
			TOTAL HOURS	15-18	

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
	TOTAL HOURS 15-18		Other		3
			TOTAL HOURS	16	

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	GER 207	Readings in Scientific German**	3
	TOTAL HOURS 15-18		Other		8-11
			TOTAL HOURS	15-18	

*COS 215 may be substituted for GEE 118.

**Not required for certification, but strongly recommended.

Chemistry Major Requirements

The chemistry major must take a minimum of 40 credit hours of chemistry courses: CHY 113/114 or CHY 111/112; CHY 240; CHY 251/252; CHY 253; CHY 371/372; CHY 373; CHY 461; 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 128; eight credit hours of physics: PHY 111/112, or PHY 121/122; 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: (COS 215 or GEE 118); and at least one year of study of a major foreign language designated by the department. French, German, or Russian is strongly recommended if the student plans to enter graduate school.

Courses in Chemistry

CHY 111 General Chemistry I

This is the first course of a two semester sequence. Topics include atomic and molecular structure, states and properties of matter, stoichiometry, solutions, thermochemistry, and periodic relationships. Familiarity with elementary physics is helpful as is a course in high school chemistry, though neither is required. Prerequisites: High school algebra and trigonometry or MAT 122. Lec 2, Rec 1, Lab 3. **Cr 4.**

CHY 112 General Chemistry II

This course is a 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 of chemistry, and physical or biological sciences. Prerequisites: CHY 111 or CHY 113. Lec 2, Rec 1, 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. More quantitative than CHY 111. Mathematical aptitude for handling quantitative applications is necessary. Lec 3, Lab 3. **Cr 4.**

CHY 114 Chemical Principles II

This course is a continuation of CHY 113. A restricted number of topics including analytical chemistry, chemical equilibrium, organic chemistry, inorganic chemistry, and chemical thermodynamics are presented in modular format.

The student may choose those modules which best suit his/her educational goals. Mathematical aptitude for handling quantitative applications is necessary. Prerequisites: CHY 113 or permission. Lec 3, Lab 3. **Cr 4.**

CHY 240 Quantitative Analysis

An introductory course illustrating the fundamental principles of gravimetric and volumetric analysis. Prerequisite: CHY 112 or 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 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: credit or concurrent registration in CHY 251. Lab 4. **Cr 2.**

CHY 254 Organic Chemistry Laboratory II

A continuation of CHY 253. Prerequisite: CHY 253 and credit or concurrent registration in CHY 252. 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 128 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: credit or concurrent registration in CHY 371. Lab 4. **Cr 2.**

CHY 374 Physical Chemistry Laboratory II

Aqueous solution equilibria, electrochemistry, reaction kinetics, and spectroscopy. Prerequisite:

site: Credit or concurrent registration in CHY 374, CHY 240 or permission. Lab 4. Cr 2.

CHY 385 Chemical Literature

A study of methods for searching the 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 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 The Chemistry of Cellulose and Wood
The chemistry of cellulose, lignin, and other components of wood. Emphasis on fundamental carbohydrate and lignin chemistry. 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

Advanced theoretical and descriptive inorganic chemistry emphasizing periodic relationships. Corequisite CHY 373 or equivalent. Lec 3. Cr 3.

CHY 462 Advanced Inorganic Chemistry

A systematic study of the preparation and physical and chemical properties of nonorganic materials emphasizing periodic trends. Prerequisite: CHY 461 and CHY 372. Lec 3, Lab 3. Cr 4.

CHY 494 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, his or her faculty adviser, and "Co-op" sponsor may be carried out in the summertime or during the academic

year. A written report is required. A specimen curriculum is available in the department office. Prerequisites: junior or senior standing with a good academic record; permission. (Pass/Fail Grade Only). Cr 1-9.

CHY 499 Undergraduate Thesis

The thesis will embody the result of an original investigation carried out in the library and in the laboratory. Open only to seniors with the consent of the department chairman. Cr 1-3.

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 instrumental analysis — theory, methods. Discussion of current literature. Topics include: Spectroscopy, Electroanalytical methods, Principles of Electronics. Prerequisite: permission of instructor. 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 than are considered in CHY 251/252. Prerequisite: CHY 252. Cr 3.

CHY 556 Theoretical Organic Chemistry

Includes topics in electronic theory and reaction mechanisms. Prerequisite: CHY 252 and CHY 575. Given on sufficient demand. Cr 3.

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 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: 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 dynamics

will be emphasized. Prerequisite: CHY 575 or permission. **Cr 3.**

CHY 575 Intermediate Physical Chemistry

Introduction to the foundations of quantum theory and molecular quantum mechanics. **Cr 3.**

CHY 576 Intermediate Physical Chemistry

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. Given on sufficient demand. Prerequisite: CHY 372. **Cr 3.**

Interdisciplinary Course

INT 498 (CHE, CHY, ELE) Undergraduate Research Participation

Research topics to be chosen by the students in consultation with faculty members in the departments and programs in the College of Engineering and Science. Students are required to submit a final report describing their research and present an oral seminar. **Cr 1-3.**

Civil Engineering

Including Surveying Engineering

Professors Alexander (Chairperson), Brutsaert, Epstein*, Gorrill, Greenwood, Nightingale, Pearce; Associate Professors Elgaaly, Leick*, Lowry, Rock, Sandford; Assistant Professors Dagher, Frank*, Humphrey, Onsrud*, Cooperating Associate Professor Uttormark; Faculty Associates Keating*, Murray, Wardwell, Woodard

Undergraduate Programs

The Civil Engineering Department offers four-year undergraduate programs leading to bachelor of science degrees in either civil engineering or surveying 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.

*Surveying Engineering Faculty

The program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

M.E., and Ph.D. degrees in both Civil and Surveying Engineering. Descriptions of the programs and general requirements for advanced degrees are described in the Graduate School catalog.

Graduate Programs

The Department of Civil Engineering offers programs of study and research leading to the M.S.

Civil Engineering Curriculum

Freshman Year

First Semester			Second Semester		
CIE 110	Materials	4	ENG 101	College Composition	3
MAT 126	Analytic Geometry and Calculus	4	GEE 101	Introduction to Engineering Design	3
PHY 121	General Physics I	4	MAT 127	Analytic Geometry and Calculus	4
	Humanities/Social Sciences Elective (1)	3	MEE 150	Applied Mechanics: Statics	3
	TOTAL HOURS	15	PHY 122	General Physics II	4
				TOTAL HOURS	17

Sophomore Year

First Semester			Second Semester		
CIE 280	Computer Usage for CE	3	CIE 281	Advanced Computer Usage for CE	3
SVE 111	Plane Surveying	3	MEE 251	Strength of Materials	3
CHY 113	Chemical Principles I	4	MAT 259	Differential Equations	4
CIE 225	Transportation Engineering	3		Basic Sciences Elective (2)	4
MAT 228	Analytic Geometry and Calculus	4		Humanities/Social Sciences Elective	3
	TOTAL HOURS	17		TOTAL HOURS	17

Junior Year

First Semester			Second Semester		
CIE 331	Fundamentals of Environmental Engineering	3	CIE 365	Soil Mechanics	3
CIE 340	Introduction to Structural Analysis	4	CIE 366	Soil Mechanics Laboratory	1
CIE 350	Hydraulics	4	ENG 317	Advanced Professional Exposition	3
MAT 3-0	Topics in Math: Probability Statistics for Engineers	3		Civil Engineering Elective (3)	3
	Humanities/Social Sciences Elective	3		Civil Engineering Elective	3
	TOTAL HOURS	17		Humanities/Social Sciences Elective	3
				TOTAL HOURS	16

Senior Year

First Semester		Second Semester	
Civil Engineering Elective	3	CIE 411	Engineering Project Management
Civil Engineering Elective	3		3
Engineering Science Elective (4)	3	CIE 412	Engineering Decisions
Technical Elective (5)	3		3
Humanities/Social Sciences Elective	3		Technical Elective
Free Elective (6)	3		3
			Engineering Science Elective
			3
			Humanities/Social Sciences Elective
			3
TOTAL HOURS	18	TOTAL HOURS	15

TOTAL CREDIT HOURS: 132

Electives:

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 advisers in developing an elective program to meet their individual needs and accreditation requirements.

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. Twelve credits of Civil Engineering electives, which must include second courses in at least three of the following four areas: (a) structures; (b) geotechnical; (c) environmental-water resources; and (d) transportation-construction. At least eight elective credits must be in design.
4. Six credits of approved engineering science electives, usually in mechanical of electrical engineering, are required. One additional credit of engineering science must be included in the civil engineering or technical electives.
5. 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.
6. The free elective is either a technical or nontechnical course offered for credit by an academic unit of the University. (Remedial courses are excluded.)

Courses in Civil Engineering**CIE 110 Materials**

The structure, properties, and testing of engineering materials and their use in constructed facilities. Topics include: metals, woods, concrete, bituminous mixtures, corrosion, insulation, plastics, adhesives. Students will be exposed to the design process by addressing materials selection problems and by designing concrete for use in various design situations. Lec 3, Lab 2.

Cr 4.

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. Civil Engineering majors or permission. Corequisite: SVE 111. Lec 3.

Cr 3.

CIE 280 Computer Usage for Civil Engineering (Introduction)

Principles of operations of hardware, functions of operating system, use of file system, editor and other utilities. Programming languages: source code, compilation, machine code, linking, execution. Programming in Pascal (all except pointers); matrices and their standard operations. Program libraries, debugging, graphical output. Students will work with P.C.'s. Prerequisite: MAT 127 or by permission. Lec 3.

Cr 3

CIE 281 Advanced Computer Usage for Civil Engineering

Standard solutions to typical engineering problems: simultaneous linear equations and matrix advanced operations, minimum/maximum using conjugate gradient, numerical differentiation and integration, finite elements, critical path. Graphical output of functions, etc. and discussion of CAD. Introduction to CMS and FORTRAN (datatypes, common block, input/output, control structure). Prerequisite: CIE 280 and MAT 128. Lec 3. Cr 3.

CIE 294 Civil Engineering Practice

Work experience in civil engineering. May be taken more than once. 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 113. Lec 3. Cr 3.

CIE 340 Structural Analysis I

Structural idealization and design loads. The analysis of statically determinate beams, frames and trusses. Introduction to the analysis of statically indeterminate structures. Prerequisite: MEE 150, MEE 251. Lec 3, Lab 3. Cr 4.

CIE 341 Fundamentals of Structural Design

Concepts of structural design, structural systems, design loads, design methods. Design of beams columns and connections for wood, steel and concrete structures. Prerequisite: CIE 340. Rec 3, Lab 3. Cr 4.

CIE 350 Hydraulics

An elementary course presenting fundamental principles of fluid flow and their applications to engineering problems. Includes study of hydrostatics, liquid measuring devices, and channel and pipe flow. Prerequisite: MEE 150. Lec 3, Lab 2. Cr 4.

CIE 365 Soil Mechanics

An introduction of the fundamental physical properties, engineering behavior and performance of soils and rocks. Prerequisite: MEE 251, CIE 280 or permission. Lec 3. Cr 3.

CIE 366 Soil Mechanics Laboratory

Geotechnical laboratory testing includes 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 to include the planning, scheduling and control of engineering work. Prerequisite: senior standing or permission. Lec 3. Cr 3.

CIE 412 Engineering Decisions

Application of various analysis methods to engineering design decisions. Evaluation of economic, financial, legal, and ethical factors that affect 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

Design of roadway pavement structures with wearing surfaces ranging from surface treatments through heavy duty bituminous or Portland cement mixes, design of roadway drainage needs and earth movement schemes, geometric design of at-grade intersections and introduction to 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 works. Laboratory emphasis will be placed on the development of design projects. Prerequisite: CIE 331, 350. Lec 3, Lab 2. Cr 4.

CIE 433 Environmental Engineering Chemistry

Fundamental aspects of chemistry emphasizing environmental engineering applications. Laboratory methods for the analysis of water and wastewater. Prerequisite: CIE 331. Lec 2, Lab 3. Cr 3.

CIE 434 Wastewater Engineering Design

The theory and design of wastewater collection, treatment, and disposal. Laboratory includes design of sewers, treatment processes, and sludge disposal systems. Prerequisite: CIE 331, 350. Lec 3, Lab 2. Cr 4.

CIE 442 Reinforced Concrete Design

The design and detailing of reinforced concrete structures: buildings, retaining walls, and footings. Prerequisite: CIE 341. Lec 3, Lab 3. Cr 4.

CIE 443 Structural Steel Design

The design and detailing of steel structures: tension members, columns, beams, frames, and connections. Prerequisite: CIE 341. Lec 3, Lab 3. Cr 4.

CIE 444 Structural Analysis II

Classical methods of indeterminate structural analysis; the matrix-displacement method applied to plane trusses, rigid frames, and composite structures; microcomputer and mainframe-based structural analysis packages. Prerequisite: CIE 340. Lec 3, Lab 2. **Cr 4.**

CIE 445 Building Design

The conceptual, preliminary and final design of a building project. Economic, engineering, and sociopolitical constraints are considered. Owner, architect, engineer, and contractor relationships are explored. Course is professional in nature, utilizing the active involvement of practicing architects, engineers, planners, and contractors. Prerequisite: CIE 444 and permission. Lec 2, Lab 3. **Cr 3.**

CIE 455 Hydrology

Application of statistical analysis to rainfall and runoff. The collection and presentation of factors affecting rainfall and runoff data. Methods for developing hydrographs and flood routing. Prerequisite: CIE 350. Lec 3. **Cr 3.**

CIE 456 Groundwater Hydrology and Hydraulics

Fundamentals of the mechanics of flow through porous media and application of analytical tools to problems of groundwater flow, supply, and pollution. Prerequisite: CIE 350 and MAT 259 or permission. Lec 3. **Cr 3.**

CIE 458 Coastal Engineering

The principles of hydraulics and civil engineering are applied to civil engineering problems in lakes and coastal areas. Topics include: wave forecasting, shoaling, refraction sediment transport, stability of rubble mound structures, design of coastal structures, linear wave theory, and storm surge. Prerequisite: CIE 350. Lec 3. **Cr 3.**

CIE 460 Geotechnical Engineering

The application of geotechnical engineering to practical engineering design and construction problems. 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, 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. construction 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. The content can be varied to suit current needs. The course may, with consent of the department, be taken more than once. Prerequisite: permission of the department. **Cr 1-3.**

CIE 499 Undergraduate Thesis

The study and reporting of some original investigation or design. Time to be arranged. Prerequisite: permission. **Cr 2-3.**

CIE 539 Water Quality

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 Design of Wood Structures

Study of mechanical and design characteristics of structural wood and wood composite members and design of structural systems containing these members. Prerequisite: CIE 341 or permission. **Cr 3.**

CIE 541 Finite Element Analysis of Structures

Review of matrix analysis of structures. Preliminary topics in elasticity and energy principles. The finite element concept. Plane stress and plane strain analysis. Plate bending analysis. Applications and introduction to finite element analysis computer programs. Prerequisites: CIE 444 or MEE 456. **Cr 3.**

CIE 546 Probabilistic Methods in Structural Engineering

Analysis and specification of structural performance using probabilistic and statistical methodology; material properties variability; uncertainty in live, earthquake and wind loads and responses; reliability of structural systems; applications of computer simulation; new code formulae with a probabilistic basis. Prerequisite: CIE 340 and one of CIE 441, CIE 442, CIE 443 or permission. **Cr 3.**

CIE 557 Water Resources Engineering

Development, control, and engineering of water resources systems. 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 will be 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: MAT 259. 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 placed on calculation of flows and on 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. An important consideration, model verification using field data is discussed along with measurement techniques. Prerequisite: MAT 259. Lec 3. Cr 3.

CIE 562 Earthwork Design

Design and construction of earth structures including earth dams and roadway embankments. Prerequisite: CIE 365. Lec 3. Cr 3.

CIE 563 Thermal Soil Mechanics

The thermal properties of soils, heat transfer, and various theories used to predict soil temper-

ature under freezing conditions. Applications to the influence of freezing on pavements, structures, and excavations. Prerequisite: CIE 365. Cr 2.

CIE 564 Deep Foundations

The theories, design concepts, and construction of pile and caisson foundations for buildings and bridges. Corequisite: CIE 460. Cr 3.

CIE 565 Foundations and Underground Structures

Theory and design of shallow foundations for buildings and bridges. 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. 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. Courses may, with the permission of the department, be taken more than once. Prerequisite: permission. Cr 1-3.

Surveying Engineering

The Surveying Engineering Program provides the technical training and analytical capabilities necessary for professional practice of surveying in its broadest sense. Included are the sub-disciplines of cartography, geodesy, engineering surveying, boundary surveying, land use planning, land information studies, photogrammetry, resource mapping, cadastral systems, hydrographic surveying, and remote sensing. Graduates are well equipped to carry out the computational and legal tasks associated with traditional sur-

veying and land development practice, engage in land information consulting, and improve techniques for collecting, quantifying and mapping physical information about the earth's surface. The curriculum also is designed to develop an understanding of the legal, social, economic, and political mechanisms which affect the practice of surveying engineering. The program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Surveying Engineering Curriculum

Freshman Year

First Semester			Second Semester		
SVE 111	Plane Surveying	3	SVE 112	Advanced Plane Surveying	3
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
PHY 121	General Physics I	4	PHY 122	General Physics II	4
ECO 110	Introduction to Economics	3		Humanities/Social Sciences Elective (1)	3
	TOTAL HOURS	15		TOTAL HOURS	17

Sophomore Year

First Semester			Second Semester		
SVE 221	Legal Aspects of Land Surveying	3	CIE 281	Advanced Computer Usage for CE	3
MAT 228	Analytic Geometry and Calculus	4	SVE 222	Land Surveying	3
COS 220	Introduction to Computer Science I	3	MAT 334	Introduction to Statistics	4
GES 101	Aspects of the Natural Environment I	4	MAT 262	Linear Algebra	4
CHY 113	Chemical Principles I (2)	4		Humanities/Social Science Elective	3
	TOTAL HOURS	18		TOTAL HOURS	17

Junior Year

First Semester			Second Semester		
SVE 361	Adjustment Computations	3	SVE 341	Geodesy I	3
SVE 451	Engineering Databases and Information Systems	3	SVE 332	Advanced Photogrammetry	3
SVE 331	Photogrammetry	3	SVE 452	Geometry and Computer Graphics	3
MAT 259	Differential Equations	4	SVE 393	Junior Seminar	1
	Humanities/Social Science Elective	3	ENG 317	Advanced Professional Exposition	3
	TOTAL HOURS	16		Humanities/Social Science Elective	3
				TOTAL HOURS	16

Senior Year

First Semester			Second Semester		
SVE 333	Remote Sensing	3	SVE 421	Cadastral Systems	3
SVE 499	Senior Thesis	3	SVE 493	Senior Seminar	1
ARE 473	Land Economics	3	ARE 474	Land Use Planning	3
SVE 342	Geodesy II	3		Engineering Science	
	Engineering Science			Elective	3
	Elective	3		Engineering Design	
	Engineering Science			Elective	3
	Elective	3		Free Elective (3)	3
	TOTAL HOURS	18		TOTAL HOURS	16

MINIMUM CREDIT HOURS: 133

Electives:

1. Humanities or social sciences—18 hours required for graduation. Students are assisted by faculty counselors in developing an elective program in the humanities and social sciences to meet their individual needs within the general college requirements. However, it is required that the humanities program contain at least one nine-hour sequence in a specific subject and that the sequence include at least two upper level courses.
2. Other approved basic science electives may be substituted.
3. Free electives are either technical or non-technical courses offered for credit by an academic unit of the University.

Courses in Surveying Engineering**SVE 101 Introduction to Surveying**

An overview of the profession of surveying, retracement of 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 veying expertise. No prerequisite. Lec 1. Cr 1.

SVE 111 Plane Surveying

An elementary course presenting fundamental 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: trigonometry in high school. Lec 2, Lab 3. Cr 3.

SVE 112 Advanced Plane Surveying

A second course in plane surveying techniques which considers the subject areas of horizontal control networks, state plane coordinate systems, surveying, astronomy, earthwork computations and engineering surveys. Prerequisite: SVE 111, MAT 126. Lec 2, Lab 3. Cr 3.

SVE 221 Legal Aspects of Land Surveying

Property 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

Boundary law, U.S. public land system, subdivision layout and design permit requirements and procedures. Prerequisite: SVE 221. Lec 3. Cr 3.

SVE 331 Photogrammetry

Procedure and methods used to derive metric data from photographs. Use of aerial photographs to prepare topographic maps of the earth's surface. Prerequisite: SVE 111. Lec 2, Lab 3. Cr 3.

SVE 332 Advanced Photogrammetry

Analytical development of photogrammetric problems and solutions including coordinate transformations, projective geometry as defined by the collinearity and coplanarity models, strip and block formation, terrestrial and close range approaches with metric and non-metric cameras, rectification, orthophotography and panoramic photography. Prerequisite: SVE 331, SVE 361 or equivalent. Lec 2, Lab 3. Cr 3.

SVE 333 Remote Sensing

Definition and overview of remote sensing, sensors, signatures and information; electromagnetic radiation, interactive mechanisms;

photographic systems, photometry and spectroradiometry; electro-optical sensors, non-imaging sensors, radar system; space platforms; information systems; processing; interpretation; application; practical utility of remotely sensed data; term project. Prerequisite: MAT 128, PHY 121. Lec 3. **Cr 3.**

SVE 341 Geodesy I

Computations on the ellipsoid, three-dimensional geodesy, conformal mapping. Geometric properties of ellipsoids, normal sections, geodesics, geodetic datum definitions, direct and inverse solutions as well as computing networks on the ellipsoid and on the mapping plane, reduction of observations onto the ellipsoid. Review of spherical trigonometry, differential geometry and complex variables as necessary. Prerequisite: MAT 128, SVE 111. Lec 3. **Cr 3.**

SVE 342 Geodesy II

Fundamentals of potential theory, boundary-value problems, geoid and gravity field determination, geoid undulations, deflections of the vertical, Stokes and Vening Meinesz formulae, reductions of gravity observations, isostasy, gravimeters, tides, height systems, interpretation of global and local gravity anomalies, gravity gradients, etc. Prerequisite: SVE 341. Lec 3. **Cr 3.**

SVE 361 Adjustment Computations

Least squares adjustment as applied in surveying: Observation equation model, condition equations, mixed model, conditions between parameters, sequential solutions, observed parameters, minimal and inner constraint solutions, laboratories. Some concepts of linear algebra and statistics are reviewed. Prerequisite: MAT 334, MAT 262 or consent. 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 topic of current interest to the group to receive credit. A paper is required. The seminar is open to anyone who chooses to attend. Prerequisite: junior standing or permission. Lec 1. **Cr 0-1.**

SVE 411 Hydrographic Surveying

Tasks and objectives of hydrographic surveying; mathematical models for offshore positioning systems; instrumentation and positional accuracies; offshore depth determination by echo sounding; reference surface for hydrographic surveys. Prerequisite: SVE 112 MAT 128. Lec 3. **Cr 3.**

SVE 421 Cadastral Systems

The 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. Prerequisite: junior standing. Lec 3. **Cr 3.**

SVE 451 Engineering Databases and Information Systems

Develop a theoretical foundation for representation of knowledge in information systems. Logic based programming as a tool for fast prototyping and design of data structures. Database management systems and their suitability for engineering data. The structure of a network DBMS. Physical data storage and basic data-structures (list, tree, hashing). Transaction concept. Design of database scheme for engineering application. Prerequisite: CIE 280 and CIE 281 or permission of instructor. Lec 3. **Cr 3.**

SVE 452 Geometry and Computer Graphics

Analytical geometry on computer systems. Representation of topological and metric properties of two dimensional geometric structures. Overview of raster based systems. Computer graphics hardware. Design of device independent programs for graphics output. Coordinate systems and transformation. Principles of effective visual communication and their application in e.g. cartography. The use of interactive engineering workstations. Prerequisite: SVE 451 or permission of instructor. Lec 3. **Cr 3.**

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

A course intended to apply theoretical concepts introduced in previous surveying, geodesy, photogrammetry and adjustments to the solution of comprehensive problems in surveying engineering. Emphasis will be on laboratory work including field observations. Prerequisite: SVE 112, SVE 342, SVE 332, SVE 361. Lec 2, Lab 3. **Cr 3.**

SVE 499 Senior Thesis

A required course by seniors in Surveying Engineering. Includes selecting an area of study with

adviser approval, then performing a full literature search, conducting the necessary research and reporting results in thesis format. The thesis must meet University format requirements and be submitted in duplicate to the department. 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

Methods of aerotriangulation, examination of control requirements and internal accuracy and reliability considerations in large blocks of photography, numerical methods used to solve reduced normal equations, topics of current interest in analytical photogrammetry. Prerequisite: SVE 332. Lec 3. Cr 3.

SVE 541 Geodesy III

Astronomical azimuth, latitude and longitude determination, satellite techniques. Stellar coor-

dinate systems, precession, nutation, proper motion, aberration, parallax, refraction, time systems, field observation of sun and stars; orbital theory of near-earth artificial satellites, satellite Doppler positioning, interferometry, Global Positioning System and related satellite surveying techniques. Prerequisite: MAT 228, SVE 341, CIE 281. Lec 3, Lab 3. Cr 3.

SVE 551 Carto III, Interactive Query Languages

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 Carto IV, Interactive Land Information Systems

Advanced course treating the interactive input and update of data in a Land Information System. Main topics will be the treatment of consistency constraints (including geometrical consistency constraints) and solution to a conceptual simple model of interaction with the user. Prerequisite: SVE 552. Lec 3. Cr 3.

**Electrical Engineering
(Including Computer Engineering)**

Professors Vetelino (Chairperson), Brown, Field, Libbey, Peake, Sheppard, Turner; Assistant Professors Christianson, Hanselman, McKenny, Musavi; Visiting Professors Lec, Wuorinen; Lecturers Beenfeldt, Whitney; Adjunct Professor Mundo

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 mech-

anical 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. The Computer Engineering Degree Program is designed to fulfill the accreditation

requirements of the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology.

A cooperative work program is available for those students who wish to include relevant in-

dustrial 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.

Computer Engineering Curriculum

Freshman 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	General Physics	4
PHY 121	General Physics	4	COS220	Introduction to Computer Science	3
ELE 172	Logic Systems	4	ELE 171	Microcomputer Architecture and Applications	4
	TOTAL HOURS	16	ENG 101*	College Composition	3
				TOTAL HOURS	18

Sophomore Year

First Semester			Second Semester		
MAT 228	Analytic Geometry and Calculus	4	MAT 259	Differential Equations	4
ELE 210	Network Fundamentals I	4	ELE 211	Electrical Networks II	3
COS 250	Discrete Structures	3	ELE 212	Electrical Networks Laboratory	3
COS 300	Introduction to Computer Science II**	3	ELE 262	Physical Electronics	3
	Humanities Elective	3	COS 301	Programming Languages	3
	TOTAL HOURS	17		TOTAL HOURS	16

Junior Year

First Semester			Second Semester		
MAT 3-0	Topics in Mathematics (Statistics for Engineers)	3	ELE 475	Sequential Logic Systems	3
ELE 314	Linear Circuits and Systems	3	ELE 400	Design Project	1
ELE 342	Electronics I	4	ENG 317	Advanced Professional Exposition	3
ELE 471	Microcomputer Applications Engineering	3	COS 331	Operating Systems	3
	Humanities Elective	3		Humanities Elective	3
	TOTAL HOURS	16		Technical Elective	3
				TOTAL HOURS	16

aware of electrical engineering activities and opportunities. The ELE 400 project course 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.

A candidate for the BSEE must maintain an average of at least 1.8 in junior and senior electrical engineering subjects, as well as meeting the requirements in the General Information section of the catalog under "Grading System."

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.

Double Major: Electrical and Mechanical Engineering

A student who earns a BSEE can earn a BSME by taking the additional courses: GEE 101, MEE 230, 231, 251, 270, 340, 341, 360, 380, 432, 442, 481. Several of these can also satisfy technical elective requirements in the electrical engineering curriculum. An appropriate design project in ELE 400 can satisfy MEE 482 and MEE 483.

A student who earns a BSME can earn a BSEE by taking the additional courses: ELE 171, 172, 211, 212, 262, 314, 323, 342, 343, 351, 383, 400 and the mathematics elective. ELE 212 can be used to replace ELE 224 in the mechanical engineering curriculum. In addition, any two of the courses ELE 323, ELE 342, ELE 343, or ELE 351 can be used to satisfy the Group 2, Engineering Science, elective requirements in the mechanical engineering curriculum. An appropriate design project in ELE 400 can satisfy MEE 482 and MEE 483.

A minimum of one extra year will be required for the double major regardless of whether the basic degree is in electrical or mechanical engineering.

Electrical Engineering Curriculum

Freshman 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	General Physics II	4
PHY 121	General Physics I	4	COS 220	Introduction to Computer Science I	3
ELE 172	Logic Systems	4	ELE 171	Microcomputer Architecture and Applications	4
	TOTAL HOURS	16	ENG 101	*College Composition	3
				TOTAL HOURS	18

*ENG 101 is a prerequisite for ENG 317. It is recommended that all Electrical Engineering students arrange to take, in the first semester of the freshman year, the exit exam given to students completing ENG 101. This will determine if they can meet this prerequisite by examination.

Sophomore Year

First Semester			Second Semester		
MAT 228	Analytic Geometry and Calculus	4	MAT 259	Differential Equations	4
ELE 210	Electrical Networks I	4	ELE 211	Electrical Networks II	3
MEE 150	Applied Mechanics: Statics	3	ELE 212	Electrical Networks Laboratory	3
	Humanities Elective (1)	3	MEE 230	Thermodynamics I	3
	Basic Science (2)	4	ELE 262	Physical Electronics	3
	TOTAL HOURS	18		TOTAL HOURS	16

Engineering Physics

Professors Smith (Chairperson), Brownstein, Camp, Carr, Czavinszky, Grunze, Hess, Kleban, Krueger, Morrow, Tarr, Unertl; Associate Professors Comins, Harmon, Mountcastle, Vietti; Assistant Professors Cook, McKay

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 disciplines 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 for those students who, by virtue of their ability and interest, 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

Students in good standing enrolled in the engineering physics curriculum who have completed their second year of undergraduate work have

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 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 496, Field Experience in Physics.

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 given in the catalog of the Graduate School.

Engineering Physics Curriculum

The following 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 freshman or sophomore year 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.

Freshman Year

First Semester			Second Semester		
PHY 121	General Physics I	4	PHY 122	General Physics II	4
CHY 113	Chemical Principles I	4		Humanities Elective I	3
MAT 126	Analytic Geometry and Calculus	4	MAT 127	Analytic Geometry and Calculus	4
GEE 101	Introduction To Engineer- ing Design	3	COS 220	Introduction to Computer Science	3
	TOTAL HOURS	15		Engineering Sequence Elective I	3-4
				TOTAL HOURS	17-18

Sophomore Year

First Semester			Second Semester		
PHY 236	Introductory Modern Physics	4	PHY 238	Mechanics	3
PHY 229	Intermediate Physics Lab- oratory I	2	PHY 230	Intermediate Physics Lab- oratory II	2
MAT 228	Analytic Geometry and Calculus	4	MAT 259	Differential Equations	4
	Engineering Sequence Elective II	3	MET 109	Machine Shop and Weld- ing	2
	Humanities Elective II	3		Engineering Sequence Elective III	3
	TOTAL HOURS	16		Humanities Elective III	3
				TOTAL HOURS	17

Junior Year

First Semester			Second Semester		
PHY 454	Electricity and Magnetism I	3	PHY 455	Electricity and Magnetism II	3
PHY 341	Electrical Measurements	2	PHY 342	Physical Measurements	2
MAT 353	Partial Differential Equa- tions I	3	PHY 472	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
	TOTAL HOURS	17		TOTAL HOURS	17

Senior Year

First Semester			Second Semester		
PHY 469	Atomic Physics	3	PHY 482	Advanced Laboratory	
PHY 481	Advanced Laboratory			Physics II	3
	Physics I	3	PHY 489	Physics Seminar II	1
PHY 488	Physics Seminar I	1		Humanities Elective VI	3
	Engineering Sequence			Technical Elective* (6)	3
	Elective VII	3		Technical Elective*	3
	Physics Elective* (5)	3		Free Elective	2-3
	Free Elective*	3		TOTAL HOURS	15-16
	TOTAL HOURS	16			

TOTAL DEGREE HOURS: 130

Notes:

1. Humanities Electives: 18 credit hours from an approved list are required for accreditation; at least two of these courses should be upper level.
2. Students with programming experience may substitute ELE 172, Logic Systems (Cr 4).
3. 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 six 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.
4. Choose from MAT 354, MAT 359, 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.
5. Possible Physics Electives:

First Semester:

PHY 351 Advanced Meteorology; PHY 463 Thermal Physics; PHY 470 and 470L Nuclear Physics; PHY 475 Methods of Mathematical Physics; INT 454 Optical Communications; PHY 501 Mechanics.

Second Semester:

PHY 347 Biophysics; PHY 462 Thermodynamics; PHY 480 Physics of Materials; AST 451 Astrophysics.

6. Technical Elective: physics, engineering, or approved science course.

Engineering Physics students receive instruction and evaluation in technical writing as part of PHY 341 and PHY 342. 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.

Courses in Engineering Physics

Consult courses listed under Physics and Astronomy in the College of Arts and Sciences.

Forest Engineering

Professors Ashley, Corcoran, Hoffman, Riley, Smith; Associate Professors Brann, Christensen, Hedstrom, Soule

The forest engineering curriculum, a joint administrative responsibility of the Agricultural Engineering Department and the Department of Forest Management and Wood Utilization, 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.

The curriculum in forest engineering is a joint offering of the Colleges of Engineering and Science, Life Sciences & 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 Summer Camp) at an accumulative degree point average of not less than 2.0.

Specimen Curriculum

Freshman Year

First Semester			Second Semester		
AEN 220	Principles of Mechanization	3	AEN 255	Materials in Agricultural Engineering	3
FTY 200	Introduction to Forest Resources	1	AEN 257	Computer Applications in Agricultural and Forest Engineering	3
GEE 116	Cartographics	2		OR	
GEE 101	Introduction To Engineering Design	(3)	COS 220	Introduction to Computer Science	(3)
MAT 126	Analytic Geometry and Calculus	4	MAT 127	Analytic Geometry and Calculus	4
PHY 121	General Physics	4	PHY 122	General Physics	4
	Elective	3		Elective	4
	TOTAL HOURS	17		TOTAL HOURS	18

Forest Engineering Curriculum

Basic Sciences and Math

CHY 113	Chemical Principles	4	FTY 204	Statistical Inference in Forest Resources	3
PHY 121	General Physics	4			
PHY 122	General Physics	4	AEN 257	Computer Applications in Agricultural and Forest Engineering	3
MAT 126	Analytic Geometry and Calculus	4		OR	
MAT 127	Analytic Geometry and Calculus	4	COS 220	Introduction to Computer Science	(3)
MAT 228	Analytic Geometry and Calculus	4		Elective*	<u>10</u>
MAT 259	Differential Equations	4		TOTAL HOURS	44

*Recommended Bio-Earth Science electives include: PSS 150 Forest Soil Science, BOT 203 The Plant Kingdom, BOT 233 Dendrology. Students must take one protection course to meet accreditation standards in forestry, either BOT 456 Forest Pathology or ENT 227 Introductory Entomology for Foresters.

Basic Engineering

GEE 116	Cartographics	2	MEE 251	Strength of Materials	3
	OR		MEE 270	Applied Mechanics: Dy- namics	3
GEE 101	Introduction To Engineer- ing Design	(3)	MEE 360	Fluid Mechanics	3
AEN 281	Plane Surveying	1		OR	
	OR		CIE 350	Hydraulics	
SVE 111	Plane Surveying	(3)	AEN 268	Computer Aided Drafting and Design	<u>2</u>
MEE 150	Applied Mechanics: Stat- istics	3		TOTAL HOURS	20
MEE 230	Thermodynamics	3			

Forest Engineering

FOE 206	Photogrammetry and Remote Sensing	3	FOE 471	Production Analysis in Forestry	2
FOE 313	Harvesting of Forest Crops	2	FOE 472	Planning and Control of Forestry Operations	2
AEN 220	Principles of Mechaniza- tion	3	FOE 473	Forest Roads and Struc- tures	3
AEN 255	Materials in Agricultural Engineering	3	FOE 474	Forest Machinery	3
AEN 465	Soil and Water Engineer- ing	3	AEN 491	Design Project I	1
			AEN 492	Design Project II	2
FOE 467	Agricultural and Forest Power	3	AEN 493	Design Project III	<u>1</u>
				TOTAL HOURS	31

Forestry

FTY 200	Introduction to Forest Resources	1	FTY 341	Field Practice on Large Forests	3
FTY 205	Forest Biometry	3	FTY 446	Forest Policy and Plan- ning	3
FTY 307	Silvics	4	FTY 449	Timber Management	2
FTY 308	Silviculture	3	FTY 450	Forest Finance and Ad- ministration	<u>3</u>
FTY 241	Field Practice on Small Woodlots	3		TOTAL HOURS	25

Humanities and Social Sciences

Economics	6	Electives	16
TOTAL HOURS			22

TOTAL CREDIT HOURS REQUIRED FOR GRADUATION: 135 + 6 (May Term)

The School of Engineering Technology offers general engineering service courses for students majoring principally in engineering and forestry.

Courses in General Engineering

GEE 101 Introduction to Engineering Design I

Exercises in multiview and pictorial drawing using freehand and instrumental techniques that apply orthographic projection theory; also lus. Lec and Lab 4. Cr 3.

GEE 102 Introduction to Engineering Design II

A continuation of GEE 101 involving engineering graphics conventions, introduction to descriptive geometry, dimensioning, tolerances and fasteners; concludes with a creative design problem requiring preparation of working drawings. Prerequisite: GEE 101. Lec and Lab 4. Cr 3.

GEE 116 Cartographics

Graphic principles, concepts, and techniques involving applied problems and creative exercises in orthographic projection, data analysis, and cartography. Rec and Lab 4. Cr 2.

GEE 118 Fundamentals of Programming for Engineers

Introduction to a high level computer language. Development of algorithms and logic to apply computerized solutions of engineering applications. Lec 1, Rec 1. Cr 2.

GEE 207 Computer Programming for Engineers

Introduction to computer aided design using digital programming to solve engineering applied problems involving numerical methods and matrix algebra. Prerequisite: MAT 126. Lec 1, Rec 2. Cr 3.

GEE 214 Architectural Drawing

The preparation of floor plans, elevations, sections, and pictorial renderings of homes and small buildings. Prerequisite: a basic GEE or GET drawing course or permission. Lec and Lab 4. Cr 3.

Mechanical Engineering

Professors Lyman (Chairperson), Clifford, Grant, Hill, Levinson, Sucec; Associate Professors Chapman, Johnson, Matthews, Poland, Sayles; Assistant Professors Boyle, Caccese, Winowich; Research Professor Senders; Adjunct Assistant Professors Parker, Dexter

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 heat (or thermal) science. Mechanics studies 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 studies 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 12 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, 314, 323, 342, 343, 351, 383, 400, 423, and the mathematics elective. ELE 212 can be used to replace ELE 224 in the mechanical engineering curriculum. *In addition, any two of the courses ELE 314 Linear Circuits and Systems, ELE 342 Electronics I, ELE 343 Electronics II, ELE 351 Fields and Waves, or ELE 423 Energy Transmission and Conversion can be used to satisfy the Group 2, Engineering*

Science, elective requirements in the mechanical engineering curriculum. An appropriate design project in ELE 400 can satisfy MEE 482 and MEE 483.

A student who earns a BSEE can earn a BSME by taking the additional courses GEE 101, MEE 230, 231, 251, 270, 340, 360, 380, 341, 432, 442, 443, and 481. Several of these can also satisfy technical elective requirements in the electrical engineering curriculum. An appropriate design project in ELE 400 can satisfy MEE 482 and MEE 483.

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 494. The course is under the direction of a mechanical engineering co-op coordinator who monitors the student's progress in the course.

Pulp and Paper Option in Mechanical Engineering

This senior year mechanical engineering and fifth 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.

Mechanical Engineering Curriculum

Freshman Year

First Semester		Second Semester	
MAT 126	Analytic Geometry and Calculus	MAT 127	Analytic Geometry and Calculus
	4		4
PHY 121	General Physics I	PHY 122	General Physics II
	4		4
GEE 101	Introduction To Engineering Design	MEE 150	Applied Mechanics: Statics
	3		3
	Elective (1)	COS 215	Introduction to Computing Using FORTRAN
	3		3
	Elective (2)		Elective (3)
	3		3
	TOTAL HOURS		TOTAL HOURS
	17		17

Sophomore Year

First Semester			Second Semester		
MAT 228	Analytic Geometry and Calculus	4	MAT 259	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 Elective (4)	3	MEE 270	Applied Mechanics: Dynamics	3
TOTAL HOURS		17	Elective (5)		3
			TOTAL HOURS		16

Junior Year

First Semester			Second Semester		
ELE 224	Instrumentation	4	MEE 320	Materials Engineering and Science	3
MEE 340	Manufacturing Processes	3	MEE 341	Mechanical Laboratory I	3
MEE 360	Fluid Mechanics	3	MEE 481	Design II	3
MEE 380	Design I	3	MEE 456	Introduction to the Finite Element Method	3
Elective (6)		3	Elective (7)		3
TOTAL HOURS		16	TOTAL HOURS		15

Senior Year

First Semester			Second Semester		
MEE 442	Mechanical Laboratory II	2	MEE 443	Mechanical Laboratory III	2
MEE 482	Design III	4	MEE 483	Design IV	4
MEE 432	Heat Transfer	3	Elective (10)		3
Elective (8)		3	Elective (11)		3
Elective (9)		3	Elective (12)		3
TOTAL HOURS		15	TOTAL HOURS		15

The curriculum contains 12 elective courses, six of which (18 credit hours) must be approved humanities or social sciences, five must be technical with the courses selected from specified groups, and one is a free elective.

Courses in Mechanical Engineering

MEE 150 Applied Mechanics: Statics

The 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

Energy and energy transformations; the First and Second Laws applied to systems and to 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. Thermodynamics of mixtures; chemical thermodynamics, thermodynamics of fluid flow, vapor and gas cycles, applicable to compressors, internal combustion engines and turbines. Computer usage will be required. 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. 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; force, mass and acceleration; impulse and momentum; work and energy and simple harmonic motion. Prerequisite: MEE 150 or MEE 252, and MAT 128. 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 340 Manufacturing Processes

Theory and application of modern metal shaping machines and processes. Design analysis for economical fabrication. Characteristics and operation of machine tools. Prerequisite: MEE 251 and junior standing in mechanical engineering. Rec 2, Lab 2. Cr 3.

MEE 341 Mechanical Laboratory I

An introduction to experiment design, data analysis, laboratory techniques, instrumentation, and calibration of equipment. Application to thermodynamics, mechanics of materials, fluid mechanics and metallurgy. Prerequisite: MAT 259, MEE 251 and MEE 360. Rec 1, Lab 3. Cr 3.

MEE 360 Fluid Mechanics

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. Lec 3. Cr 3.

MEE 383 Turbomachine Design

The theory and design of turbomachinery flow passages; control and performance of turbomachinery; gas-turbine engine process. Prerequisite: MEE 230. Rec 3. Cr 3.

MEE 384 Power Plant Design and Engineering

Power station engineering and economy. Design, construction and operating theory of steam, internal-combustion, and hydroelectric power plants. An introduction to nuclear power plants, utilization of solar energy, fuel cells, and associated problems. Prerequisite: MEE 230. Rec 3. Cr 3.

MEE 385 Heating and Ventilating System Design

Determination of heating 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

Methods of producing artificial low temperatures. Refrigeration for controlled-temperature applications in comfort air conditioning and industrial manufacturing processes and their control. Prerequisite: MEE 230. Rec 3. Cr 3.

MEE 421 Metallography

Methods of preparation of metal specimens for optical microstructure examination. Microstructure interpretation. Effect of processes on microstructure. Photomicroscopy. Microhardness testing. Experimental problems. Prerequisite: MEE 320 or permission. Lab 6. Cr 3.

MEE 422 Thermal and Mechanical Processing of Engineering Metals

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. Failure analysis. Prerequisite: MEE 320. Lec 3. Cr 3.

MEE 432 Heat Transfer

The fundamental laws of heat transfer by conduction, convection and radiation. Application 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

An introduction to the fundamentals of solar energy collection and use as process thermal energy. Performance analysis of solar collectors and thermal energy storage devices both separately and combined as a 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 442 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 443 Mechanical Laboratory III

A continuation of MEE 442. Mechanical Engineering problems in a laboratory setting. Prerequisites: MEE 341 or permission. Cr 2.

MEE 453 Experimental Mechanics

Experimental methods and techniques for analysis of stress and displacement and their engineering significance. Electric strain gages, brittle lacquers, mechanical and optical strain gages, and introduction to photoelasticity. Prerequisite: MEE 251. Rec 2, Lab 2. Cr 3.

MEE 454 Theory of Elasticity

Plane stress and plane strain, stress function. Problems in Cartesian and polar coordinates. Photo-elasticity, strain energy. Three-dimensional problems. Prerequisite: MAT 259 and MEE 251. Rec 3. Cr 3.

MEE 455 Advanced Strength of Materials

Limitations of elementary stress formulas, theories of failure, unsymmetrical bending, beams, plates, torsion of non-circular bars, thick-walled cylinders, stress concentrations, energy methods, and introduction to theory of elasticity. Prerequisite: MEE 251. Rec 3. Cr 3.

MEE 456 Introduction to the Finite Element Method

Development of finite element approximations and application to problems in fluid mechanics, heat conduction, and solid mechanics. Emphasis is on obtaining numerical values for specific physical problems. Prerequisite: MAT 259. Rec 3. Cr 3.

MEE 457 Advanced Application of the Finite Element Method

The course will consider applications of the finite element method to a variety of problems in

Mechanical Engineering. Some of the applications considered include flow in porous media, transient and steady state heat transfer, linear/nonlinear problems in viscous flow, solid mechanics and dynamics problems. The emphasis of the course would be to use for the most part available computer programs for specific physical problems. The topics covered will depend upon the instructor. Prerequisite: MEE 456 or permission. Rec 3. Cr 3.

MEE 461 Compressible Fluid Flow I.

The dynamics of compressible flows. Fundamental equations and concepts will be 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

Flow in multiple-pipe systems, boundary-layer flows, inviscid incompressible flow, compressible flow, open-channel flow. Prerequisite: MEE 360. Lec 3. Cr 3.

MEE 471 Mechanical Vibrations

Free and forced vibrations with viscous damping for discrete and continuous mass systems. Derivation and application of energy methods. Applications. Prerequisite: MEE 270 and MAT 259. Rec 3. Cr 3.

MEE 472 Advanced Dynamics

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. Lec 3. Cr 3.

MEE 481 Design II

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. Rec 3, Comp 2. Cr 3.

MEE 482 Design III

Design of mechanical engineering systems, including problem definition, analysis, synthesis and optimization. Prerequisite: MEE 231, MEE 481, MEE 432 concurrently or permission. Rec 4. Cr 4.

MEE 483 Design IV

Design of mechanical engineering systems, including problem definition, analysis, synthesis and optimization. Prerequisite: MEE 231, MEE 481, MEE 432 concurrently. Rec 4. Cr 4.

MEE 494 Mechanical Engineering Practice

Full-time engineering work with participating companies of the Mechanical Engineering Department Cooperative Education Program. Course may be taken more than once. (Pass/Fail Grade Only). **Cr 3.**

MEE 497 Seminar

Rec 1. **Cr Ar.**

MEE 523 Fatigue Failure

Mechanisms of metal fatigue. Metallurgical, mechanical and environmental factors affecting fatigue. Methods of failure analysis. Prerequisite: MEE 320 or permission. **Cr 3.**

MEE 536 Advanced Heat Transfer I

Transfer of heat by conduction. 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 544 Mechanical Engineering Analysis I

Formulation and study of mathematical models applicable to mechanical engineering. Problems in heat transfer, thermodynamics, solid and fluid mechanics. Prerequisite: permission. **Cr 3.**

MEE 545 Mechanical Engineering Analysis II

Extremum problems and variational calculus with applications in mechanical engineering. Approximate solution techniques for ordinary and partial differential equations that occur in heat transfer, and solid and fluid mechanics. Prerequisite: permission. **Cr 3.**

MEE 557 Introduction to Continuum Mechanics

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. 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. 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

Theory of vibrations with continuously varying mass and stiffness. Solutions of wave equations for strings, longitudinal and torsional systems. Vibration of beams. Methods of Rayleigh, Ritz and Stodola. Introduction to nonlinear vibrations. Prerequisite: MEE 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**

This course will introduce students to the theoretical bases and practical applications of Human Factors Engineering, and Man-Machine Systems Analysis. Third year standing in any field of engineering or (for students from other faculties) permission of the instructor. **Cr 3.**

School of Engineering Technology

Professors McDonough (Director), Hamilton, Webster, Westfall; Associate Professors Crosby, Elliott, Furbish, Hayes, R. Johnston, Messier, Metcalf; Assistant Professors Gray, Viger; Instructor Madden; Lecturers Grecni, Johnson; Teaching Associates Lodgek, Newman

Engineering technology programs are offered on a two-plus-two basis, i.e., two years for an associate degree and two additional years for a bachelor's degree.

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 major courses (i.e., CET, EET, MET).
2. An accumulative average of 2.0.
3. Passing grades in all required courses in the program of study.
4. A minimum of 69 degree hours (depending on program).

Bachelor of Science in Engineering Technology

Bachelor's programs are offered in electrical and mechanical engineering technology. The programs are designed to further the technical competence of an associate degree graduate for a

career as an engineering technologist. Both programs are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.

Admission Requirements

1. Successful completion of associate degree studies.
2. Recommendation of appropriate program committee and approval of the director of the School of Engineering Technology.

Graduation Requirements

1. An accumulative average of 2.0 in all major courses (i.e., CET, EET, MET).
2. An accumulate average of 2.0.
3. Passing grades in all required courses in the program of study.
4. A minimum of 64 degree hours beyond the associate degree studies (depending on program).

Civil Engineering Technology

The curriculum is designed to provide the student with a basic grounding in the physical and mathematical sciences, engineering graphics, computers and communication skills as preparation for his or her specialized studies in civil engineering technology. These specialized studies are coordinated so as to prepare the 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.

Civil Engineering Technology Curriculum

Associate Degree

First Semester			Second Semester		
CET 100A	Civil Engineering Technology Orientation	0	CET 102A	Advanced Surveying	4
CET 101A	Elementary Surveying	4	CET 121A	Materials, Properties and Testing	4
GET 115A	Computer Programming Fundamentals	2	MAT 164A	Analytical Geometry and Introductory Calculus	3
GET 121A	Technical Drawing	4	PHY 108A	Basic Physics	4
MAT 142A	Algebra and Trigonometry	4		Graphics Elective	3
PHY 107A	Basic Physics	4		TOTAL HOURS	18
	TOTAL HOURS	17			
Third Semester			Fourth Semester		
CET 211A	Structural Mechanics	4	CET 212A	Structural Design	4
ENG 101A	Critical Written Expression	3	CET 232A	Civil Works Technology	3
MAT 246A	Introductory Calculus	3	CET 240A	Civil Management Technology	3
	Technical Elective	3	SPE 101A	Oral Communications	3
	Technical Elective	3		Technical Elective	3
	TOTAL HOURS	16		Humanities/Social Sciences Elective	3
				TOTAL HOURS	19

TOTAL DEGREE HOURS REQUIRED FOR ASSOCIATE DEGREE: 70

Students should choose technical electives from one of the following two tracks:

Construction Track

GET 130A	Construction Drawing	3	CET 226A	Principles of Construction Estimating and Scheduling	3
CET 222A	Construction Materials	3	CET 231A	Construction Technology	3

Surveying Track

GET 132A	Surveying Graphics	3	SVE 222	Land Surveying	3
SVE 221	Legal Aspects of Land Surveying	3	SVE 331	Photogrammetry	3

Electrical Engineering Technology

The purpose of the two-year program is to prepare the student for practical work in the application of electrical engineering principles to equipment and instrumentation. Graduates will find employment opportunities in all types of industry; in large firms as responsible assistants to electrical engineers, and in small firms whose electrical needs include some knowledge of the

theoretical basis of electrical applications. Students who successfully complete four semesters may be awarded an associate of science degree in electrical engineering technology. Students who want to continue and who have the recommendation of the faculty may continue for another two years and upon successful completion of eight semesters, will be awarded the bachelor of science degree in electrical engineering technology.

Electrical Engineering Technology Curriculum

Associate Degree

First Semester			Second Semester		
EET 111	Circuit Analysis I	5	EET 112	Circuit Analysis II	5
ENG 101A	Critical Written Expression	3	GET 121A	Technical Drawing	4
GET 115A	Computer Programming Fundamentals	2	MAT 164A	Analytical Geometry and Introductory Calculus	3
MAT 142A	Algebra and Trigonometry	3	PHY 108A	Basic Physics	4
PHY 107A	Basic Physics	4		Humanities Elective	3
	TOTAL HOURS	17		TOTAL HOURS	19
Third Semester			Fourth Semester		
COS 215	Introduction to Computing Using FORTRAN OR	3	EET 242	Linear Electronics II	4
COS 220	Introduction to Computer Science I	(3)	EET 252	Electrical Projects	2
EET 241	Linear Electronics I	4	EET 274	Introduction to Microcomputers	4
EET 271	Digital Electronics I	4	EET 282	Electronic Communications	4
MAT 246A	Introductory Calculus	3	ENG 105A	Business, Professional and Technical Writing	3
SPE 101A	Oral Communications	3		TOTAL HOURS	17
	TOTAL HOURS	17			

TOTAL DEGREE HOURS REQUIRED FOR ASSOCIATE DEGREE: 71

Bachelor's Degree

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 368A	Ordinary Differential Equations	3	MAT 369A	Applied Statistics for Engineering Technology	3
	Free Elective	3		Non-Technical Elective*	3
	TOTAL HOURS	18		TOTAL HOURS	17
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
	Technical Elective	3		Non-Technical Elective*	3
	Non-Technical Elective	3		Non-Technical Elective*	3
	TOTAL HOURS	15		TOTAL HOURS	15

TOTAL CREDIT HOURS REQUIRED FOR BACCALAUREATE DEGREE: 135

*Non-technical electives must be selected from the fields of communications, humanities, and social sciences.

Mechanical Engineering Technology

The field of mechanical engineering technology includes mechanical design, manufacturing processes, energy utilization, such as heat power and heating or air conditioning buildings, and the economics of these activities.

Students enrolled in the Mechanical Engineering Technology Program will receive an associate degree after successfully completing two years of the program. The two-year program prepares its graduates for a variety of opportunities as engineering technicians in engineering departments, manufacturing operations and the mechanical service industries.

Students who want to continue and have the recommendation of the faculty may continue for another two years and upon successful completion of eight semesters, will be awarded the bachelor of science degree in mechanical engineering technology. This program prepares graduates for a wide variety of careers in engineering.

The curriculum provides training in all areas of mechanical engineering technology. Classroom instruction in the various subjects is supplemented by extensive training in their practical application in the laboratory and shop.

Students are strongly urged to take technical or industrial employment during each summer recess.

Mechanical Engineering Technology Curriculum

Associate Degree

First Semester			Second Semester		
MAT 142A	Algebra and Trigonometry	3	GET 115A	Computer Programming Fundamentals	2
ENG 101A	Critical Written Expression	3	SPE 101A	Oral Communications	3
MET 107	Machine Tool Laboratory I	3	MAT 164A	Analytical Geometry and Introductory Calculus	3
PHY 107A	Basic Physics	4	PHY 108A	Basic Physics	4
GET 121A	Technical Drawing	4	GET 126A	Machine Drawing	1
	TOTAL HOURS	17	MET 150	Statics	3
				TOTAL HOURS	16

Third Semester		
MAT 246A	Introductory Calculus	3
MET 211	Machine Tool Laboratory II	2
MET 219	Strength of Materials	3
CHY 111	General Chemistry I	4
MET 233	Thermal Science	3
	Humanities Elective	3
	TOTAL HOURS	18

Fourth Semester		
EET 210A	Circuits, Machines and Electronics	4
MET 212	Machine Tool Laboratory III & Welding	1
MET 234	Mechanical Technology Laboratory I	3
MET 236	Thermal Applications	3
MET 261	Design I	3
MET 270	Manufacturing Technology	3
	TOTAL HOURS	17

TOTAL CREDIT HOURS REQUIRED FOR ASSOCIATE DEGREE: 68

EET 242 Linear Electronics II

Applications and extensions of the material covered in Linear Electronics I. Amplifier frequency analysis, power amplifiers, PNP devices, linear integrated circuits, voltage regulators, feedback and oscillators are covered. Prerequisite: EET 241. Lec 3, Lab 3. **Cr 4.**

EET 252 Electrical Projects

Instruction and practice in electronic construction, soldering, printed circuit board layout, and troubleshooting. Lab 6. **Cr 2.**

EET 261 Engineering Materials

Physical and electrical properties of materials used in electrical equipment and electronic devices. Emphasis on electrical insulation, semiconductor materials, and magnetic materials. Lec 3. **Cr 3.**

EET 271 Digital Electronics I

Introductory course in digital electronics. Logical design and analysis, using Boolean algebra, Karnaugh maps, Quine-McCluskey procedures, etc. as applied to combinational logic circuits. Elementary concepts of sequential logic circuit analysis and synthesis will be introduced. 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 introduced, including microprocessors, registers, control units, memory and I/O. Prerequisite: EET 271. 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, MAT 164A. 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, system considerations. Prerequisites: EET 112, MAT268A. Lec 3. **Cr 3.**

EET 321 Electrical Machinery

Theory, performance characteristics and basic operational control of DC and AC machines. Basic theory and application of power transformers. Introduction to per-phase and per-unit analysis. Prerequisite: EET 112. Corerequisite: MAT 268A. Lec 3, Lab 3. **Cr 4.**

EET 322 Power Systems I

Control of AC and DC motors, including programmable controllers. Industrial solid state electronics, including theory and application of four layer devices, and transducers used as control devices. Design of open loop control systems. Three phase circuit analysis and analysis of power system networks by matrix algebra. Introduction to symmetric components. Prerequisite: EET 321. Lec 3, Lab/Comp 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

Digital electronics theory and application; emphasis on sequential circuit analysis and synthesis. Asynchronous and synchronous circuits. Circuits encountered in computer and other digital applications introduced. Prerequisite: EET 271. Lec 3, Lab 3. **Cr 4.**

EET 423 Power Systems II

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.**

EET 428 Power Distribution, Illumination and Acoustics

Distribution of electric power to load centers, losses, voltage regulation, power factor correction. General illumination theory; elementary acoustic theory. Prerequisite: EET 112. Lec 3, Comp 4 or Lab 3. **Cr 4.**

EET 468 Engineering Management

Management techniques in industrial organizations, capitalization and amortization, planning techniques, time value of money. Lec 3. **Cr 3.**

EET 475 Microcomputer Applications

A continuation of EET274. Emphasis on the application of the microcomputer to problems in engineering technology. Applications include 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.**

GET 105A Forestry Drawing

An introduction to the basic graphical construction techniques, orthographic projection and cartography. Lec and Lab 4. **Cr 3.**

GET 115A Computer Programming Fundamentals

Introduction to digital computer programming using BASIC language, to numerical solution methods applicable to engineering technology problems and using the computer to create technical reports supplemented with analysis aids such as spreadsheets and graphs. Prerequisite: MAT142A concurrently. Lec 2, Rec 1. **Cr 3.**

GET 121A Technical Drawing

An introduction to graphic symbols and skills applied to engineering drawings. Topics include: lettering, geometric construction, multiview drawing, sections, graphs, dimensioning, and pictorial drawing. Lec 2, Lab 2. **Cr 3.**

GET 126A Machine Drawing

Preparation of complete working drawings of a project for MET 211 Machine Tool Lab II. Topics include: design process, dimensioning, tolerancing, fasteners, details, and assembly drawings. Prerequisite: GET 121A. Lec and Lab 2. **Cr 1.**

GET 130A Construction Drawing

The theory of graphics applied to architectural and structural details, mapping, highways, and fabrication drawings. Prerequisite: GET 121A. Lec and Lab 4. **Cr 3.**

GET 132A Surveying Graphics

The theory of graphics applied to surveying and mapping, including boundary, highway, site, and layout plans, map projections, topographic maps, and computer graphics. Prerequisite: GET 121A. Lec and Lab 4. **Cr 3.**

GET 227A Descriptive Geometry

The solutions of problems of a three-dimensional nature by applying graphical methods. Theoretical and applied problems related to engineering technology. Prerequisite: GET 121A. Lec and Lab 3. **Cr 2.**

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 115A and GET121A. Lec 2, Lab 2. **Cr 3.**

GET 484 Engineering Economics

Economic applications in engineering and industrial organizations; capitalization and amortization, planning techniques, time value of money, cost analysis, and computer modeling. Prerequisite: Senior standing in SET or permission of the instructor. 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. Behavioral and quantitative techniques, network analysis, operations control, and social responsibility are emphasized. Prerequisite: Senior standing in SET or permission of instructor. Lec 3. **Cr 3.**

CHY 110A Principles of Chemistry

A survey of major topics in general chemistry. Descriptive and qualitative approaches are used to develop an understanding of chemical principles. Quantitative relationships that strengthen the principles covered emphasized. Provides a strong foundation for subsequent work in chemistry courses. Lec 3, Lab 3. **Cr 4.**

MAT 142A Algebra and Trigonometry

Algebra and trigonometry, including numbers, functions, graphs, factoring and fractions, exponents and radicals, logarithms, linear equations, quadratic equations, vectors, and solutions to triangles. **Cr 3.**

MAT 164A Analytical Geometry and Introductory Calculus

Equations of higher degree, determinants, solutions of inequalities, variation, progression, trigonometric identities and inverse trigonometric functions, elements of analytic geometry and introductory calculus, including straight lines, conic sections, and an introduction to the derivative and its applications. Prerequisite: MAT 142A. **Cr 3.**

MAT 246A Introductory Calculus

Applications of the derivative, an introduction to integration and its applications, derivatives of transcendental functions and techniques of integration. Prerequisite: MAT 164A. **Cr 3.**

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

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. Inferences concerning means, variance, and proportions. Prerequisite: MAT 246A or its equivalent. **Cr 3.**

PHY 107A Basic Physics

An introduction to the basic concepts of mechanics, sound and heat with illustrations taken from technical applications. Calculus is not used. Lec with Dem 2, Rec 2, Lab 2. **Cr 4.**

PHY 108A Basic Physics

An introduction to the basic concepts of electricity, magnetism and light with illustrations taken from technical applications. Calculus is not used. Prerequisite: PHY 107A. Lec 2, Rec 1, Lab 2. **Cr 4.**

MET 105 Heat Treatment

Modern ferrous metal heat treating operations and the basic principles underlying them. Analysis of the effects of thermal and mechanical operations on microstructure and attendant mechanical properties. Prerequisites: MET 107, MET 219. Rec 1, Lab 2. **Cr 2.**

MET 107 Machine Tool Laboratory I

Theory and application of fundamental metal removing processes. 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 110 Principles of Production Processes

The function of basic metal working machine tools in diversified manufacturing operations. Applications to maintenance, service, research, and industrial support. Lec and Lab 3. **Cr 3.**

MET 150 Statics

The study of forces, systems, particles and rigid bodies in equilibrium, trusses, centroids and centers of gravity, properties of area and friction. Prerequisites: MAT142A, PHY107A, and GET121A. Rec 3. **Cr 3.**

MET 211 Machine Tool Laboratory II

Design and manufacture of prototype assembly. Application of skill and theory in supervising group projects. Construction and use of production setups. Advanced metrology. Prerequisite: MET 107, GET126A. Lab 4. **Cr 2.**

MET 212 Machine Tool Laboratory III and Welding

Completion and evaluation of prototype assembly. Introduction to welding techniques. Prerequisites: MET 211 and sophomore standing. Lab 3. **Cr 1.**

MET 219 Strength of Materials

Stress and strain in materials and bodies subject to tension, compression, torsion, and flexure. Deflection of prismatic members; columns; combined stresses. Prerequisite: MET 150 and MAT164A. Rec 3. **Cr 3.**

MET 220 Selected Topics in Mechanical Engineering Technology I

Topics in engineering technology not regularly covered in other courses. Content is varied to suit the needs of individuals. May be taken more than once. Prerequisite: consent of the instructor. **Cr 1-3.**

MET 233 Thermal Science

Elementary thermodynamics. Engineering calculations relative to heat, power, work and mechanical and electrical energy. Prerequisite: PHY108A. Rec 3. **Cr 3.**

MET 234 Mechanical Technology Laboratory I

Experimental application of solid and fluid mechanics, and thermodynamics. Calibration of laboratory instruments. Prerequisite: MET 233 and MET 219. Rec 2, Lab 4. **Cr 3.**

MET 236 Thermal Applications

Applications of fundamentals studied in MET 233. 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 strength of materials as applied to design. Theories of failure; factors of safety; and design of mechanical components including design calculations for shafts, coupling, bearings, gears, belts, clutches, brakes, springs, and bolted joints. Prerequisite: MET 219. Rec 3. **Cr 3.**

MET 270 Manufacturing Technology

Production processes and problems to include: process planning, automation, numerical control, quality analysis, quality control, specialized machine tools and current advances in the field of metal working. Prerequisites: MET 211 and sophomore standing. Rec 3. **Cr 3.**

MET 317 Dynamics

The study of kinematics of particles and rigid bodies and the kinetics of particles and rigid

bodies, including work and energy, impulse, and momentum. Prerequisite: MET 150 or CET 211A and MAT 246A. Rec 3. Cr 3.

MET 318 Statics and Strength of Materials

The 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 107A, PHY 108A, 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 is varied to suit the needs of individuals. May be taken more than once. Prerequisite: consent of the instructor. Cr 1-3.

MET 325 Fluid Flow Technology

Fluid statics, dynamics and energy; flow measuring devices, fluid power components and systems. Prerequisite: MET 233, MET 236. Rec 3. Cr 3.

MET 331 Digital Computation in Mechanical Engineering Technology

Computer programming using Fortran language. Applications to mathematical and technical problems. Prerequisite: MAT 246A. 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 3. Cr 3.

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

Energy transfer by conduction, convection, and radiation. One-and-two-dimensional steady state conduction processes in solids by use of exact solutions, shape factors, and finite differences. 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: MAT 246A 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, concrete and semi conductors. The laboratory demonstrates the effect of heat treatment on the mechanical properties of steels. Prerequisites: CHY 111, MET 219, MET 234 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 317, MET 261. Rec 3. 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 393 Internal Combustion Engines

Application of thermodynamics laws and principles to internal combustion engine cycles, theory of design and operation; fuels and combustion, carburetion, detonation, cooling, and lubrication. Prerequisite: MET 236, MET 325. 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 and Senior standing. Cr 3.

MET 450 Experimental Mechanics

Experimental methods and techniques for analysis of stress, strain, and displacement and their engineering significance. Electric strain gages, brittle lacquers, mechanical and optical strain gages, and introduction to photoelasticity. Prerequisite: MET 261. Rec 2, Lab 3. Cr 3.

MET 451 Experimental Mechanics II

Experimental methods and techniques for analysis of stress, strain and motion. Dynamic strain measurement, motion measurement using a reference, Seismic systems, and photoelasticity. Prerequisite: MET 450. Rec 2, Lab 2. Cr 3.

MET 462 Design II

Analysis of mechanical elements. Applications of mechanics of materials, stress concentration, combined stresses, fatigue, and factor of safety to the design of machine components. Prerequisite:

site: MET 261 and senior standing. Rec 3, Comp 2. Cr 4.

MET 463 Design III

Continuation of Design II. 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 student is asked to solve technical problems similar to those encountered by technologists in industry. Prerequisite: MET 335. Rec 1, Lab 3. Cr 3.

NAVAL SCIENCE

Professor of Naval Science CDR Kaiserian; Assistant Professors CDR Meteer, LCDR Schneider, LT Cook, LT Graves, LT Kuong

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

1. be a U.S. citizen
2. be at least 17 but less than 21 years of age
3. be physically qualified
4. possess satisfactory records of academic ability and moral integrity
5. demonstrate those characteristics desired of a Naval Officer; and
6. have no moral obligation or personal conviction that will prevent the bearing of arms.

The 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 are required to serve on active duty for four years. High school students may apply for the 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 UM may also be eligible for 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 freshman 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

This course introduces the student to the organization of the U.S. Navy. It examines the historical development of the Navy, the development of seapower, and its application in a geopolitical world today. The course also introduces the student to the many career paths available in aviation, surface warfare, nuclear power, and the Marine Corps. An understanding of the responsibilities of a naval officer, the Navy's mission, general military information, and the applications of these concepts within the Navy is also stressed. Cr 2.

NAV 102 Naval Ships Systems I (Engineering)

The course examines the engineering systems presently in use aboard a U.S. Naval Ship. Major emphasis is given to 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 Intrepid and Santee. The cruise will consist of approximately 3 weeks aboard the yachts and 2 weeks aboard fleet ships. Cr 3.

NAV 201 Naval Ships Systems II (Weapons)

This course provides an indepth study of the theory and principles of operation of contemporary naval weapons systems. It includes coverage of weapons system types, capabilities and limitations; theory of target acquisition, identification and tracking; trajectory principles; and basics of naval ordnance. **Cr 3.**

NAV 202 Seapower and Maritime Affairs

This course provides an overview of United States Naval History and a study of the more important issues involved in a use of the sea. It also introduces the student to 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

This course provides the prospective Naval Ensign with a fundamental understanding and practical working capability in safe navigation. Included is a comprehensive treatment of coastal piloting and an introduction to celestial and electronic navigation methods. **Cr 3.**

NAV 302 Navigation and Naval Operations II

This course familiarizes the student with the functions and responsibilities of the Junior Naval Officer in the areas of shipboard operations and administration. Included is 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 of the road. Prerequisite: NAV 301. **Cr 3.**

NAV 303 Naval Leadership and Management I

A study of the basis for the development of effective managerial and leadership competence. In this course the student's attention is focused 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 personnel and equipment management which familiarizes the student with the scope of the duties, responsibilities, and overall authority of a newly commissioned Naval Officer. Topics include: counseling and interviewing; performance appraisal. The Navy Human Resource Management Support System; Military Law; and Division Administration. **Cr 3.**





College of Forest Resources

Fred B. Knight, *Acting Dean*

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 offers several professional programs, two of which are cooperative with other colleges. In addition to the instructional programs and research and public service responsibilities, the College has a well-developed, student-oriented counseling system. Each student has a faculty advisor who assists in program planning 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 Science and the College of Life Science and Agriculture.

In Wildlife Management.

Concentrations in resource management; science; law enforcement; forestry; math, statistics and computer science; fisheries; education; and communications.

In Recreation and Park Management.

Concentrations in management, in interpretation and in tourism.

In Wood Technology.

Concentration in wood science and technology.

Associate of Science

In Forest Management Technology

Admission Requirements

Four-Year Degree Program

English	4 units
Algebra	2 units
Plane Geometry	1 unit
Trigonometry	
(Forest Engineering)	½ unit
Science (lab)	2 units
(one of which must be chemistry or physics)	
History	1 unit
or	
Social Science	
Electives	5½ or 6 units
TOTAL	16 units

Two-Year Degree Programs

English	4 units
Algebra	2 units
Plane Geometry	1 unit
Science (lab) (biology strongly recom- mended)	1 unit
(Rec. chemistry or physics)	1 unit
History	1 unit
or Social Science	
Electives	<u>6 units</u>
TOTAL	16 units

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 139 credit hours of course work, including three to six credits during summer sessions. Wildlife management students must complete 132 credit hours including 3 credits during a summer session 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 68 credit hours earned at an accumulated grade point average of at least 2.0.

The Honors Program

College Honors Secretary: Ray B. Owen, Jr.

Freshmen of marked academic ability enrolled in all colleges are invited to apply for admission to the Honors Program. The work of the freshman 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 Program 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 requirements 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 Management

Professors Field (Chairperson) Ashley, Corcoran, Hoffman, Shottafer; Associate Professors Brann, Hale, Kimball, Newby, Risk, Robbins, Sader, Seymour, Shepard; Assistant Professor Forster; Instructor Morin; Faculty Associates Blumenstock, Irland, Lilly, Philp, Solomon

The Department of Forest Management offers programs leading to bachelor of science degrees in forestry, forest engineering, recreation and park management, and wood technology. A concentration in forestry business administra-

tion is offered jointly with the College of Business Administration.

Forestry Curricula

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 concentra-

tions 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, but 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 election of courses other than those required.

Field and work experience is essential to forestry training. Students are advised to obtain forest-related summer employment, and are required to attend a three-week summer camp following both the sophomore and junior years.

BASIC CORE

All students in *forestry* must complete the general forestry core curriculum. In addition, they must complete a 25-credit concentration, or an approved 18-credit minor plus 7 credits of technical electives.

BIO 100	Basic Biology	4	FTY 205	Forest Biometry	3
BOT 201	Plant Biology	4	FTY 241	Field Practice on Small Woodlots	3
BOT 233	Dendrology	4	FTY 341	Field Practice on Large Forests	3
CHY 111	General Chemistry I	4	FTY 307	Silvics (Forest Ecology)	4
CHY 112	General Chemistry II (1)	4	FTY 308	Silviculture	3
	OR		ENT 227	Introductory Entomology for Foresters	3
PHY 111	General Physics I	4		OR	
PSS 150	Forest Soil Science	3	BOT 456	Forest Pathology	4
ENG 101	College Composition	3	WTY 212	Wood Technology I	4
ENG	Writing Elective	3	FTY 444	Forestry Economics	3
SPC	Speech Elective	3	FTY 446	Forest Policy and Planning	3
GEE 116	Cartographics	2	FTY 448	Timber Management Lab	1
MAT 122	Algebra and Trigonometry, Pre-Calculus (2)	4	FTY 449	Timber Management	2
MAT 151	Calculus for Life Sciences I	4	FTY 450	Forest Finance and Administration	3
ECO 110	Introduction to Economics	3		Humanities/Social Sciences Electives	9
COS	Computer Science Elective	3		Free electives	12
SVE 111	Plane Surveying	3			
FTY 101/102	Introduction to Forest Resources I, II	4			
FTY 204	Statistical Inference in Forest Resources	3			
				TOTAL HOURS	114

NOTES:

1. CHY 112 required in Forest Biology Concentration
2. May enter MAT requirement directly by testing.

Additional Required Courses

Forest Management Concentration

FTY 305	Forest Inventory and Growth	3	WLM 320	Introduction to Wildlife Conservation	2
FTY 210	Wildland Fire Management	2	WLM 420	Forest Wildlife Management	1
FTY 310	Artificial Regeneration	3	BOT 456	Forest Pathology	4
FTY 357	Forest Watershed Management	3	ENT 227	Introductory Entomology for Foresters	3
FOE 206	Photogrammetry and Remote Sensing	3		(whichever <i>not</i> chosen in basic core requirements).	
FOE 313	Harvesting of Forest Crops	2			
RPM 352	Forest Recreation Management	3		TOTAL HOURS	26

Timber Utilization Concentration

BUA 201	Principles of Accounting I	3	WTY 315	Process Analysis in Forest Utilization	3
FOE 313	Harvesting of Forest Crops	2	WTY 425	Wood Technology II	3
FTY 305	Forest Inventory and Growth	3		Forest Resources Tech. Electives	3
BOT 456	Forest Pathology	4		Free elective (if selected WTY 416 rather than BOT 456)	1
WTY 416	Wood Anatomy (Must also take ENT 227 from basic core)	3		TOTAL HOURS	25
WTY 314	Primary Wood Processes	4			

Forest Biology Concentration

BOT 452	Plant Physiology	3	WLM 200	Ecology	3
BOT 453	Plant Physiology Lab	1		Forest Protection Elective	3
BCH 221	Organic Chemistry	4		Directed Electives*	8
MAT 337	Statistical Methods in Research	3		TOTAL HOURS	25

*Electives will be selected for a biology and science course concentration, e.g., genetics, protection, etc.

Forestry Recreation Concentration

RPM 352	Forest Recreation Management	3	PSS 429	Park Planning and Design	3
RPM 453	Natural and Cultural Heritage Interpretation	3	AEN 230	Park Service and Maintenance	3
RPM 454	Cultural Resource Management	3		Directed Electives*	10
				TOTAL HOURS	25

*Electives will be selected from a list of courses appropriate to the recreation concentration.

Forestry Business Administration

Professor Field, Coordinator

Forestry Business Administration is a five-year program offered jointly by the Colleges of Forest 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 will be especially well-suited for employment with forest industries and private forestry enterprises, and equally well-suited for the public sector.

Forestry Business Administration Concentration (Undergraduate)

FBA majors must complete the same basic core requirements as other forestry majors. The program requirements beyond the core courses are as follows:

BUA 201	Principles of Accounting I	3	BUA 350	Business Finance	3
BUA 202	Principles of Accounting II	3	BUA 370	Marketing	3
BUA 220	The Legal Environment of Business	3	FOE 313	Harvesting of Forest Crops	2
BUA 325	Principles of Management and Organization	3	FOE 471	Production Analysis in Forestry	2
BUA 335	Business Information Systems	3		TOTAL HOURS	25

Forest Engineering

Professors Ashley, Corcoran, Hoffman, Riley, Smith; Associate Professors Brann, Christensen, Hedstrom, Soule

The forest engineering curriculum, a joint administrative responsibility of the Agricultural 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 soci-

eties. 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.

The curriculum in forest engineering is a joint offering of the Colleges of Engineering and Science, Life Sciences and Agriculture, and For-

est 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 135 degree hours plus six degree hours in Forestry Field Practice at an accumulative degree point average of not less than 2.0.

Specimen Curriculum

Freshman Year

First Semester			Second Semester		
AEN 220	Principles of Mechanization	3	AEN 255	Materials in Agricultural Engineering	3
FTY 200	Introduction to Forest Resources	1	AEN 257	Computer Applications in Agricultural and Forest Engineering	3
GEE 116	Cartographics	2	OR		
GEE 101	Introduction To Engineering Design I	(3)	COS 220	Introduction to Computer Science	(3)
MAT 126	Analytic Geometry and Calculus	4	MAT 127	Analytic Geometry and Calculus	4
PHY 121	General Physics I	4	PHY 122	General Physics II	4
	Elective (e.g., ECO 110)	3		Elective (e.g., BIO 100 or BOT 203)	4
	TOTAL HOURS	17		TOTAL HOURS	18

Forest Engineering Curriculum

Basic Sciences and Math

CHY 113	Chemical Principles I	4		Engineering	3
PHY 121/122	General Physics I and II	8		OR	
MAT 126	Analytic Geometry and Calculus	4	COS 220	Introduction to Computer Science I	(3)
MAT 127	Analytic Geometry and Calculus	4	FTY 204	Statistical Inference in Forest Resources	3
MAT 228	Analytic Geometry and Calculus	4		Bio-Earth Science Electives*	10
MAT 259	Differential Equations	4		TOTAL HOURS	44
AEN 257	Computer Applications in Agricultural and Forest				

*Recommended Bio-Earth Science electives include: PSS 150 Forest Soil Science, BOT 203 The Plant Kingdom, BOT 233 Dendrology, BOT 456** Forest Pathology, ENT 227** Introductory Entomology for Foresters

**Students must take one protection course to meet accreditation standards in forestry.

Basic Engineering

GEE 116	Cartographics	2	MEE 251	Strength of Materials	3
	OR		MEE 270	Applied Mechanics, Dynamics	3
GEE 101	Introduction To Engineering Design I	(3)	MEE 360	Fluid Mechanics	3
AEN 281	Elementary Plane Surveying	1	OR		
	OR		CIE 350	Hydraulics	
SVE 111	Plane Surveying	(3)	AEN 268	Computer Aided Drafting and Design	1
MEE 230	Thermodynamics I	3		TOTAL HOURS	19
MEE 150	Applied Mechanics: Statics	3			

Forest Engineering

FOE 206	Photogrammetry and Remote Sensing	3	FOE 471	Production Analysis in Forestry	2
FOE 313	Harvesting of Forest Crops	2	FOE 472	Planning and Control of Forestry Operations	2
AEN 220	Principles of Mechanization	3	FOE 473	Forest Roads and Structures	3
AEN 255	Materials in Agricultural Engineering	3	FOE 474	Forest Machinery	3
AEN 465	Soil and Water Engineering	3	AEN 491	Design Project I	1
FOE 467	Agricultural and Forest Power	3	AEN 492	Design Project II	2
			AEN 493	Design Project III	1
				TOTAL HOURS	31

Forestry

FTY 200	Introduction to Forest Resources	1	FTY 341	Field Practice on Large Forests	3
FTY 205	Forest Biometry	3	FTY 446	Forest Policy and Planning	3
FTY 307	Silvics (Forest Ecology)	4	FTY 449	Timber Management	2
FTY 308	Silviculture	3	FTY 450	Forest Finance and Administration	3
FTY 241	Field Practice on Small Woodlots	3		TOTAL HOURS	25

Humanities and Social Sciences

Economics	6	Electives	16
		TOTAL HOURS	22

TOTAL CREDIT HOURS REQUIRED FOR GRADUATION: 135 plus 6 (May Term)

Wood Science and Technology

Faculty of the Forest Products Laboratory: Professor Shottafer; Associate Professors Jagels, Hale; Assistant Professor Goodell

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 conversion 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 wood products, and both public and private research and development organizations. In addi-

tion 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 241/341.

The program leads to a Bachelor of Science in Wood Technology. This is not a professional forestry degree; however, the program is accredited by the Society of Wood Science and Technology in cooperation with and under the auspices of the Society of American Foresters.

Wood Science and Technology Curriculum

Basic Sciences and Mathematics (1)

BIO 100	Basic Biology	4	MAT 151/152	Calculus for Life Sciences	8
BOT 201/202	Plant Biology	4		I/II	4
CHY 111/112	General Chemistry	8	BOT 233	Dendrology	4
PHY 111/112	General Physics	8	BCH 221	Organic Chemistry	3
TOTAL HOURS					39

Wood Science and Technology (2)

<i>Material Properties and Characteristics:</i>			WTY 317	Wood Drying and Preservation	3
WTY 212	Wood Technology I	4	WTY 429	Research Methods in Wood Technology	3
WTY 425	Wood Technology II	3	WTY 394	Cooperative Education Wood Technology (Summer Session)	3
WTY 416	Wood Anatomy	3		OR	
<i>Wood Products and Processes:</i>			FTY 241/341	Field Practice	(6)
WTY 314	Primary Wood Processes	4			
WTY 315	Process Analysis in Forest Utilization	3	TOTAL HOURS		
					26

Professional Requirements (3)*

FTY 101	Introduction to Forest Resources	2	FOE 471	Production Analysis in Forestry	2
FTY 204	Statistical Inference in Forest Resources	3	FOR 460	Seminar	2
FTY 205	Forest Biometry	3	ENT 227	Introductory Entomology for Foresters	3
FTY 307	Silvics (Forest Ecology)	4	BOT 456	Forest Pathology	4
FTY 444	Forestry Economics	3	BUA 201	Principles of Accounting I	3
TOTAL HOURS					29

General Education and Electives (4)*

GEE 116	Cartographics	2	ECO 110	Introduction to Economics	3
COS	Computer Programming Requirement	3	SPC 103	Fundamentals of Public Communication	3
ENG 101	College Composition	3	Humanities Elective Requirement		
ENG 317	Advanced Professional Exposition	3	Electives		
TOTAL HOURS					45

TOTAL HOURS REQUIRED TO GRADUATE: 139

*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.

Bachelor of Science in Recreation and Park Management

Professors Newby, Risk

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 and tourism fields.

Rapidly changing social phenomena associated with leisure time, energy problems, popula-

tion 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	MAT 232	Principles of Statistical Inference	3
COS	Computer Science Elective	3		OR	
CHY 111	General Chemistry I	4	FTY 204	Statistical Inference in Forest Resources	(3)
				TOTAL HOURS	13

Biological Sciences

BIO 100	Basic Biology	4	BOT 464	Taxonomy of Vascular Plants	(4)
BIO 103	Field Natural History of Maine	3		OR	
BOT 233	Dendrology	4	PSS 122	Woody Landscape Plants	(3)
	OR		ZOL 204	Animal Biology	4
			WLM 200	Ecology	3
				TOTAL HOURS	18(17)

Earth Science

GES 101	Aspects of the Natural Environment I	3	PSS 140	Soil Science	(3)
PSS 150	Forest Soil Science	3			
				TOTAL HOURS	6

Social Sciences and Humanities

ECO 110	Introduction to Economics	3	INT 224	Sociology of Rural Life Electives (<i>recommended</i>) (select one:)	(3) 3
BUA 201	Principles of Accounting I	3	ANT 101	Introduction to Anthropology	
BUA 325	Principles of Management and Organization	3	HTY 477	History of the Treatment of the American Environment	
POS 100	American Government	3	PSY 100	General Psychology	
POS 103	State and Local Government	(3)	PSY 330	Social Psychology	
PAA 200	Introduction to Public Management and Bureaucracy	3		TOTAL HOURS	21
SOC 101	Introduction to Sociology	3			
	OR				

Communications

ENG 101	College Composition	3	SPC 245	Small Group Communication	
SPC 103	Fundamentals of Public Communication	3	SPC 257	Business and Professional Communication	
	Electives (select one:)	3		TOTAL HOURS	9
ENG 317	Advanced Professional Exposition				

Professional Preparation

AEN 230	Park Service and Maintenance	3	WLM 320	Introduction to Wildlife Conservation	2
ARE 171	Economics of Environmental Quality	3	WLM 420	Forest Wildlife Management	1
FTY 210	Wildland Fire Management	2	HPR 250	Electives (select two:)	5
RPM 225	Readings in Outdoor Recreation	2	HPR 310	First Aid and Emergency Care	
FTY 349	Principles of Forest Management	3	HPR 361	Outdoor Preparedness	
RPM 352	Forest Recreation Management	3		Organization and Administration of Physical Education and Recreation	
RPM 452	Environmental Interpretation I: Principles	3	HPR 271	History and Philosophy of Physical Education and Recreation	
RPM 453	Environmental Interpretation II: Methods	3	HPR 385	Leadership in Physical Education and Recreation	
RPM 454	Cultural Resource Management	3		TOTAL HOURS	36
RPM 470	Principles of Tourism	3			
PSS 429	Park Planning and Design	3			

Areas of Concentration

(select one:)

Park Management

ARE 471	Resource Economics	3	BUA 374	Sales Management	
ARE 474	Land Use Planning	3	PAA 405	Administrative Law	
BUA 220	The Legal Environment of Business	3	PAA 350	Administration of Public Personnel	
	Electives (select two:)	6	PAA 340	Public Budgeting and Financial Administration	
BUA 350	Business Finance		POS 358	Public Opinion	
BUA 370	Marketing				
BUA 372	Advertising				
				TOTAL HOURS	15

Interpretation

ANT 325	Oral History and Folklore: Fieldwork	3	JBR 216	Introduction to Photojournalism	
ANT 217	Introduction to Archaeology	3	OCE 270	Oceanography Today	
HTY 477	History of the Treatment of the American Environment	3	AST 109	Introduction to Astronomy	
			INM 433	Instructional Media	
				TOTAL HOURS	15

Other

Free Electives 12 (11)

MINIMUM HOURS REQUIRED FOR GRADUATION: 130

Forest Management Technology

Professors Robbins, Kimball

Forest industries and federal and state resource agencies indicate a need for highly trained forest technicians on a continuing basis. Many positions are salaried and are supervisory in nature. Duties may include timber cruising and mark-

ing, administration of recreation areas, or assisting forestry research. Much of the work will be in attractive outdoor surroundings. The curriculum includes six credits of practical field training. Students may not register for the fourth semester until all practical field training requirements have been satisfied.

Forest Management Technology Curriculum

Communications and Mathematics

ENG 101A	Critical Written Expression	3	MAT 141A	Elementary Algebra and Trigonometry	3
SPE 101A	Oral Communications	3	TOTAL HOURS:		12
ENG 105A	Business, Professional and Technical Writing	3			

Technical Forestry

FMT 108A	Applied Silviculture	4	FMT 209A	Forest Land Management	3
FMT 101A	Introduction to Forest Technology	2	FMT 201A	Field Measurements and Inventory	2
FMT 206A	Aerial Photo Interpretation	3	FMT 202A	Harvesting and Multiple Use Management	3
FMT 105A	Forest Measurements	4	FMT 203A	Forest Resources Field Trip	1
FMT 204A	Wood Products Utilization	3	FMT 212A	Forest Laws and Regulations	2
FMT 211A	Forest Protection	2			
					TOTAL HOURS: 29

Supporting Subject Matter

ARE 110A	Economics	3	GET 105A	Forestry Drawing	3
ARE 130A	Accounting	3	CET 104A	Plane Surveying	3
BOT 101A	Introductory Botany	3	PST 150A	Fundamentals of Forest Soils	3
AEN 105A	Power Technology	3			
AEN 116A	Forest Machinery Systems	3			
					TOTAL HOURS 24

Other

Humanities/Social Sciences Electives 3

TOTAL HOURS REQUIRED TO GRADUATE: 68

Forest Biology

Professors M. Greenwood (Chairperson), G. Brown, Knight, McCormack; Associate Professors, Carter, Jagels, Assistant Professors B. Goodell, J. Goodell, Ostrofsky; Faculty Associates Blum, Frank, Grimble, Saviello, Warner

The Department of Forest Biology offers graduate programs leading to a Master of Science and Doctor of Philosophy. However, Department faculty teach undergraduate courses in cooperation with the Department of Forest Management. Graduate education and research are

available in the areas of forest ecology, forest genetics, forest protection, woody plant physiology, the biology of wood decay and environmental physiology. Extensive funded research projects in the areas of effects of atmospheric deposition on Northeastern conifers, gene expression in conifers, and enzymology of wood decay are examples of current departmental research activities.

Students interested in graduate programs in Forest Biology are encouraged to pursue undergraduate experience in the following courses: FTY 345, FTY 394, FTY 395 and FTY 396.

Wildlife

Professor Owen (Chairperson); Associate Professors Gilbert, Hunter, Krohn, O'Connor; Assistant Professor Brown, Spalinger; Faculty Associates Corr, Crawford, Hutchinson, Larouche, Longcore, Matula

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 and on 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 wildlife management and/or wildlife biology. In addition, students must use at least 15 hours of free electives to study an area of interest 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 are required to take at least two field courses, one of which must be wildlife ecology.

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 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

Freshman Year

First Semester			Second Semester		
BIO 100	Basic Biology	4	ZOL 204	Animal Biology	4
FTY 101	Introduction to Forest Resources	2	CHY 112	General Chemistry II	4
WLM 100	Introduction to Wildlife Resources	2	ARE 148	Principles of Agricultural Economics	3
CHY 111	General Chemistry I	4		History, Government Elective	3
MAT	Math Requirement	4	ENG 101	College Composition	3
TOTAL HOURS			TOTAL HOURS		
16			17		

Sophomore Year

First Semester			Second Semester		
ZOL 329/331	Vertebrate Biology I/Laboratory	4	ZOL 330/332	Vertebrate Biology II; Laboratory	4
FTY 204	Statistical Inference in Forest Resources	3	BOT 464	Taxonomy of Vascular Plants	4
WLM 200/201	Ecology/Laboratory	5		Computer Science Elective	3
SPC 103	Fundamentals of Public Communication	3		Social Science Elective	3
TOTAL HOURS			TOTAL HOURS		
15			17		

May Term

WLM 250	Wildlife Ecology	3
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Junior Year

First Semester			Second Semester		
FTY 307	Silvics (Forest Ecology)	4	WLM 350	Principles of Wildlife Biology	5
PSS 150	Forest Soil Science	3	ENG 317	Advanced Professional Exposition	3
ENT 226	Introductory Entomology	4		Literature/Fine Arts Elective	3
	OR			Electives	6
ZOL 453	Invertebrate Zoology	(4)		TOTAL HOURS	17
	Electives	6			
	TOTAL HOURS	17			

Senior Year

First Semester			Second Semester		
WLM 450	Wildlife Management Practices	3	WLM 470	Wildlife Policy and Administration	2
FTY 449	Timber Management AND/OR	2		Communications Elective	3
ZOL 470/471	Fishery Biology/Laboratory	4		Electives	10
ARE	Land Economics Requirement	3		TOTAL HOURS	15
	Electives	6			
	TOTAL HOURS	17			

PROGRAM TOTAL FOR THE B.S. DEGREE 132

Courses in Forest Technology

FMT 101A Introduction to Forest Technology

A review of the development of forestry in the United States, the Forest Resources with which they may be concerned, and the identification of the tree species growing in Maine and the Northeast. Lec 2. **Cr 2.**

FMT 102A Woodlot Management

Open to Associate Degree students to acquaint them with the basic principles of applied forest ecology, forest measurement and multiple use management. Not open to students in the College of Forest Resources. Lec 2, Rec 1. **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 108A Applied Silviculture

Practices and basic concepts in the regeneration, management and cultural treatments of forest stands in order to produce desired timber crops and recreational and other forest values. Field practice and planting, thinning, weeding and pruning and observation of various harvesting methods. Lec 2, Lab 4. **Cr 4.**

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 108A. **Cr 2.**

FMT 202A Harvesting and Multiple Use Management

Woods safety, including chainsaws and harvesting equipment, fire-attack crew training, harvesting practice, planning and supervision of harvesting operations, including considerations for wildlife habitat, recreation activities. Prerequisite: FMT 201A. **Cr 3.**

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. It also includes visits to a variety of wood products industries. Prerequisite: FMT 105A, FMT 108A. **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: FMT 201A, FMT 202A, FMT203A. **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: FMT 201A, FMT 202A, FMT 203A. **Rec 2, Lab 3. Cr 3.**

FMT 209A Forest Land Management

Land titles, surveys, owner's rights and liabilities, trespass and relations with the public. Organization and management of properties for timber production and other uses. Methods of predicting returns from investment. Prerequisite: FMT 201A, FMT 203A, FMT 203A. **Rec 2, Lab 3. Cr 3.**

FMT 211A Forest Protection

Problems involved and practices used in the prevention and control of forest fires, insects, diseases and other causes of loss or damage. **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**

Construction of planimetric and topographic maps by photogrammetric methods. Determi-

nation of forest types and stand composition by interpretation and measurements of air photos. Prerequisite: GEE 102 or GEE 116 or permission. **Rec 2, Lab 3. Cr 3.**

FOE 313 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. **Rec 2. Cr 2.**

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 467 Agricultural and 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. **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. 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. 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, or PHY 106. Lec 2, Lab 3. Cr 3.

FOE 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.

Course in Forest Resources**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.

Courses in Forestry**FTY 101 Introduction to Forest Resources**

Instruments and techniques for field measurements orientation. Required of freshmen in the College of Forest Resources. Rec 1, Lab 3. Cr 2.

FTY 102 Introduction to Forest Resources II

A seminar introducing the opportunities, concerns and professional responsibilities of the forestry profession. Intended for freshman and transfer students interested in management, utilization and research careers. Lec 2. Cr 2.

FTY 200 Introduction to Forest Resources

Same content as FTY 101 except no lecture orientation is given. Transfer students only. No freshmen. 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 205 Forest Biometry

Determination of volume of standing and felled timber. Construction of log rules, volume tables, and yield tables. Determination of growth and yield. Prerequisite: FTY 101, FTY 204. Rec 2, Lab 3. 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 211 Forest Fire Control Laboratory

Lab 2. Cr 1.

FTY 241 Field Practice in Forest Ecology and Management

Three week intensive field training in the skills and concepts needed for professional, integrated management of productive woodlands. The course reinforces basic skills in forest mensuration and mapping; stresses the multi-dimensional nature of forest resources and introduces the disciplines of forest soils, forest protection, forest recreation, forest products, forest ecology and silviculture. Field work includes an in-depth study of a small woodlot and related field trips to utilization plants and selected forest properties throughout Maine. Prerequisites: FTY 205, SVE 111 and sophomore standing. Cr 3.

FTY 305 Forest Inventory and Growth

Principles and exploration in detail of approaches to Inventory and Growth. Prerequisite: FTY 205. Rec 3. Cr 3.

FTY 307 Silvics (Forest Ecology)

Biological principles and environment factors governing the natural establishment and development of forest trees and stands. Prerequisite: BOT 233 or BOT 464, WLM 250, FTY 241 or permission. Rec 2, Lab 3. Cr 4.

FTY 308 Silviculture

Technical methods of controlling the composition, growth, quality, and regeneration of forest stands. Prerequisite: FTY 307. Rec 2, Lab 3. Cr 3.

FTY 310 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 341 Field Practice on Large Forests

Principal topics covered include natural resource surveys and survey design, forest harvesting, and topics in forest engineering. Prerequisite: FTY 241. **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 357 Forest Watershed Management

Role of forests in water cycle. Effect of logging, recreation, mining, and other forest land uses on water resources. Prerequisite: FTY 204, FTY 307, (or their equivalents) PSS 150, or permission of instructor. Rec 2, Lab 2 **Cr 3.**

FTY 380 Applications in Computer-Assisted Cartography

An introduction to the methods and processes associated with computer-assisted cartographic systems and geographic information systems. Emphasis is placed on project planning and hands-on experience in system operation. Prerequisite: GEE 116 or FOE 206 and permission of instructor. Lec 2, Lab 1. **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. **Cr Ar.**

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 Planning

Development of national, state, and private forest policies in the United States and selected foreign countries. The process of forest policy formation. Technical and ethical considerations of strategic planning. Implementation of forest policies. Senior majors in Forest Resources or permission. Rec 3. **Cr 3.**

FTY 448 Timber Management Laboratory

Preparation of a timber management plan. Senior majors in forest management or permission. Rec 1. **Cr 1.**

FTY 449 Timber Management

The physical basis for timber management. Determining and regulating the allowable cut based on silviculture factors and product needs. Senior majors in forest resources or permission. Rec 2. **Cr 2.**

FTY 450 Forest Finance and Administration

Analysis of forestry investment opportunities. Evaluation of forest resources for acquisition, taxation, disposal. Establishing and operating a forestry business. Administration of private, state and federal forestry enterprises. Senior majors in Forest Resources or permission. Rec 3. **Cr 3.**

FTY 455 Remote Sensing of Land Use

Procedures and methods used to evaluate and utilize remote sensor data as well as the design of remote sensing systems are considered. Emphasis will be given the use of aerial photography in determining land use. Image interpretation procedures and mapping methods for imagery col-

lected from aircraft and earth orbiting satellites will be studied in the laboratory. **Cr 3.**

FTY 509 Advanced Silviculture (Seminar)

Applied silvicultural practices and results of current silvicultural research in important forest types of the United States. Prerequisite: FTY 308. 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 308, FTY 310 or permission. Lec 3. **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. Lec 2, Rec 1. **Cr 3.**

FTY 532 Forest Influences

Effects of forest vegetation upon climate, soil water, stream flow, erosion and soil productivity. Prerequisite: FTY 307 and PSS 150. **Cr 2.**

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 313 and FTY 450 or equivalent. **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 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 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. Offered to Forest Resources majors or by permission of instructor. 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, 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.**

RPM 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.**

RPM 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.**

RPM 453 Environmental Interpretation II: Methods

Study of interpretation of natural and cultural resources with emphasis on philosophy, methods, and techniques; planning, design, construction, implementation, and evaluation of interpretive methodology and systems. Prerequisites:

RPM or General Forestry/Forest Recreation majors. RPM 352. **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 554 Forest Recreation Planning

Measuring, analyzing, and forecasting recreational use of forest lands. Concepts of planning, and their application to forest recreation. Prerequisite: RPM 352 or permission. **Cr 3.**

Courses in Wildlife

WLM 100 Introduction to Wildlife Resources

A seminar introducing the opportunities, concerns, and professional responsibilities of the wildlife profession. Intended for freshman and transfer students interested in wildlife management or research careers. Lec 2. **Cr 2.**

WLM 200 Ecology

The relationships between living organisms and their environment. The ecosystem, ecological factors, succession, community distribution, populations and the role of ecology in natural resources. Resource majors only. No freshmen. 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 210 The Development of Wildlife Conservation

Historical overview of wildlife conservation and management activities in the United States. Basic concepts in wildlife conservation will be covered. Rec 2. **Cr 2.**

WLM 250 Wildlife Ecology

Field problems in wildlife ecology. Recognition, measurements and analysis of wildlife populations and their habitats. Three weeks in May term. Wildlife Majors Only. Prerequisites: WLM 200, WLM 201, BOT 464, 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. For non-wildlife majors. **Cr 2.**

WLM 350 Wildlife Biology

Consideration of the biological factors influencing wildlife. Saturday field trips required. Prerequisites: WLM 200, WLM 250, ZOL 329, ZOL 330. Rec 3, Lab 4. **Cr 5.**

WLM 394 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 396 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 397 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 420 Forest Wildlife Management

Managing forest ecosystems for wildlife, especially as it pertains to maintaining natural diversity. Prerequisites: WLM 200 or WLM 320; FTY 307 recommended. **Cr 1.**

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 Management Practices

Evaluation and manipulation of wildlife populations and their habitats as part of a wildlife management program. Prerequisites: WLM 250 and WLM 350. Rec 2, Lab 3. **Cr 3.**

WLM 460 Wildlife Management Plan

Preparation of a wildlife management plan. Co-requisite 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 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 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 530 Behavioral Ecology

How animals adapt to their environment through behavioral processes: mate selection, optimal foraging, territoriality, parental care, communication, and predator avoidance. Prerequisite: a course in ecology or animal behavior. Alternate years. **Cr 3.**

WLM 550 Ecological Energetics

A study of the energy relations of individuals, populations, and ecosystems. Sources of energy

available to animals, factors affecting the energy requirements of animals, and the role of energy in population dynamics and the function of ecosystems will be stressed. Prerequisite: An ecology course. Lec 2, Lab 4, and occasional field trips. (Alternate Years). **Cr 4.**

WLM 560 Waterfowl Biology and Management

An analysis of the biology and management of waterfowl. Prerequisites: An ornithology class or permission. Lec 3, Lab 3. (Alternate Years). **Cr 4.**

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.**

Interdisciplinary Course**INT 219 (BOT, ZOL) Introduction to Ecology**

An introduction to ecology emphasizing ecological principles and their relationships to the natural environment and man. Not open to majors in the biological sciences or resource management areas. Prerequisite: BIO 100. Rec 3. **Cr 3.**

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. Rec 2, Lab 3. **Cr 4.**

WTY 315 Process Analysis in Forest Utilization
Processing research and development problems and review of current methods of analysis and solution. Application of process design, systems analysis and materials technology in the investigative situation. Prerequisite: permission of instructor. Rec 2, Lab 2. **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 393 Cooperative Education Wood Tech (Summer Session)
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: Wood Tech students with junior standing and permission. (Pass/Fail Grade Only). **Cr 1-16.**

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; use of letter grade. Open to Wood Technology students only. **Cr 1-16.**

WTY 416 Wood Anatomy

Identification and anatomical characteristics of wood and wood fibers by gross and microscopic features. Prerequisite: WTY 255 or BOT 435 or permission. Lec 2, Lab 4. **Cr 4.**

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 2. **Cr 3.**

WTY 429 Research Methods in Wood Technology

Advanced methods of evaluating wood, wood based, and related materials. Introduction to techniques and concepts of evaluation design. Review of pertinent laboratory equipment and its applications. Prerequisite: FTY 204, WTY 425. Rec 1, Lab 4. **Cr 3.**

WTY 515 Research Techniques in Wood Anatomy

Preparation of woody tissue for microscopic examination and recording, including micro-techniques 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 3.**

niversity of Maine



College of Life Sciences and Agriculture

Wallace C. Dunham, *Dean*

The College of Life Sciences and Agriculture specializes in programs in four fundamental areas:

Basic Biological Sciences
Human Health and Development
Economic Development of Natural Resources
Agricultural 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 of Life Sciences and Agriculture. Baccalaureate (4-year) programs leading to the Bachelor of Science degree are offered through two schools (the School of Human Development and the School of Nursing) and nine academic departments (Agricultural and Resource Economics, Agricultural Engineering, Animal and Veterinary Sciences, Biochemistry, Botany and Plant Pathology, Entomology, Food Science, Microbiology and Plant and Soil Sciences). A tenth department, Military Science, offers elective courses for the University community and specialized courses for students in the Reserve Officer Training Program of the United States Army. 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 freshman year students meet weekly in small seminar classes with their academic advisor for the freshman year. 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 Life 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 strengthen 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 the Basic Biological Sciences

Biology*

Biochemistry (Department of Biochemistry)

Botany (Department of Botany and Plant Pathology)

Entomology (Department of Entomology)

Microbiology (Department of Microbiology)

Molecular and Cellular Biology*

Programs in Human Health and Development

Nursing (School of Nursing)

Food and Nutrition (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

Agriculture*

Agricultural Engineering (Department of Agricultural Engineering)

Agricultural Mechanization (Department of Agricultural Engineering)

Agribusiness and Resource Economics (Department of Agricultural and Resource Economics)

Agribusiness Administration (Department of Agricultural and Resource Economics and College of Business Administration)

Food Science (Department of Food Science)

Home Economics (School of Human Development)

Landscape Horticulture (Department of Plant and Soil Sciences)

Natural Resources*

Programs in Agricultural Biology

Animal Science (Department of Animal and Veterinary Sciences)

Pre-Veterinary (Department of Animal and Veterinary Sciences)

Plant and Soil Sciences (Department of Plant and Soil Sciences)

Pre-Medical, Pre-Veterinary and Other Pre-Professional Programs

The programs in biochemistry, biology, microbiology, and molecular and cellular biology have specific curricula designed for students wishing

to prepare to enter medical school, dental school, or a college of optometry. Today, post-baccalaureate, professional schools no longer require adherence to a rigid, pre-professional curriculum. However, certain specific requirements must be met, and the timing of these courses during the undergraduate program is critical. The four programs mentioned above take these requirements into consideration in building the curriculum. Most students in the college who pursue advanced degrees in one of the medical professions prepare by majoring in one of these four programs.

Pre-veterinary students in the college normally major in the pre-veterinary concentration of the program in animal sciences. Besides preparing students academically for application to a college of veterinary medicine, the program also allows valuable experience in working with large 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 food and nutrition 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:

Agricultural Mechanization Technology (Agricultural Engineering) (two-plus-two)

Animal Agriculture Technology (Animal and Veterinary Sciences)

Animal Medical Technology (Animal and Veterinary Sciences)

Merchandising (School of Human Development)
Landscape and Nursery Management (Plant and Soil Sciences)
Resource and Business Management (Agricultural and Resource Economics) (two-plus-two)

Programs designated as two-plus-two are designed so that students completing the first two years with an accumulative grade point average of 2.5 or higher may transfer to the appropriate baccalaureate program and earn the B.S. degree after an additional two years of study.

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. Basic Biological Sciences, Agricultural Sciences, and Natural Resources

English	4 units
Algebra	2 units
Plane Geometry	1 unit
Trigonometry (Agricultural Engineering only)	½ unit
Science (chemistry or physics preferred)	2 units
History or Social Science	1 unit
Electives	<u>5½ to 6 units</u>
TOTAL	16 units

B. School of Human Development:

English	4 units
Mathematics* (at least 1 of algebra)	2 units
Science* (chemistry recommended)	1 unit
History or Social Science	1 unit
Electives	<u>8 units</u>
TOTAL	16 units

*Algebra I and II, plane geometry, and chemistry required for majors in food and nutrition and health and family life education. Chemistry is required for home economics education.

C. School of Nursing

English	4 units
Algebra	2 units
Geometry	1 unit
History or Social Studies	1 unit
Biology	1 unit
Chemistry	1 unit
Electives	<u>6 units</u>

TOTAL 16 units

Associate Programs

Students entering two-year, associate of science programs must have graduated from high school, 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, except for the Agricultural Mechanization Program which requires two units of high school algebra and one unit of geometry. 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 Life Sciences and Agriculture leads to a degree of bachelor of science. All students are required to complete a minimum of 120 degree hours. Agricultural 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, degree candidates are required to com-

plete the following minimum degree requirements:

Communications	6
Writing course*	(3)
Speaking course**	(3)
Humanities and Social Sciences	15

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

TOTAL HOURS 21

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

*Students selected for Freshman Honors are excused; students may receive degree credit through Advanced Placement. All others ordinarily will take

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.

ENG 101, College Composition, with possible substitution of ENG 212, Intermediate Composition, and ENG 317, Advanced Professional Exposition, or JBR 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.



Programs of Instruction

Division of Life Sciences

Bachelor of Science in Biochemistry

The B.S. in Biochemistry is offered by the faculty of the Department of Biochemistry.

Associate Professor R. Roxby (Chairperson); Professors Blake, De Haas; Associate Professor Sherblom; Assistant Professors Hutchison and Vayda; Instructors Jacobs, S., Roxby, S.

The discipline is concerned with the study of living systems at the cellular and molecular levels and therefore permeates 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, 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, and 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	4
	OR	
CHY 372	Physical Chemistry II	(4)
	TOTAL HOURS	23

Biological and Physical Sciences

BIO 100	Basic Biology	4
ZOL 204	Animal Biology	4
	OR	
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
	TOTAL HOURS	39(38)

Mathematics

MAT 122	Algebra and Trigonometry, Pre-Calculus	4
MAT 126	Analytic Geometry and Calculus	4
MAT 127	Analytic Geometry and Calculus	4
	TOTAL HOURS	12

Communications

	Writing Course	3
	Speaking Course	3
BCH 471/472	Seminar	2
	TOTAL HOURS	8

Humanities and Social Sciences

	TOTAL HOURS	15
LSA 117	Issues and Opportunities	1
	Electives	22

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

Courses in Biochemistry

BCH 207 Fundamentals of Chemistry

A review of the essential material from inorganic chemistry followed by a study of 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 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. Included will be a discussion of the experimental techniques used in the genetic manipulation of organisms. Prerequisite: BIO 100. Lec 3. **Cr 3.**

BCH 322 Biochemistry

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 work experience for which aca-

demetic credit 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.**

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

Essentially 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, at the discretion of the instructor. 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

A 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, MAT 127 Lec 3, Lab 3. **Cr 4.**

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: survival, muta-

genesis, and repair of radiation damage. Prerequisites: PHY 121, 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

Required are written reports on computer techniques as applied to biochemical research. Formal talks on this material are given before an audience of classmates and faculty. Prerequisites: BCH 450, 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 Molecular Biology

Gene function at the molecular level. Biological, chemical and physical properties and structure-function relationships of the informational macromolecules. Prerequisites: BCH 451 or permission. Lec 3. 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 542 Biochemical Mechanisms

Metabolic regulatory mechanisms. Cooperativity and feedback control, induction, repression and control of protein synthesis; regulation of membrane transport and energy metabolism. Prerequisite: BCH 467 or equivalent and BCH 451 or equivalent, or permission. Cr 3.

BCH 550 Special Topics in Molecular Biology

To include 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.

Bachelor of Science in Biology

The B.S. in Biology is offered cooperatively by the Departments of Biochemistry, Botany and Plant Pathology, Entomology, Microbiology, and Zoology. The program is coordinated by Dr. Benjamin Liles.

The biology program permits a student to gain a broad background in the biological sciences. The curriculum offers several program choices leading to career opportunities as naturalists, for example, as well as in the fields of high school teaching, ecology, and agricultural

science. The curriculum is 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 can prepare for admission to professional schools of medicine, dentistry, optometry, pharmacy, and prepare as well for other advanced study, such as marine biology. For some, a broad education is desired rather than a specific, career-oriented program.

Curriculum in Biology

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	4
ZOL 465	Evolution	3
BCH 322	Biochemistry	3
	OR	
BCH 451/463	Principles of Biochemis- try/ Introduction to Biochemical Laborato- ry Methods	(6)
INT 419	General Ecology	3

Group Requirements

Taxonomy

Students choose one from among the following:

BOT 459	General Mycology (fungi)	4
BOT 464	Taxonomy of Vascular Plants	4
BOT 473	Biology of Algae	4
ENT 440	Insect Biology and Taxon- omy	4
ENT 453	Biology and Taxonomy of Advanced Orders	4
MCB 410	Determinative Bacteriolo- gy	4
ZOL 329/331	Vertebrate Biology I/Lab- oratory	5
ZOL 453	Invertebrate Zoology	4
ZOL 458/459	Animal Parasitology/Lab- oratory	4

Physiology

Students choose one from among the following:

BOT 452/453	Plant Physiology/Labora- tory	4
BOT 454	Intermediate Plant Physi- ology	4
MCB 430	Bacterial Physiology	4
ZOL 377	Animal Physiology	3

Anatomy

Students choose one from among the following:

BOT 435	Plant Anatomy	4
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ZOL 333	Comparative Anatomy	4
ZOL 336	Developmental Biology	<u>4</u>
	TOTAL HOURS	46(50)

Other Sciences

Mathematics

MAT 126	Analytic Geometry and Calculus	4
	(Many students will need MAT 122, Alge- bra and Trigonometry, as preparation)	<u> </u>
	TOTAL HOURS	4

Chemistry

CHY 111/112	General Chemistry I/II	8
BCH 221/221	Organic Chemistry	4
	OR	
CHY 251/253	Organic Chemistry I Lec- ture/Laboratory	(5)
	AND	
CHY 252/254	Organic Chemistry II Lec- ture/Laboratory	<u>(5)</u>
	TOTAL HOURS	12(18)

Physics

PHY 111/112	General Physics I/II	<u>8</u>
	TOTAL HOURS	8

TOTAL HOURS IN
OTHER SCIENCES 24(30)

Other Areas

Communications (***)

ENG 101	College Composition	3
SPC 103	Fundamentals of Public Communication	<u>3</u>
	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

Free Electives (***)

Students in Life Sciences and Agriculture 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 19-27

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TOTAL HOURS REQUIRED FOR
GRADUATION: 120**Bachelor of Arts in Biology**

Students may earn a B.A. in Biology by completing the curriculum outlined above, and by substituting the requirements of the College of Arts and Sciences for the sections marked above (**). See the introduction to Arts and Sciences elsewhere in this bulletin for a detailed explanation of requirements and options.

Courses in Biology

Other courses in the biological sciences can be found under Biochemistry, Botany, Entomology, 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. 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

The interrelationships between man and the rest of nature, with consideration of human population growth, natural resources, population and degradation of the biosphere. Environmental problems are examined in the light of ecological ideas and principles. No freshmen. Rec 3. **Cr 3.**

BIO 394 Cooperative Education in Biology

A regular program of approved work experience for which academic credit is given, alter-

nated 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 for which academic credit 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.**

BIO 451 Interpretation of Biological Statistics

A beginning course in univariate statistics dealing with parametric and nonparametric tests. Much emphasis on the interpretation of results and application of techniques to biological literature. Prerequisite: MAT 122 and BIO 100. **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 479 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 513 Biological Literature

Use of library indexes to the biological literature and research journals. Manuscript preparation for scientific publication. For beginning graduate students as an aid in library use, literature search, thesis preparation, and publication. Prerequisite: permission. **Cr 2.**

Bachelor of Science in Botany

The B.S. in Botany is offered by the faculty of the Department of Botany and Plant Pathology.

Professors Vadas (Chairperson), Davis, Homola, Manzer; Associate Professors Campbell, Cronan, Jacobson, McAlice, Neubauer, Schwintzer, Tavantzis, Tjepkema; Assistant Professors Davison, Lambert, Liles, Livingston, Steneck; Cooperating Professors Greenwood, Langille; Cooperating Associate Professor Jagels; Cooperating Assistant Professor Jellison Adjunct Professor Leach; Adjunct Assistant Professor Ostrofsky; Emeritus Professors McCrum, Cooper, 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 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 firsthand 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 419	General Ecology	2
	TOTAL HOURS	28-30

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 454	Intermediate Plant Physiology	4
BOT 456	Forest Pathology	4
	OR	
BOT 457	Plant Pathology	4
BOT 458	Bryology	2
BOT 459	General Mycology	4
BOT 464	Taxonomy of Vascular Plants	4
BOT 473	Biology of Algae	4
BOT 475	Algal Growth and Sea- weed Mariculture	3
BIO 203	Field Natural History of Maine	2
BIO 468	Limnology	2
BIO 469	Limnology Lab and Field	2
BCH 310	Introductory Molecular Biology	2
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	4

OCE 370	Introduction to Oceanography	3
PSS 140	Soil Science	3
ZOL 204	Animal Biology	4
ZOL 213	An Introduction to Marine Science	3
ZOL 453	Invertebrate Zoology	4
ZOL 465	Evolution	3
ZOL 472	Aquatic Food Webs	2
	TOTAL HOURS	16

Other Sciences

Chemistry

CHY 111/112	General Chemistry I/II OR	(8)
CHY 251/253	Organic Chemistry I Lecture/Laboratory AND	(5)
CHY 252/254	Organic Chemistry II Lecture/Laboratory	(5)
BCH 221	Organic Chemistry/Laboratory	4
	TOTAL HOURS 12-18	

Physics

PHY 106	Essentials of Physics OR	6
PHY 111/112	General Physics I/II	(8)
	TOTAL HOURS	5-8

Mathematics*

MAT 126	Analytic Geometry and Calculus OR	4
BIO 451	Interpretation of Biological Statistics OR	(3)
MAT 232	Principles of Statistical Inference	(3)
	TOTAL HOURS	3-4

*For students planning a research career and/or graduate school program, a calculus course and a statistics course are strongly recommended.

College Requirements

Communications

ENG 101	College Composition	3
SPC 103	Fundamentals of Public Communication	3
	TOTAL HOURS	6

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.

TOTAL HOURS 15

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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.

TOTAL HOURS 25

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

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 454	Intermediate Plant Physiology	4
BOT 457	Plant Pathology	4
BCH 451	Principles of Biochemistry	4
BCH 463	Introduction to Biochemical Laboratory Methods	2
MCB 300/305	General Microbiology/Laboratory	5
CHY 251/252	Organic Chemistry I Lecture/Laboratory AND	5
CHY 253/254	Organic Chemistry II Lecture/Laboratory	5
MAT 126	Analytic Geometry and Calculus	4
BIO 451	Interpretation of Biological Statistics OR	3
MAT 232	Principles of Statistical Inference	(3)

Ecology

BOT 464	Taxonomy of Vascular Plants OR	4
ZOL 465	Evolution	(3)
BIO 203	Field Natural History of Maine	3

BIO 468	Limnology	3	BIO 451	Interpretation of Biological Statistics	3
ENT 226	Introductory Entomology OR	4	OR		
ENT 227	Introductory Entomology for Foresters	(3)	MAT 232	Principles of Statistical Inference	3
OCE 370	Introduction to Ocean- ography	3			
PSS 140	Soil Science AND/OR	3	Plant Physiology		
GES 101	Aspects of the Natural Environment I	(4)	BOT 454	Intermediate Plant Physi- ology	4
ZOL 204	Animal Biology	4	BCH 451	Principles of Biochemistry	4
MAT 126	Analytic Geometry and Calculus	4	BCH 463	Introduction to Biochemi- cal Laboratory Methods	2
BIO 451	Interpretation of Biologi- cal Statistics	3	BCH 464	Advanced Biochemical Laboratory Methods	4
OR			MCB 300/305	General Microbiology/ Laboratory	5
MAT 232	Principles of Statistical Inference	(3)	CHY 251/252	Organic Chemistry I Lec- ture/Laboratory	5
			CHY 253/254	Organic Chemistry II Lec- ture/Laboratory	5
Marine Biology			MAT 126/127	Analytic Geometry and Calculus	8
BOT 473	Biology of Algae	4			
BOT 475	Algal Growth and Sea- weed Mariculture	3	Systematics and Evolution		
OCE 370	Introduction to Ocean- ography	3	BOT 464	Taxonomy of Vascular Plants	4
ZOL 204	Animal Biology	4	BIO 103	Field Natural History of Maine	3
ZOL 213	An Introduction to Ma- rine Science	3	ENT 227	Introductory Entomology	4
ZOL 453	Invertebrate Zoology	4	OR		
ZOL 472	Aquatic Food Webs	2	ENT 227	Introductory Entomology for Foresters	(3)
MAT 126	Analytic Geometry and Calculus	4	GES 101	Aspects of the Natural Environment I	4
BIO 451	Interpretation of Biologi- cal Statistics	3	ZOL 465	Evolution	3
OR			BIO 451	Interpretation of Biologi- cal Statistics	3
MAT 232	Principles of Statistical Inference	3	OR		
			MAT 232	Principles of Statistical Inference	(3)
Plant Pathology					
BOT 456	Forest Pathology OR	4	Two or more of the following:		
BOT 457	Plant Pathology	(4)	BOT 233	Dendrology	4
BOT 459	General Mycology	4	BOT 458	Bryology	3
BOT 464	Taxonomy of Vascular Plants	4	BOT 459	General Mycology	4
ENT 226	Introductory Entomology OR	4	BOT 473	Biology of Algae	4
ENT 227	Introductory Entomology for Foresters	(3)			
MCB 300/305	General Microbiology/ Laboratory	5	Courses in Botany		
PSS 140	Soil Science	3	BOT 201 Plant Biology		
MAT 126	Analytic Geometry and Calculus	4	<p>An introduction to plant structure and function and the relationship to the ecology of plants.</p> <p>Prerequisite: BIO 100. Lec 3. Cr 3.</p>		

BOT 202 Plant Biology Laboratory

A laboratory 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**

Classroom and field work on identification and classification of trees and native shrubs of North America. Prerequisite: BIO 201. Lec 2, Rec 1, Lab 2.

Cr 4.**BOT 391 Problems in Botany I**

During the sophomore year these courses fulfill the function of a Sophomore Tutorial designed to acquaint students with different aspects of plant biology.

Cr Ar.**BOT 392 Problems in Botany II**

During the sophomore year these courses fulfill the function of a 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 396 Field Experience in Botany**

An approved work experience for which academic credit 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.**BOT 420 Ecology Laboratory and Field Course**

Ecosystems studies in the field, and ecologic experimentation in the laboratory, to illustrate ecologic principles and provide technical experience. Saturday field trips. Prerequisites: IDL 419 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. Methods 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. Lec 3.

Cr 3.**BOT 453 Plant Physiology Laboratory**

Laboratory study of the physiological function of the higher plants. Prerequisite or corequisite: BOT 452. Lab 2.

Cr 1.**BOT 454 Intermediate Plant Physiology**

Physiological and biochemical aspects of plant metabolism, growth and development. Laboratory methods for physiological studies on intact plants, isolated organelles and enzymes. Prerequisite: BOT 452, Organic Chemistry or permission of the instructor. Lec 2, Lab 4.

Cr 4.**BOT 456 Forest Pathology**

Principles of plant disease with emphasis on understanding the identification, ecology, and control of tree pathogens. Open to juniors and seniors. Prerequisites: BIO 100. Lec 2, Rec 1, Lab 2.

Cr 4.**BOT 457 Plant Pathology**

Principles of plant disease. Open to juniors and seniors. Prerequisite: BIO 100. Lec 2, Rec 1, Lab 2.

Cr 4.**BOT 458 Bryology**

Identification and classification of liverworts and mosses. Prerequisite: BOT 203 or an equivalent with the permission of instructor. Lec 1, Rec 1, Lab 2.

Cr 3.**BOT 459 General Mycology**

Comparative morphology, classification and identification of fungi plus investigation of unusual hereditary and physiological characteristics. Prerequisite: BIO 100. Lec 2, Lab 4.

Cr 4.

BOT 464 Taxonomy of Vascular Plants

Identification and classification of flowering plants. Prerequisite: BIO 100. Lec 2, Lab 4.

Cr 4.

BOT 473 Biology of Algae

Comparative morphology and reproduction, identification and classification of algae. Laboratory and field work emphasize studies on 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 474 Aquatic Flowering Plants

Identification, classification and ecology of marsh and aquatic flowering plants. Prerequisite: BOT 464 or permission. Lec 1, Lab 2.

Cr 2.

BOT 475 Algal Growth and Seaweed Mariculture

An introduction to growth and culture processes in micro and macroalgae. Basic aspects of nutrition will be stressed including: culture media, nutrient requirements, physical factors, and nutrient cycling. Emphasis will be given to growth, biomass and productivity. Laboratory exercises will emphasize "hands on" experience in isolating, growing and calculating yields of micro and macro algae. Two Saturday field trips. Prerequisites: 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 503 Natural History and Ecology of Marine Algae

Systematic problems, genetics, and distributions of benthic alga and seagrasses, physiology and morphogenesis, growth and productivity, adaptation and population biology, community organization. Prerequisite: INT 419 or BOT 473 or equivalent. Lec 2, Lab 4.

Cr 4.

BOT 545 Physiological Plant Ecology

Interactions between plants and their physical environment. Concepts concerning energy and gas exchange will be used to examine effects of solar and terrestrial radiation, ambient temperature, wind, moisture supply, CO₂ and O₂ in plants. Adaptations to a variety of stresses including high and low temperature, low moisture and low N and P will be discussed. Prerequisite: INT 419 or equivalent plus BOT 452 or permission of instructor (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 419 and one year of college chemistry. (Open to advanced undergraduate and graduate students). Lec 3.

Cr 3.

BOT 556 Physiology of Plant Disease

Advanced study of plant disease with emphasis on the physiology of parasitism and microbial interaction. Prerequisite: BOT 452 and BOT 456. Lec 2, Lab 4.

Cr 4.

BOT 557 Plant Virology

Provides the student with a working knowledge of the techniques used in the study of plant viruses, the structure and organization of plant viruses and how this relates to their role as pathogens, the biology, epidemiology, and control of plant virus diseases. Prerequisite: BCH 450 or permission of instructor. Lec 1, Lab 6.

Cr 4.

BOT 558 Advanced Plant Physiology

Advanced study of the photosynthetic process, respiration, water relations, mineral nutrition and growth correlations of plants. Prerequisite: BOT 452. Lec 2, Lab 4.

Cr 4.

BOT 560 Comparative Morphology of Vascular Plants

Basic concepts on the origin and development of vascular plants, their development, anatomy, homologies, and interrelationships. Prerequisite: BOT 435. Lec 2, Lab 4.

Cr 4.

BOT 562 Plant Geography

Distribution of plants on the earth with emphasis on the causes of distributional phenomena. Field trips arranged. Prerequisite: BOT 464. Lec 3.

Cr 3.

BOT 564 Photosynthesis and Chloroplast Development

The physiology and biochemistry of photosynthesis. Chloroplast structure and development, chlorophyll synthesis, photolysis of H₂O, electron transport, photophosphorylation, the path of carbon in photosynthesis, photorespiration, and plant productivity. Prerequisite: BCH 322 and BOT 452, or permission of instructor. Lec 2, Rec 1.

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. Aspects of plant population ecology. Prerequisite: INT 419 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.**

Interdisciplinary Courses**INT 219 (BOT, ZOL) Introduction to Ecology**

An introduction to ecology emphasizing ecological principles and their relationships to the natural environment and man. Not open to majors in the biological sciences or resource management areas. Prerequisite: BIO 100. Lec 3. **Cr 3.**

INT 375 (BOT, FOR, OCE, ZOL) Field Studies in Ecology

A field trip of one to several weeks to an area of ecologic interest; details announced in time for registration each year course is offered. Trips may be scheduled during Christmas, midyear, spring recess or summer. An intensive ecology field course; field and living conditions will often be rigorous and/or primitive. Prerequisite: a course in ecology. Other preparation and/or recommended prerequisites announced for each trip. Credit will differ, depending upon trip. **Cr Ar.**

INT 419 (BOT, ZOL) General Ecology

Ecological principles for the science major. Envi-

ronmental 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 500 (ANT, BOT, GES, PSS) Seminar in Quaternary Studies

A multidisciplinary seminar concerned with selected areas of study, physical, biological and anthropological, related to the Quaternary Period. Subject areas will vary each semester; may be taken more than once for credit. One weekend field trip required. Prerequisite: consent of instructor. Lec 2. (Offered Spring and Fall Semesters). **Cr 2.**

INT 539 (ANT, BOT, QUS) Ice Ages and Mankind

Introduction to the physical, biological, and human environments of the Quaternary Period (roughly the past 1.5 million years), with greatest 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 of instructor. Lec 3. (Offered Fall semester only). **Cr 3.**

INT 545 (BOT) 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 man. 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 chemistry; plant taxonomy and quaternary geology; limnology recommended. Lec 2, Lab and Rec 5, at least two all-day field trips. **Cr 4.**

INT 563 (BOT, OCE, ZOL) Marine Benthic Ecology

An advanced course emphasizing ecological studies on benthic intertidal and subtidal marine organisms. Includes discussions on limiting factors, distributions, zonation, biotic interactions, food webs, succession, productivity, community structure and organization. Prerequisite: a course in ecology, Lec 2, Rec 1. **Cr 3.**

Bachelor of Science in Entomology

The B.S. in Entomology is offered by the faculty of the Department of Entomology.

Professors Forsythe (Chairperson), Dimond, Osgood, Storch; Associate Professors K.E. Gibbs, McDaniel; Assistant Professor Alford; Cooperating Professors Bentley, Knight; Cooperating Associate Professor Houseweart; Cooperating Educator Dill; Faculty Associate Jennings; Emeritus Professors Dirks, Simpson

The entomology curriculum is designed to provide training for various positions in government and industry. Also, it provides a foundation for further training at the graduate level leading to teaching or extension positions in universities, or to research positions in universities, experiment stations, or industry. Students with sufficient background and interest will be encouraged to enter graduate school for further specialization. Graduate students in entomology may work toward the master of science or doctor of philosophy degrees.

Curriculum in Entomology

Entomology

ENT 226	Introductory Entomology	4
ENT 440	Insect Biology and Taxonomy	4
ENT 453	Biology and Taxonomy of Advanced Orders	4
ENT 449	Economic Entomology	3
	TOTAL HOURS	15

Biological Sciences

BIO 100	Basic Biology	4
BOT 203	The Plant Kingdom	4
BOT 464	Taxonomy of Vascular Plants	4
	OR	
BOT 233	Dendrology	(4)
BCH 221	Organic Chemistry/Laboratory	4
BCH 322	Biochemistry/Laboratory	4
MCB 300	General Microbiology	3
ZOL 204	Animal Biology	4
ZOL 453	Invertebrate Zoology	4
ZOL 462	Principles of Genetics	4
INT 419	General Ecology	3
	TOTAL HOURS	38

Physical Sciences

CHY 111/112	General Chemistry I/II	8
PHY 111/112	General Physics I/II	8
	OR	
PHY 106	Essentials of Physics	(5)
	TOTAL HOURS	16(13)

Mathematics

BIO 451	Interpretation of Biological Statistics	3
	OR	
FTY 204	Statistical Inference in Forest Resources	(3)
MAT 122	Algebra and Trigonometry, Pre-Calculus	4
MAT 126	Analytic Geometry and Calculus	4
	TOTAL HOURS	11

Communications

ENG 101	College Composition	3
SPC 103	Fundamentals of Public Communication	3
	TOTAL HOURS	6

Humanities and Social Sciences

Recommended foreign language: 8 hours of French, German, or Russian.		
	TOTAL HOURS	15
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MINIMUM HOURS REQUIRED FOR GRADUATION: 120

* Recommended ZOL 377, COS 220, and advanced ENT courses.

Courses in Entomology

ENT 220 Insects, Science and Society

A presentation of the insects and their close relatives designed to acquaint the non-biology major with our dependence on and interactions with insects. Insect structure, biology, effects on

human health and food supplies and control strategies are discussed. Offered without lab. Lec 3. **Cr 3.**

ENT 226 Introductory Entomology

Fundamental principles of insect life and the relation of insects to plants, animals, and man. Laboratory includes a study of structure, and systematics. An insect collection is required. (Offered in the fall semester only). Prerequisite: BIO 100. Lec 2, Lab 4. **Cr 4.**

ENT 227 Introductory Entomology for Foresters

Principles of insect life with emphasis in lectures on technical aspects of interest to professional foresters. Laboratory includes a study of insect structure, physiology, and systematics. (Offered in the spring semester only). Prerequisite: BIO 100. Lec 2, Lab 2. **Cr 3.**

ENT 247 Problems in Entomology I

Open to juniors and seniors in any college who have special interest and qualifications in entomology. **Cr Ar.**

ENT 248 Problems in Entomology II

Open to juniors and seniors in any college who have special interest and qualifications in entomology. **Cr Ar.**

ENT 394 Cooperative Education in Entomology

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.**

ENT 396 Field Experience in Entomology

An approved work experience for which academic credit 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.**

ENT 440 Insect Biology and Taxonomy

Introduction to the orders and families of insects: their characteristics, evolution, biology, and systematics. Laboratory emphasis is on identification of lower orders and Coleoptera. Prerequisite: ENT 226 or 227. Lec 2, Lab 4. **Cr 4.**

ENT 443 Forest Insect Ecology

Study of the physical and biotic environmental

components which regulate the distribution and abundance of insects. Forest insects are used to illustrate ecological principles. Prerequisite: ENT 226 or 227. Lec 2, Lab 2. **Cr 3.**

ENT 449 Economic Entomology

The basic principles involved in applied control of insects. Biological, chemical, and newer types of control methods and their ecological implications. Legislation related to use of chemicals. Laboratory includes independent study, demonstrations, and selected readings of special topics. Prerequisite: ENT 226 or 227. Lec 2, Lab 2. **Cr 3.**

ENT 453 Biology and Taxonomy of Advanced Orders

Characteristics, biology, and systematics of Lepidoptera, Diptera, and Hymenoptera. Laboratory deals exclusively with the identification of native and exotic specimens within those three orders. Prerequisite: ENT 226 or 227. Lec 2, Lab 4. **Cr 4.**

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. Roles as food sources for fish and waterfowl and indicators of water quality emphasized. 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 541 Medical Entomology

Training in recognition, classification, life cycles, habits and control of insects and near relatives that cause disease or function as vectors of pathogens. Prerequisite: ENT 226 or ENT 227 or permission. Lec 2, Lab 2. **Cr 3.**

ENT 551 Morphology of Insects

External and internal anatomy of insects. Laboratory includes examination of external and internal organs of representative insects. Prerequisite: ENT 226 or 227. Lec 2, Lab 4. **Cr 4.**

ENT 561 Seminar

Review of entomological literature on assigned topics and its presentation. Subject area of seminar varies each semester. Course can be taken more than once for credit. **Cr 1.**

ENT 562 Seminar

Review of entomological literature on assigned topics and its presentation. Subject area of seminar varies each semester. Course can be taken more than once for credit. **Cr 1.**

ENT 580 Insect Physiology

Lectures and laboratories on the fundamental principles of insect life systems in terms of their

structure and function. Laboratory techniques and current literature will be emphasized. Prerequisite: Permission. Lec 2, Lab 2. **Cr 3.**

Interdisciplinary Course**INT 480 (ENT, PSS) Pesticides and the Environment**

Study of the properties of pesticides and their fate in the environment. Emphasis will be on insecticides, fungicides and herbicides, application technology, governmental regulations, and environmental concerns. Prerequisite: One semester of biology or chemistry. Rec 3. **Cr 3.**

Bachelor of Science in Microbiology

The B.S. in Microbiology is offered by the faculty of the Department of Microbiology.

Professors Nicholson (Chairperson), Bain, Gersham; Associate Professors DeSiervo, Jerkofsky, King, Moody, Reno; Assistant Professor Singer

The microbiology curriculum is designed to give students a thorough knowledge of biological principles while providing skills needed to study microorganisms, cell culture, molecular biology, viruses, immunology, etc.

Students with a background in microbiology are prepared for a wide variety of positions in biotechnology, industry, government, public health laboratories, and research. With proper selection of electives, a student can satisfy requirements to all medical and dental schools.

Students who are well qualified and interested are encouraged to pursue graduate work for further specialization. The Department of Microbiology offers a thesis master of science degree and a non-thesis Master of Professional Studies (M.P.S.); a doctor of philosophy degree can be earned through a cooperating program.

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, in a course of study that conforms to the following curriculum.

Curriculum in Microbiology**Microbiology**

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 OR	2
MCB 480	Seminar and MCB 487 Independent Study	2
	TOTAL HOURS	30

Physical Sciences

CHY 111/112	General Chemistry I/II	8
PHY 111/112	General Physics I/II	8
CHY 240	Quantitative Analysis	4
	TOTAL HOURS	20

Biological Science

BIO 100	Basic Biology	4
ZOL 204	Animal Biology	4
	TOTAL HOURS	8

Organic Chemistry and Biochemistry

CHY 251/253	Organic Chemistry I Lecture/Laboratory	5
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CHY 252/254	Organic Chemistry II Lecture/Laboratory	5
BCH 451	Principles of Biochemistry	4
BCH 463	Introduction to Biochemical Laboratory Methods	2
	TOTAL HOURS	16

Mathematics

MAT 126	Analytic Geometry and Calculus	4
MAT 232	Principles of Statistical Inferences	3
COS 210	Introduction to Computing Using COBOL	3
	TOTAL HOURS	10

Communication

ENG 101	College Composition	3
ENG 212	Intermediate Composition	3
SPC 103	Fundamentals of Public Communication	3

Humanities and Social Sciences

	Electives	15
	TOTAL HOURS	15
LSA 117	Issues and Opportunities	1
	Free Electives	12
	Science electives from approved list	6

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

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

A basic biology course dealing with general principles as illustrated by microorganisms, in particular, bacteria and viruses. 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. Mi-

croscopy, cultivation, biochemical activities and control of microorganisms. Prerequisite: or co-requisite: MCB 300. Cr 1.

MCB 305 General Microbiology Laboratory

A laboratory study of the properties of bacteria and related microorganisms. 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 work experience for which academic credit 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.

MCB 400 Our Microbial World

Basic principles of microbiology and their application to agriculture, industry, sanitation, public health and disease. C.E.D. only. Rec 3. Cr 3.

MCB 410 Determinative Bacteriology

Morphological, cultural and physiological characteristics of important bacterial groups. 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

The relationships and characteristics of microorganisms that cause disease in man and animals and the response of the latter to the invasion of the parasite. Prerequisite: MCB 300, MCB 301. Lec 2, Lab 4. Cr 4.

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

An introductory course in the study of viruses, emphasizing their nature, methods of cultivation, mode of transmission, genetics and classification. Prerequisite: MCB 420 or permission of instructor. Lec 2, Lab 4. Cr 4.

MCB 460 Microbial Biotechnology

An analysis of established and new technologies in applied biology with an emphasis on the role of microbes and microbiological techniques. Topics will 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. Basic subject matter including gene mutations, genetic mapping, plasmids and transposons, mechanisms of genetic exchange, recombination, and gene regulation will be discussed. Prerequisite: MCB 300 or permission of instructor. Cr 3.

MCB 497 Independent Study

A laboratory and conference for students desiring to pursue some particular line of investigation. Prerequisite: permission of instructor. 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, on animal-microbe and plant-microbe interactions, and on the relationship between physiological and ecological attributes of microorganisms. Prerequisites: MCB 300 or INT 419 or permission of instructor. Lec 3. Cr 3.

MCB 515 Marine Bacteriology

Study of properties and distribution of bacteria in the marine environment. Attention given to 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 placed on pathology, host immunity and the specific viral, bacterial, and mycotic pathogens of cultural and wild fish. Laboratory covers diagnostic techniques in identifying the above organisms. Prerequisite: MCB 300, 301 or permission of instructor. Lec 2, Rec 1, Lab 4. Cr 4.

MCB 530 Cell Culture

Study of cell culture techniques designed to acquaint the student with methods of growing tissue cells from various sources and the practical applications. Prerequisite: MCB 301 or BOT 456. 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: MCB 540 or concurrent registration therein. 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 will be placed on topics of current significance. Prerequisite: MCB 450 or permission of instructor. Lec 3. Cr 3.

MCB 560 Molecular Genetics

An advanced course taught from reviews and the 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.

Interdisciplinary Course**INT 438 (FOS, MCB) Food Microbiology**

Importance of microorganisms in food processing, spoilage, and preservation. Role of microor-

ganisms in fermentation and production of protein, enzymes, and other products. Food as vehicle of infection and intoxication. Lec 3, Lab 4. **Cr 4.**

Bachelor of Science in Molecular and Cellular Biology

The Bachelor of Science in Molecular and Cellular Biology is an interdisciplinary program coordinated by the Biochemistry Department.

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 expected to have 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 necessarily 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.

For further, detailed information about course offerings, consult the program listings of participating departments, e.g. Biochemistry, Botany, Microbiology.

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
	TOTAL HOURS	26

Physical Chemistry

(choose one)

BCH 467	Physical Biochemistry	(4)
CHY 371	Physical Chemistry I	(4)
PHY 347	Biophysics	3
	TOTAL HOURS	3(4)

Cell Biology

(choose one)

MCB 430	Bacterial Physiology	4
ZOL 480	Cell Physiology	(4)
	TOTAL HOURS	4

Genetics

(choose one)

MCB 490	Introduction to Microbial Genetics	3
BOT 445	Plant Genetics	(3)
ZOL 462	Principles of Genetics	(4)
	TOTAL HOURS	3(4)

Program Electives

Courses are selected from the following list:

Physiology

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 Physiology	4

Techniques					
BCH 481	Radiation Biology	2	MCB 300	General Microbiology	3
BCH 483	Laboratory in Radiation Biology	2	MCB 305	General Microbiology Laboratory	2
COS 220	Introduction to Computer Science I	3	CHY 111/112	General Chemistry I/II	8
COS 460	Interactive Computer Graphics	3	CHY 251/252	Organic Chemistry Lec- ture I/II	6
			CHY 253/254	Organic Chemistry Labo- ratory I/II	4
Biochemistry			PHY 111/112	General Physics I/II	8
BCH 525	Proteins and Enzymes	3	MAT 126/127	Analytic Geometry and Calculus	8
BCH 542	Biochemical Mechanisms	3		TOTAL HOURS	47
BCH 488	Seminar in Computer Applications in the Bio- chemical Sciences	1	Communications		
			ENG 101	College Composition	3
Other Areas			SPC 103	Fundamentals of Public Communication	3
BOT 557	Plant Virology	4		TOTAL HOURS	6
MCB 440	Introductory Immunolo- gy	3	Humanities and Social Sciences		
MCB 540	Advanced Immunology	3	Students choose courses from a wide variety of offerings.		
ZOL 465	Evolution	3		TOTAL HOURS	15
ZOL 436	Biological Ultrastructure	3			
MCB 450	Virology	4	LSA 117	Issues and Opportunities	1
MCB 550	Advanced Topics in Ani- mal Virology	3	MINIMUM HOURS REQUIRED FOR GRADUATION: 120		
	TOTAL HOURS	23			
Supporting Sciences and Mathematics					
BIO 100	Basic Biology	4			
BOT 201	Plant Biology OR	4			
ZOL 204	Animal Biology	(4)			

School of Human Development

Professors Brightman, McIntire, Oliver; Associate Professors Baranowski, Birnbaum, Cook, Csavinszky, Hyatt, Milardo, Schilmoeller, Schomaker; Assistant Professors Ahern, Balcazar, Webber

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 persons 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, humanities, social and natural sciences, and specialized subjects from the School of Human Development. Students develop an area of specialized study to prepare professionally for such fields as dietetics; food service administration; teaching in the public schools, and adult or public service agencies in health, family life, home economics, early childhood education, elementary education and extension; home economics in business and consumer service; fashion merchandising; and social and community service. Students may prepare for graduate study leading to research, college teaching, and other specialized professional positions.

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.

The dietetics curriculum meets the requirements of the American Dietetic Association for internships and traineeships. Education curricu-

la 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 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 a course in oral communication, and three hours in a written communications course.

Laboratory Sciences: 8 hours

To be selected from biology, botany, geology, chemistry, entomology, physics, microbiology, or zoology. Biochemistry is required for food and nutrition, and health and family life. Chemistry is required for a food and nutrition major.

Social Sciences: 12 hours

PSY 100 is required, and others may be selected from anthropology, sociology, psychology, government, economics, political science, or modern society. Introductory courses are not to exceed nine hours.

Humanities: 9 hours

Philosophy, art, literature, music, history, intermediate and advanced levels of language, and honors. Two fields must be represented in these nine hours.

Requirements

Pre-professional sequences and electives complete the required 120 hours. In addition, students who enter the program as freshmen must complete the freshman seminar, LSA 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 children in educational settings may select from two options. The early childhood environments option prepares students to work with the younger child in a variety of settings such as infant care, day care, nursery schools, kindergarten, recreation programs, counseling and mental health centers, pediatric wards, child development centers and clinics, and respite care for children of families experiencing duress. Those in this option who specifically intend to work in educational settings may apply for certification in elementary education with an emphasis on nursery-kindergarten through third grade. The elementary education option prepares students to *apply* for the elementary (K-8) education certificate; the certification process is governed by the Maine State Department of Education and Cultural Services, Augusta, Maine.

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 UAP and Interdisciplinary Concentrations in Index.)

CHF 200, 201, and 202 are required in all of the following concentrations and each must be passed with a grade of "C" or better. Students earning less than a "C" in any of these courses must re-take that course.

Students electing the Early Childhood Environments or Elementary Education Options must take the following courses:

Concentration A

Early Childhood Environments

K-8 Certification

CHF 201/202	Introduction to Lifespan Development I/II	6
CHF 200	Family Interaction	3

CHF 203	Practicum in Early Childhood Programs	3
ECE 420	Creativity and Young Children	4
CHF 331	Cognitive Development	3
ECE 321/322	Curriculum for Young Children I/II	6
ECE 421	Student Teaching in Early Childhood*	6
ECE 422	Field Placement in Early Childhood Environments*	6
ECE 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
ERI. 318	Teaching Language Arts in the Elementary School	3
TOTAL HOURS		53

Plus a subject concentration of 24 credits. However, if the subject concentration is in either child development or psychology, only nine additional credits are needed because 15 credits in child development are counted toward the total of 24 credits.

*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, a speech and hearing evaluation, and a physical exam prior to placement.

Concentration B

Elementary Education

K-8 Certification

CHF 201/202	Introduction to Lifespan Development I/II	6
CHF 200	Family Interaction	3
CHF 203	Practicum in Early Childhood Programs	3
ECE 420	Creativity and Young Children	4
CHF 331	Cognitive Development	3

CHF 432	Socialization of the Child	3
EDB 202	The American School	3
EDB 204	The Teaching Process	3
HNF 101	Introduction to Food and Nutrition	3
ERL 313	Teaching of Reading in the Elementary School	3
ERL 318	Teaching Language Arts in the Elementary School	3
EMA 314	Teaching Mathematics in Elementary School	3
ESS 315	Teaching Social Studies in the Elementary School	3
ESC 316	Teaching Science in the Elementary School	3
STT 490	Full-Day Student Teaching (Elementary)	6
MAT 107	The Structure of Arithmetic I	3
	TOTAL HOURS	55

Plus a subject concentration of 24 credits. However, if the subject concentration is in either child development or psychology, only nine additional credits are needed because 15 credits in child development are counted toward the total of 24 credits.

Concentration C

Individual and Family Services

CHF 200	Family Interaction	3
CHF 201.202	Introduction to Lifespan Development I/II	6
CHF 432	Socialization of the Child	3
CHF 451	Family Relationships	3
SWE 320	Introduction to Social Work and Social Welfare	3
SWE 340	Social Welfare Policies and Issues	3
SWE 361	Social Work Methods	3
	TOTAL HOURS	24

At least 18 additional hours from the following:

CHF 203	Practicum in Early Childhood Programs	3
CHF 331	Cognitive Development	3
CHF 351	Human Sexuality	3
CHF 352	Strategies for Family Intervention	3
CHF 404	Selected Topics in CDFR	3
CHF 406	Introduction to Research* Methods in CDFR	3
CHF 409	Special Problems in Child Development	3

CHF 431	Parenting	3
CHF 433	Adolescence	3
CHF 434	The Older Adult	3
CHF 435	Developmental Assessment	3
CHF 452	Violence in the Family	3
	TOTAL HOURS	18

Recommended Electives (To complete 120 hours required for graduation):

Students are not restricted in their choice of electives, but rather should consult with their advisor to select courses which best suit professional goals. The following list of recommended electives is meant to be illustrative, but not necessarily exhaustive.

EDU 500	The Computer in Education
ENG 317	Advanced Professional Exposition*
HNF 101	Introduction to Foods and Nutrition
HOM 485	Family Financial Problems
PAA 200	Public Administration
PAA 340	Public Budgeting and Financial Administration
PSY 308	Theories of Personality
PSY 312	Abnormal Psychology
PSY 330	Social Psychology
PSY 341	Statistics in Psychology*
MAT 232	Principles of Statistical Inference*
SOC 316	Sociology of Aging
SOC 318	Sociology of the Family
SPC 110	Introduction to Human Communication
SPC 257	Business and Professional Communication

*Highly recommended for students intending to pursue education beyond the Bachelor's degree.

Concentration D

General

A minimum of 33 credits in child development and family relations courses is required. (Note: 48 credits of child and family courses is the maximum amount of credit that will count toward the 120 credits needed to graduate.)

The following courses are required:

CHF 200	Family Interaction	3
CHF 201/202	Introduction to Lifespan Development I/II	6
HNF 101	Introduction to Food and Nutrition	3
	TOTAL HOURS	12

Bachelor of Science in Food and Nutrition

This program is designed to give professional preparation for those students who want to become dietitians or food service administrators in commercial, industrial, publicly owned, or private food establishments. These options provide the minimum competencies for admission into an approved American Dietetic Association program (internship or traineeship) or for graduate level education.

A minor in food and nutrition consisting of 15 credit hours above introductory level courses is available to any student.

Curriculum for Pre-Dietetic Intern*

HNF 101	Introduction to Food and Nutrition	3
HNF 102	Introductory Food and Nutrition Laboratory	1
HNF 103	Family Food Management	3
HNF 221	The Science of Food Preparation	4
HNF 243	Experimental Foods	3

*Approved by the American Dietetic Association and recommended for all dietitians.

HNF 121/201	Food Service Systems Management I/II	8
HNF 301	Nutrition and Growth	3
HNF 310	Human Nutrition	3
HNF 320	Nutrition in Abnormal Conditions	4
HNF 401	Problems in Food and Nutrition Education	3
EDB 221	Educational Psychology	3
BUA 325	Principles of Management and Organization	3
MCB 300/305	General Microbiology/Laboratory	5
BIO 100	Basic Biology	4
ZOL 204	Animal Biology	4
ZOL 377	Animal Physiology/Laboratory	4
ECO 110	Introduction to Economics	3
CHY 111/112	General Chemistry I/II	8
BCH 221	Organic Chemistry/Laboratory	4
BCH 322	Biochemistry/Laboratory	4
ANT 215	Social Anthropology	3
	OR	
ANT 102	Introduction to Anthropology II	(3)
	TOTAL HOURS	80

Bachelor of Science in Home Economics

The Home Economics 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. Home economics students are provided with a broad general education and a strong foundation for a variety of professional careers in business, education, and service fields. Several concentrations allow 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 consumer service representatives for banks, utilities, food and appliance retailers; educators in schools, government agencies, and extension; managers of textile and apparel stores; fashion consultants; entrepreneurs of home-based businesses; and department store management training program participants.

Programs of Study

Undergraduate study leads to a B.S. degree in home economics. Concentrations included in the major are:

- A. Consumer and Home Economics Education
- B. Business/Consumer Service
- C. Clothing, Textiles
- D. General Home Economics

Each student must choose a program designed to provide competencies in one aspect of the profession plus special interest courses in related areas directed toward a specific professional goal. The four-year program includes 36 hours of liberal education, courses in each area of home economics, and a concentration of courses in the student's chosen specialty:

General Education (from basic core): 36 hours
Home Economics Courses (see listing below):
37-45 hours

Professional Education (for consumer and home-making education): 21 hours
 Electives: to complete 120 hours
 Computer literacy is recommended.

Curriculum in Home Economics

Concentration A

Consumer and Home Economics Education

CHF 200	Family Interaction	3
CHF 201/202	Introduction to Lifespan Development I/II	6
CHF 203	Practicum in Early Childhood Programs	3
CLD 222	Apparel Construction	3
CLD 225	Consumer Textiles	3
CLD 423	Comparative Tailoring OR	3
CLD 424	Creative Clothing Construction	(3)
HOM 381	Family Resource Management	3
HOM 391	Housing	3
HOM 482	Management in Homes	3
HOM 485	The Family's Financial Problems	3
HOM 487	The Consumer in the Present Economy (alt. HOM 482)	(3)
HOM 488	Explorations in Current Consumer Issues (alt. HOM 482)	(3)
HOM 493	Equipment and Energy Usage	3
HNF 101	Introduction to Food and Nutrition	3
HNF 103	Family Food Management	3
HNF 221	The Science of Food Preparation	4
HNF 310	Human Nutrition (alt. HUM 221)	(3)
CLD 231	Design Appreciation	3
CLD 492	Interior Design	3
EDB 202	The American School	3
SED 300	Survey of Exceptionality	3
HEC 270	Introduction to Home Economics	1
HEC 371	Curriculum Development in Home Economics Education and Health and Family Life	3
HEC 372	Techniques of Teaching Home Economics and Health and Family Life	3
HEC 373	Supervised Student Teaching	15
	TOTAL HOURS	80

Concentration B

Business-Consumer Service

CLD 225	Consumer Textiles	3
CLD 231	Design Appreciation	3
CLD 428	Seminar: Dress and Adornment	3
HEC 270	Introduction to Home Economics	1
HNF 103	Family Food Management	3
Twelve hours from the following:		
HOM 381	Family Resource Management	3
HOM 482	Management of Homes	3
HOM 485	The Family's Financial Problems	3
HOM 487	Consumer in the Present Economy	3
HOM 488	Explorations in Current Consumer Issues	3

Plus 3 hours in clothing, textiles and related arts, 6 hours in housing, interior design and equipment, and, if selected, 3-9 hours in child development and family relations. Twelve hours of business courses are chosen to meet student needs.

TOTAL HOURS 43

Concentration C

Clothing and Textiles

CLD 222	Apparel Construction	3
CLD 225	Consumer Textiles	3
CLD 231	Design Appreciation	3
CLD 428	Seminar: Dress and Adornment	3
HEC 270	Introduction to Home Economics	1
CLD 233	Applied Design and Decoration	3
CLD 423	Comparative Tailoring (alt. to CLD 424)	3
CLD 424	Creative Clothing Construction (alt. to CLD 423)	(3)
CLD 429	Special Problems in Clothing and Textiles	6
CLD 433	Textile Decoration	3
CLD 439	Special Problems in Clothing, Textiles and Design	3
HOM 487	Consumer in the Present Economy	3
HOM 488	Current Consumer Issues	3

Students may select 9 hours in housing and interior design; Family Food Management (3 hrs.); 6 hours in child development and family relations; or 12 hours of business courses if desiring a career in fashion merchandising. Students may also choose HUD 396, Field Experience in Human Development (1-16 hrs.).

TOTAL HOURS	49
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Concentration D

Home Economics-General

CHF 200	Family Interaction	3
CHF 201/202	Introduction to Lifespan Development I/II	6
CLD 222	Apparel Construction	3
CLD 225	Consumer Textiles	3
CLD 231	Design Appreciation	3

HOM 381	Family Resource Management	
HOM 485	The Family's Financial Problems	
	OR	
HOM 487	The Consumer in the Present Economy	
HNF 101	Introduction to Food and Nutrition	
HNF 103	Family Food Management	
HEC 270	Introduction to Home Economics	

Plus 3 hours in consumer studies, housing and management, 3 hours in food and nutrition, 3 hours in clothing and textiles, and 12 additional hours in School of Human Development course:

TOTAL HOURS	5
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Bachelor of Science in Health and Family Life Education

This program is designed to give professional preparation for those who want to become public school teachers or supervisors in the newer fields of health and family life education. The program includes general health education. The content of the curriculum has been designed to fulfill national and state recommendations regarding the preparation needed for such teachers.

General Education (from basic core)	35 hours
Professional Education	22 hours

Health and Family Life

CHF 200	Family Interaction	3
CHF 201/202	Introduction to Lifespan Development I/II	6
CHF 351	Human Sexuality	3
CHF 431	Parenting	3
CHF 432	Socialization of the Child	3
CHF 451	Family Relationships	3
HNF 101	Introduction to Food and Nutrition	3
HOM 485	The Family's Financial Problems	3
MCB 300/305	General Microbiology/Laboratory	5
PSY 312	Abnormal Psychology	3
BIO 100	Basic Biology	4

ZOL 208	Anatomy and Physiology	
ZOL 316	Drug Use and Abuse	
	TOTAL HOURS	4

Professional Education Courses for K-12 Certification

HEC 372	Techniques of Teaching Home Economics and Health and Family Life	
HEC 373	Supervised Student Teaching	1
EDB 202	The American School	
EDB 221	Educational Psychology	
HPR 278	Health Education	
HPR 383	Planning the Health Education Curriculum	
	TOTAL HOURS	2

OR

Agency Concentration (No Certification)

HEC 476	Adult Education	
SWE 320	Introduction to Social Work and Social Welfare	
SWE 340	Social Welfare Policy and Issues	
HUD 394	Cooperative Education in Human Development	

PAA 200	Introduction to Public Management and Bureaucracy	3
PAA 340	Public Budgeting and Financial Administration	3
	TOTAL HOURS	18

Courses in Child Development and Family Relationships

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 Lifespan Development I

Influences on human development from conception through middle childhood. Theoretical perspectives, empirical evaluation, and practical implications. Cr 3.

CHF 202 Introduction to Lifespan Development II

Influences on human development from early adolescence through old age. 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. Rec 2. 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

Sexuality and its social implication 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 352 Strategies for Family Intervention

Examines the family as a system interacting with other social systems and focuses on the practice and process of assisting or intervening in families. Prerequisite: CHF 200. Cr 3.

CHF 404 Selected Topics in Child Development/Family Relations

Review of specific subject areas in the field. Subject areas vary by semester. (May be taken more than once for credit.) Prerequisite: CHF 201. 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, CHF 202 or permission. Cr 3.

CHF 409 Special Problems in Child Development

Prerequisite: permission. Cr Ar.

CHF 431 Parenting

Parent behavior and the dynamics of parenthood are studied. Emphasis is on interpersonal, familial, and societal roles of parents, and factors influencing role behaviors and expectations. Prerequisite: CHF 200, CHF 201 and CHF 202. Cr 3.

CHF 432 Socialization of the Child

A study of normal development and behavior with emphasis on children and the impact of peers, school, and family on the developing child. Theory in child development is also examined. Prerequisites: CHF 201 and CHF 202. Cr 3.

CHF 433 Adolescence

Growth and development during the adolescent years. Conceptual models and recent research are discussed. Prerequisite: CHF 200, CHF 201, 202 or permission. Cr 3.

CHF 434 The Older Adult

Developmental processes and problems in later adulthood. Theory and research on personal growth, learning, sexuality, work and retirement, and family relations in the later years are discussed. Prerequisite: CHF 200, CHF 201, 202 or permission. Cr 3.

CHF 435 Developmental Assessment

An introduction to the basic principles and issues of assessment. Gives students the opportunity to develop 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. Lec 3. 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.

CHF 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.

CHF 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.

CHF 525 Theories of Child Development

Theoretical conceptualizations influencing the study of child development. Prerequisite: Permission of instructor. Cr 3.

CHF 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.

CHF 540 Theories and Concepts of Family Development

A critical evaluation of theories and concepts utilized in the understanding and study of family functioning. An interdisciplinary approach is utilized. Prerequisite: Permission of the instructor. Cr 3.

CHF 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.

CHF 560 Seminar in Child Development

Reports and discussions of research findings in child development. Cr 3.

CHF 585 Newer Findings in Child Development and Family Relationships

Recent findings in child development and family relationships selected to help teachers interpret children's interaction and adjustment to peers, to family, to school and to society. Cr 3.

Courses in Clothing, Textiles, and Design

CLD 222 Apparel Construction

Fundamentals of garment construction and analysis of fit. Decision-making skills emphasized. Lec 2, Lab 2. Cr 3.

CLD 225 Consumer Textiles

Fundamentals of fibers, yarns, fabrications, and finishes as related to consumer selection, use and care of textiles. Cr 3.

CLD 231 Design Appreciation

Development of appreciation of beauty 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. Lec 3. Cr 3.

CLD 233 Applied Design

Application of design principles to problems in visual merchandising such as displays, advertising, and other promotional media. Prerequisite: CLD 231. Lab 2, Lec 2. Cr 3.

CLD 423 Comparative Tailoring

Women and men's custom and speed methods of tailoring, including fitting principles and finishing details. Development of three-dimensional form through the construction of a tailored garment. Prerequisite: CLD 222, or permission. Lab 2, Lec 2. Cr 3.

CLD 424 Creative Clothing Construction

An introduction to the principles of fashion design through the application of flat pattern methods. Development of a personal master pattern and the creation of an original garment design. Prerequisite: CLD 222 or permission. Lec 2, Lab 2. Cr 3.

CLD 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.

CLD 429 Special Problems in Clothing and Textiles Cr 1-3.**CLD 433 Textile Decoration**

Application of design principles to surface decoration on textiles. Techniques, such as silk screen, batik, and direct dye will be investigated. Prerequisite: CLD 231. Lab 2, Rec 2. Cr 3.

CLD 439 Special Problems in Clothing, Textiles and Design Cr 1-3.**CLD 441 Seminar on Consumer Problems in Textiles and Clothing**

Consumer issues related to clothing and textiles in a variety of managerial, technological, personal, and social situations. Informative labeling and consumer protection. Comparative analysis of new fiber, fabrications, finishes. Prerequisite: Undergraduate courses in textiles and clothing, or permission. Cr 3.

CLD 492 Interior Design

Planning residential interiors to meet human needs of individuals and families. Selections, organization of furnishing and materials. Layout in floorplans and wall elevations. Historic and contemporary interiors and furnishings. Prerequisite: CLD 231 or permission. Rec 2, Lab 2. Cr 3.

CLD 531 Graduate Seminar in Textile Design

Prerequisite: permission. Cr 1-3.

Courses in Early Childhood Environment

ECE 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 as they apply to the development of early childhood environments. Prerequisite: CHF 201, CHF 203, ECE 420 or permission. Cr 3.

ECE 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). These course requirements will evolve from the contents structured in ECE 321. Prerequisite: CHF 201, ECE 203, ECE 420, ECE 321 or permission. Cr 3.

ECE 420 Creativity and Young Children

Exploration of theoretical and research evidence pertaining to the nature of creativity and the

conditions requisite for its expression. Included will be the developmental stages, strategies, materials and workshops in specific areas including children art, music, creative movement, story telling, play and creative dramatics. A practicum for the participation in a translation of theory into practice will be required. Prerequisite: CHF 203 or permission, junior standing. Cr 4.

ECE 421 Student Teaching in Early Childhood

Supervised teaching in one of the following settings; nursery school, day care, or kindergarten through grade three. Prerequisite: senior standing. Cr 6.

ECE 422 Field Placement in Early Childhood Environments

Individual study in selected early childhood settings such as family day care homes, counseling and mental health centers, child development programs, child and family oriented hospital settings. Experience will include 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.

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 ECE 421 and ECE 422 or permission of instructor. (Pass/Fail Grade Only). Cr 1.

Courses in Home Economics

HEC 270 Introduction to Home Economics

A seminar to introduce preservice home economists to philosophies; components; professional role; career opportunities; role of the teacher; students; the educational environment. An introductory course required of all home economics majors. Rec 1. Cr 1.

HEC 371 Curriculum Development in Home Economics Education and Family Life

Current educational philosophies, principles, and practices; their application to home economics education through program planning and curriculum development. Prerequisite: HEC 270 or permission. Rec 3. Cr 3.

HEC 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. Learnings reinforced through microteaching and experience in public school classrooms. Prerequisite: HEC 270 and 371. Cr 3.

HEC 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: HEC 270, HEC 371 and HEC 372. Cr 15.

HEC 374 Seminar in Home Economics

Explanation of newer concepts and future developments in home economics as a profession and as related to career opportunities. Rec 1. Cr 1.

HEC 411 Supervision of Student Teaching in Home Economics

Theory and principles of supervision for improved educational programs; procedures for improved communication between supervisor and other personnel; evaluation of growth with individuals and programs. Cr 3.

Note: Designed for supervisory teachers, city/county/state supervisors, extension agents, and others in a supervisory capacity. Supervising teachers participating in student teaching programs do so on an individual basis. They must participate in a workshop or institute on the application of supervision theory to student teachers following a course which includes supervision principles and theory. These workshops will be sponsored by the institution with which the teacher will work.

HEC 475 Advanced Home Economics Education

Current philosophy of teaching home economics; concept development in selected areas of the field with attendant unit development. Study of department management selection and use of space and equipment, and other pertinent issues related to teaching home economics in secondary schools. Cr 3.

HEC 476 Adult Education

Need for and purpose of adult education programs. Consideration of learning program development, organization, and administration of programs. Emphasis on adult education through the public schools. Cooperative Extension Service, and community agencies. Cr 3.

HEC 490 Methods of Teaching Home Economics

Methodology effective in teaching at different development levels, in several subject areas, according to objectives of programs. Experimentation in methods and teaching aids, considering class size and time schedule. Emphasis is on creative teaching. Review of research in methodology. Cr 3.

HEC 579 Special Problems in Home Economics Education

Cr 1-3.

Courses in Food and Nutrition**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. Rec 3. Cr 3.

HNF 102 Introductory Food and Nutrition Laboratory

Students use Study Guide, audiocassettes, 35 mm slides, measuring devices and food demonstrations for increasing understanding of nutrition principles for application through the lifespan. Study of nutritional assessment through evaluation of individual anthropometric measurements and dietary intake records. To be taken concurrently with HNF 101. Required of Fn and HeE majors, elective for other majors. Lab 2. Cr 1.

HNF 103 Family Food Management

The criteria for making intelligent food choices. Application of those standards in the planning of family meals. Limited amount of food preparation and service. Rec 2, Lab 2. Cr 3.

HNF 121 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 utilized by management 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

Supervised observation and administrative of selected food services. Theories of management, cost control, pricing, merchandising, purchasing, and training personnel. Local, state, and

federal regulations. Current trends affecting management. Prerequisite: HNF 121. Rec 2, Lab 4. **Cr 4.**

HNF 203 Special Problems in Food Service Management
Permission. **Cr 1-3.**

HNF 221 The Science of Food Preparation
Factors that determine results obtained in preparation and preservation of food. Selection of appropriate preparation techniques, considering chemical composition reactions, and structure stressed. Prerequisite: HNF 103, BCH 208 or BCH 322. Lec 2, Lab 4. **Cr 4.**

HNF 243 Experimental Foods
An experimental approach to the preparation of foods. An individual project will be selected, defined, planned, executed, reported and evaluated. Prerequisites: HNF 221, BCH 322 and junior and senior standing. Lec 1, Lab 4. **Cr 3.**

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
A nutrition course 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 210. **Cr 3.**

HNF 301 Nutrition and Growth
Principles of nutrition applied to feeding children from infancy through adolescence. Study of relationship between nutrition, growth and learning behavior. Prerequisite: HNF 101. **Cr 3.**

HNF 310 Human Nutrition
Body metabolism and requirements for nutrients by normal individuals. Prerequisite: BCH 322 and ZOL 204 or equivalent. **Cr 3.**

HNF 320 Nutrition in Abnormal Conditions
Principles involved in adjusting diets for diseases and abnormal conditions that may benefit from variations in normal diets. Prerequisite: HNF 310. Rec 3, Lab 2. **Cr 4.**

HNF 370 Fundamentals of Nutrition
Influence of food patterns on human health. The nutrients, interrelationships, requirements through the life cycle, food sources, effect of processing and storage, food fads, safety in food handling, individual diet studies, school nutrition programs and consumerism. Rec 3. **Cr 3.**

HNF 371 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.**

HNF 398 Special Problems in Food and Nutrition
Opportunity is provided for specialization in specific areas of food and nutrition. Prerequisite: HNF 101 or 103 or permission. **Cr 1-3.**

HNF 401 Problems in Food and Nutrition Education
Methods and curriculum materials for the nutritionist to meet individual and community health needs. Understanding methods of demonstrating food preparation and preservation. Selection of concepts appropriate for teaching nutrition in health programs in grades K-12, to adult education groups; and in agencies related to supplying food or preventing disease. Prerequisites: HNF 101, 103 and senior standing or permission. Rec 2, Lab 4. **Cr 1-4.**

HNF 501 Advanced Human Nutrition
Basic scientific and medical discoveries in human nutrition with emphasis on biochemical and physiological principles. Relationship of diet to human health and well-being. Prerequisite: BCH 322, HNF 310 or equivalent. (alternate years) **Cr 3.**

HNF 502 Seminar in Nutrition
Reports and discussion of recent developments in nutrition and related fields with special attention to critical analysis. Prerequisite: HNF 310 or equivalent. **Cr 1-2.**

HNF 503 Special Problems in Nutrition: Community Nutrition
A study of the role of the nutritionist in meeting individual and community health needs; understanding methods of assessment of nutritional status; design and evaluation of intervention programs and community educational programs. **Cr 1-3.**

HNF 510 Digestion and Absorption of Nutrients
The processes by which nutrients are digested into simple compounds for absorption, and the mechanisms by which these digestive end products are absorbed. Clinical conditions related to abnormal gastrointestinal function are considered. Prerequisites: HNF 310 and ZOL 377 or permission. Offered alternate years. **Cr 2.**

HNF 596 Nutrition Education Practicum
A planned program of nutrition education experiences in community, state and federal agen-

cies and in an educational setting selected to meet individual needs. Prerequisite: HNF 503. Cr 1-6.

Courses in Consumer Studies, Housing, and Management

HOM 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.

HOM 391 Housing

Physical, social and emotional aspects of the housing environment. Floor plan principles in relation to family life cycle. Local government controls; natural problems in housing. Prerequisite: junior standing. Cr 3.

HOM 482 Management in Homes

Comparison of resources and home management practices of families and individuals of different social, economic, and educational levels at various stages of the family life cycle. Observation and analysis of management of resources to achieve goals through field placement with public and private agencies. Prerequisite: HOM 281. Rec 2, Lab 2. Cr 3.

HOM 485 The Family's Financial Problems

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, legal aspects of transactions. Prerequisite: junior standing. Cr 3.

HOM 487 The Consumer in the Present Economy

Examination of consumer problems; dimensions of the consumer role; interaction of consumers, government, and the market; consumer decision making; appraisal of information sources useful to consumers; analysis of programs for consumer protection. Cr 3.

HOM 488 Explorations in Current Consumer Issues

Issues of current interest to consumers. Issues will vary from year to year based on importance and student interest. Social and economic effect on families will be emphasized. Cr 3.

HOM 489 Special Problems in Consumer Studies, Housing, Management Cr 1-3.

HOM 493 Equipment and Energy Usage

Consumer buying of equipment for the home. Energy conservation in the use of small electric and major appliances. Prerequisite: junior standing. Cr 3.

HOM 499 Special Topics in Housing Cr 1-3.

Courses in Human Development

HUD 394 Cooperative Education in Human Development

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.

HUD 396 Field Experience in Human Development

An approved work experience for which academic credit 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.

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 freshmen. 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. These will supplement guided visits to classrooms, hospitals, food services and agency settings. Cr 3.

Division of Agricultural Sciences

Bachelor of Science in Agriculture

The B.S. in Agriculture is an interdisciplinary program offered cooperatively by the faculty of the Division of Agricultural Sciences.

Professor Robert Rhoads, Coordinator

Students who desire a broad education encompassing the full spectrum of agricultural production will find this a useful program. Groups especially attracted include (1) small and part-time farmers, (2) international students from the less-developed countries, (3) those interested in teaching agriculture and natural science in high schools, (4) those interested in careers with various agribusiness firms, and (5) those desiring to enter or return to commercial farming.

The program is in the process of integrating a philosophy of agricultural sustainability into the curriculum emphasizing the coexistence of agriculture with rather than the dominance over the natural systems. Program changes will occur over the next two years.

The more specific goals of the program include providing students with the basic principles of production and efficient management of dairy cattle, livestock, and poultry; a balanced educational program in the study of plant production and the soil resources related to crop production; an ability to handle the business management aspect of an integrated farm enterprise. An option to teach high school agriculture is available. (See Agricultural and Natural Resource Education.)

The curriculum in agriculture is the shared responsibility of the Departments of Agricultural Engineering, Animal and Veterinary Sciences, Agricultural and Resource Economics, and Plant and Soil Sciences.

This degree requires satisfactory completion of at least 120 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.

Curriculum in Agriculture

Basic Sciences and Mathematics

CHY 111/112 General Chemistry I/II 8

	OR	
BCH 207/208	Fundamentals of Chemistry/Elementary Physiological Chemistry	(8)
MAT 122	Algebra and Trigonometry, Pre-Calculus	4
MAT 232	Principles of Statistical Inference	3
BIO 100	Basic Biology	4
BOT 201	Plant Biology/Laboratory	4
	OR	
ZOL 204	Animal Biology	(4)
MHE 250	Our Environment	3
ENT 220	Insects, Science and Society	3
PHY 103/104	Fundamental Physics/Laboratory	4
COS 210	Introduction to Computing Using COBOL (recommended elective)	(3)
	TOTAL HOURS	33

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

ARE 148	Principles of Agricultural Economics	3
	OR	
ECO 110	Introduction to Economics	(3)
POS 103	State and Local Government	3
SOC 324	Contemporary Rural Problems	3
	OR	
SOC 101	Introduction to Sociology Electives	(3) 6
	TOTAL HOURS	15

Agricultural Sciences

Core Requirement		
PSS 105	Principles of Sustainable Agriculture	3
TOTAL HOURS		3

Agricultural Engineering (Select 3:)

AEN 231	Field Machinery Management	3
AEN 232	Farm Buildings and Equipment	3
AEN 235	Soil Water Control	3
AEN 236	Farm and Forest Power	3
AEN 238	Electrification	3
AEN 239	Agricultural Processing Technology	3
TOTAL HOURS		9

Animal and Veterinary Sciences

ANV 145	Animal Science (required)	4
(Select 2 from the following courses:)		
ANV 236	Physiology of Domestic Animals	3
ANV 346	Dairy Cattle Technology	3
ANV 348	Livestock Management	3
INT 265	Meat Technology	3
ANV 385	Poultry Technology	3
ANV 437	Animal Diseases	3
ANV 456	Applied Animal Feeding	4
TOTAL HOURS		10

Agricultural and Resource Economics

ARE 353	Farm Management (required)	3
BUA 201	Principles of Accounting I (required)	3
(Select 1)		
ARE 459	Agricultural Business Finance	3
ARE 365	Food and Fiber Marketing	3
ARE 471	Resource Economics	3
TOTAL HOURS		9

Plant and Soil Sciences

PSS 100	Crop Science (required)	3
PSS 140	Soil Science (required)	4
(Select 1)		
PSS 110	Horticulture	3
PSS 112	The Home Garden: Vegetables and Fruits	3
PSS 101	Crop Management	4
PSS 403	Principles of Weed Control	3
PSS 410	Plant Propagation	3
TOTAL HOURS		10

Electives	17	
Recommended: Cooperative Education	4	
LSA 117	Issues and Opportunities	1

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

Bachelor of Science in Agricultural Engineering

The B.S. in Agricultural Engineering is offered by the faculty of the Department of Agricultural Engineering.

Professors Riley (Chairperson), Klinge, Rhoads, Rowe, Smith; Associate Professors Christensen, Hedstrom, Huff, Hunter, Sides, Soule; Assistant Professor Schaufler

The Agricultural Engineering curriculum combines study in engineering and mathematics with biological sciences and physical sciences to provide a unique background for solving engineering problems associated with agriculture.

The basic curriculum is strengthened by elective options which permit students to specialize in one of four areas according to their interests and needs. Areas of specialization are:

(1) machinery and power units for the agricultural and forestry industries; (2) food and fiber processing systems; (3) design of agricultural structures; and (4) soil and water conservation engineering. Electives in engineering and the life sciences aid in providing a broad base of knowledge for engineering practice.

Employment opportunities for agricultural engineers are as diverse as the agricultural industry itself. Graduates in agricultural engineering may be employed as design engineers by machinery and farmstead 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 Agricultural Engineering is a joint responsibility of the Colleges of Engineering and Science and Life 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 following curriculum:

Curriculum in Agricultural Engineering

Agricultural Engineering

AEN 220	Principles of Mechanization	3
AEN 255	Materials in Agricultural Engineering	3
AEN 257	Computer Applications in Agricultural and Forest Engineering	3
AEN 268	Computer Aided Drafting and Design	2
AEN 281	Elementary Plane Surveying	1
AEN 282	Introduction to Agricultural Engineering	2
AEN 460	Agricultural Machinery	3
AEN 463	Farm Structures Design	3
AEN 464	Instrumentation and Control Systems	3
AEN 465	Soil and Water Engineering	3
AEN 467	Agricultural and Forest Power	3
AEN 469	Agricultural Process Engineering	3
AEN 480	Senior Seminar	1
AEN 491	Design Project I	1
AEN 492	Design Project II	2
AEN 493	Design Project III	1
	MINIMUM HOURS	37

Basic Engineering

GEE 101	Introduction to Engineering Design	3
MEE 150	Applied Mechanics: Statics	3
MEE 230	Thermodynamics I	3

MEE 251	Strength of Materials	3
MEE 270	Applied Mechanics: Dynamics	3
MEE 360	Fluid Mechanics	3
MEE 380	Design I	3
ELE 215	Electrical Circuit Fundamentals	3
	MINIMUM HOURS	24

Technical Electives

A group of engineering or science courses selected by the student and approved by the advisor.

MINIMUM HOURS 9

Basic Sciences and Mathematics

CHY 113	Chemical Principles I	4
PHY 121	General Physics I	4
PHY 122	General Physics II	4
MAT 126	Analytic Geometry and Calculus	4
MAT 127	Analytical Geometry and Calculus	4
MAT 228	Analytical Geometry and Calculus	4
MAT 259	Differential Equations	4
	MINIMUM HOURS	28

Agricultural and Biological Sciences

BIO 100	Basic Biology	4
PSS 140	Soil Science	3
	Electives	3
	MINIMUM HOURS	10

Humanities, Social Sciences and Communications

MINIMUM HOURS 21

Other

LSA 117	Issues and Opportunities	1
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MINIMUM HOURS REQUIRED FOR GRADUATION: 130

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 Agricultural Engineering.

Graduate Work in Agricultural Engineering

The degrees of Master of Science (Agricultural Engineering) and Master of Engineering (Agricultural Engineering) are offered with options for specialization in soil and water engineering,

farm structures, agricultural power and machinery, and electric power and processing.

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 in Forest Engineering is a program administered by the College of Forest Resources and the Agricultural 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.)

Bachelor of Science in Agricultural Mechanization

The B.S. in Agricultural Mechanization is offered by the faculty of the Department of Agricultural Engineering.

The curriculum in agricultural mechanization provides training in specific aspects of engineering technology coupled with training in business, economics, and agricultural subjects. It is designed to prepare graduates for work in the application of equipment and systems to food production, processing, and handling; either as field representatives of industrial concerns or as management personnel on mechanized farms. The program is approved by the American Society of Agricultural Engineers.

Graduates find employment as technical sales representatives for machinery companies, farm service advisers for electric power companies, field advisers for fuel companies, machinery managers on corporation farms, field managers for food processors, and as agricultural contractors. Positions also are available as high school agriculture or mechanics teachers and with equipment companies in the field of product development and product education.

The department also offers an opportunity for students to be certified to teach high school agriculture. (See Agricultural and Natural Resource Education.)

There are two avenues to the B.S. degree in agricultural mechanization: one is by entry to the traditional four-year program, the other is through the two-year Technical Division in a

two-plus-two program. (See Technical Division, later in this section, for this method of admission.) By direct entry, the bachelor's degree requires satisfactory completion of at least 120 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 and Science 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 Agricultural Mechanization.

Curriculum in Agricultural Mechanization

Agricultural Mechanization Professional Courses

AEN 220	Principles of Mechanization	3
AEN 229	Basic Shop Techniques	2
AEN 231	Field Machinery Management	3
AEN 232	Farm Buildings and Equipment	3
AEN 233	Fluid Power Technology	3
AEN 235	Soil Water Control	3
AEN 236	Farm and Forest Power	3

AEN 238	Electrification	3
AEN 239	Agricultural Processing Technology	3
AEN 268	Computer Aided Drafting and Design	2
AEN 480	Senior Seminar	1
	TOTAL HOURS	29

Professional Field Supporting Courses

ECO 110	Introduction to Econom- ics OR	3
ARE 148	Principles of Agricultural Economics	(3)
BUA 201	Principles of Accounting I OR	3
ARE 138	Agribusiness Accounting I Electives *	(3) 18
	TOTAL HOURS	24

Basic Sciences and Engineering

GEE 101	Introduction to Engineer- ing Design	3
MAT 122	Algebra and Trigonome- try, Pre-Calculus	4
MAT 232	Principles of Statistical Inference OR	3
FTY 204	Statistical Inference in Forest Resources	(3)
PHY 111	General Physics I	4
PHY 112	General Physics II	4
CHY 111	General Chemistry I OR	4
BCH 207	Fundamentals of Chemis- try	(4)
	TOTAL HOURS	22

Agricultural and Biological Sciences

BIO 100	Basic Biology	4
ANV 145	Animal Science	4
PSS 140	Soil Science Electives	3 6
	TOTAL HOURS	17

*Nine hours must be in LSA courses.

Other

	Communications	6
	Humanities and Social Sciences	15
LSA 117	Issues and Opportunities	1
	Free Electives	6
	TOTAL HOURS	28

MINIMUM HOURS REQUIRED FOR
GRADUATION: 120

Courses in Agricultural Engineering

AEN 220 Principles of Mechanization

Basic concepts of farm and forest mechaniza-
tion; functional analysis and organization of
machine systems and materials handling opera-
tions. Prerequisite: MAT 122. Lec 2, Lab 2.

Cr 3.

AEN 229 Basic Shop Techniques

A course in selection, care and use of tools,
woodworking techniques, metalworking and
welding. For Agricultural Mechanization and
Agricultural Education majors only. Lec 1, Lab
3.

Cr 2.

AEN 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 appli-
cations. Lec 2, Lab 2.

Cr 3.

AEN 231 Field Machinery Management

Economic selection of machinery to integrate
field operations in food and fiber production
systems; efficient management and use of ma-
chines. Prerequisite: MAT 122. Lec 2, Lab 2.

Cr 3.

AEN 232 Farm Buildings and Equipment

Consideration of environmental control; meth-
ods and materials of construction; functional
requirements and system economics of produc-
tion, processing and storage buildings. Prerequi-
site: MAT 122. Lec 2, Lab 2.

Cr 3.

AEN 233 Fluid Power Technology

Basic fluid power systems, component installa-
tion and function analysis, basic system design,
troubleshooting and testing techniques. Prereq-
uisite: PHY 111, 112 or PHY 106 or permission.
Lec 2, Lab 3.

Cr 3.

AEN 235 Soil Water Control

Field surveying, planning, layout and construc-
tion of soil and water control structures such as

farm ponds, drainage systems, irrigation systems and soil erosion control systems. Lec 2, Lab 3. Cr 3.

AEN 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.

AEN 238 Electrification

Fundamentals of electric circuits. Basic wiring techniques and planning of wiring systems. Selection, use, and care of electric devices and controls used in agriculture and forestry. Emphasis on practical application. Prerequisite: PHY 106 or equivalent. Lec 2, Lab 2. Cr 3.

AEN 239 Agricultural Processing Technology

A study of unit operations involved in on-farm and in-plant processing of agricultural products. Emphasis on sizing and selecting equipment. Prerequisite: MAT 122 and PHY 111, 112. Lec 2, Lab 3. Cr 3.

AEN 241 Energy and Society

Basic concepts of energy and power. Energy sources and their limitations. Demands for energy, forms in which we use it, and reasons for shortages. Energy conversion, storage, and transport, and their effects on environment. Energy conservation and future use of energy. Lec 2, Lab 2. Cr 3.

AEN 242 Metals and Society

The influence of metals technology on society, past and present. After a brief historical review the course covers the scope of our metallic resources, mining and concentration methods, extraction, refining and fabrication. Recycling and environmental effects are examined. Properties of metal, alloying and heat treating are briefly covered. Welding as a fabrication method is studied and electric arc and gas welding instruction is given in the two-hour lab. No prerequisite. Lec 2, Lab 2. Cr 3.

AEN 255 Materials in Agricultural 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.

AEN 257 Computer Applications in Agricultural and Forest Engineering

An introductory programming course using the FORTRAN language. Program exercises are se-

lected to illustrate numerical techniques important in engineering and are done on either the mainframe or microcomputer. Additional topics include an introduction to using: microcomputers, data files, graphic input and output devices, editors, wordprocessors and spreadsheets. Prerequisite: MAT 126. Lec 2, Rec 2. Cr 3.

AEN 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 either on an 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, Lab 3. Cr 2.

AEN 281 Elementary Plane Surveying

An elementary course designed to help the student understand the concepts and develop the skills necessary for basic surveying. Lec 1. Cr 1.

AEN 282 Introduction to Agricultural Engineering

An introduction to engineering experimentation involving biological material. Primarily for sophomores majoring in agricultural engineering. Lec 1, Lab 2. Cr 2.

AEN 297 Special Problems in Agricultural Engineering

Independent study. Cr Ar.

AEN 298 Special Topics in Agricultural 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.

AEN 394 Cooperative Education in Agricultural Engineering

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.

AEN 396 Field Experience in Agricultural Engineering

An approved work experience for which academic credit 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.**

AEN 441 Energy and Society

Basic concepts of energy and power. Energy sources and their limitations. Demands for energy, forms in which we use it, and reasons for shortages. Energy conversion, storage, and transport, and their effects on environment. Energy conservation and future use of energy. (C.E.D. only). **Cr 3.**

AEN 442 Metals and Society

The influence of metals technology on man's existence. A practical look at testing, properties manipulation, fabrication, and utilization of metals is included. Production and processing methods. Environmental effects. Welding instruction available at the student's option. No prerequisite. Lec 3. (C.E.D. only). **Cr 3.**

AEN 443 Energy-Efficient Housing

Examination of mankind's efforts to develop shelter. Topics will include 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.**

AEN 452 Fluid Power and Robotics

Design of pneumatic and hydraulic circuits. Control theory applied to fluid power actuated mechanical systems. Data acquisition, transducers, computer interfacing, and programming for control. Introduction to 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.**

AEN 460 Agricultural Machinery

A design oriented course for engineering majors covering power requirements, capacity, economics of agricultural machines. Functional analysis is an integral part of the course. Laboratory and field testing is carried out. Prerequisite: MEE 251. Lec 2, Lab 3. **Cr 3.**

AEN 462 Fluid Power

Fluid power fundamentals and theory, analysis and operation principles of components, design techniques and circuit analysis for hydraulic systems, introduction to pneumatic systems. Prerequisites: MEE 230 and MEE 360 (or CIE 350) or permission. Lec 2, Lab 3. **Cr 3.**

AEN 463 Farm Structures Design

Structural design and environmental control in production, processing and storage buildings; consideration of functional requirements, system economics and methods and materials of construction. Prerequisite: MEE 251. Lec 2, Lab 3. **Cr 3.**

AEN 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.**

AEN 465 Soil and Water Engineering

Analysis of hydrologic processes and hydraulics related to runoff, flood control, and water resource development. Principles of and design procedures for earth dams, drainage, irrigation, and erosion control systems. Prerequisite: CIE 350 or MEE 360. Lec 2, Lab 3. **Cr 3.**

AEN 467 Agricultural and Forest Power

Heat engine and electric power units for mobile and stationary application; power transmission; interactions between tractors, implements, and the ground; application of new energy sources to agricultural and power needs. Prerequisites: MEE 230. Lec 2, Lab 3. **Cr 3.**

AEN 469 Agricultural 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.**

AEN 480 Senior Seminar

Problems associated with professionalism and the first employment of the young agricultural engineer. Lec 1. **Cr 1.**

AEN 491 Design Project I

The first of a three-course sequence which gives a supervised design experience to upperclass AEN and FOE majors. This course will include 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 1.

AEN 492 Design Project II

The second of a three-course sequence which gives a supervised design experience to upper-class AEN and FOE majors. This course will be taught as a tutorial where each student will carry out a design project in his or her field of interest. Lab 6.

Cr 2.

AEN 493 Design Project III

The third of three-course sequence which gives a supervised design experience to upperclass AEN and FOE majors. Successful completion of this

course requires preparation of a written report suitable for submission to the ASAE engineering design competition and preparation and delivery of a one hour seminar on the student's design project. Rec 1.

Cr 1.

AEN 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/CSMP. Prerequisite: MAT 126 or equivalent, elementary Fortran. Lec 3.

Cr 3.

Bachelor of Science in Agribusiness and Resource Economics

The B.S. in Agribusiness and Resource Economics is offered by the faculty of the Department of Agricultural and Resource Economics.

Associate Professor Kezis (chairperson); Professors Delphendahl, Dunham, King, Ploch, Watkins; Associate Professors Johnston, Reiling, White; Assistant Professors Adelberg, Boyle, Criner, Leiby, Marra; Lecturer and Assistant Scientist Cook

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 in the economic and social aspects of the food and fiber industries and related fields, and in the development of human and natural resources. 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, pro-

cessing, distribution, consumption, and community development. In addition, training is complemented by a comprehensive, integrated program of courses in the life sciences, other social sciences, communications, arts, and humanities.

Employment opportunities exist in sales, 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 farm 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

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

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
INT 324	Sociology of Rural Life Electives**	9
	TOTAL HOURS	15

Mathematics and Statistics

MAT 113/114	Mathematics for Business and Economics I/II OR	6
MAT 126	Analytic Geometry and Calculus	(4)
MAT 215	Introduction to Statistics for Business and Economics OR	3
ECO 385	Introduction to Economic Statistics and Econometrics	(3)
ARE 123	Micro-Computer Applications for Agriculture	3
	TOTAL HOURS	12(10)

Life Sciences and Agriculture

INT 219	Introduction to Ecology Electives***	9
	TOTAL HOURS	12

Economics

ECO 120	Principles of Microeconomics	3
ECO 121	Principles of Macroeconomics	3
ECO 332	Intermediate Macroeconomics OR	3
ECO 353	Money and Banking	(3)
ECO 373	Intermediate Microeconomics	3
	TOTAL HOURS	12

**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 Life Sciences and Agriculture except those with the designations ARE, CLD, CHF and HEC.

Agribusiness

ARE 138	Agribusiness Accounting I	3
ARE 139	Agribusiness Accounting II	3
ARE 171	Economics of Environmental Quality	3
ARE 353	Farm Management	3
ARE 354	Introduction to Production Economics	3
ARE 358	Principles of Management in Agribusiness	3
ARE 365	Food and Fiber Marketing	3
ARE 386	Government Policies Affecting Rural America	3
ARE 459	Agricultural Business Finance	3
ARE 468	Price Analysis and Forecasting	3
ARE 471	Resource Economics OR	3
ARE 473	Land Economics	(3)
ARE 489	Seminar	2
	Electives (any ARE courses)	6
	TOTAL HOURS	41
	Free Electives****	10(12)
LSA 117	Issues and Opportunities	1

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

****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 and Veterinary Science and Plant and Soil Science.

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 Life Sciences and Agriculture, and by the College of Business Administration.

Students interested in the program apply for Admission to Agribusiness and Resource Economics in the College of Life Sciences and Agriculture.

Admission to the five year program will officially occur after the student's freshman year.

Normal admission and continuance in the program 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:

$$((\text{Undergraduate}) \times 200) + \text{GMAT score} = 1075 \text{ or more.}$$

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*	<u>7</u>
	TOTAL HOURS	11

Communications

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

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

Humanities and Social Studies

ENG 317	Advanced Professional Exposition	3
INT 324	Sociology of Rural Life Electives**	<u>9</u>
	TOTAL HOURS	15

Mathematics and Statistics

MAT 113/114	Mathematics for Business and Economics I/II OR	6
MAT 126	Analytic Geometry and Calculus	(4)
MAT 215	Introduction to Statistics for Business and Economics OR	3
ECO 385	Introduction to Economic Statistics and Econometrics	(3)
ARE 123	Micro-Computer Applications for Agriculture	<u>3</u>
	TOTAL HOURS	12(10)

Life Sciences and Agriculture

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

Economics

ECO 120	Principles of Microeconomics	3
ECO 121	Principles of Macroeconomics	3
ECO 332	Intermediate Macroeconomics OR	3
ECO 353	Money and Banking	3
ECO 373	Intermediate Microeconomics	<u>3</u>
	TOTAL HOURS	12

**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 PSS 140 Soils Science, PSS 150 Forest Soil Science, FOE 206 Photogrammetry and Remote Sensing, AEN 235 Soil and Water Control, PSS 100 Crop Science, FTY 444 Forest Economics, FTY 446 Forest Policy and Planning, or other LSA courses excluding ARE.

Agricultural and Resource Economics		
ARE 138	Agribusiness Accounting I	3
ARE 139	Agribusiness Accounting II	3
ARE 171	Economics of Environmental Quality	3
ARE 354	Introduction to Production Economics	3
ARE 322	Human Factors in Resource Development	3
ARE 471	Resource Economics	3
ARE 473	Land Economics	3
ARE 386	Government Policies Affecting Rural America	3
ARE 489	Seminar	2
	Electives in ARE or Economics****	9
	TOTAL HOURS	35
	Free Electives*****	16(18)
LSA 117	Issues and Opportunities	1

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

****Choose from ECO 371 Public Finance and Fiscal Policy, ECO 372 State and Local Government Finance, ECO 345 Regional Economics, ECO 344 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, PSS 442 Soil Taxonomy, PSS 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 agribusiness productivity. The course focusses primarily on the use of word processor, spread sheet and data base management applications software for the microcomputer environment. Also included are limited coverage of mainframe computer use, personal computer selection, programming and hands-on exposure to the materials. **Cr 3.**

ARE 138 Agribusiness Accounting I

Introductory accounting includes preparation of financial statements, mechanics of accounting cycle, and asset valuation and analysis. Prerequisites: None. Lec 2, Lab 2. **Cr 3.**

ARE 139 Agribusiness Accounting II

Continuation of introductory accounting 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 171 Economics of Environmental Quality

Economic aspects of environmental issues. Analysis of the underlying causes of environmental problems and the choices available to solve the problems. The economic and social consequences of proposed solutions. Prerequisite: none. Rec 3. **Cr 3.**

ARE 322 Human Factors in Resource Development

Methods of applied social change in community and individual resistances to, and acceptance of, development programs. Consequences of development for community social systems. Development as an interactive force in the community. Prerequisite: INT 224, or permission. Rec 3. **Cr 3.**

ARE 353 Farm Management

The concepts and tools of farm management in today's economic environment are developed. Among the topics covered are: 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 354 Introduction to Production Economics

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

ARE 358 Principles of Management in Agribusiness

Fundamental concepts and tools of management and economics as applied to agribusiness firms including cooperatives. Emphasis on applications

to nonfarm agribusiness that provide supplies and services to farmers or who market and process farm products. Case analysis. Rec 3.

Cr 3.

ARE 365 Food and Fiber Marketing

Economic principles applied to marketing structures, services and agencies; analysis of costs and efficiencies; impact of industry organization and government. Prerequisite: ECO 110 or permission of instructor. Rec 3.

Cr 3.

ARE 386 Government Policies Affecting Rural America

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

Cr 3.

ARE 394 Cooperative Education Agriculture and Resource Economics

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.

ARE 396 Field Experience in Agriculture and Resource Economics

An approved work experience for which academic credit 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.

ARE 459 Agricultural Business Finance

Designed to assist the student to develop skills necessary to deal with financial aspects of agricultural businesses. Cases and problems used extensively to provide practical knowledge of financial analysis techniques. 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 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 373, MAT 215 or permission of instructor. Rec 3.

Cr 3.

ARE 471 Resource Economics

Principal economic and institutional factors affecting man and his use of land and resources; 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 471 or permission.

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; the principles 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 373.

Cr 3.

ARE 517 Research Methods in Agricultural and Resource Economics

The nature of economic and social analysis. The scientific method and the formulation and testing of hypotheses. Introduction and use of economic research quantitative techniques, including matrix algebra, 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 principals of community economic development in rural settings, with emphasis on social analysis, strategy planning and policy formulation. **Cr 3.**

ARE 528 Community Development Applications

Introduction and practice of 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 agribusiness firm. The use of advanced techniques for attaining optimum resource allocation. **Cr 3.**

ARE 565 Marketing Theory and Concepts in AgriBusiness

Economic theory underlying the policies of agricultural marketing firms; study of current marketing problems and market practices for selected commodities and segments of the agribusiness sector of the U.S. economy. Prerequisite: ARE 365, ECO 373. **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 Resource Use and Economic Growth

Resource utilization and economic growth in retrospect. Importance of resources. Theories and measurements of regional economic development. Planning for resource development. Prerequisite: ARE 471, ARE 473. **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 373 **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. Maximum of six credits. May be repeated for additional credit. **Cr 1-3.**

Interdisciplinary Courses

INT 224 (ARE, SSW) Sociology of Rural Life

Significance of rural society in American culture. The impact of forces of change, including population movement. The significance of changes in the social systems of community, family, religion, education, and stratification. Rec 3. **Cr 3.**

INT 324 (ARE, SSW) 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, SSW) The Individual and the Community

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

INT 530 (ARE, ECO) Econometrics

An introduction to economic concepts and relationships expressed in quantitative terms. Problems of ordinary least squares, generalized least squares, estimation and use of multiequation models and forecasting. Prerequisite: ECO 385 or permission. **Cr 3.**

Bachelor of Science in Animal and Veterinary Sciences

The B.S. in Animal and Veterinary Sciences is offered by the faculty of the Department of Animal and Veterinary Sciences.

Associate Professor Stimpson (Chairperson); Professors Bayer, Gershman, Gibbs, Hidu; Associate Professors Congleton, Corey, Harris, Hawes, Stokes; Assistant Professors Anderson, Barton, Goater, Kling, Pratt; Instructors El-Begearami, Opitz; Faculty Associates Andrews, Birmingham, Bushover, Cohen, Cunliffe-Beamer, Feher, Fossett, Frechette, Gauger, Griffin, Havey, Ingraham, Jonas, Jorgenson, Meiczinger, Miles, Porter, Rogers, Shankin, Simard, Stevens, Stiles, Wall, Williams

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, poultry, 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 and Veterinary Sciences offers the master of science degree in animal science for a program of study in animal nutrition, pathology, physiology, management, or breeding. The doctor of philosophy degree may be earned in the nutritional sciences or biological sciences program.

Course and Credit Requirements

Animal Science Courses	42
General Science Courses	32
Liberal Arts Courses	21
General Electives	25
(Including LSA 117: Issues)	<u>1</u>
TOTAL HOURS	120

Animal Science Courses

ANV 145	Animal Science	4
ANV 163	Career Seminar	1
ANV 260	Animal Genetics and Breeding	3
ANV 351	Animal Science Technology	2
ANV 437	Animal Diseases	3
ANV 455	Animal Nutrition	3
ANV 456	Applied Animal Feeding	4
ANV 461	Advanced Animal Breeding	3
ANV 472	Endocrinology	3
ANV 474	Senior Topics	1
ANV 480	Physiology of Reproduction	4
	Production Courses*	12

Large Animal Courses

ANV 346	Dairy Cattle Technology	(3)
ANV 347	Equine Science	(3)
ANV 348	Livestock Management	(3)

Small Animal Course

ANV 211	Aquaculture	(3)
ANV 349	Laboratory Animal Technology	(4)
ANV 385	Poultry Technology	(3)
	TOTAL HOURS	42

*Students are required to take four production courses; one must be either Dairy Cattle Technology (ANV 346) or Livestock Management (ANV 348) and another course from the small animal group. Substitution for the remaining two production courses will be allowed from any 300-400 level course in Biochemistry, Biology, Chemistry, Microbiology, Physics or Zoology. Other accepted courses are (ANV 212) Maine Mariculture, (ANV 335) Zoonoses, (ANV 409) Shellfisheries Biology.

General Science Courses

BIO 100	Basic Biology	4
ZOL 204	Animal Biology	4
CHY 111	General Chemistry I	4
CHY 112	General Chemistry II	4
BCH 221	Organic Chemistry/Laboratory	4
ZOL 377	Animal Physiology OR	3
ANV 236	Physiology of Domestic Animals	(3)
MAT 122	Algebra and Trigonometry, Pre-Calculus OR (MAT 126, 232)	4 or 3
ARE 123	Micro-computer Applications for Agriculture OR (COS 210, 215)	3
FOS 301	Food Processing Industry: Principles and Problems	<u>3</u>
TOTAL HOURS		32/33

Liberal Arts Courses

ENG 101	College Composition OR (ENG 212, 317, JBR 231)	3
SPC 103	Fundamentals of Public Communication OR (SPC 106, 245, 247, 257)	3
ARE 148	Principles of Agricultural Economics OR (ECO 110) Humanities/Social Sciences	3 <u>12</u>
TOTAL HOURS		21

Specialized Curricula**General Concentration**

Offers maximum minor possibilities particularly for agribusiness-oriented students. Recommended agribusiness courses include:

ARE 354	Introduction to Production Economics	3
ARE 459	Agricultural Business Finance	3
ARE 365	Food and Fiber Marketing	3
ARE 468	Price Analysis and Forecasting	3
BUA 201	Principles of Accounting I	3

Graduate School or Pre-veterinary Concentration

Courses recommended:

MAT 126	Analytic Geometry and Calculus	4
CHY 251/253	Organic Chemistry Lecture/Laboratory I	5
CHY 252/254	Organic Chemistry Lecture/Laboratory II	5
ZOL 333	Comparative Anatomy	4
MCB 300/305	General Microbiology/Laboratory	5
CHY 240	Quantitative Analysis	4
PHY 111/112	General Physics I/II	8
BCH 460	Advanced Biochemistry	3

Laboratory Concentration

Additional courses recommended:

ZOL 333	Comparative Anatomy	4
MCB 300/305	General Microbiology/Laboratory	5
PHY 106	Essentials of Physics	5
CHY 240	Quantitative Analysis	4
BCH 322	Biochemistry/Laboratory	4
MCB 420	Pathogenic Bacteriology and Serology	4
MCB 450	Virology	4
ZOL 443	Animal Microtechnique	3

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 and Veterinary Sciences**ANV 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: mission. Lec 3, Lab 2. **Cr 4.**

ANV 163 Career Orientation

Professional opportunities in the Animal Sciences and related areas are featured through guest speakers. Emphasis also placed on career

preparation requirements, personal resume preparation and professional literature. Lec 1. Cr 1.

ANV 211 Aquaculture

The history and current status of world sea farming with emphasis on mollusks and the developing Maine situation. Cr 3.

ANV 212 Maine Mariculture

The history, current advances and status of world commercial 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.

ANV 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. Prerequisite: none. Lec 2. Cr 2.

ANV 236 Physiology of Domestic Animals

A basic core in the physiology of domestic mammals and birds. Gross and histological features of animal systems involved in major physiological processes, meat uses, and disease. Prerequisite: ZOL 204 or equivalent. Lec 3. Cr 3.

ANV 260 Animal Genetics and Breeding

The principles of genetics. The transmission and expression of hereditary factors in animals. Prerequisite: ZOL 204. Lec 3. Cr 3.

ANV 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.

ANV 346 Dairy Cattle Technology

The application of breeding, feeding, housing, selection, care, records, breed association programs and recent research findings to herd management. Prerequisite: ANV 145, ANV 480, ANV 260, ANV 455. Cr 3.

ANV 347 Equine Science

Principles of equine science, including breeds, breeding, conformation, nutrition, management, unsoundness, health program, selection, housing, and training. Lec 3. Cr 3.

ANV 348 Livestock Management

The selection, breeding, feeding, care and management of beef cattle, sheep, and swine. Prerequisite: ANV 145. Lec 3. Cr 3.

ANV 349 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: ANV 145. Lec 3, Lab 3. Cr 4.

ANV 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: ANV 347. Lec 2, Lab 2. Cr 3.

ANV 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: ANV 346 or ANV 348. Lec 1, Lab 3. Cr 2.

ANV 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 in techniques of sheep management from lambing to marketing. Prerequisite: ANV 145 or permission. Lec 1, Lab 2. Cr 2.

ANV 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 in this course toward graduation. Prerequisite: ANV 145 or permission. Cr Ar.

ANV 385 Poultry Technology

The science of the biology, breeding, feeding, incubation, and diseases of the domestic fowl; and the application of housing, management, and business practices of the table egg, hatching egg, and broiler industries. Field trips are arranged to acquaint students with industry. Prerequisite: juniors and seniors. Lec 2, Lab 2. Cr 3.

ANV 394 Cooperative Education in Animal and Veterinary Science

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.**

ANV 396 Field Experience in Animal and Veterinary Science

An approved work experience for which academic credit 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: Permission. (Pass/Fail Grade Only). **Cr 1-16.**

ANV 409 Shellfisheries Biology

The biology, ecology and management of commercial marine shellfish, especially mollusks. In a lecture, lab demonstration format the course will emphasize species commercially important to Maine's natural fisheries and those having a high potential in mariculture. Lec 3. **Cr 3.**

ANV 437 Animal Diseases

Introduction to the study of disease in animals. Studies on the courses, pathology and control of diseases of domestic animals. Prerequisite: ANV 236, ZOL 377, permission. Lec 3. **Cr 3.**

ANV 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.**

ANV 455 Animal Nutrition

Principles of nutrition, methods of experimentation and discussion of nutritional balances. Prerequisite: ZOL 204, CHY 112, BCH 221 or equivalent. **Cr 3.**

ANV 456 Applied Animal Feeding

Nutrient requirements of livestock and avian species. The nutritive value and characteristics of feedstuffs. Methods of formulating balanced nutrient intakes. Prerequisite: ANV 455. Lec 3, Lab 2. **Cr 4.**

ANV 461 Animal Breeding

The inheritance of the commercially valuable characteristics. 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: ANV 260 and MAT 122 or MAT 126 or MAT 232 and ARE 123 or COS 210, COS 215. Lec 2, Lab 2. **Cr 3.**

ANV 472 Endocrinology

The animal endocrine system and functional relationships of each of the endocrine glands to growth, reproduction and lactation. Prerequisite: ZOL 377 or ANV 236. Lec 3. **Cr 3.**

ANV 474 Senior Topics

Review and evaluation of current literature in the animal sciences. Each student will participate in a panel presentation and will also present an individual seminar. Senior students. Lec 2. **Cr 1.**

ANV 480 Physiology of Reproduction

Comparative development and functions of the reproductive process domestic animals. Prerequisite: ZOL 377 or ANV 236. Lab fee \$6. Lec 3. **Cr 3.**

ANV 501 Monogastric Nutrition and Physiology

Structure of the monogastric gastrointestinal tract and its functions will be discussed. Details of digestive absorption and secretion of digestive glands will be emphasized. The utilization of energy, proteins, fats, carbohydrates, vitamins and minerals will be studied. Prerequisites: ANV 236, ANV 455, ANV 456, BCH 322 or equivalent courses. Lec 3. **Cr 3.**

ANV 502 Ruminant Nutrition and Physiology

Ruminant metabolism will be explored from the point of rumen function, factors which modify it and the effects on the flow of nutrients to the host animal. Anatomical and physiological development of the rumen will be covered. Factors affecting digestion and microbial metabolism will be given special attention in the context of a dynamic system. Prerequisites: ANV 236, ANV 455, BCH 322 or permission. Lec 3. **Cr 3.**

ANV 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: ANV 236, ANV 437, ANV 455, BCH 322 or equivalents. Lec 3. **Cr 3.**

ANV 504 Research Methods in Nutrition

A multidisciplinary, non species-oriented, approach to the laboratory and animal techniques used in nutritional research. Prerequisites: ANV 455 or NFS 310, CHY 240 or permission. Lec 2, Lab 6. **Cr 4.**

ANV 505 Nutritional Energetics

A systematic discussion and evaluation of the factors which influence partition of dietary en-

ergy in all species. Particular emphasis will be placed on dietary composition and nutritional adequacy as they influence energy metabolism. Emphasis will also be placed on the development of systems for rationing based on energetics. Prerequisites: ANV 455, BCH 450 or permission. Lec 3. **Cr 3.**

ANV 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: ANV 455 or HNF 310, BCH 322 or permission. Lec 2. **Cr 2.**

ANV 507 Nutritional-Environmental Interactions

Effects of the physical environment on the nutrition, metabolism and performance of animals. Implications for their feeding and management. Prerequisites: ANV 455 or HNF 310, PHY 106 or permission. Lec 3. **Cr 3.**

ANV 508 Minerals

A discussion of the inorganic elements, both essential and nonessential and their metabolism. Discussion will include the absorption, biochemical function, excretion, storage, and deficiency and toxicity symptoms associated with each. Emphasis will also be placed on the interaction of minerals with other inorganic and organic substances. Prerequisite: ANV 455 or HNF 310, BCH 322 or permission. Lec 3. **Cr 3.**

ANV 590 Special Topics in Animal Science

Anatomy, breeding, diseases, management, nutrition, physiology as related to poultry, dairy, or marine animals. Prerequisite: permission. **Cr Ar.**

Interdisciplinary Course

INT 265 (ANV, FOS) Meat Technology

The basic science of meat and meat processing, packinghouse methods and cutting of meat. Rec 2, Lab 2. **Cr 3.**

Bachelor of Science in Food Science

The B.S. in Food Science with a management option is offered by the faculty of the Department of Food Science.

Professor Slabyj; Associate Professors A. Bushway (Chairperson), R. Bushway; Assistant Professor Kim

The Food Science curriculum is designed to provide a strong educational background in the applications of the basic sciences (chemistry, biochemistry, microbiology) to food systems to enable students to prepare for careers in the rapidly growing food industry or to pursue graduate training. Students may concentrate in food science or may select the management option with a minor emphasis on agribusiness skills. The program provides students with the ability to solve problems related to the evaluation, prediction, preservation and quality control of foods during handling, storage, processing, distribution, and preparation for consumption.

The curriculum 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.

Graduates with a B.S. in Food Science find employment in the food industry in entry level technical (product development, food processing) or supervisory (quality control manager, processing control manager, distribution manager) positions. Government employment is available with the United States Department of Agriculture as food inspectors and/or graders or as part of a team of overseas scientists providing technical assistance in developing countries.

Superior students should consider graduate level studies. The Department of Food Science offers the Master of Science degree in Food Science while a Doctor of Philosophy degree may be earned in Nutritional Sciences.

Curriculum in Food Science

Basic Sciences

BIO 100	Basic Biology	4
ZOL 204	Animal Biology	4
CHY 111/112	OR	
CHY 113/114	General Chemistry I/II	8

CHY 251/253	Organic Chemistry Lecture/Laboratory I	5
	OR	
BCH 221	Organic Chemistry	(4)
CHY 252/254	Organic Chemistry Lecture/Laboratory II	
	OR	
BCH 322	Biochemistry	(4)
MCB 300/305	General Microbiology Lecture/Laboratory	5
PHY111/112	General Physics I/II	8
MAT 122	Algebra and Trigonometry, Pre-Calculus	4
MAT 126	Analytic Geometry and Calculus	4
MAT 232	Principles of Statistical Inference	3
BCH 451	Principles of Biochemistry	4
HNF 310	Human Nutrition	3
AEN 239	Agricultural Processing Technology	3
	TOTAL HOURS	58(60)

Food Sciences

FOS 301	Food Processing Industry Principles and Problems	3
FOS 502	Food Industry Quality Control	3
FOS 581	Problems in Food Science	Cr. Ar.
INT 438	Food Microbiology	4
FOS 582	Food Chemistry	4
FOS 587	Food Analysis	4
FOS 585	Quality Evaluation	2
FOS 586	Food Biochemistry	3
	OR	
INT 265	Meat Technology	(3)
	OR	
CHY 240	Quantitative Analysis	(4)
	TOTAL HOURS	28(29)

Communications

ENG 101	College Composition	3
SPC 103	Fundamentals of Public Communication	3
	TOTAL HOURS	6

Humanities and Social Sciences

	TOTAL HOURS	15
	Free Electives	9-12
LSA 117	Issues and Opportunities	1

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

Management Option Curriculum

Agribusiness courses to be substituted for basic science courses.

ARE 148	Principles of Agricultural Economics	3
ARE 138/139	Agribusiness Accounting I/II	6
ARE 123	Micro-Computer Applications for Agriculture	3
ARE 358	Principles of Management in Agribusiness	3
ARE 365	Food and Fiber Marketing	3
ARE 354	Introduction to Production Economics	3
ARE 459	Agricultural Business Finance	3

Courses in Food Science

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 Food Processing Industry Principles and Problems

Scope of the food manufacturing industry, processing principles and practices discussed in relation to product quality and problems involved. Rec 3. **Cr 3.**

FOS 394 Cooperative Education in Food Science

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.**

FOS 396 Field Experience in Food Science

An approved work experience for which academic credit 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.**

FOS 502 Food Industry Quality Control

Formulation of product criteria, quality evaluation (sensory and objective procedures) and quality control procedures. Prerequisite: Permission of instructor. Lec 2, Lab 4. **Cr 4.**

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 Ar.**

FOS 583 Food Microbiology

Role and significance of microorganisms in food spoilage as related to sanitation, shelf life, and safety of foods - mechanisms of microbial fermentation in food processing, food preservation and beverage manufacture. **Cr Ar.**

FOS 585 Quality Evaluation

Methods and techniques for sensory evaluation of foods. Selection of methods, material, design, questionnaire, and statistical analysis of the data. Application and correlation of objective and subjective testing methods. **Cr Ar.**

FOS 586 Food Biochemistry

Biochemical changes that occur in food during processing and storage. **Cr Ar.**

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 Ar.**

FOS 588 Food Preservation

Fundamentals of pasteurization, refrigeration, freezing, dehydration, heat treatment, chemical preservatives and antibiotics. Methods to avoid spoilage and food poisoning, with consideration of new ways for extending shelf life through freeze drying and irradiation. **Cr Ar.**

Interdisciplinary Courses**INT 265 (ANV, FOS) Meat Technology**

The basic science of meat and meat processing, packinghouse methods and cutting of meat. Rec 2, Lab 2. **Cr 3.**

INT 438 (FOS, MCB) Food Microbiology

Importance of microorganisms in food processing, spoilage, and preservation. Role of microorganisms in fermentation and production of protein, enzymes, and other products. Food as vehicle of infection and intoxication. Lec 3, Lab 4. **Cr 4.**

Bachelor of Science in Natural Resources

The B.S. in Natural Resources is an interdisciplinary program offered cooperatively by faculties from several Departments.

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 curriculum in Natural Resources provides a general grounding in the principles of biology, ecology, resource economics, and resource conservation. In addition, it includes study of state and federal decision-making processes, and 12 hours of courses in communication skills. This reflects our belief that to be an effective natural resource planner, it is essential to understand the political process by which decisions

are made, and to develop the skills necessary to contribute to policy debates.

The Natural Resources curriculum is designed to allow students wide flexibility in choosing areas of specialization, thereby permitting them to concentrate in a chosen aspect of natural resources (for example, in resource economics, resource education, forest resources, soil resources, and so on).

The option in land use planning is designed specifically for students who wish to pursue this area as a career goal. In addition to the basic courses found in the general natural resources curriculum, it includes courses in photogrammetry, land use planning, surveying, cartography, public administration, and soil classification. This option can be completed without exceeding

the 120 degree hours required for all B.S. graduates.

Curriculum in Natural Resources

Physical Sciences and Mathematics

CHY 111/112	General Chemistry I/II	8
MAT 122	Algebra and Trigonometry, Pre-Calculus	4
	Elective*	3
	TOTAL HOURS	15

Biological Sciences

BIO 100	Basic Biology	4
WLM 200	Ecology	3
	Electives**	7
	TOTAL HOURS	14

Earth Sciences

GES 101	Aspects of the Natural Environment I	4
PSS 140	Soil Science/Laboratory	4
	TOTAL HOURS	8

Humanities and Social Sciences

ECO 110	Introduction to Economics	3
POS 103	State and Local Government	3
	Electives***	9
	TOTAL HOURS	15

Communications

ENG 101	College Composition	3
ENG 317	Advanced Professional Exposition	3
SPC 103	Fundamentals of Public Communication	3
SPC 257	Business and Professional Communication	3
	TOTAL HOURS	12

*Choose from the following fields: chemistry, geology, mathematics, physics.

**Choose from the following fields: botany, biochemistry, entomology, microbiology, zoology.

***Choose from the following fields: agricultural and resource economics, anthropology, history, literature, modern society, philosophy, political science, psychology, sociology, speech.

Resource-Related Courses

AEN 441	Energy and Society	3
ARE 171	Economics of Environmental Quality	3
ARE 471	Resource Economics	3
FTY 446	Forest Policy and Planning	3
PSS 100	Crop Science	3
	Electives****	16
	TOTAL HOURS	31

Statistics

COS 210	Introduction to Computing Using COBOL	3
MAT 232	Principles of Statistical Inference	3
	TOTAL HOURS	6

Free Electives 19
(Any university course for which the student is qualified.)

LSA 117	Issues and Opportunities	1
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MINIMUM HOURS REQUIRED FOR GRADUATION: 120

Land Use Planning Concentration

The goal of this option is to provide the student with an introduction to land use planning. Students graduating from this program find employment opportunities with private industry, federal, state, or local agencies related to resource use and management.

Required Courses

ARE 474	Land Use Planning (Humanities and Social Sciences)	3
SVE 111	Plane Surveying (Free Electives)	3
FOE 206	Photogrammetry and Remote Sensing (Resource-Related Courses)	3

****Choose from the following courses: AEN 242, Metals and Society; ARE 386, Government Policies Affecting Rural America; RPM 352, Forest Recreation Management, and FTY electives; PSS 442, Soil Taxonomy; PSS 444, Soil Morphology and Soil Mapping.

GEE 116	Cartographics (Resource-Related Courses)	2
PAA 200	Introduction to Public Management and Bu- reaucracy (Humanities and Social Sciences)	3
PSS 442	Soil Taxonomy (Resource-Related Courses)	3
TOTAL HOURS		17

The required courses in the Land Use Planning Option can be taken as part of the natural resource degree program within the 120 degree hours required. Field identifiers in the parentheses are those under which the course can be taken.

Bachelor of Science in Plant and Soil Sciences

The B.S. in Plant and Soil Sciences with options in plant science, soil science, and forest science is offered by the faculty of the Department of Plant and Soil Sciences. For information call (207)581-2939.

Professors Holyoke (Chairperson), Erhardt, Glenn, Langille, Smagula; Associate Professors Fernandez, Goltz, Hepler, Mitchell, Reeves, Zibilske; Assistant Professors Maca, Stack, Wiedenhoeft; Senior Soil Scientist Rourke; Faculty Associates Clapham, Gardner, Honeycutt, LaFlamme, Litton

The department provides a challenging educational program for the students interested in using their natural curiosity and enthusiasm for science to help solve some of society's toughest problems in increasing the supply of high quality food, feed, and fiber crops while maintaining or improving environmental standards. The program provides training for students in the basic sciences as well as the opportunity to develop understanding of the practical applications of plant and soil sciences, the use of the soil/forest soil resource base. Students are expected to take fundamental courses in both plant science and soil science, additional courses in the student's area of special interest, and they are expected to develop skills in other sciences such as geology, botany, microbiology, genetics, entomology and biochemistry. Included in the curriculum are other applied sciences that will prepare them for their careers.

A minor in landscape horticulture, plant science or soil science is available to students not majoring in a discipline within the Department of Plant and Soil Sciences.

Upon meeting the requirements established by the University and the department, students will receive a B.S. degree in plant and soil sciences. Many interesting and exciting careers both nationally and abroad await students in public and private agencies, in agribusiness, and in production agriculture. They may also pursue careers in teaching, since the department offers an opportunity for students to teach in high schools by minoring in biology education. Some of the diverse positions recent graduates have qualified for include: environmental consultant, plant propagator, soil site evaluator, and grounds superintendent.

Many positions in teaching, research, or extension require training beyond the B.S. degree. Students eligible for advanced work can pursue graduate programs through this department at the M.S. and Ph.D. levels.

Curriculum in Plant and Soil Sciences

Core Courses

Basic Sciences and Mathematics

BIO 100	Basic Biology	4
CHY 111/112	General Chemistry I/II	8
OR		
CHY 113/114	Chemical Principles I/II	(8)
MAT 126	Analytic Geometry and Calculus	4
PHY 111/112	General Physics I/II	8
COS 210	Introduction to Comput- ing Using COBOL	3
OR		

COS 220	Introduction to Computer Science I	(3)
BIO 451	Interpretation of Biological Statistics	3
FTY 204	OR Statistical Inference in Forest Resources	(3)
	TOTAL HOURS	30

Communications

ENG 101	College Composition	3
ENG	Literature Course*	3
ENG 317	Advanced Professional Exposition	3
SPC 103	Fundamentals of Public Communication	3
	TOTAL HOURS	12

Introductory Professional Core

BCH 221	Organic Chemistry/Laboratory	4
BOT 452	Plant Physiology	3
BOT 453	Plant Physiology Laboratory	1
PSS 440	Soil Fertility	3
PSS 370	Senior Seminar in Plant and Soil Sciences	1
PSS 140	Soil Science/Laboratory	4
	TOTAL HOURS	16
	Humanities and Social Sciences	12
LSA 117	Issues and Opportunities	1
	TOTAL HOURS FOR CORE COURSES	72

Soil Science Concentration**Requirements**

GES 101	Aspects of the Natural Environment I	4
GES 541	Glacial Geology	3
PSS 100	Crop Science	3
PSS 400	Bioclimatology	3
PSS 442	Soil Taxonomy	3
PSS 444	Soil Morphology and Soil Mapping	3

*Recommended choices: ENG 120, 121, 122, 123, 235.

PSS 446	Chemical Properties of Soils	4
PSS 447	Physical Properties of Soils	4
PSS 144	Soil and Water Conservation	2
PSS 448	Soil Microbiology	4
	TOTAL HOURS	33

Electives 15(19)

TOTAL HOURS 47(51)

MINIMUM HOURS REQUIRED FOR GRADUATION: 123**Recommended Electives**

AEN 235	Soil Water Control	3
AEN 465	Soil and Water Engineering	3
ARE 148	Principles of Agricultural Economics	3
ARE 471	Resource Economics	3
BCH 322	Biochemistry/Laboratory	4
BUA 201	Principles of Accounting I	3
BOT 457	Plant Pathology	4
CHY 240	Quantitative Analysis	4
ECO 110	Introduction to Economics	3
ENT 226	Introductory Entomology	4
PSS 101	Crop Management	4
PSS 403	Principles of Weed Control	3
PSS 142	Soil Judging	1
PSS 144	Soil and Water Conservation	2
PSS 146	Land Use Planning-Soil Aspects	2

Forest Soil Science Concentration**Requirements**

GES 101	Aspects of the Natural Environment I	4
FTY 101	Introduction to Forest Resources	2
FTY 307	Silvics (Forest Ecology)	4
FTY 308	Silviculture	3
WLM 200	Ecology	3
FTY 357	Forest Watershed Management	3
PSS 442	Soil Taxonomy	3
PSS 444	Soil Morphology and Soil Mapping	3
PSS 446	Chemical Properties of Soils	4

PSS 447	Physical Properties of Soils	3
PSS 448	Soil Microbiology	4
BOT 233	Dendrology	4
GES 541	Glacial Geology	3
	Electives	9
TOTAL HOURS		52

MINIMUM HOURS REQUIRED FOR GRADUATION: 123

Recommended Electives

AEN 235	Soil Water Control	3
AEN 465	Soil and Water Engineering	3
BOT 435	Plant Anatomy	4
BOT 445	Plant Genetics	3
BOT 456	Forest Pathology	4
BOT 459	General Mycology	4
BOT 464	Taxonomy of Vascular Plants	4
CHY 240	Quantitative Analysis	4
ECO 110	Introduction to Economics	3
ENT 227	Introductory Entomology for Foresters	3
FOE 206	Photogrammetry and Remote Sensing	3
FOE 313	Harvesting of Forest Crops	2
FOE 473	Forest Roads and Structures	3
FTY 241	Field Practice on Small Woodlots	3
FTY 341	Field Practice on Large Forests	3
FTY 310	Artificial Regeneration	3
FTY 444	Forestry Economics	3
FTY 446	Forest Policy and Planning	3
FTY 449	Timber Management	2
GEE 116	Cartographics	3
GEO 210	Geography of Maine	3
GES 324	Geology of North America	3
PSS 124	Greenhouse Management	4
PSS 142	Soil Judging	1
PSS 144	Soil and Water Conservation	2
PSS 146	Land Use Planning—Soil Aspects	2
PSS 400	Bioclimatology	3
PSS 403	Principles of Weed Control	3

SVE 111	Plane Surveying	3
RPM 352	Forest Recreation Management	2
WTY 212	Wood Technology I	4

Plant Science Concentration

Requirements

PSS 100	Crop Science	3
PSS 101	Crop Management	4
PSS 400	Bioclimatology	3
PSS 410	Plant Propagation	3
BOT 435	Plant Anatomy	4
BOT 454	Intermediate Plant Physiology	4
BOT 457	Plant Pathology	4
BOT 464	Taxonomy of Vascular Plants	4
ENT 226	Introductory Entomology	4
BOT 445	Plant Genetics	3
	OR	
ZOL 462	Principles of Genetics	4
	Electives	13(14)
TOTAL HOURS		52

MINIMUM HOURS REQUIRED FOR GRADUATION: 123

Recommended Electives

ARE 148	Principles of Agricultural Economics	3
ART 101	Drawing I	3
BOT 203	The Plant Kingdom	4
BCH 322	Biochemistry/Laboratory	4
BOT 464	Taxonomy of Vascular Plants	4
MCB 300/305	General Microbiology/Laboratory	5
PSS 120	Herbaceous Landscape Plants	3
PSS 122	Woody Landscape Plants	3
PSS 124	Greenhouse Management	4
PSS 126	Agrostology	3
PSS 128	The Art of Home Landscaping	3
PSS 403	Principles of Weed Control	3
PSS 401	Advanced Crop Management	3
PSS 501	Plant Growth Regulators	3
PSS 503	Post-Harvest Physiology	3

Bachelor of Science in Landscape Horticulture

Professor Holyoke, (Chairperson); Associate Professor Mitchell; Assistant Professors Maca, Stack

The Department of Plant and Soil Science offers a degree program in Landscape Horticulture. 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, 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) 581-2939.

Curriculum in Landscape Horticulture

Landscape Horticulture Professional Courses

PSS 110	Horticulture	3
PSS 120	Herbaceous Landscape Plants	3
PSS 122	Woody Landscape Plants	3
PSS 123	Nursery/Garden Center Operation	3
PSS 124	Greenhouse Management	4
PSS 125	Drawing/Graphics	3
PSS 126	Agrostology	3
PSS 128	Landscape Design	3
PSS 140	Soil Science	3
PSS 223	Landscape Maintenance	3
PSS 370	Seminar	2
PSS 410	Plant Propagation	3
PSS 428	Landscape Design Problems	3
PSS 440	Soil Fertility	3
TOTAL HOURS		43

Basic Sciences

BIO 100	Basic Biology	4
CHY 111/112	General Chemistry	8
COS 100	Introduction to Personal Computers	2
MAT 122	Algebra and Trigonometry, Pre-Calculus	4
TOTAL HOURS		18

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 226	Introductory Entomology	4
TOTAL HOURS		20

Communications

ENG 101	College Composition	3
ENG	Literature Course*	3
ENG 317	Advanced Professional Exposition	3
SPC 103	Fundamentals of Public Communication	3
TOTAL HOURS		12

Humanities and Social Sciences

Minimum Hours	12
Free Electives—Minimum Hours	15
TOTAL HOURS	27

MINIMUM HOURS REQUIRED FOR GRADUATION: 120

Supporting Electives

AEN 235	Soil Water Control	3
AEN 268	Computer Aided Drafting and Design	3
ART 101	Drawing I	3
ART 102	Drawing II	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
ECO 110	Introduction to Economics	3
ENT 220	Insects, Sciences, and Society	3

*Recommended choices: ENG 120, 121, 122, 123, 235.

ENT 449	Economic Entomology	3
INT 143	Tropical Agriculture	3
INT 480	Pesticides and the Environment	3
PHY 103	Fundamentals of Physics	3
PSS 144	Soil and Water Conservation	3
PSS 146	Land Use Planning—Soil Aspects	2
PSS 397	Problems in Plant Sciences	Ar
SVE 111	Plane Surveying	3

Courses in Plant and Soil Sciences

PSS 100 Crop 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.**

PSS 101 Crop Management

Principles and practices in the management of selected agricultural crops and field ornamentals. Includes weekly guest lecturers illustrating major species of the Northeast. Prerequisite: PSS 100 or permission. Rec 4. **Cr 4.**

PSS 105 Principles of Sustainable Agriculture

This course includes the 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.**

PSS 110 Horticulture

General horticultural principles and practices as related to fruits, vegetables and ornamentals. Special aspects relating to plant propagation, home landscaping, and home gardens. Rec 3. **Cr 3.**

PSS 112 The Home Garden-Vegetables and Fruits

The small scale, intensive culture of the vegetable and fruit plants ordinarily grown in northern gardens. Alternative management and cultural techniques are discussed and evaluated. Rec 3. **Cr 3.**

PSS 120 Herbaceous Landscape Plants

The principles and practices of growing and using herbaceous garden flowers in the landscape. Emphasis on identification and selection of the plants, and the garden designs in which they are used. Rec 2, Lab 2. **Cr 3.**

PSS 122 Woody Landscape Plants

The study of woody plants suitable for landscape use in New England including their selection, arrangement, planting, and care. Prerequisite: junior or senior standing or permission. Rec 2, Lab 2. **Cr 3.**

PSS 124 Greenhouse Management

The application of plant science to growing ornamental plants in commercial, school, and home greenhouses. Emphasis on specialized cultural techniques, structures, and marketing. Rec 3, Lab 2. **Cr 4.**

PSS 126 Agrostology

The identification, fertilization, mowing, pest control, and soil requirements of grasses suitable for use on lawns, golf courses, athletic areas, cemeteries and parks. Rec 3. **Cr 3.**

PSS 128 The Art of Home Landscaping

The principles of home landscaping as applied to the planning and planting of property in making it a useful and an attractive place to live. Rec 2. **Cr 2-3.**

PSS 130 Floral Design: Retail Shop

Demonstrations, work sessions showing the basic practices in a flower shop, taping, wiring, vase arrangements, corsage, wedding and funeral designs. Fresh and dried flowers will be used. Prerequisites: None. Lab 2. (Pass/Fail Grade Only). **Cr 1.**

PSS 131 Floral Design: Home

Design labs will emphasize the use of flowers in the home. Introducing the basic elements and principles in flower design, the care and storage of cut flowers. Fresh, silk, and dried materials will be used. Lab 2. (Pass/Fail Grade Only). **Cr 1.**

PSS 140 Soil Science

The chemical, physical and biological properties of soil. Also considers origin, management and interrelationships of soils to plant growth. Prerequisite: CHY 111 or BCH 207. Rec 3, Lab 2. **Cr 3-4.**

PSS 142 Soil Judging

Methods of describing and interpreting soil properties for urban, agricultural, recreational and other uses are developed. Various landscapes

will be judged. Soil judges will compete in the annual regional soil judging competition. A course fee of \$100 for each student. Prerequisites: PSS 140 or PSS 150. Rec and Lab 1. (Pass/Fail Grade Only). **Cr 1.**

PSS 144 Soil and Water Conservation

Management of soil and water resources in accordance with the multiple use concepts. Problems of erosion and water pollution are also dealt with. Rec 2. **Cr 2.**

PSS 146 Land Use Planning-Soil Aspects

A consideration of basic soil characteristics and properties as they influence land use and aid regional planning. Rec 2. **Cr 2.**

PSS 150 Forest Soil Science

Fundamentals of soil science including the study of development, properties, and management of soils and the interrelationships of soils to forest growth. Prerequisite: CHY 111. Rec 2, Lab 2. **Cr 3.**

PSS 370 Senior Seminar in Plant and Soil Sciences

Review of literature, problems, and research as related to the areas of plants and soils. Rec 1. **Cr 1.**

PSS 394 Cooperative Education in Plant and Soil Science

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.**

PSS 396 Field Experience in Plant and Soil Science

An approved work experience for which academic credit 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.**

PSS 397 Problems in Plant and Soil Sciences

Opportunity is provided for specialization in specific areas of plant and soil sciences. **Cr Ar.**

PSS 400 Bioclimatology

An introduction to forces governing weather and climate. Interrelationships of atmospheric and biological processes and solutions to prob-

lems of plant and animal responses to the microclimate. Prerequisite: PHY 111 and 112, MAT 126 or permission. Rec 3. **Cr 3.**

PSS 401 Advanced Crop Management

Basic practices in the production of specific agricultural crops. Students may register for one or more of the following sections. Section 01-Fruits. Scientific principles and practices used in the production of fruit crops. The culture of fruits adapted to the Northeast with emphasis given to apples and blueberries. Section 02-Vegetables. The important vegetable crops, emphasizing their characteristics and culture with consideration given their adaptation to local soil and climatic conditions. Section 03-Forages. The production practices important in growing forage grasses, legumes, and silage corn. The principles of forage preservation will also be studied. Prerequisite: PSS 100 or PSS 101 or permission. **Cr 3.**

PSS 403 Principles of Weed Control

Principles and practices of controlling weeds in agricultural crops and in non-crop areas. Emphasis on chemical methods. Functions, equipment and recommendations for herbicides. Prerequisites: BIO 100 and PSS 100 or permission of instructor. Rec 3. **Cr 3.**

PSS 410 Plant Propagation

Principles and methods involved in the propagation of herbaceous and woody plants by seeds, division, layering, cutting, budding, grafting, and tissue culture. Prerequisite: BOT 453 and 452 or permission. Rec 2, Lab 2. **Cr 3.**

PSS 428 Landscape Design Problems

The practical and theoretical principles of landscape design as they are applied to common problems. Emphasis is on exposure and awareness in the area of landscape design. Prerequisite: PSS 122, or PSS 128 or permission. Rec 2, Lab 2. **Cr 3.**

PSS 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: junior, senior RPM majors. Rec 2, Lab 2. **Cr 3.**

PSS 440 Soil Fertility

A study of soil as a source of the essential nutrients needed for plant growth and the properties and use of fertilizers, liming materials, and manures. Prerequisite: PSS 140 or PSS 150. Rec 3. **Cr 3.**

PSS 442 Soil Taxonomy

Taxonomy and classification of soils. Prerequisite: PSS 140 or PSS 150 and GES 101, GES 541; junior, senior or graduate standing. Rec 2, Lab 3. Cr 3.

PSS 444 Soil Morphology and Soil Mapping

Soil profile description and soil map construction taught in an intensive 3 week course. Prerequisites: PSS 140 or PSS 150, PSS 442. Lab 6. Cr 3.

PSS 446 Chemical Properties of Soils

Origin and nature of chemical properties of soils and their effect on plant growth and soil management. Prerequisite: PSS 440. Rec 3, Lab 3. Cr 4.

PSS 447 Physical Properties of Soils

An intensive consideration of the physical properties of the soil and their effect on plant growth. Prerequisite: PSS 140 or PSS 150 and PHY 111 and PHY 112 and MAT 126. Rec 3, Lab 3. Cr 4.

PSS 448 Soil Microbiology

Soil-inhabiting microorganisms and the important processes they mediate (organic matter decomposition, transformations and cycling of nitrogen, sulfur, phosphorus and other elements). Prerequisites: BCH 221 or permission. Rec 3, Lab 2. Cr 4.

PSS 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) crop breeding. Prerequisite: PSS 100 or PSS 101 or permission. Cr 3.

PSS 478 Advanced Studies in Crop Science II (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) crop breeding. Prerequisite: PSS 100 or PSS 101 or permission. Cr 3.

PSS 479 Crop Physiology

Bridges the gap between ecology and process physiology. Concern centers on understanding the ways in which various processes are integrated to produce the response shown by whole plants when grown as a community. Prerequisites: PSS 440, PSS 400, BOT 452 or permission. Rec 3, Lab 1. Cr 4.

PSS 501 Plant Growth Regulators

Concepts and techniques in the study of plant growth and development with emphasis on phytohormones and synthetic growth substances in relation to economic plants. Prerequisite: BOT 453 and 452. Rec 3, Lab 3. Cr 3.

PSS 503 Post-Harvest Physiology

Biochemical and physiological processes associated with ripening and keeping quality of harvested plant products. Includes temperature, humidity, growth regulators, types of storage, handling and physiological disorders. Prerequisite: BOT 453 and 452 or permission. Rec 2, Lab 2. Cr 3.

PSS 505 Mineral Nutrition of Plants

History of plant nutrition, plant composition and function of essential elements, mechanisms of uptake, movement and distribution. Also a list of optional topics chosen by the class which includes: mineral nutrient budgets, mineral nutrition and plant breeding and mineral nutrition and plant ecology. Prerequisite: BOT 452 and 453 or permission. Rec 3. Cr 3.

PSS 507 Methods of Spectrochemical Analysis

The theory and practice of colorimetry and absorption and emission spectroscopic methods in quantitative chemical analysis. Prerequisite: CHY 240, PHY 111, PHY 112 or permission of instructor. Rec 2, Lab 4. Cr 4.

PSS 509 Experimental Design

Principles of research in biological sciences, design of experiments, statistical analysis and interpretation of data. Permission. Rec 3, Lab 2. Cr 4.

PSS 546 Chemistry of Soils

Composition and chemical transformation in soils, soil-solution equilibria considerations, soil profile development, and ion-exchange phenomena in soils. Prerequisites: PSS 140, PSS 440, PSS 446 and CHY 240 Rec 2, Lab 4. Cr 4.

PSS 548 Rhizosphere Microbiology

A study of microbial activities, excluding pathogenesis, in the plant root environment. Prerequisite: PSS 448 and BOT 454 or permission. Rec 3, Lab 3. Cr 4.

PSS 570 Graduate Seminar in Plant and Soil Sciences

A presentation of literature reviews, research, methodology and research progress before a critical audience of peers and faculty. Cr 1.

PSS 597 Special Topics in Plant and Soil Sciences

Advanced study of plant and soil related topics. Prerequisite: permission. **Cr Ar.**

Interdisciplinary Courses

INT 143 (PSS) Tropical Agriculture

A consideration of the characteristics and problems of the soils, plants, and animals of the tropics. Programs and methods for stimulating

their potential productivity will be explored. Rec 3. **Cr 3.**

INT 480 (ENT, PSS) Pesticides and the Environment

Study of the properties of pesticides and their fate in the environment. Emphasis will be on insecticides, fungicides and herbicides, application technology, governmental regulations, and environmental concerns. Prerequisite: One semester of biology or chemistry. Rec 3. **Cr 3.**



Special College-wide Courses, Programs, and Minors

College-wide Courses

MHE 250 Our Environment

Effect of the biological and physical environment on life and humankind A basic, interdisciplinary, introduction to environmental issues. Students investigate one environmental topic of their choice in detail. A paper relating to these efforts, reflecting both the nature of the problem and solutions, is required. Open to students in all colleges. Offered as an eight-week block course. Cr 3.

LSA 117 Issues and Opportunities

The course will consist of general meetings conducted by the Associate Dean, and one weekly small group session (usually of 10 or fewer students) conducted by the freshman advisor. (Pass/Fail) Cr 1.

Honors Program

The Honors Committee of the College of Life Sciences and Agriculture consists of J. Delphendahl, A. DeSiervo, J. Dimond, M. Gershman (Secretary), S. Goltz, B. Liles, Jr., R. Milardo, W. Rice, R. Rowe, R. Roxby, and B. Slabyj.

Freshmen of marked academic ability enrolled in all colleges are invited to apply to the secretary for admission to the sequence of honors courses listed here. The work of the freshman 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 for a thesis to be written during the senior year and 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 of Life Sciences and Agriculture. HON 101, 102 and HON 301, 302 may be used to meet up to nine hours of the elective humanities and social sciences requirements of the college. Any honors course meets the free elective requirements in any program of study.

Cooperative Program with Bangor Theological Seminary

Regularly enrolled students in the College of Life Sciences and Agriculture may register for courses at the Bangor Theological Seminary not to exceed six credit hours per semester, without paying additional fees. The college extends a like privilege to students regularly enrolled at the seminary. All registrations must have the approval of the academic deans of both institutions and the instructors involved. Credit for courses so taken will be considered a part of the student's program at the institution where enrolled.

While enrolled at the seminary a student may, with approval of his or her dean and the Admissions Office of the University, also register as a special student in the College of Life Sciences and Agriculture on the established fee basis for such courses. Work so taken, if it does not duplicate courses taken in the Seminary program, may be counted as advanced standing credit toward the degree in the event a student later registers for a degree program at the University.

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 Foods and Nutrition* (for example) to the student's official university transcript.

Minors are strictly optional: you are not required to complete a minor if you are majoring in a program in Life Science and Agriculture. 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 notify Mrs. Dubay of 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.

Agricultural Sciences

(27 credits)

The minor in Agricultural Sciences requires the 12 credits of introductory courses in the agricultural sciences listed below, plus an additional 15 credits of upper level courses selected from the following departments:

Animal and Veterinary Science
Agricultural Engineering
Agricultural and Resource Economics
Botany and Plant Pathology
Food Science
Plant and Soil Sciences

Courses selected to meet the requirement for upper level courses may not duplicate courses required in the major program.

Required Introductory Courses:

ANV 145 Animal Science
PSS 140 Soil Science
PSS 100 Crop Science
ARE 148 Principles of Agricultural Economics

Agricultural Mechanization

(18 credits) The requirements for the minor in Agricultural Mechanization include:

AEN 220 Principles of Mechanization

Plus four courses selected from the following list:

AEN 231 Farm Machinery Management
AEN 232 Farm Buildings and Equipment
AEN 235 Soil and Water Control
AEN 236 Farm and Forest Power
AEN 239 Agricultural Processing Technology

Plus *one* additional course selected from the *above* list, or *two* additional courses selected from the *following* list:

AEN 229 Basic Shop Techniques
AEN 233 Fluid Power Technology
AEN 238 Electrification
AEN 241 Energy and Society
AEN 242 Metals and Society
AEN 443 Energy-efficient Housing

Agribusiness and Resource Economics

(18 credits) The requirements for the minor in Agribusiness and Resource Economics include:

A course in Economics (ARE 148 or ECO 110)
Plus the following required core of courses:

ARE 358 Principles of Management in Agribusiness
ARE 459 Agricultural Business Finance
ARE 365 Food and Fiber Marketing
OR
ARE 471 Resource Economics

Plus two courses selected from the following list:

ARE 354 Introduction to Production Economics
ARE 468 Price Analysis and Forecasting
ARE 474 Land Use Planning
ARE 386 Government Policies Affecting Rural America
ARE 353 Farm Management
ARE 518 Mathematical Optimization Techniques
ARE 554 Production Economics
ARE 565 Marketing Theory and Concepts in Agribusiness
ARE 577 Economics of Public Choice
INT 324 Contemporary Rural Problems

Animal and Veterinary 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 and Veterinary Sciences include:
ANV 145 Animal Science

Plus, the student selects one of the two options detailed below.

Animal Industry Option

Select *two* courses from the following list:

ANV 346 Dairy Cattle Technology
ANV 347 Equine Science
ANV 348 Livestock Management
ANV 385 Poultry Technology

Select an *additional two* courses from the following list:

ANV 480 Physiology of Reproduction
ANV 461 Advanced Animal Breeding
ANV 456 Applied Animal Feeding
ANV 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:

ANV 346 Dairy Cattle Technology
ANV 348 Livestock Management
ANV 385 Poultry Technology

Plus *four* courses from the following list:

ANV 437 Animal Diseases
ANV 455 Animal Nutrition
ANV 456 Applied Animal Feeding
ANV 480 Physiology of Reproduction
ANV 461 Advanced Animal Breeding
ANV 472 Endocrinology

Botany

(19 credits) The requirements for the minor in Botany include the following four courses:

BOT 201/202 Plant Biology/Laboratory
OR

BOT 203 The Plant Kingdom

Plus the following *three* courses:

BOT 435 Plant Anatomy
BOT 452 Plant Physiology
BOT 464 Taxonomy of Vascular Plants

Plus an additional *four* credits in BOT courses numbered 200 or above.

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, Life Sciences and Agriculture, at the time the student formally declares an intention to pursue the minor in Chemistry.

Computer Science

(15 credits) The requirements for the minor in Computer Science include:

COS 220 Introduction to Computer Science I
COS 300 Introduction to Computer Science II
COS 330 Computer Architecture and Assembly Language

Plus any two additional COS courses at the 300 level or above.

Education

(22 credits of professional courses) 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. Students seeking certification as agriculture teachers must complete 18 credits of technical courses from the curriculum described below.

Teacher certification for Maine is awarded by the Maine Department of Educational and Cultural Services. Applicants for certification must be graduates of an approved curriculum and 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 teaching placement can be arranged, and so that students can plan their schedule to accommodate student teaching within their

major program. In some cases it may be necessary to extend a program by one semester to complete the student-teaching 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 500 Field Observation
- ESC 352 Teaching Science in the Secondary School
- STT 4XX Student Teaching (Secondary) Courses marked by an asterisk(*) may be counted toward meeting the LSA humanities/social sciences requirement.

Agricultural and Natural Resource Education

(18 additional credits) Students interested in the curriculum in Agricultural and Natural Resources Education should consult the coordinator, Professor Rhoads, in 106 Winslow Hall.

The curriculum in Agricultural and Natural Resource Education is offered as a minor within the following major programs: Agriculture, Agricultural Mechanization, Agribusiness and Resource Economics, Animal and Veterinary Sciences, Forestry, and Plant and Soil Sciences. In addition to teaching opportunities in these major fields, students completing this curriculum are also prepared to teach in one or more of the following areas: agricultural production, agricultural supply and services, agricultural mechanics, agricultural products, agricultural and natural resources, forestry, horticulture, and other agricultural areas.

In addition to the 22 credits of professional education courses listed above, students must complete a minimum of 18 credits of technical courses outside the major. Thus, the total program requires 40 credits, 9 of which count for humanities/social sciences and 31 of which count as elective courses within the student's major.

The 18 credits of technical courses must consist of six credits in each of three disciplines outside the major, selected from a list of approved courses in the following areas:

- Agricultural Mechanization
- Agribusiness and Resource Economics
- Animal and Veterinary Sciences
- Forestry
- Plant and Soil Sciences

Students completing this program may apply for certification as a general agriculture teacher. Certification as a vocational teacher requires, in addition, appropriate agricultural experience.

Entomology

(19 credits) The requirements for the minor in Entomology include:

- ENT 226 Introductory Entomology
- ENT 440 Insect Biology and Taxonomy
- ENT 443 Forest Insect Ecology

OR

- ENT 449 Economic Entomology

Plus an additional eight credits selected from the following list:

- ENT 247/248 Problems in Entomology
- ENT 443 Forest Insect Ecology
- ENT 449 Economic Entomology
- ENT 453 Biology and Taxonomy of Advanced Orders
- ENT 511 Insect Ecology
- ENT 541 Medical Entomology
- ENT 530 Aquatic Entomology
- ENT 551 Morphology of Insects
- ENT 561/562 Seminar

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 students, it may be of particular interest to students majoring in biology, child development, physical education, or special education. 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
- AND
- HNF 102 Introduction to Food and Nutrition Laboratory (prerequisites for all other HNF courses)
- HNF 103 Family Food Management
- HNF 121 Food Service Systems Management I
- HNF 201 Food Service Systems Management II
- HNF 221 The Science of Food Preparation
- HNF 270 World Food and Nutrition

- HNF 401 Problems in Food and Nutrition Education
 HNF 280 Human Nutrition for the Health Professions
 HNF 301 Nutrition and Growth
 HNF 371 Recent Advances in Food and Nutrition
 HNF 398 Special Problems in Food and Nutrition

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.

Journalism

(24 credits) The requirements for the minor in Journalism include:

- JBR 100 Introduction to Mass Communication
 Plus the following core of courses:

- JBR 231 Reporting and Newswriting
 JBR 232 Public Affairs Reporting
 JBR 375 Mass Media Law and Ethics
 JBR 430 Copy Editing
 JBR 431 Newspaper Laboratory I
 JBR 432 Newspaper Laboratory II
 JBR 489 Seminar in Journalism

Marine Resources

(18 credits) Professor Robert Bayer, Coordinator
 The minor in Marine Resources is designed for students in the Colleges of Life Sciences and Agriculture and Arts and 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):

- ANV 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 419 Ecology (BIO 100)
 ARE 171 Economics of Environmental Quality
 ARE 577 Economics of Public Choice (ECO 373)
 MCB 520 Fish Diseases (ZOL 204, MCB 300 or permission)
 ANV 212 Maine Mariculture (ZOL 453)
 ANV 211 Aquaculture
 ANV 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

- AEN 469 Agricultural Process Engineering (MEE 230, 360)
 AEN 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

(18-20 credits) The requirements for the minor in Mathematics include:

MAT 127 Analytic Geometry and Calculus

MAT 228 Analytic Geometry and Calculus

MAT 259 Differential Equations

OR

MAT 334 Introduction to Statistics

MAT 262 Linear Algebra

OR

MAT 351 Introduction to Vector and Tensor Analysis

Plus *one* course selected from the following list:

MAT 262 Linear Algebra (if not selected to meet requirements listed above)

MAT 334 Introduction to Statistics

MAT 435 Introduction to Mathematical Statistics

MAT 439 Regression and Analysis of Variance

MAT 387 Numerical Analysis

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 111/121 General Physics I

OR

PHY 112/122 General Physics II

PHY 236 Introductory Modern Physics

PHY 238 Mechanics

Plus *three* courses chosen from the following list:

PHY 454 Electricity and Magnetism I

PHY 347 Biophysics

PHY 462 Heat and Thermodynamics

PHY 470 Nuclear Physics

PHY 472 Optics

Plant and Soil Sciences

(17-22 credits) The Department of Plant and Soil 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

PSS 110 Horticulture

PSS 140 Soil Science/Laboratory

Plus two courses from the following list:

PSS 124 Greenhouse Management

LNM 123A Nursery/Garden Center Operation

PSS 128 Landscape Design

Plus one course from the following list:

PSS 120 Herbaceous Landscape Plants

PSS 122 Woody Landscape Plants

Plus one additional course selected either from the list above or from the following list:

PSS 410 Plant Propagation

BOT 201/202 Plant Biology

BOT 452/453 Plant Physiology

BOT 457 Plant Pathology

BOT 464 Taxonomy of Vascular Plants

ENT 226 Introductory Entomology

The requirements for the minor in Plant Science include:

BOT 452 Plant Physiology

PSS 100 Crop Science

PSS 101 Crop Management

PSS 370 Seminar in Plant and Soil Sciences

Plus one course from the following list:

BOT 464 Taxonomy of Vascular Plants

PSS 400 Bioclimatology

PSS 401 Advanced Crop Management

PSS 403 Principles of Weed Control

PSS 410 Plant Propagation

PSS 440 Soil Fertility

Plus two additional courses selected either from the list above or from the following list:

PSS 110 Horticulture

PSS 120 Herbaceous Landscape Plants

PSS 122 Woody Landscape Plants

PSS 124 Greenhouse Management

PSS 126 Agrostology

PSS 128 The Art of Home Landscaping

The requirements for the minor in Soil Science include:

PSS 144 Soil and Water Conservation

PSS 146 Land Use Planning - Soil Aspects
 PSS 440 Soil Fertility
 PSS 442 Soil Taxonomy
 PSS 370 Seminar in Plant and Soil Sciences

Plus three courses from the following list:

GES 541 Glacial Geology
 INT 500 Seminar in Quaternary Studies
 PSS 100 Crop Science
 PSS 400 Bioclimatology
 PSS 446 Chemical Properties of Soils
 PSS 447 Physical Properties of Soils

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 354 Human Learning
 PSY 356 Theories of Learning
 PSY 361 Sensation and Perception
 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.

Military Science

Professor of Military Science LTC Michaud; Assistant Professors MAJ Skaggs, CPT Moores, CPT Rice, CPT Porter; Instructors SGM Gavin, MSG Pickett; Supply Technician Mr. Bowden

General

The Department of Military Science conducts a General Military level and the two 200 level courses, or ROTC Basic Camp (MIS 290). HTY 478 is also required. The student may enter the Basic Course by taking any of the courses numbered below 300, provided the course is listed in the "Schedule of Classes" for the semester concerned.

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. Selected students may attend Ranger School in lieu of ROTC Advanced Camp. Students receive \$100.00 a month and may be commissioned in either the army reserve or regular army.

Scholarship Program

The Department of Army offers a two- and three-year ROTC scholarship to selected freshman and sophomore students, regardless of enrollment in the Military Science Program, who have demonstrated outstanding leadership and scholastic ability. This scholarship pays full tuition for the respective number of years at the University, laboratory fees, a stipend for text books, and \$100 per month during the academic year for the duration of the scholarship.

Simultaneous Membership Program

Students who are members of the Army National Guard of the Army Reserve and who have completed basic training may qualify for entry into the Advanced Course. 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.

Courses in Military Science

MIS 010 Rifle Marksmanship

History of the rifle. Rifle parts and functional operation. Ammunition, and how a rifle fires. Rifle maintenance. Rifle handling safety procedures. Sighting and aiming, and firing positions. Range firing. Participation in Leadership Laboratory one evening each week and on occasional weekends is required if student is enrolled in ROTC. (Pass/Fail Grade Only). **Cr 0.**

MIS 020 Pistol Marksmanship

Pistol parts and operation. Pistol ammunition, safety, and range procedures. Positions and grip. Sighting and aiming, and making shots count. Pistol maintenance. Range firing. Participation in Leadership Laboratory one evening each week and on occasional weekends is required if student is enrolled in ROTC. (Pass/Fail Grade Only). **Cr 0.**

MIS 030 Patrolling

Planning a patrol, to include organization, equipment, communication, movement, inspection, and rehearsal. Estimate of distances. Sounds and smells. Participation in a patrol. Participation in leadership laboratory one evening each week and on occasional weekends is required if student is enrolled in ROTC. (Pass/Fail Grade Only). **Cr 0.**

MIS 040 Orienteering

Use information placed on a map. Indicate coordinates on a map. Measure map and ground distance. Plot and measure azimuths. Navigation techniques. Cross country travel. Design, organize, run, score, and evaluate free, score, line, and project orienteering. Participation in leadership laboratory one evening each week and on occasional weekends is required if student is enrolled in ROTC. (Pass/Fail Grade Only). **Cr 0.**

MIS 050 Military Physical Fitness

Leading and participating in military conditioning exercises and programs. The Army Physical Fitness Tests. Run For Your Life. Participation in Leadership Laboratory one evening each week and on occasional weekends is optional. (Pass/Fail Grade Only). **Cr 0.**

MIS 060 Air Assault School

A ten-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 three-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 080 Winter Survival School

A five-day school conducted at Brunswick Naval Air Station and in the Rangeley area by the U.S. Navy. Transportation is provided by the Army. Instruction and practical experience in winter survival equipment and techniques. Enhancement of the student's self-confidence in his/her ability to survive in an extremely rigorous environment. Offered during January. Students apply for enrollment to the Professor of Military Science during December. (Pass/Fail Grade Only). **Cr 0.**

MIS 100 Leadership Laboratory

Leadership Lab is a requirement for all regular program cadets. The purpose of Leadership Lab is to provide the environment wherein each cadet can develop and improve military leadership skills. Continuous counselling and periodic evaluations of cadet performance are the primary methods used. In case of class conflicts an alternate Leadership Lab will be arranged to meet student requirements). **Cr 0.**

MIS 105 Military Physical Fitness

Study and experience in leading and participating in the U.S. Army physical fitness program. The role of exercise and fitness in one's life, as well as the development of an individual training program, will be emphasized. Experience in a variety of aerobic exercises and strength building programs will provide actual leadership and fitness opportunities. **Cr 1.**

MIS 110 Introduction to ROTC and the U.S. Army

The purpose and organization of the ROTC program. The role of officers. Customs, courtesies, and traditions. An overview of the defense establishment. The importance of the Reserve Components (U.S. Army and Navy National Guard). Future direction of the U.S. Army. Participation in Leadership Laboratory one evening

each week and on occasional weekends is required. **Cr 1.**

MIS 120 Basic Military First Aid

A study of basic life saving and first aid skills used in a field environment, including Basic CPR techniques and heat and cold injury prevention. Lec 1. **Cr 1.**

MIS 130 National Security

Technological advances and their influence on warfare. Organization of the U.S. Army and the national defense structure. Factors and instruments of national power and the attainment of national objectives. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. **Cr 1.**

MIS 210 Map Reading

Reading and interpreting maps and aerial photographs. Marginal information, map grid coordinates, scale and distance, directions. Use of the compass, intersection/resection, elevation and relief. GM angle, and map substitutes. Participation in leadership laboratory one evening each week and on occasional weekends is required. **Cr 1.**

MIS 220 Squad Tactics

Rifle squad organization. Squad movement techniques and actions on contact. Hand and arm signals, field fortifications, camouflage, rifle and concealment, and techniques of fire. Estimate of the situation, rifle squad in the attack, and rifle squad in the defense. Infantry-tank teams. Patrolling. Participation in leadership laboratory one evening each week and on occasional weekends is required. **Cr 1.**

MIS 290 ROTC Basic Camp

A six-week summer camp conducted at Fort Knox, Kentucky. The student receives pay, and travel costs are defrayed by the Army. The environment is rigorous, and is similar to Army Basic Training. No military obligation incurred. Training includes the role and mission of the U.S. Army, map reading and land navigation, first aid, marksmanship, leadership, physical training and parades, and tactics. Completion of MT 29 satisfies all Basic Course requirements.

Three different cycles offered during the summer, but candidates are accepted only during the first two months of the 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 for attendance is based on qualifications and merit. **Cr 6.**

MIS 310 Leadership

Exposure to the branches of the Army. How to plan and conduct military training. Exposure to the various leadership theories and to the leadership environment. Fundamentals of leadership, human behavior, communication, and contemporary human problems. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. **Cr 3.**

MIS 320 Advanced Tactics

Exposure to military equipment and military tactics at the squad, platoon, and company level. Completion of Advanced Camp prerequisites in Leadership Laboratory one evening each week and on occasional weekends is required. **Cr 2.**

MIS 410 Military Management

Exposure to military law. Analysis of legal problems facing small unit leaders. The Code of Conduct. Management theory. Motivation theory. Training, personnel, and logistics management practices. Management by Objective (MBO) and Organizational Effectiveness (OE). The Modern Volunteer Army (MVA) and total Army goals. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. **Cr 2.**

MIS 420 Operations and Seminar

Exposure to larger unit operations at the brigade and battalion level. Sequence of command and staff actions the problem solving process. Organization of the division, brigade, and battalion. Preparation of combat orders. Discussion of current military problems in the leadership/management area. Case studies. Professional ethics. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. **Cr 3.**

Technical Division

Robert B. Rhoads, Director

Six associate degree programs are offered at the University of Maine by the College of Life Sciences and Agriculture (LSA) through its Technical Division. The programs are administered through their respective Life Sciences and Agriculture departments at Orono. Course offerings in the technical programs are distinct and separate 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.

The two-plus-two programs, Agricultural Mechanization Technology and Resource and Business Management, are designed to complete an associate of science degree after two years of study and a bachelor of science degree after two additional years of study. While the remaining 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 Life 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.

A basic core curriculum of general education subjects is required in most 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

LSA 100A	Seminar in Program Major	1
	Mathematics (See program)	3
ENG 101A	Critical Written Expression	3
SPE 101A	Oral Communications	3
	Humanities or Social Science Elective	3

Associate of Science in Agricultural Mechanization Technology (two-plus-two)

Agricultural mechanization technology covers the application of engineering developments to agriculture and forestry. Opportunities in the field are many and varied, including positions on farm production units, sales and service positions with farm, forestry machinery and equipment companies, work as field technicians or

supervisors with equipment test teams, and as high school agriculture teachers.

The curriculum in agricultural mechanization technology includes basic physical science and agricultural science courses and covers specific aspects of machinery selection and operations.

There are two routes to a B.S. degree in agricultural mechanization. For those students who prefer and qualify for direct admission to the four-year program, 120 credit hours are required. For those who prefer to divide their studies into two phases, a "two-plus-two" program with an associate degree after two years is described herein. One hundred and twenty-nine hours are required to obtain the B.S. degree by this route.

Associate of Science Degree

The first two years of study in Agricultural Mechanization Technology cover the basic and practical aspects of the subject and prepare the graduate to work at the technician level. The associate of science degree is awarded after two years of study. A minimum accumulative average of 2.5 for the first two years is required to continue for the bachelor of science degree in Agricultural Mechanization.

Bachelor of Science Degree

The third and fourth years of the program provide an opportunity for more depth in the scientific aspects of agricultural production and mechanization as well as opportunity for greater breadth in non-technical areas. The bachelor of science degree is earned after these studies. The full range of positions in agricultural mechanization is available to holders of the B.S. degree.

Specimen Curriculum

First and Second Years

Science and Mathematics

LSA 113A	Applied Mathematics	3
MAT 142A	Algebra and Trigonometry	3
BOT 101A	Introductory Botany	3
	TOTAL HOURS	9

Major Field

AEN 105A	Power Technology	3
AEN 108A	Farm Machinery	3
AEN 109A	Farm Buildings	3
AEN 110A	Electrification	3
AEN 111A	Soil and Water Management	3
AEN 116A	Forest Machinery Systems	3

AEN 229	Basic Shop Techniques	2
CET 101A	Elementary Surveying*	4
GET 121A	Technical Drawing	4
LSA 100A	Seminar in (Program Major)	1
	Animal or Plant Science Elective	3
PST 140A	Soils and Fertilizers	4
	Technical Elective	3
	TOTAL HOURS	39

Supporting Courses

ARE 110A	Economics	3
ARE 130A	Accounting	3
ARE 155A	Business Management	3
	TOTAL HOURS	9

Communications and Humanities

ENG 101A	Critical Written Expression	3
SPE 101A	Oral Communications	3
	Humanities and Social Science Elective	3
	TOTAL HOURS	9

MINIMUM HOURS REQUIRED FOR ASSOCIATE OF SCIENCE DEGREE: 66

Third and Fourth Years Required Courses

Science and Mathematics

PHY 111/112	General Physics I/II	8
CHY 111	General Chemistry I	4
	OR	
BCH 207	Fundamentals of Chemistry	(4)
MAT 232	Principles of Statistical Inference	3
	OR	
FTY 204	Statistical Inference in Forest Resources	(3)
	TOTAL HOURS	15

Major Field

AEN 220	Principles of Mechanization	3
AEN 231	Field Machinery Management	3
AEN 233	Fluid Power Technology	3

*CET 101A, CET 102A Plane and Advanced Surveying may be substituted

AEN 239	Agricultural Processing Technology	3	Humanities and Social Sciences	
AEN 242	Metals and Society	3	Electives	12
AEN 480	Senior Seminar	1	TOTAL HOURS	12
	TOTAL HOURS	16		
Supporting Courses				
	Electives	20		
	TOTAL HOURS	20		
			SUBTOTAL (3rd and 4th years)	63
			TOTAL HOURS REQUIRED FOR BACHELOR OF SCIENCE DEGREE:	129

Associate of Science in Animal Agriculture Technology

This program of study provides technical training and experience for careers in animal production in dairy cattle, poultry, beef cattle, pleasure horses, sheep, swine, and the related sales and service industries. Previous farm experience is considered helpful for enrollees. Graduates frequently return to the home farm or are employed as herdsmen or foremen on other farms. An increasing number of graduates are employed in sales and service in the feed, fertilizer, and machinery industries. Other employment opportunities include soil conservation service workers, breeding technicians, D.H.I.A. field men, and Peace Corps representatives.

Specimen Curriculum

Basic Core

LSA 100A	Seminar in (Program Major)	1
LSA 113A	Applied Mathematics	3
ENG 101A	Critical Written Expression	3
SPE 101A	Oral Communications	3
	Humanities or Social Science Elective	3
	TOTAL HOURS	13

Animal and Veterinary Science

ANV 101A	Dairy Cattle	4
ANV 102A	Animal Production	4
ANV 103A	Animal Selection	2
ANV 104A	Animal Breeding	3
ANV 106A	Animal Feeding	3
ANV 107A	Poultry Production	4
ANV 109A	Mammalian Anatomy	3
ANV 110A	Mammalian Physiology	3
ANV 112A	Reproduction and Breeding	3
ANV 115A	Livestock Diseases	3
	TOTAL HOURS	32

Agriculture Technology

ARE 154A	Farm Management	3
PST 140A	Soils and Fertilizers	4
PST 163A	Forage Management	3
	TOTAL HOURS	10
	Free Electives	8
	TOTAL HOURS REQUIRED FOR ASSOCIATE DEGREE:	63

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.

Specimen Curriculum

Basic Core

LSA 100A	Seminar in (Program Major)	1
LSA 113A	Applied Mathematics	3
ENG 101A	Critical Written Expression	3
SPE 101A	Oral Communications	3
	TOTAL HOURS	10

Fundamental Sciences

ANV 109A	Mammalian Anatomy	3
ANV 110A	Mammalian Physiology	3
ANV 119A	Laboratory Animal Diseases	3

BCH 125A	Chemistry for Animal Technology	5
INT 120A	Basic and Pathogenic Microbiology	5
	TOTAL HOURS	19

Applied Technology

ANV 113A	Large Animal Care and Handling	3
ANV 114A	Laboratory Animal Technology I	3
ANV 116A	Laboratory Animal Technology II	3
ANV 123A	Clinical Laboratory Methods	3
ANV 124A	Laboratory Methods Practicum	3
ANV 128A	Radiology	2
	TOTAL HOURS	17
ANV 130A	Practicum in Animal Medical Technology: Externship	16
	Humanities and Social Sciences Elective	3
	TOTAL HOURS REQUIRED FOR ASSOCIATE DEGREE:	65

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, home furnishings, commercial and advertising design, and fashion merchandising.

At the completion of the second semester, a six-month placement training program is offered to those students selected by a screening committee. This course is designed to provide on-the-job training. The cooperating merchant compen-

sates 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 the 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 Home Economics with a concentration in Clothing and Textiles. 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.

Specimen Curriculum

Basic Core

ARE 140A	Introduction to Organizational Behavior	3
ENG 101A	Critical Written Expression	3
SPE 101A	Oral Communications	3
LSA 100A	Seminar in Merchandising	1
LSA 105A	Mathematics for Business Humanities 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	Commercial and Advertising Design	3
CLD 108A	Fashion Merchandising	3
	TOTAL HOURS	21

Business and Economics

ARE 110A	Economics	3
ARE 160A	Marketing	3
ARE 141A	Social and Economic Problems of Rural Life	3
ARE 130A	Accounting	3
ARE 162A	Sales Promotion	3
	TOTAL HOURS	15
	Electives	8

TOTAL HOURS REQUIRED FOR ASSOCIATE DEGREE: 60

Placement Training: CLD 196A.

Students electing placement training will receive 14 credit hours in place of 9 hours of elective credit, CLD 105A and ARE 160A.

Associate of Science in Landscape and Nursery Management

The Landscape and Nursery Management Program is offered cooperatively by the Department of Plant and Soil Sciences of the University of Maine and the Southern Maine Vocational Technical Institute of South Portland. Students may enroll and take their freshman 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 individuals through

the next ten years. The young person who prepares for a career in this field has almost unlimited opportunities.

Specimen Curriculum

Required Courses

LSA 100A	Seminar in Landscape and Nursery Management	1
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Communications

ENG 101A	Critical Written Expression	3
SPE 101A	Oral Communications	3
ENG 105A	Business, Professional and Technical Writing	3
	TOTAL HOURS	9

Mathematics

LSA 113A	Applied Mathematics	3
	TOTAL HOURS	3

Humanities and Social Sciences

POS 102A	State and Local Government	3
	Elective	3
	TOTAL HOURS	6

Basic Sciences

BOT 101A	Introductory Botany	3
ENT 101A	Applied Entomology	3
	TOTAL HOURS	6

Applied Sciences

AEN 107A	Landscape Machinery	3
LNM 128A	Landscape Design	3
LNM 126A	Turfgrass Management	3
LNM 127A	Landscape Construction	3
LNM 123A	Nursery and Garden Center Operations	3
LNM 140A	Soils and Fertilizers	4
LNM 196A	Field Experience in Landscape and Nursery Management	4
PSS 110	Horticulture	3
PSS 120	Herbaceous Landscape Plants*	3
PSS 122	Woody Landscape Plants*	3
PSS 124	Greenhouse Management*	4
	TOTAL HOURS	36

Electives 5

TOTAL HOURS REQUIRED FOR ASSOCIATE DEGREE: 66

*See Plant and Soil Sciences section for course descriptions.

Associate of Science in Resource and Business Management

This curriculum places major emphasis on the principles of business management and economics and provides practical training in preparation for entry-level management positions in the food and fiber industries. The training includes courses in economics, marketing, accounting, data processing, statistics, sales promotion, and business management as well as selected technical courses offered by the College of Life Sciences and Agriculture. Second year students with a 2.5 grade point average may broaden their range of technical electives by selecting four-year courses for which they are qualified.

Students will be prepared for eventual managerial, supervisory, sales, and service positions with business firms and relevant government agencies. Opportunities are available in such fields as food processing, food inspection, retail

food stores, floral shops, wholesale nurseries, feeds, farm machinery, golf courses, and campgrounds.

Students will have the opportunity to apply for placement training with a business firm in Maine as an integral part of their academic program. Students selected for this option will spend approximately six months working in a management training program away from campus. For successful completion of this program, students receive up to 16 hours of academic credit. This program takes place during the summer and fall following the first year on campus. Students not electing this option remain on campus in regular academic classes. Both groups complete their programs in two academic years. A student also may elect a shorter period of field experience on either a full or part time basis. The

placement training experience provides a resource that gives greater breadth to the program in areas where formal courses are not available.

A two-plus-two alternative is available to students. The program of study during the first year is identical for both alternatives. Students are required to have a 2.5 grade point average after the first year of study in order to continue in the two-plus-two alternative. Students selecting this alternative complete the second year of the associate degree program in transition to the bachelor's degree program in Agribusiness and Resource Economics. Upon successful completion of specified courses, the student receives an associate degree and qualifies for transfer to the B.S. program in Agribusiness and Resource Economics which may be completed in four additional semesters or a total of four years.

Those students who do not elect the two-plus-two option, but who later desire to continue their education in a baccalaureate program, can still apply for transfer under existing university regulations. Because of the specialized nature of the courses in the curriculum, the program is especially suitable for transfer into the bachelor's degree program in Agribusiness and Resource Economics. It is not intended, nor designed, as a transfer program into the College of Business Administration.

Curriculum in Resource and Business Management

Associate Degree

First and Second Years*

LSA 100A	Seminar in Resource and Business Management	1
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Communications

ENG 101A	Critical Written Expression	3
SPE 101A	Oral Communications	3
ENG 105A	Business, Professional and Technical Writing	3
TOTAL HOURS		9

*Student must have a grade point average of 2.5 after the first year of study in order to continue in the two-plus-two option. The associate of science degree is awarded after the completion of 60 credit hours.

Mathematics

LSA 105A	Mathematics for Business	3
TOTAL HOURS		3

Social Sciences

ARE 140A	Introduction to Organizational Behavior	3
ARE 141A	Social and Economic Problems of Rural Life Humanities or Social Science Elective	3
TOTAL HOURS		9

Business and Economics

ARE 110A	Economics	3
ARE 160A	Marketing	3
ARE 130A	Accounting	3
ARE 132A	Agribusiness Accounting	3
ARE 120A	Statistics	3
ARE 155A	Business Management	3
ARE 122A	Data Processing	3
TOTAL HOURS		21
LSA Electives		8
Free Electives		9

TOTAL HOURS REQUIRED FOR ASSOCIATE DEGREE: 60

Curriculum in Two-plus-Two Option*

Students electing to continue the two-plus-two option the second year will take the following courses:

ARE 120A	Statistics	3
ARE 155A	Business Management	3
ENG 105A	Business, Professional and Technical Writing	3
ECO 121	Principles of Macroeconomics	3
BIO 100	Basic Biology	4
ARE 365	Food and Fiber Marketing	3
MAT 113	Mathematics for Business and Economics	3
MAT 114	Mathematics for Business and Economics II	3
ARE 386	Government Policies Affecting Rural America	3
LSA	Electives (four-year transferable)	3

Third and fourth year subjects leading to a B.S. degree for students completing the A.S. degree two-plus-two option:

Bachelor's Degree**Basic Sciences**

Electives	4
TOTAL HOURS	4

Humanities and Social Sciences

Electives	3
TOTAL HOURS	3

LSA Electives

INT 219	Introduction to Ecology	3
	Electives	6
	TOTAL HOURS	9

Economics

ECO 332	Intermediate Macroeconomics	3
	OR	
ECO 353	Money and Banking	(3)
ECO 373	Intermediate Microeconomics	3
	TOTAL HOURS	6

Agricultural and Resource Economics

ARE 171	Economics of Environmental Quality	3
ARE 353	Farm Management	3
ARE 354	Introduction to Production Economics	3
ARE 358	Principles of Management in Agribusiness	3
ARE 459	Agricultural Business Finance	3
ARE 468	Price Analysis and Forecasting	3
ARE 471	Resource Economics	3
	OR	
ARE 473	Land Economics	(3)
ARE 489	Seminar	2
	TOTAL HOURS	23

Mathematics and Statistics

MAT 215	Introduction to Statistics for Business and Economics	3
	OR	
ECO 385	Introduction to Economic Statistics and Econometrics	(3)
	TOTAL HOURS	3

Free Electives (any course in the University for which the student is qualified)

11

SUBTOTAL (3rd and 4th years) 59

TOTAL HOURS REQUIRED FOR BACHELOR OF SCIENCE DEGREE: 120

Courses in Agricultural Mechanization Technology**AEN 105A Power Technology**

Construction principles and maintenance of spark ignition and diesel engines. Power transmission as related to agricultural and forestry equipment. Lec 2, Lab 2. **Cr 3.**

AEN 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 operations. Laboratory includes test and adjustment of small engines and related equipment. Lec 2, Lab 2. (Pst majors only) **Cr 3.**

AEN 108A Farm Machinery

Principles of construction, operation and adjustment of machines used in agricultural production. Economic principles related to cost and management of mechanized operations. Laboratory work includes testing and adjustment of several agricultural machines and related equipment. Lec 2, Lab 2. **Cr 3.**

AEN 109A Farm Buildings

Functional planning and economic considerations, materials, methods of construction and environmental control for production, processing and storage buildings. Lec 2, Lab 2. **Cr 3.**

AEN 110A Electrification

Electrical terms and circuits. Electrical equipment for heat and power. Basic wiring techniques including planning of wiring systems. Lec 2, Lab 2. **Cr 3.**

AEN 111A Soil and Water Management

Elementary Soil and Water Conservation Engineering and Farm Surveying. Application of soil erosion control systems, drainage systems, farm ponds, and irrigation systems to field problems in agriculture and landscaping. Lec 2, Lab 2. **Cr 3.**

AEN 116A Forest Machinery Systems

Vehicles and mobility, hydraulic systems, and economics of forest equipment operation. Lec 2, Lab 2. **Cr 3.**

AEN 196A Field Experience in Agricultural Mechanization Tech

Provides on-the-job training in the field related to program of study. Work is to be under supervision of employer and appropriate department or school in the College of Life Sciences and Agriculture. Prerequisite: C average. (Pass/Fail Grade Only). **Cr Ar.**

Courses in Animal Agriculture and Animal Medical Technology

ANV 101A Dairy Cattle

Practical application to herd management of lactation, environment, reproduction, sanitation, housing, and breed association programs. Laboratory devoted to practical problems in the management of a herd of dairy cattle. Field trip fee \$10.00. Lec 3, Lab 2. **Cr 4.**

ANV 102A Animal Production

Breeds and types of beef cattle, sheep, swine and pleasure horses; their care, feed, and management. Field trip fee \$9.00. Lec 3, Lab 2. **Cr 4.**

ANV 103A Animal Selection

A study of the principles of animal selection. Lec 1, Lab 2. **Cr 2.**

ANV 104A Animal Breeding

Animal genetics, systems of breeding and principles of selecting farm and laboratory animals. Lec 3. **Cr 3.**

ANV 106A Animal Feeding

A study of the principles of nutrition, feeds and their values, and the nutritive requirements of animals. The laboratory is devoted to the principles of nutrition and ration formulation; Lec 2, Lab 2. **Cr 3.**

ANV 107A Poultry Production

A survey course to introduce students to the many aspects of the poultry industry. Guest speakers and field trips (which are part of laboratory) to visit the industry are featured. Lecture section may be taken without laboratory. Field trip fee \$6. Lec 3, Lab 1. **Cr 4.**

ANV 109A Mammalian Anatomy

A study (with dissection of the cat) of mammalian anatomy. Lec 2, Lab 1. **Cr 3.**

ANV 110A Mammalian Physiology

A basic course discussing the function of different organ systems and their interrelationship in mammals. Emphasis is placed on the neuromuscular, cardiovascular, renal, respiratory, digestive, endocrine and reproductive system. Prerequisite: ANV 109A. Lec 3. **Cr 3.**

ANV 111A Survey of Animal Nutrition

A course designed to orient the student to the basic principles of nutrition as they apply to such monogastric animals as chicks, rats, mice, guinea pigs, hamsters, dogs, cats, pigs, rabbits, swine and horses and such ruminant animals as goats, sheep and bovines. Lec 2. (AMT students only) **Cr 2.**

ANV 112A Reproduction and Breeding

The principles and practices of the complete reproductive cycles of breeding management, by species, of farm animals (for AT) or pets and laboratory animals (for AMT). Lec 3. **Cr 3.**

ANV 113A Large Animal Care and Handling

A course designed to familiarize the student with handling, restraining, sampling and medicine administration of common large animals encountered in veterinary practice. Lab fee \$10. Lec 2, Lab 2. **Cr 3.**

ANV 114A Laboratory Animal Technology I

The principles of humane with animal care in clinics, hospitals and research laboratories. Animal house design, equipment and management problems will be discussed. Characteristics of individual animal species will be studied. Lab fee \$15. Lec 2, Lab 2. **Cr 3.**

ANV 115A Livestock Diseases

An overview of the diseases of the common domestic farm animals, including clinical signs and treatments emphasizing prevention and control through applied principles of hygiene, sanitation, and vaccination. Lec 3. **Cr 3.**

ANV 116A Laboratory Animal Technology II

This course will be divided between a consideration of the principles of animal genetics and the principle of animal nutrition. Topics to be included under animal genetics are: 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.**

ANV 119A Laboratory Animal Diseases

Principles of disease prevention and control as they apply to common laboratory rodents, carnivores and primates. Lec 3. **Cr 3.**

ANV 121A Problems in Animal and Poultry Production I **Cr Ar.****ANV 122A Problems in Animal and Poultry Production II** **Cr Ar.****ANV 123A Clinical Laboratory Methods**

A descriptive and familiarization course of current laboratory procedures used in veterinary medicine. Technical procedures in urinalysis, hematology, clinical chemistry, instrumentation and parasitology will be covered. Lab fee \$10. Lec 2, Lab 2. **Cr 3.**

ANV 124A Laboratory Methods Practicum

The practical application of veterinary techniques on live animals, including surgical preparation, instrument preparation and sterilization, anesthesia, and the demonstration of commonly used surgical methods. Lab fee \$10. Lec 1, Lab 4. **Cr 3.**

ANV 128A Radiology

Radiology and laboratory periods prepare the student for positioning of animals, the working of the X-ray machine, proper precautions, and development of quality films. **Cr 2.**

ANV 130A Practicum in Animal Medical Technology

Fourteen weeks of practical experience from both assigned laboratories and veterinary facilities in the field with UM appointments. The student will be taught the practical aspects of anesthesiology, radiology, nursing, ethics, public relations, pharmacology and assisting in surgery, and laboratory techniques and procedures. Visits from the director of the AMT program will be made every 3 weeks to check on progress of the training. (Pass/Fail Grade Only). **Cr 16.**

ANV 196A Field Experience in Animal and Veterinary Science

Provides on-the-job training in the field related to program of study. Work is to be under supervision of employer and appropriate department or school in the College of Life Sciences and Agriculture. Prerequisite: C average. (Pass/Fail Grade Only). **Cr Ar.**

Interdisciplinary Courses

INT108A (ANV, FOS) Meat and Meat Products
Methods of handling and preparing livestock for market, packing house methods, cutting and

curing of meats with special emphasis on retailing of meat and poultry products. Course fee of \$5. Lec 2, Lab 2. **Cr 3.**

INT120A (ANV, MCB) 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 5.**

Courses in Resource and Business Management**ARE110A Economics**

Economic principles applied to solving problems of the consumer and firms. The interdependence of the natural resource sector with the national economic forces influencing prices, competition, level of employment and economic growth. Rec 3. **Cr 3.**

ARE120A 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.**

ARE122A Data Processing

Introduction to the principles and techniques of microcomputer processing. Practical applications are included. Rec 3. **Cr 3.**

ARE130A Accounting

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. Rec 2, Lab 2. **Cr 3.**

ARE132A Agribusiness Accounting

This course is 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.**

ARE140A Introduction to Organizational Behavior

This course describes and explains the systems and subsystems which comprise an organization's structure. Cases are used to develop skills needed by a successful manager operating in

either a small scale or large scale economic institution **Cr 3.**

ARE141A Social and Economic Problems of Rural Life

The social and economic problems of rural life. The social systems of community, family, religion, education, and economics. Leadership, power structure and social stratification. Rec 3. **Cr 3.**

ARE154A Farm Management

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.**

ARE155A Business Management

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.**

ARE160A 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. Food and agricultural marketing applications and case analysis. Rec 3. **Cr 3.**

ARE162A Sales Promotion

The use of advertising, sales and merchandising techniques. Training of sales and service personnel. Case studies are used to develop an interdisciplinary approach to promotion. Rec 3. **Cr 3.**

ARE196A Field Experience in Agriculture and Resource Economics

Provides on-the-job training in the field related to program of study. Work is to be under supervision of employer and appropriate department or school in the College of Life Sciences and Agriculture. Prerequisite: C average. (Pass/Fail Grade Only). **Cr Ar.**

ARE197A Independent Studies

Analysis of and readings on current management problems in production, processing, distribution, and marketing. Prerequisite: permission of instructor. **Cr Ar.**

Courses in Merchandising

CLD101A Introduction to Design

Selection and organization of visual elements and principles of design to create harmony in compositions and to obtain function, economy, beauty, and individuality in daily living. Rec 2, Lab 2. **Cr 3.**

CLD103A Textiles: Fiber to Fabric

Learning to recognize quality features of fabrics and to understand labels for fiber content, functional finish, and care. Fiber properties and performance data. Fair claim policy. Names and consumer uses of fabrics. **Cr 3.**

CLD104A Designing and Furnishing the Home

Planning functional and aesthetic qualities of the home for individual and family situations. Focus on selection, organization, and evaluation of furnishings and materials for residential interiors. Layout in floor plans and wall elevations. Rec 2, Lab 4. **Cr 3.**

CLD105A Retail Management

A study of the operations of a retail store culminating in the actual experience of managing a store. **Cr 4.**

CLD106A The Apparel Consumer

Clothing and accessories for physical, social, and economic needs of various age groups. Size, cut, fit, construction, and price level. Hanger appeal and combining value in the wardrobe. Studies of consumers' satisfaction. **Cr 3.**

CLD107A Commercial and Advertising Design

Creation of visually stimulating designs to focus and hold people's interest on a product, service, or idea. Problems in visual communication such as trademarks, advertisements, posters, package designs, and displays. Lettering, illustration, layout. Rec 1, Lab 4. **Cr 3.**

CLD108A Fashion Merchandising

Sources of fashion with charting of trends. Promotion of fashion in home furnishings and clothing. Comparative shopping and evaluation of perishability. **Cr 3.**

CLD196A Field Experience in Merchandising

Provides on-the-job training in the field related to program of study. Work is to be under supervision of employer and appropriate department or school in the College of Life Sciences and Agriculture. Prerequisite: C average. (Pass/Fail Grade Only). **Cr Ar.**

Courses in Landscape and Nursery Management

LNM123A Nursery and Garden Center Operations

A course in nursery and garden center management designed mainly to acquaint students with the diversity of nursery plant production, equipment and retail store operations and grounds maintenance. Rec 2, Lab 2. **Cr 3.**

LNM126A Turfgrass Management

The characteristics, soil and environmental adaptation, propagation, specific uses and management requirements of grasses for turf. Identification, fertilizing, clipping, watering and controlling weeds, insects, and diseases of turf grasses. Renovation and construction of turf areas by seeding and sodding. Rec 2, Lab 2. **Cr 3.**

LNM127A Landscape Construction

Techniques and use of construction materials in landscaping. Emphasis on the basic knowledge and skills needed for planning and constructing terraces, steps, walls, fences, site furniture, decks, irrigation design and paving materials. Rec 2, Lab 2. **Cr 3.**

LNM128A Landscape Design

The principles of landscape design as applied to selected problems. The course is designed to prepare students for situations similar to those in the industry. Rec 2, Lab 2. **Cr 3.**

LNM140A 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.**

LNM150A Fundamentals of Forest Soils

Study of the basic properties and processes of forest soils with emphasis on factors influencing tree growth in commercial forests. Rec 2, Lab 2. **Cr 3.**

LNM161A Potato Production

Production of potatoes for seed, tablestock and processing. Fertilization, variety selection, disease and insect pests, and plant development are among the topics covered. Rec 3. **Cr 3.**

LNM163A Forage Management

Production of hay, silage, and pasture crops. Selection of seeding mixtures, establishment of

forage seedings; use of lime and fertilizers to maintain forage productivity. Pasture management; harvesting and preservation of hay and silage. Rec 2, Lab 2. **Cr 3.**

LNM196A Field Experience in Landscape and Nursery Management

Provides on-the-job training in the field related to program of study. Work is to be under supervision of employer and the department of Plant and Soil Sciences in the College of Life Sciences and Agriculture. Prerequisite: C average. (Pass/Fail Grade Only). **Cr Ar.**

Technical Division Courses

BOT101A Introductory Botany

The structure and life processes of seed plants, their propagation, breeding, classification, and relation to their environment. Rec 2, Lab 3. **Cr 3.**

BCH125A Chemistry for Animal Technology

An introduction to the principles of inorganic, organic, and biochemistry. Lec 4, Lab 2. **Cr 5.**

ENT101A Applied Entomology

Consideration of insect benefits and detriments to man. General structure, classification, habits, and life histories of representative pest species. Study of all phases of control with emphasis on development, use and implication of pesticides to production and marketing. Lec 2, Lab 2. **Cr 3.**

LSA100A Seminar in (Program Major)

A review of the major area of study and a survey of career opportunities. (Pass/Fail Grade Only). Rec 1. **Cr 0-1.**

LSA105A Mathematics for Business

A review of topics from arithmetic, with emphasis on problem solving and (elementary) algebra, including factoring, functions, exponents, radicals and graphing. Applications of these principles to problems in business stressed. **Cr 3.**

LSA113A Applied Mathematics

Use of equations, basic algebra, and graphical methods in the solution of problems in business, mechanics, agricultural production, and family and institutional management. **Cr 3.**

School of Nursing

Jean Symonds, *Interim Director*

Assistant Professors Bicknell, Bresnick, Hart-Smith, Pike, Regan, Starrett, Symonds; Instructors Carlisle, Frey, Kuhns-Hastings, Perrone, Symanski; Director, Learning Resource Center, Lavin

The School of Nursing offers a baccalaureate nursing program. The aims of the program are to: Provide a baccalaureate education in nursing; prepare a beginning professional nurse for practice in a variety of settings; prepare a beginning professional nurse who can respond to the health needs of consumers and the community; and provide a foundation for graduate study in nursing.

Each nursing student must complete a minimum of 121-125 credits which include nursing, general education, liberal arts, sciences, and other supporting courses. Upon successful completion of the program the student is awarded a bachelor of science degree with a major in nursing, and is eligible to take the State Board Examination for R.N. licensure.

The School of Nursing is approved by the Maine State Board of Nursing and accredited by the National League for Nursing.

Prerequisite to clinical nursing courses are: English Composition, Philosophy, Physical and Behavioral sciences, humanities, and fine arts. Freshmen and sophomore nursing students must achieve a minimum of 2.25 grade point average in order to be eligible to progress to the junior year.

Curriculum in Nursing

The curriculum of the School of Nursing is under revision. The following program of study will change for the Class of 1989. A course entitled *Introduction to Professional Role* will be offered to sophomores in the spring of 1988.

Changes for the junior year are in place, however, are subject to approval. In addition, the senior year will be different for the Class of 1989 than the program of study in this catalog.

Freshman and Sophomore Requirements

English Composition	3
Philosophy	3
Humanities	6
Fine Arts	6
General Electives	12
(throughout all four years)	
General Biology	4
Anatomy & Physiology	4
Inorganic Chemistry	4
Organic or Biochemistry	4
Microbiology	4
Introduction to Professional Nursing Role	3
Introductory Psychology	3
Introductory Sociology	3
Human Growth and Development	3 or 6
Human Nutrition	3

General Information

The junior and senior years consist of clinical nursing courses, courses supportive of nursing content, and elective courses. Clinical nursing courses are organized in a manner that facilitates the integration of nursing and other disciplines. These courses focus on the use of the nursing process to promote, maintain, and restore the health of clients. Students have experiences which involve assessment, planning, implementation, and evaluation of care for individuals of all ages, families, groups of clients, and communities in all spectra of the health continuum. Inpatient and outpatient hospital settings, community health agencies, community experiences, nursing homes, schools and industries are used for clinical experience.

Nursing majors are required to have the Medical History and Physical Examination Form completed and on file at the Cutler Health Center before enrolling in clinical courses. Nursing majors must purchase uniforms before entry into the junior year. In addition, a \$15.00 fee per semester (junior and senior years) is required as a course fee. Clinical learning experiences take place in a variety of settings and geographic locations. It is the student's responsibility to provide his/her own transportation for junior and clinical experiences. Professional liability

insurance and health insurance are strongly recommended for students in the School of Nursing. Cardiopulmonary resuscitation (CPR) certification is required prior to entry into clinical experiences.

Information on curriculum changes will be available at the School of Nursing Office and the Office of Admissions.

Twelve elective credits are required during the program for graduation with a major in nursing. No more than three credits of pass/fail in general elective credit will be accepted.

Specimen Curriculum

Junior Year

First Semester			Second Semester		
NUR 300	Nursing I	7	NUR 305	Nursing II	8
ZOL 303	Pathophysiology	3	ZOL304	Fundamentals of Pharmacology	3
PSY 312	Abnormal Psychology	3			

Senior Year (sample program)

First Semester			Second Semester		
NUR 400	Nursing III	8	NUR 405	Nursing IV	7
NUR 401	Health-Related Research	3	NUR 407	Leadership and Issues in Professional Nursing	5
NUR 406	Community Health	3			

RN Studies Policy for Registered Nurse Students

RN Studies

The University of Maine recognizes the need and desirability for registered nurses to attain a baccalaureate degree within the state. An RN Studies Track is offered at four locations within the University System. The University of Southern Maine in Portland, UM in Orono, The University of Maine at Fort Kent and the University of Maine at Farmington. The School of Nursing faculty believes in a flexible approach to attaining this goal. We realize that R.N.s returning to school face life complexities such as changes in established roles, financial strains, and family and work responsibilities. Every effort is made to promote dialogue to aid in the integration of the personal and educational changes that will occur in moving toward the BSN degree. In response to the need for baccalaureate program for R.N.'s, the School of Nursing has developed a process of prior learning assessment. Inherent within this process is the recognition that R.N.s

may have attained the prior knowledge and skills that are necessary to successfully demonstrate prior knowledge in selected upper division courses. The process includes taking specific examinations to demonstrate that knowledge. The first Nursing course is offered during May and June and is specifically tailored for R.N.'s. Please contact the University of Maine School of Nursing for further details.

Grading

The clinical courses in the nursing major are sequential and must be passed with a minimum grade of "C" before progressing to the next level. All support courses (Pathophysiology, Pharmacology, Health-Related Research, Community Health), must be passed with a minimum grade of "C" or above.

Graduation

To be eligible for graduation with a Bachelor of Science degree with a major in Nursing, the student must have successfully completed all requirements, and a minimum of 121-126 credit hours with a grade point average of at least 2.00.

Courses in Nursing

NUR 300 Nursing Process I

Introduces the student to basic cognitive affective, and psychomotor skills fundamental to nursing practice. Utilization of the nursing process is emphasized to assist individuals to promote and maintain optimal health. Concepts and selected theories provide a basis for understanding the factors which facilitate and/or inhibit the growth and development of human beings. Didactic classroom and experiential learning in the Learning Resource Center provides the opportunity to practice and develop basic skills which will be applied in selected clinical settings. Prerequisite: Junior level standing in the School of Nursing. Concurrent: ZOL 303, NUR 303. Lec 6, Lab 3 Cr 9.

NUR 305 Nursing Process II

Utilizes the nursing process in promoting, restoring and maintaining the health of individuals and families experiencing short-term alterations in health which do not significantly disrupt potential but do require nursing and/or other intervention. Prerequisite: NUR 300, NUR 303 and ZOL 303. Concurrent: ZOL 304. Lec 4, Lab 4 Cr 8.

NUR 308 Women in Health

An interdisciplinary approach will be used to explore and analyze the political, economic, legal and social factors influencing women's health. Topics of discussion will include: women as receivers and deliverers of health care; health related legislation; sex-role development and its impact on women's health; women's work; health issues related to the reproductive cycle; violence against women; mental health for women; health needs of special groups. Prerequisite: Permission of the instructor. Cr 3.

NUR 400 Nursing Process III

Utilizes the nursing process in the promotion, restoration and maintenance of health with individuals, families, and groups experiencing long-term alterations in health which significantly disrupt potential and require nursing and/or other intervention. Collaborates and consults with health team members in a variety of settings. Prerequisite: NUR 302, 303, 305. Concurrent: NUR 401 or 406. Lec 3, Lab 4 Cr 4.

NUR401 Health-Related Research

Various types and methods of research and concepts basic to the research process including sampling, validity, reliability, and ethics will be introduced. The student will evaluate and utilize health-related research and consider implications

for nursing practice and the nurse as a researcher. Prerequisite: statistics. Open to other than nursing students with permission of faculty.

Cr 3.

NUR 405 Nursing Process IV

Utilizes the nursing process in the promotion restoration, and maintenance of health with individuals, families, and groups experiencing depleted health, i.e. alterations resulting in actual or predictable disintegration requiring complex and/or other intervention. Collaborates and consults with health team members in any setting. Prerequisites: NUR 400, 401. Concurrent: NUR 406, 407. Cr 6.

NUR 406 Community Health

Introduces concepts and principles basic to the development and maintenance of community health. Emphasis is on population aggregates in the community as the unit of service. The epidemiological process is stressed in surveying current major health issues. Concurrent: NUR 405, 407. Must be taken during senior year. Open to other than nursing students with permission of faculty. Cr 3.

NUR 407 Leadership and Issues in Professional Nursing

Theories of leadership, organizations, and planned change are presented. The student will analyze systems and methods of health care delivery and identify factors and strategies which inhibit or facilitate change. Professional and ethical issues, legislation, and emerging role in nursing will be analyzed. An experiential component is required and varies with the student's learning objectives and interests. Prerequisite: NUR 400, 401. Concurrent: NUR 405, 406. Cr 5.

NUR 495 Nursing Independent Study

Individualized study in an area of nursing with the permission of the instructor. Cr 1-3.

NUR 520 Ethical Issues In Health Care

This course will analyze selected contemporary ethical issues confronting health care professionals. Examination of major ethical theories and principles. Cr 3.

NUR 530 Perspectives On Aging

This course is intended to serve as a foundation in aging science for students in any discipline. The content approaches aging as a normal developmental process with an analysis of issues confronting aged. An experiential component allows the student to broaden learning objective and specific interest areas. Cr 3.

NUR 540 Issues In Health Education

This course involves research-based discussion of the components of health education from needs assessment and goal-setting through educational interventions to evaluation. Adult

learning theory is modeled by an opportunity to develop a teaching plan based on the students' own interest level and by contract grading.

Cr 3.



University College

Charles R. MacRoy, *Dean*

P. David DeFroschia, *Associate 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, Human Services, Legal Technology, Liberal Studies, Medical Record Technology, and University Studies. *Academic Assessment and Support Services* are provided by the Developmental Studies Program, the Onward Program, counseling, tutoring, and writing and mathematics laboratories. *University/Community Support Services* include the Conferences and Institutes Division, the Continuing Education Division, Cooperative Education, 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

Human Services (programs in chemical addiction counseling, child and youth services, developmental disabilities, gerontology, and mental health)

Legal Technology

Medical Records Technology

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.

The Admissions Center, in cooperation with the Onward, Special Services and Developmental Studies faculty, conducts Pre-Admissions Conferences (PACS) throughout the year. These are small group sessions made up of applicants for the various programs. During these confer-

ences, an evaluation is made of each candidate's academic background and potential, together with an assessment of his or her career interests. Following each conference, applicants are notified concerning their admission status.

For additional 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.

Each student at University College is assigned a specific academic advisor. All academic advisors are members of the teaching faculty at University College. Each academic advisor is responsible for the management of all academic matters for his/her ten to twelve 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 Degree Programs

Business Management

Associate of Science Degree Program

Assistant Professors Vaughan (Chairperson), Lane

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.

Of the 60 credit hours of instruction, 15 hours are allowed in the area of career electives

in order to enable students to pursue their areas of special interest.

Sixty credit hours 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 18 hours 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 remedial courses may be required in appropriate cases. These courses may be taken along with regular program courses. Candidates also will be invited to a Pre-Admissions Conference (PACS) for consultation with admissions office staff and the program chairperson.

Specimen Program

First Year

First Semester			Second Semester		
BUS 102A	Business Management I	3	BUS 104A	Financial Accounting	3
BUS 101A	Economics	3	BUS 155A	Introduction to Taxation	3
BUS 103A	Business Law I	3	BUS 158A	Data Processing	3
ENG 101A	Critical Written Expression	3		Business Mathematics	3
POS 102A	State and Local Government	3		Social Science Elective	3
	TOTAL HOURS	15		TOTAL HOURS	15

Second Year

Third Semester			Fourth Semester		
BUS 202A	Business Management II	3	BUS 251A	Principles of Finance	3
BUS 201A	Marketing	3	BUS 212A	Business Management Seminar	3
	Career Elective	3		Career Elective	3
	Career Elective	3		Career Elective	3
	Career Elective	3		Free Elective	3
	TOTAL HOURS	15		TOTAL HOURS	15

Courses in Business Management

BUS 101A Economics

Economic principles applied to the economy as a whole and to the business firm. Money and banking, government, demand, supply, competition and pricing. **Cr 3.**

BUS 102A Business Management I

Forms of business organization, economic framework, the managerial functions, managerial decision making and concepts of managerial economics are presented in light of the needs of a firm. **Cr 3.**

BUS 103A Business Law I

The general principles of the law of business. Emphasis on the subjects of contracts with its sub-areas of agency, sales and negotiable instruments, and business organizations with its sub-areas of corporations and partnerships. **Cr 3.**

BUS 104A Financial Accounting

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. **Cr 3.**

BUS 155A Introduction to Taxation

An introductory survey of local, state and federal taxation as it applied to both individuals and businesses. Sales tax; property tax; state and federal income tax individuals, partnerships, and corporations; gift and estate tax; and social security and unemployment tax. **Cr 3.**

BUS 158A Data Processing

Introduction to the principles and techniques of electronic data processing, including history and progression in types of data processing equipment, principles of the components and operations of computers, introduction to programming languages. Emphasis on BASIC and practical application. **Cr 3.**

BUS 201A 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. **Cr 3.**

BUS 202A Business Management II

Advances from the introductory business management course (BUS 102A) in both breadth and depth. The management of a small business as it grows into a larger one. Presents relatively

sophisticated business concepts, theories and techniques and illustrates the same with cases and examples of practical application. Prerequisite: BUS 102A. **Cr 3.**

BUS 203A Business Law II

This course introduces the student to the study of the uniform commercial code and explores the laws governing business enterprise organization. The emphasis is on sales contracts, negotiable instruments, secured transactions, partnerships, and corporations. Prerequisite: BUS 103A. **Cr 3.**

BUS 204A Managerial Accounting

The preparation and utilization of financial information for management purposes. Focuses on cost determination, cost control, performance evaluation and use of this financial information for planning and decision making. Prerequisite: BUS 104A. **Cr 3.**

BUS 206A Real Estate Law

This subject provides the first third of an approved course of study for those who wish to prepare for the State of Maine Real Estate Brokers' License Examination. The course is also intended to be of value to newcomers in the field of real estate and to those in fields related to real estate. No prerequisites. **Cr 3.**

BUS 210A Insurance and Risk Management

The discovery and realization of existing risks; the analysis of probability and seriousness of these risks; the consideration of methods of dealing with these risks; and the implementation and evaluation of meeting various risks through transfer of the same to particular types of insurance such as property, liability and life and health. Prerequisite: BUS 102A or instructor's permission. **Cr 3.**

BUS 212A Business Management Seminar

A seminar composed of advanced students and selected faculty members meeting periodically in small groups for analysis, discussion and formulation of a business plan for an actual or hypothetical new or expanding small business. Prerequisite: second year students; BUS 104A, BUS 101A, BUS 102A, BUS 202A. **Cr 3.**

BUS 214A Intermediate Accounting

Designed to provide the student with a broad review of accounting and augment the foundation necessary for the study that is to follow in which examination of particular major accounting problems and application will be dealt with in greater depth. Prerequisite: BUS 104A or by permission of instructor. **Cr 3.**

BUS 216A Real Property Valuation

One of three courses for those preparing for the Maine Real Estate Brokers' License Examination. While major emphasis is on real estate appraisal, this course also covers construction methods and components, residential architecture, and land use planning, codes, and ordinances. No prerequisites. BUS 206A recommended. **Cr 3.**

BUS 220A Sales Promotion

The use of advertising, sales and merchandising techniques. Training of sales and service personnel. Case studies used to develop an interdisciplinary approach to promotion. **Cr 3.**

BUS 226A Real Estate Practice

One of three courses for those preparing for the Maine Real Estate Brokers' License Examination. This course covers all the general functions of real estate brokerage in Maine including listings, sales, financing, mathematics, advertising, and closing procedures. No prerequisites. BUS 206A and BUS 216A recommended. **Cr 3.**

BUS 230A 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. **Cr 3.**

BUS 251A Principles of Finance

The function of finance in a firm; specific tasks assigned to a financial manager; tools and techniques to measure his performance; the role of finance in the American economy; how managerial finance is used to further these goals. Prerequisite: BUS104A or by instructor's permission. **Cr 3.**

BUS 258A Data Processing II

This course provides students the opportunity to develop realistic computer programs using microcomputers in a small business scenario,

and then develops computer programs to solve specific problems, such as payroll, taxes, inventory, etc. The BASIC language is used in this course. Prerequisite: BUS 158A or equivalent. **Cr 3.**

BUS 268A Business Data Processing-COBOL

An introduction to data processing concepts with emphasis on the use of computers in business. Fundamentals of computers and their operation will be studied and business application programs will be written utilizing the COBOL programming language. Prerequisite: Algebra Competence. **Cr 3.**

BUS 269A Business Data Processing-COBOL II

A course designed to expand upon the COBOL language skills and programming techniques acquired in the introductory COBOL course. Advanced concepts will include table handling; sequential and random file processing; sorting, merging and updating files; the use of subprograms. Prerequisite: BUS 268A and faculty approval. **Cr 3.**

BUS 289A Topics in Business Management

An independent study undertaken by a student by special arrangement and direction of the faculty of the Business Management Program. Also, can be a special course created from the request of a group of students with special interests outside of the regularly scheduled courses. **Cr 3.**

BUS 294A Cooperative Education/Field Experience

A work experience that integrates the classroom theory with practical experience. An opportunity to work 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.**

Dental Health Programs

Associate Professor Lee, Chairperson

Dental Hygiene

Associate of Science Degree Program

Associate Professors Bearor, Lee; Assistant Professors Graham, Medas; Instructors Bell, 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. The student is educated to perform many functions, including oral inspection, scaling and polishing of teeth, giving fluoride treatments, sealant applications, exposing and processing X-rays, and the education of patients in good oral health habits. Laboratory equipment and a dental hygiene clinic are among the facilities provided in the program.

Extramural clinical experience is gained through the cooperation of the Veterans Administration Center in Togus, Maine. In addition to the permanent faculty, staff also is drawn from practicing dentists and dental hygienists in the area. Courses are 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. Courses are particularly suited to those who have a sincere interest in science and enjoy working with people.

Recommended for admission to the program is a college preparatory course in high school, including laboratory courses in biology and chemistry. The applicant also must write the Scholastic Aptitude Tests of the College Entrance Examination Board. Students accepted for admission are further required to have a complete physical examination, including dental and eye examinations, within 3 months prior to entering the program and to 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, recommenda-

tions, etc.) are received by the Admissions Office. The deadline for making application is July 15.

Fee

Each dental hygiene student purchases an instrument kit, a lab coat, a clinical uniform, 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.

The estimated cost including books, beyond room, board, and tuition is approximately \$900 total for the two years. These fees are subject to change without notice.

Academic Progress

Students in the Dental Hygiene Program must earn a grade of "C" or better in all dental hygiene courses and an overall average of 2.0 to graduate. All courses in a semester must be passed before the student is admitted to the next semester, with a grade of "C" or better being the passing grade for all Dental Hygiene courses. 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.

Transfer

There is a transfer agreement with the School of Human Development, College of Life Sciences and Agriculture, which enables dental hygiene students to complete a baccalaureate degree in two additional years.

Specimen Curriculum

First Year

First Semester			Second Semester		
BIO 160A	Anatomy and Physiology	4	ENG 101A	Critical Written Expression	3
BCH 160A	Introduction to Biochemistry	4	PSY 101A	Introduction to Psychology	3
BIO 280A	Pathophysiology	2	MCB 160A	Medical Microbiology	4
DEH 110A	Preclinical Dental Hygiene	3	DEH 150A	Clinical Dental Hygiene I	2
DEH 111A	Preclinical Dental Hygiene Theory	2	DEH 151A	Clinical Dental Hygiene Theory I	3
DEH 112A	Oral, Head and Neck Anatomy	3	DEH 152A	Oral Pathology	2
DEH 113A	Dental Radiology	3	DEH 153A	Oral Histology and Embryology	2
	TOTAL HOURS	21	DEH 155A	Nutrition	3
				TOTAL HOURS	22

Second Year

Third Semester			Fourth Semester		
SPE 101A	Oral Communications	3	SOC 101A	Introduction to Sociology	3
DEH 210A	Clinical Dental Hygiene II	3	DEH 250A	Clinical Dental Hygiene III	3
DEH 211A	Clinical Dental Hygiene Theory II	2	DEH 251A	Clinical Dental Hygiene Theory III	1
DEH 212A	Pharmacology and Anesthesiology	2	DEH 252A	Dental Specialties	3
DEH 213A	Dental Materials	2	DEH 253A	Community Dentistry	3
DEH 213AL	Dental Materials Lab	1	DEH 254A	Ethics, Jurisprudence and Office Management	2
DEH 214A	Periodontology	2			
	TOTAL HOURS	15		TOTAL HOURS	15

Courses in Dental Hygiene

DEH 110A Preclinical Dental Hygiene

Practical experience in techniques of instrumentation, operation and maintenance of chairside and support equipment and data gathering procedures. Prerequisite: enrollment in Dental Hygiene Program. Lab 6. (Pass/Fail Grade Only).

Cr 3.

DEH 111A Preclinical Dental Hygiene Theory

Essentials of dental hygiene theory and practice as it relates to clinical experience. Prerequisite: enrollment in Dental Hygiene Program. Lec 2.

Cr 2.

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

Ionizing radiation, the history of X-rays, their production and properties, radiation measurement, radiation hazards and principles of radiation safety. The 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. Clinic 8 hours. (Pass/Fail Grade Only).

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 proce-

dures, 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

The 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 and to the dietary counseling of the dental patient. Prerequisite: BIO 160A, BCH 160A; DEH 150A taken concurrently. 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 150A, DEH 151A, DEH 152A, DEH 153A, DEH 154A, 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

The use of drugs and anesthetics with emphasis on those 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, Credits 2. Dental Hygiene Lab 2 hours,

Credit 1; Dental Assisting Lab 4 hours, Credit 2. Variable Credit.

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 154A, DEH 155A, MCB 160A. Lec 2. 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 of instructor. 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 213. Lec 3. Cr 3.

DEH 253A Community Dentistry

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. This course will also provide 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

This course is designed to give the student a foundation in professional ethics, a knowledge of the laws governing the dental profession and an understanding of the activities involved in practice management. Students will also explore current issues and controversies within the dental hygiene profession. Prerequisite: DEH 250A, DEH 251A. Lec 2. **Cr 2.**

DEH 255A Environmental Control of the Dental Operative Field

This will develop the participants knowledge of a special task that enhances the quality and quantity of restorative dental services available for the patient. **Cr 1.**

Dental Assisting Certificate Program

Associate Professor Lee; Assistant Professors Graham, Medas

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 all aspects of four-handed dentistry and in all duties which may be delegated to dental assistants as expressed in the Maine Dental Practice Act. Students gain practical experience through clinical and laboratory sessions and through assignments to private practices, dental offices, and community and hospital dental clinics.

The courses of study are particularly suited to those who have a sincere interest in science and enjoy working with people.

The Dental Assisting Program has been accredited by the American Dental Association.

Admission

To be eligible for admission, the applicant must have graduated from an accredited high school or hold a certificate of high school equivalency with an academic average of at least a 2.0 on a 4.0 scale. The applicant is required to have taken one year of a laboratory science, preferably biology or chemistry, and have satisfactorily completed courses in mathematics and typing. Students accepted for admission are further required to have a complete physical examination (including dental and optical examinations)

within three months prior to the beginning of the first term and to 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. The deadline for making application is July 31.

Fees

Beyond the expense for tuition, room, board, and books, students will purchase a laboratory coat and a clinical uniform. Transportation costs to clinical assignments within the Bangor area are the student's responsibility, as are certification examination fees.

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. Professional conduct and attitude are expected at all times.

Certification

Upon graduation students will be eligible to take the Certification Examination for Dental Assistants administered by the Dental Assisting National Board.

Specimen Curriculum

First Year

First Semester			Second Semester		
BIO 105A	Human Biology	4	DEA 102A	Chairside Dental Assisting II	3
DEA 101A	Chairside Dental Assisting I	5	DEH 153A	Oral Histology and Embryology	2
DEA 110A	Clinical Practice I	2	DEH 113A	Dental Radiology	3
DEH 112A	Oral, Head and Neck Anatomy	3	DEA 153A	Dental Health Education	3
DEH 213A	Dental Materials	4	DEA 150A	Clinical Practice II	4
	TOTAL HOURS	18	DEA 152A	Dental Office Management	3
			ENG 101A	Critical Written Expression	3
				TOTAL HOURS	21

Courses in Dental Assisting

DEA 100A Introduction to Dental Assisting

The history of dentistry, professional ethics and jurisprudence and the roles of each member of the dental health team. Basic terminology will be introduced. Prerequisite: Enrollment in the Dental Assisting Program. Lec 1. Cr 1.

DEA 101A Chairside Dental Assisting I

Introduces the use of dental and laboratory equipment, patient and operator positioning and the essentials of disease transmission and control. Instrument set-ups, use and transfer will be stressed. Prerequisite: enrollment in the Dental Assisting Program. Lec 3, Lab 4. Cr 5.

DEA 102A Chairside Dental Assisting II

Various specialty practitioners present the fundamental concepts of periodontics, orthodontics, endodontics, pedodontics and oral surgery. Emphasis on the dental assistant's role in these areas. During laboratory sessions students will have the opportunity to assist in various specialty procedures. Prerequisite: DEA 100A, DEA 101A, DEH 112A, DEH 213A, BIO 115A. Lec 2, Lab 2. Cr 3.

DEA 150A Clinical Practice

Gives the student the opportunity to practice chairside dental assisting under direct supervision in private practice offices, community and hospital clinics. Prerequisite: DEA 101A, DEA 101AL, DEH 112A, DEH 112AL, DEH 154A, DEH 154AL, DEH 213A, DEH 213AL, BIO 105A, BIO 105AL. 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, antihistamine 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

This course encompasses various aspects of office management including appointment control, business and patient record-keeping, patient management and effective communication. Prerequisite: DEA 110A, DEA 102A, DEA 151A, DEA 153A, DEH 152A, DEH 153A, DEH 154A. Lec 4. Cr 3.

DEA 153A Dental Health Education

Emphasis on the theories and techniques of patient education and motivation. Areas stressed include caries and periodontal disease prevention, plaque control methods and human nutrition. Students conduct oral health and nutritional counseling sessions. Prerequisite: DEH 112A, BIO 115A. Lec 2, Lab 2. Cr 3.

DEA 154A Dental Assisting Seminar

Provides a consolidation of dental assisting theories 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.

Human Services

Associate of Science Degree Programs

Professor Cormier (Chairperson); Associate Professors Scott, Setter; Assistant Professor Samuelian.

Human Service Programs are offered in chemical addiction counseling, children and youth services, developmental disabilities, 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, halfway 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, and substance abuse counselors.

The Human Service Programs are approved by the National Council for Standards in Human Service Education.

Practicum

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 of credit hours as defined by the Program curriculum must be satisfactorily completed. A grade of "C" or above is required in all practicum courses. An accumulative average of 2.0 is required for graduation.

The faculty and administration reserve the right to 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 reserve 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

Program applicants are required to submit two letters of recommendation from professionals who are appropriate to comment on their potential to be effective in helping relationships, prior to a personal interview which is required for admission.

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 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. Those

whose lives have been touched by alcoholism or drug addiction, their own or that of a family member, are particularly encouraged to apply. Former alcoholics or drug addicts must have demonstrated sobriety or abstinence to be admitted to the Program.

Specimen Curriculum

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 Lab	4
PSY 101A	Introduction to Psychology	3		2 Introductory Courses	6
SOC 101A	Introduction to Sociology	3		TOTAL HOURS	17
	TOTAL HOURS	15			

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		TOTAL HOURS	15
	TOTAL HOURS	16			

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.

Specimen Curriculum

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 Process	3	BIO 105A	Human Biology and Lab	4
PSY 101A	Introduction to Psychology	3	HUS 120A	Child Mental Health 1 Introductory Course	3
SOC 101A	Introduction to Sociology	3		TOTAL HOURS	17
	TOTAL HOURS	15			

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 1 Introductory Course	3		TOTAL HOURS	15
	TOTAL HOURS	16			

Developmental Disabilities

The Developmental Disabilities option of the Human Service Programs is designed to prepare human service workers to work primarily in

direct services within an area of specialization, i.e., mental retardation, cerebral palsy, epilepsy, autism, or other handicapping conditions.

Specimen Curriculum

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	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
	TOTAL HOURS	15		TOTAL HOURS	17

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 231A	Methods of Working with Developmentally Disabled	3		Elective*	3
	1 Introductory Course	3		TOTAL HOURS	15
	TOTAL HOURS	16			

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.

The first semester is offered during the spring semester. Applications are accepted during the summer and fall semesters.

Specimen Curriculum

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	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		TOTAL HOURS	17
	TOTAL HOURS	15			

Second Year

Third Semester			Fourth Semester		
HUS 203A	Practicum in Human Services	4	HUS 204A	Practicum in Human Services	6
HUS 140A	Introduction to Gerontology	3	HUS 208a	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		TOTAL HOURS	15
	TOTAL HOURS	16			

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, and public and private human service community agencies.

Specimen Curriculum

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
TOTAL HOURS		15	TOTAL HOURS		17

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	TOTAL HOURS		15
TOTAL HOURS		16			

*Electives

HUS 206A Principles of Rehabilitation
 HUS 209A Behavior Management Techniques
 HUS 212A Prevention Management Techniques
 HUS 213A Drugs: Use and Abuse
 HUS 214A Human Services Agency Management

HUS 232A Resource Awareness and Utilization
 HUS 242A Physiology and Pathology of the Elderly
 POS 100A National Government
 PSY 205A Abnormal Psychology
 PSY 253A Adolescent Psychology
 SOC 151A Contemporary Social Problems

Courses in Human Services

HUS 100A Introduction to Human Services

A non-theoretical course designed as an orientation to the national, state and local human service delivery systems. The human service specialty areas, models, and professions will be presented. Interrelationships within all human service and health professions. Professional ethics, confidentiality and relevant professional terminology. Basic helping skills presented and

practiced. This course is designed to afford the student more confidence entering the practicum situation and is a prerequisite to all practicum placements. Cr 3.

HUS 101A Group Processes

Directed to an understanding of group functioning and leadership. Factors involved in group cohesions and group conflict. Communication systems, emotional styles, and role functions in groups. Techniques of role playing, psychodra-

ma, and sociodrama. Small group studies itself and puts communication and sensitivity skills into practice. Prerequisite: PSY 101A. Cr 3.

HUS 102A Practicum in Human Service

Offers experiential learning in two human service agencies with the student's program option. Students practice skills of objective observing, reporting and recording, interpersonal relationships, interviewing and other helping relationship skills under professional supervision. Weekly group seminars with instructor. 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 of the instructor. Cr 4.

HUS 110A Alcohol and Alcoholism

An introduction to the substance alcohol, its use and abuse, historically and in contemporary society. Special attention to: (1) the properties of alcohol which promote its use; (2) the psychological and sociological theories explaining alcohol and drug use; (3) the etiology of alcoholism; and (4) the conceptual models of alcoholism. Cr 3.

HUS 120A Child Mental Health

An interdisciplinary applied course that integrates and builds on preliminary courses of the physical and social sciences. Expands on the physical, emotional, intellectual and social growth processes; addresses positive mental health, and explores prevention, detection and rehabilitation programming. Prerequisites: BIO 105A, PSY 201A or permission of the instructor. Cr 3.

HUS 130A Nature and Needs of the Developmentally Disabled

An overview of developmental disabilities. The physiological, psychological, educational, and familiar characteristics of developmental disabilities. Mental retardation, cerebral palsy, epilepsy, autism, and other handicapping conditions closely related to mental retardation. The historical development of treatment for the developmentally disabled. Current definitions and concepts. The practicum site will be used to assist in the identification and knowledge of the developmentally disabled. Prerequisite: HUS 100A and/or permission of instructor. Cr 3.

HUS 140A Introduction to Gerontology

Introduction to theory and practice of gerontology. Course will (1) trace the historic, legal and

political aspects of services to the elderly; (2) consider the economic, physiological, psychological adjustments of older persons, as well as the transportation, communication, learning and social aspects; (3) consider the unique cultural, social and communication needs of ethnic minorities, and (4) provide understanding of the role and function of a gerontology specialist. Prerequisite: HUS 100A. Cr 3.

HUS 150A Introduction to Mental Health

As in-depth exploration of the mental health system. Presentation of treatment models for acute and chronic mentally disordered individuals in residential and community based programs. Prerequisites: HUS 10A0, PSY 101A or permission of instructor. Cr 3.

HUS 196A Human Service Practicum

Experiential learning within the broad area of human services. Students exposed to specific knowledge and skills within their practicum placement which may be drawn from the wide range of human services. Prerequisite: open only to HS degree candidates; HUS 100A and permission of instructor. Divided between field experience and seminar. Cr 4-6.

HUS 203A Practicum in Human Service

Second practicum course offers students experiential learning within their program option. Begins a specialization within a functional area (e.g. chemical addiction counseling, child mental health, developmental disabilities, gerontology, and mental health) as a generalist. Students exposed to the delivery system of their human service options with consideration to four elements of the system: prevention, non-residential care, residential care, and aftercare services. Students continue to refine helping relationship skills and acquire functional specialization. Weekly conferences provide interaction sessions in which students share experiences, and demonstrate acquisition of helping skills. Students assigned to human service agency within their program option. Prerequisites: open only to HS major, HUS 102A and permission of the instructor. Cr 4.

HUS 204A Practicum in Human Service

The third sequential experiential learning practicum course. 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. A weekly seminar provides interaction sessions in which the student will share experiences and demonstrate

acquisition of the helping and change-agent skills. Prerequisites: open only to HS major; HUS 203A and permission of the instructor. **Cr 6.**

HUS 205A Interviewing-Counseling

Examination of and practice with the techniques of psychological interviewing for the purposes of gathering data and/or modifying human behavior. Current theories and techniques of counseling and psychotherapy. Experience with interviewing and counseling techniques will be gained under professional supervision. Prerequisite: PSY101A. **Cr 3.**

HUS 206A Principles of Rehabilitation

A presentation of the philosophies, principles, theories, strategies and techniques of the rehabilitation process. Principles are discussed 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 and HUS 100A or permission of instructor. **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 research to human services. **Cr 3.**

HUS 208A Individual Assessment

Study and practice of the methods by which individuals deal with other people and social systems. Objective and group psychological tests such as the MMPI, Strong Vocational Interest Blank, etc. studied and used so that the student will be able to practice the techniques of psychological assessment under professional supervision. Prerequisite: PSY 101A. **Cr 3.**

HUS 209A Behavior Modification Techniques

Concepts and techniques of behavior modification as it applies to the developmentally disabled. The practicum site supplements classroom experience. Identifying and recording behavior, outlining consequences, and identifying and implementing procedures to modify behavior. Students expected to develop modification program which could effectively be used at their practicum site. **Cr 3.**

HUS 211A Alcohol Treatment and Rehabilitation

An introduction to the treatment and rehabilitation process of the alcoholic. 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 will be explored. Prerequisite: HUS 110A. **Cr 3.**

HUS 212A Prevention and Early Detection of Substance Abuse

An in-depth course oriented towards understanding the concept of prevention and its relationship to what is already known about alcoholism and other abuse. Will address issues such as: (1) what constitutes responsible use of drugs; (2) how society's attitude towards drugs effects prevention, treatment, etc.; (3) what differences there are in prevention techniques that could be utilized most effectively, i.e., schools, industry, courts, etc. and how to approach these areas, and (5) future areas where research in substance abuse would be most beneficial. Prerequisite: HUS 211A. **Cr 3.**

HUS 213A Drugs: Use and Abuse

An introductory course that approaches the drug issue from both the medical and psycho-social aspects. The pharmacology of drugs and the cultural milieu of their users. Current federal drug laws and their development. The dimensions of legal/illegal use/misuse/abuse of drugs. Prerequisite: HS/CAC Degree candidate or permission of the instructor. **Cr 3.**

HUS 214A Human Service Agency Management

An exploration of management theories and an examination of the process and techniques involved in the management of small, community-based human service programs. Major aspects of management, including policy development personnel management, fiscal responsibilities, goal setting, and report and grant writing. Prerequisite: HUS 102A and PSY 101A or permission of instructor. **Cr 3.**

HUS 215A Applied Group Process

A treatment of the most widely used applications of group process. Acquisition of relevant theory and the development of specific skills in group process facilitated through a training laboratory approach. Areas to include: (1) encounter groups, (2) group counseling, (3) group process consultation in organizations, (4) human relation skill development, and (5) conflict management. Prerequisite: HUS 101A and permission of the instructor. Not open to first-year students. **Cr 3.**

HUS 216A Supervision in Human Services

The focus of this course is to establish an understanding of the theoretical concepts of supervi-

sion as applied to human services. Issues related to the supervisory process, the decision-making process and various leadership theories will be enhanced by group practical applications. Prerequisite: PSY 101A and second year level or permission of instructor. **Cr 3.**

HUS 221A Adolescent Mental Health

An interdisciplinary applied course which integrates physical, emotional, intellectual and social aspects of adolescent development. An exploration of prevention, detection and rehabilitation programs. Emphasis on interrelationships of the physiological, psychological and cognitive systems. Prerequisite: HUS 120A. **Cr 3.**

HUS 231A Methods of Working with the Developmentally Disabled

Methods to improve physical, social, educational, and perceptual-motor skills of the developmentally disabled. Recreational and leisure time resources within the community. Social adjustment of the developmentally disabled. Basic tenets of personal and social guidance. Students expected to directly apply course content to their practicum setting. Prerequisite: HUS 130A and/or permission of instructor. **Cr 3.**

HUS 232A Resource Awareness and Utilization

Community, regional, state and federal resources discussed with the goal of establishing a better awareness of resource utilization. Interrelationships between public and private programs, development of program financing, and discussion of program models. Current provisions and programs relative to educational planning. 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

The procedures, practices, and aids for organizing and conducting programs to maintain the physical, social, and emotional functioning of the elderly. The exploration of 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: HUS 140A or permission of instructor. **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

This course will focus on the historical and present perspectives of rehabilitation philosophy and techniques of psychosocial rehabilitation for individuals with mental disorders. Students will have the opportunity to develop assessment, planning, and intervention skills which may be applied in a variety of mental health settings. Prerequisite: HUS 150A, HUS 205A, or permission of instructor. **Cr 3.**

HUS 260A Senior Seminar

Students select from a series to be arranged by the coordinator each spring semester. Topics may include such specialties as behavioral engineering, community service methods, mental health methods, activity therapies, corrections. Professionals with specialties in topic area will teach the seminars. Reading, discussions and practical experience integrated in the seminar. Prerequisite: open to program majors, or with permission. **Cr 3.**

HUS 289A Special Topics in Human Services

An opportunity to acquire specialized skills within human service disciplines. Topics vary from semester to semester, depending on expressed interest or identified needs. Fulfills specialized needs of student population. Prerequisite: permission of the instructor. *Note: HUS 102A, HUS 203A, HUS 204A practicum courses required in all programs. The program option determines the type of agency or facility utilized for experiential learning. **Cr 3.**

HUS 298A Independent Study

Independent study for human service students on an approved topics under the guidance of a human service faculty member. The course content may include research, reading or an experiential project to gain additional knowledge of particular human service worker functions. Prerequisite: Permission of instructor. **Cr 1-3.**

Legal Technology

Associate of Science Degree Program

Assistant 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, para-legal 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 in such subjects as investigation, criminal and constitutional law, administration,

and legal report writing. Required liberal arts courses are in the social and political sciences and the humanities. Many electives are offered to enable students to pursue their own special professional areas of interest (law enforcement, para-legal work, business and industrial security, and environmental law enforcement). Additional electives also may be used in the liberal arts and other areas.

Sixty credit hours 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 college ability tests may be recommended or required. Certain remedial courses may be required in appropriate cases. These courses may be taken along with the regular program courses. Candidates also will be invited to a Pre-Admissions Conference (PACS) for consultation with the Admissions Office staff and program chairperson.

Specimen Program

First Year

First Semester			Second Semester		
ENG 101A	Critical Written Expression	3	LET 170A	Legal Technology Report Writing	3
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 105A	Legal Research and Materials*		LET 216A	Principles of Litigation*	
LET 120A	Principles of Criminal Law	3	SPE 101A	Oral Communications	3
	Career Elective			Social Science Elective	3
	Social Science Elective	3		Career Elective*	
	TOTAL HOURS	15		TOTAL HOURS	15

Second Year

Third Semester			Fourth Semester		
LET 200A	Principles of Investigation	3	ENG 105A	Business, Professional, and Technical Writing	3
LET 212A	Real Estate Transfers*		LET 218A	Estate Administration*	3
	Social Science Elective	3	LET 260A	Constitutional Law	3
LET 120A	Criminal Law*			Career Elective	3
	Career Elective	3		Career Elective	3
ENG 105A	Business, Professional and Technical Writing*			Career Elective	3
	Career Elective	3		Free Elective*	
	Free Elective	3		TOTAL HOURS	15
	TOTAL HOURS	15			

*Alternate required courses

Courses in Legal Technology

LET 100A Introduction to the Legal System

An introductory study of American law and the legal system. Emphasis on the development of American law, both the substance and procedure of the civil law and the criminal law systems. No prerequisites. Cr 3.

LET 105A Legal Research and Materials

This course will introduce the student to the research methods and the use of legal materials in preparing legal memoranda. Students will use statutes, case reporters, digests, treatises, legal encyclopedias, restatements, Shepard's Citations and other related law finders in preparing several memoranda. Assignments require use of the Penobscot County Law Library. Cr 3.

LET 110A Principles of Organization and Management I

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

Local, state and federal laws; their development, application, and enforcement. Cr 3.

LET 150A Principles of Organization and Management II

Principles of organization and management as applied to criminal justice agencies and private security organizations; introduction to concepts of organizational behavior. Cr 3.

LET 160A Introduction to Forensics

Physical science as used and applied in judicial matters. The collection, identification and preservation of physical evidence for use in the courts; science laboratory capabilities, techniques and limitations as an aid to the resolution of judicial matters. Prerequisite: LET 110A, LET 120A. Cr 3.

LET 170A Legal Technology Report Writing

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

Fundamentals of the investigatory process as applied in such cases as accidents, crimes and other incidents. Theory and application of scientific method to such cases; interviewing of witnesses and gathering of facts and evidence and drawing conclusions. Prerequisite: 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; crime prevention and the phenomena of crime. Cr 3.

LET 210A Consumer Transactions

A survey study of selected topics in American law that impact upon a citizen in his or her daily life. The emphasis will be upon substantive law rather than procedure and will cover such areas as: landlord/tenant law, motor vehicle repair and purchase, insurance regulations, employment regulations. Cr 3.

LET 212A Real Estate Transfer Procedures

This course describes the process of creating an adequate history of title to real estate and provides an opportunity for the student to hone her/his skill. In addition, the student is acquainted with other closing documents, their purpose, and their statutory references. Assignments require use of Penobscot County Registry of Deeds. **Cr 3.**

LET 216A Principles of Litigation

This course investigates the important steps of civil and criminal procedure so that the student will be familiar with the sequence and strategy of events as well as the relevant, accompanying documents, starting with the commencement of an action or arrest, and following through the appellate procedure and the enforcement of the judgment or incarceration. The course will also provide an opportunity for the student to acquire the skills of file and document organization. Prerequisite: LET 100A or equivalent. **Cr 3.**

LET 218A Estate Administration

This course prepares the student to participate in the disposition of a decedent's estate through the probate process. The student will be acquainted with 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, both income and inheritance, of administering an estate. **Cr 3.**

LET 220A Principles of Supervision

A basic course designed to give the student an introduction to the supervision process. Stress techniques for effective supervision in both the public and private sectors. **Cr 3.**

LET 222A Domestic Relations

This course will acquaint the student with the Maine law of divorce including custody and property division and the Maine law of adoption and paternity. The student will also be acquainted with the drafting requirements of complaints, motions, orders and agreements as well as interviewing techniques. **Cr 2.**

LET 225A Juvenile Justice System

This course will approach the concept of juvenile justice by interrelating the roles 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 requisite to successful performance of duty and

responsibility when 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

An introduction to business and industrial security. Emphasis on appropriate countermeasures to combat increases in business and industrial crime. Increased usage of computers in business and industry requires that security personnel be made aware of special protection that is needed in this area. **Cr 3.**

LET 245A Women in Crime: The Female as Victim and as Offender

Crimes pertinent to women, both in their role as offender and as victim. Variations in female criminality by race and social class. Treatment of women by the criminal justice system. 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 investigatory 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 in the context of the subject matter. **Cr 3.**

LET 260A Constitutional Law

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 298A Directed Individual Study in Legal Technology

Designed to offer those students with special interests in the Legal Technology field an opportunity to undertake study in specialized areas not covered in the regular course offerings. Prerequisite: permission of program faculty. **Cr 3-6.**

Medical Record Technology

Associate of Science Degree Program

Assistant Professor Volpe, Chairperson

The Medical Records Associate Degree Program is designed to prepare medical records technicians for professional employment in medical record departments and other health care settings. Upon accreditation of the program, the graduate is eligible to take a national accreditation examination for designation as an Accredited Record Technician (ART).

The medical record technician possesses the technical skills necessary to maintain components of health records systems consistent with the medical, administrative, ethical, legal, accreditation and regulatory requirements of the health care delivery system. The medical record technician analyzes and evaluates health records according to standards; compiles various types of administrative and health statistics for use in planning and evaluating; codes symptoms, diseases, operations, procedures and other therapies; releases health information; and maintains and utilizes a variety of health record indexes and storage and retrieval systems. In addition, the medical record technician operates word processing and computer equipment, abstracts discharge data to support quality assurance activities, supports committee chairpersons in carrying out committee functions, and supervises one or more health record service activities.

The MRT curriculum is comprised of 36 credit hours of technical courses, 18 credit hours of general liberal studies courses, and 7 credit hours of science. 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 necessary for entry level placement in health information services.

To facilitate the practical learning experience, the Medical Record Technology Program has affiliation agreements with Maine health

care facilities including acute care, long term care, ambulatory care, psychiatric care and special care facilities or units. Students are required to have a complete physical examination prior to their first clinical experience and to provide transportation to the clinical site.

Admission

Applicants must have a high school diploma or the equivalent. Required high school subjects include English, laboratory science, algebra, and typing. Applicants should type a minimum of 35 words per minute. The School College Ability Test (SCAT) will be administered to all applicants at the Pre-Admission Conference (PACS). The program accommodates full and part-time students.

Academic Progress

Students in the Medical Record Technology Program must earn a grade of "C" or better in all Medical Record Technology courses and an overall average of 2.0 to graduate. All courses in a semester must be passed before the student is admitted to the next semester, with a grade of "C" or better being the passing grade for all Medical Record Technology courses. Professional behavior and attitude are expected at all times.

Degree

Sixty-one credit hours are required for the degree. Students transferring to the program must complete the Medical Record Technology courses, as well as satisfying all other program requirements. Upon successful completion of this program, the student will be awarded the Associate of Science Degree in Medical Record Technology.

Specimen Curriculum

First Year

First Semester			Second Semester		
MRT 101A	Introduction to Medical Record Science	4	MRT 151A	Medical Record Science II	3
MRT 111A	Health Care Delivery Systems	1	MRT 161A	Medical Transcription	3
MRT 131A	Medical Terminology	3	MRT 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
	TOTAL HOURS	15		TOTAL HOURS	16

Second Year

Third Semester			Fourth Semester		
MRT 201A	Medical Record Science III	3	MRT 251A	Medical Record Science IV	3
MRT 221A	Directed Clinical Practice II	3	MRT 261A	Personnel Supervision	3
BIO 231A	Health Care Statistics	3	MRT 271A	Directed Clinical Practice III	3
PSY 101A	Introduction to Psychology	3	MRT 281A	Medical Record Technology Seminar	1
	General Elective	3	MRT 141A	Data Processing and Management of Health Information	3
	TOTAL HOURS	15	SOC 101	Introduction to Sociology	3
				TOTAL HOURS	15

TOTAL HOURS 61

Courses in Medical Record Technology

MRT 101A Introduction to Medical Record Science

This course is the first of a series of courses designed to instruct students in the theory and principles of medical record technology. The course will include material on: content and analysis of the medical record, the medical record profession, medical staff functions, the master patient index, filing and storage methodologies, the microfilmed record and standards for accreditation and licensure. Lec 3, Lab 2. Prerequisite: Medical Record Technology student only.

Cr 4.

MRT 111A Health Care Delivery Systems

A course designed to introduce students to health care delivery system: the health care industry, governmental and voluntary organizations in

health care, the functions of health care facilities, and the medical staff organization and bylaws.

Cr 1.

MRT 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.

MRT 141A Data Processing and the Management of Health Information

Hardware and software components of computers for medical record applications; methods for

controlling the accuracy and security of data in computer systems; record linkage, data sharing concepts; and methods for choosing the right system. Prerequisite: BUS 158A or permission. Lec 2, Lab 2. Cr 3.

MRT 151A Medical Record Science II

The second in a series of four sequential medical record science courses. This course focuses on the legal aspects of the medical record by introducing the student to legal terminology and procedures; the Court system, policies and procedures for the control of and release of medical information; health care legislation and regulations relating to the maintenance of confidentiality and the appropriate use of medical records; ethical standards for medical record practice; development of informed consents. Prerequisite: MRT 101A. Lec 2, Lab 2. Cr 3.

MRT 161A Medical Transcription

A one semester course designed to develop basic transcription proficiency by integrating spelling, grammar, medical terminology with typing and word processing applications. The student will be instructed in the use of transcription equipment, reference material, formatting reports, production and accuracy standards. Prerequisite: MRT 131A and typing competency. Lec 2, Lab 2. Cr 3.

MRT 171A Directed Clinical Practice I

The first in a series of three directed clinical practices, this course is designed to introduce the student to the functions of a Medical Record Department through supervised field work in local hospitals and health care facilities. Prerequisites: MRT 101A, MRT 111A, MRT 131A. Cr 1.

MRT 201A Medical Record Science III

The third in a series of four medical record science courses; focuses on maintenance requirements of various indexes and registries; nomenclatures, classification systems, data abstracting; entry and retrieval techniques; with exploration of recent reimbursement schemes and their effect on the Medical Record Department. Prerequisite: MRT 151A, BIO 160A, BIO 280A. Cr 3.

MRT 221A Directed Clinical Practice II

The second in a series of three directed clinical practices, this course is designed to introduce the student to 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: MRT 151A, MRT 171A. Cr 3.

MRT 231A Health Care Statistics

An introductory course in descriptive and vital statistics. To cover definitions, data collection and computation methodologies for hospitals and public health statistics, reporting requirements, and report writing. Prerequisites: Open to Medical Record Technology students only or with permission, MRT 101A. Lec 2, Lab 2. Cr 3.

MRT 251A Medical Record Science IV

This fourth medical record science course inspects the ancillary roles of the medical record professional through the study of quality assurance methodologies, medical audit, utilization review, functions of the tumor registry and medical staff committee support functions. Forms design and the Problem Oriented Medical Record are examined with medical records in long term care, ambulatory care and mental health facilities. Prerequisite: MRT 201A. Lec 2, Lab 2. Cr 3.

MRT 261A Personnel Supervision

An introductory study to personnel supervision in the Medical Record environment, this course focuses on the principles of authority and responsibility, delegation and effective communication; organization charts, job descriptions and policies and procedures; employee motivation, discipline and performance evaluation. Prerequisite: MRT 101A. Lec 2, Lab 2. Cr 3.

MRT 271A Directed Clinical Practice III

The third in a series of three directed clinical practices, this course introduces the student to 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: MRT 201A, MRT 221A, MAT 231A. Cr 2.

MRT 281A Medical Record Technology Seminar

A seminar course designed to identify the trends in the health care delivery systems, changing technology, methods and regulations. The student will complete a research project. Medical Record Technology students only. Cr 1.

Liberal Studies

Associate of Arts Degree Program

Associate Professor Storch (Chairperson)

The Liberal Studies Program offers every 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.

Students applying in the Liberal Studies Program who need special services such as counseling and basic skills instruction in reading, writing, and math will be provided such services.

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 applicants complete the College Entrance Examination Board Scholastic Aptitude Test (SAT). In the event this is not done, the School and College Ability Test will be administered by the Admissions Office at University College. Further testing may be required in the areas of reading, writing, and mathematics. The deadline for making fall application is July 31.

If the available data predicts academic success, the applicant will receive unconditional admission to the Liberal Studies Program. However, if a student shows significant weaknesses in basic skills, he or she will receive conditional admission to the program. Such a student will receive recommendations, made on a semester basis, as to the number, type (degree or developmental) and sequence of courses that must be taken. If such a student applies to the Liberal

Studies Admissions Policy Committee for unconditional acceptance into the program, and if the committee does not grant the student's petition, but recommends instead that the student take additional work in basic academic skills, the student may again apply for unconditional admission to the program the following semester.

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 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.

Students must complete a minimum of 60 credit hours of study for the degree of Associate of Arts in Liberal Studies. Of these credits, a minimum of 45 must be earned in Liberal Studies courses. 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 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.

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
	TOTAL HOURS	15		TOTAL HOURS	16

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 Electives	6		TOTAL HOURS	15
	TOTAL HOURS	16			

*The Specimen Program is one of many which will meet the requirements for the degree. Students should consult with their advisor concerning Program requirements.

Courses in Drama and Theatre

Associate Professor Batty

DRA 101A Introduction to Theatre

Designed to give the student a general knowledge of all aspects of a theatrical production; play selection, interpretation and the technical aspects which will culminate in actual production in which participation will be required. Field trips and attendance at other plays will also be required. Cr 3.

DRA 151A Play Production

An introduction to the theatre as a contemporary performing art, providing the student with 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 approval of instructor. 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 approval of instructor. Cr 1-3.

Courses in English

Professor Nadelhaft; Associate Professors Baker, Batty, Booth, Danielson, Phillips; Assistant Professors Kurth, Levy

ENG 101A Critical Written Expression

An introductory course in college writing which provides intensive exercise 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 105A Business, Professional and Technical Writing

Consideration of and exercise in various types of business, professional and technical writing. The writing of various types of correspondence, the preparation and execution of reports, and presentation of data of a specialized nature; emphasis on clarity, conciseness and accuracy. Prerequisite: ENG101A or permission. Rec 3. **Cr 3.**

ENG 110A Critical Appreciation of Literature

Intended to stimulate a student's interest in reading literature, this course introduces the student to 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: emphasis will be placed on Babylonian, Sumerian, and Greek mythology. Students will study myths and collections of myths that have been vital to western civilization and literature; in addition, classical works rich in allusions to mythology will round out the list of required texts. **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. **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. Selections will vary from section to section, and some sections will be organized thematically, but all sections will emphasize important and recognized contemporary works. Prerequisite: ENG 110A or permission of the division. **Cr 3.**

ENG 225A Intermediate Critical Written Expression

A continuation of ENG-101 which provides additional writing experience, with particular emphasis on the extended essay which uses 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 240A Survey of English Literature

Within a broad historical context, the course will examine selected themes of English literature drawn from poetry, drama and fiction. Prerequisite: ENG 110A or permission of the division. **Cr 3.**

ENG 245A Survey of American Literature

Thematic analysis of American literature which examines the differences between neo-classic, romantic, regional, realistic, naturalist and contemporary views of experience. Sample themes might include man's relationship with the land, the artist in American society or the American hero-heroine. Prerequisite: ENG 101A or permission of the instructor. **Cr 3.**

ENG 250A Utopian and Dystopian Literature

Through reading, writing and class discussion students examine Utopian and Dystopian constructs in literature from varied historical periods. What the works reveal about such forces as power, wealth, education, family, property, status, religion, sexuality, idealism and spiritual enlightenment. No prerequisites. **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. Prerequisite: ENG 110A, ENG 101A or permission of the division. **Cr 3.**

SPE 101A Oral Communications

This is a basic course in oral communication designed to increase the students' understanding of communication and its components and to improve their skills in public speaking and group discussion. **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. Opportunity for the student to gain work experience, to integrate academic understanding with working life and to explore possible career goals while in college. Prerequisite: 30 hours credit with recommendations from two faculty members normal-

ly required. Credit arranged 1 to 6 Hrs. May be taken more than once until a total of 9 credit hours is accumulated. (Pass/Fail Grade Only).

Cr 1-6.

LIB 298A Independent Study in Liberal Studies

An elective option for an individual student or a group of students interested in pursuing a subject or theme principally through independent reading and research. The student and instructor identify the specific subject or theme and learning objectives and draw up a learning plan. Progress monitored through meetings with instructor. Offered every semester, including summer session and May Term. Prerequisites: ENG 101A and successful completion of 12 credits. Credits: 1 to 3, depending on the learning plan. May be taken more than once until a total of 9 credit hours is accumulated.

Cr 1-3.

Courses in History

Professor DeFroschia

HTY 101A Western Civilization to 1714

The histories of ancient Egypt, the Near East, classical Greece and Rome, and the Middle Ages to 1714 are given preference. Emphasis is placed on the contributions of these civilizations to the development of contemporary thought and institutions.

Cr 3.

HTY 105A United States History to 1865

An analysis of the colonial and revolutionary years, followed by an examination of basic 19th century problems such as 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. Stress on the leading political, contemporary 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

An introductory survey of the foreign relations of the United States from World War II to the present. The methods and assumptions of the policy makers, the myths and fallacies of policy, and the responsibilities of states in the international family. Survey of American policy since 1945. How U.S. policy got the nation into its present international posture. An overview of the American stance in Europe, Latin America,

Africa, and Asia. The United States view on such diplomatic questions as revolution, co-existence, war, and counterinsurgency.

Cr 3.

HTY 254A Contemporary America

Postwar American society through the early 1970's. The political, social and cultural history of the period examined; special attention given to the challenges of the 1960's and 70's. Popular American cultures studies. No prerequisites. HTY 105A and/or HTY 155A desirable.

Cr 3.

Courses in Humanities

HUM 201A Literature and The Exploration of Human Values

Through reading and discussion the class will examine 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 such forces and goals as power, wealth, ownership, status, sexuality, love, idealism and spiritual enlightenment. No prerequisites.

Cr 3.

HUM 280A Introduction to Films

Provides students with a critical framework for interpreting films and will show how film makers have treated various themes. Prerequisite: ENG 101A. Spring only.

Cr 3.

HUM 298A 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

MAT 101A Mathematics For The Consumer

The course is designed to help students to gain knowledge in the application of 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 110A Problem Solving Using Intermediate Algebra and Geometry

Emphasizes how mathematical language, concepts, and skills can be used in solving problems

encountered in various interdisciplinary fields. The mathematics used would include topics of intermediate algebra and 1, 2, or 3-dimensional geometry. Only a knowledge of elementary algebra is assumed. Prerequisites: DSM 035A or a year of high school algebra. Cr 3.

MAT 115A Elementary Statistics

Introductory theory of statistics is discussed. Emphasis on the basic concepts, and their applications. Collection, analysis, and presentation of data are extensively taken up. 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

This course is designed to provide the understanding of underlying mathematical concepts related to the application of finite mathematics in career fields of liberal studies majors. Course topics include introductory treatment of sets, graphs, linear modeling, matrices, linear programming, probability, games of strategy and statistics. This introductory approach to these fields of mathematics can provide the proper transition to further math study required by the student's discipline. Computer solutions using package programs may be used. Prerequisite: Two years of high school algebra. Cr 3.

MAT 124A Mathematical Inquiry

Designed for the Liberal Studies students. It is aimed at developing an appreciation of basic mathematical concepts. Elementary set theory, mathematical proofs, functions and graphs of one and two variables in first and second degree, solution of linear equations and quadratic equations, probability and statistics, interest and annuities, computers and computer programs. Prerequisite: one year of high school algebra. Cr 4.

MAT 141A Elementary Algebra and Trigonometry

Elementary algebra and trigonometry, including numbers, functions, graphs, factoring, exponents and radicals, logarithms, linear equations, quadratic equations, and solutions to triangles. Cr 3.

MAT 142A Algebra and Trigonometry

Algebra and trigonometry, including numbers, functions, graphs, factoring and fractions, exponents and radicals, logarithms, linear equations, quadratic equations, vectors, and solutions to triangles. Cr 3.

MAT 160A Algebra and Trigonometry

A course that considers topics in algebra and trigonometry that are necessary for a student to learn before he can study calculus. 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

Equations of higher degree, determinants, solutions of inequalities, variation, progression, trigonometric identities and inverse trigonometric functions, elements of analytic geometry and introductory calculus, including straight lines, conic sections, and an introduction to the derivative and its applications. Prerequisite: MAT 142A. Cr 3.

MAT 246A Introductory Calculus

Applications of the derivative, an introduction to integration and its applications, derivatives of transcendental functions and techniques of integration. Prerequisite: MAT 164A. Cr 3.

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 a student 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

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. Inferences concerning means, variance, and proportions. Prerequisite: MAT 246A or its equivalent. Cr 3.

COS 125A An Introduction to Computer Science

Use of the computer terminal, a survey of the history and development of the computer field, operation and components of a computer, and flowcharting. The programming language BASIC is studied and applied to computer games, matrix algebra, business applications, and statistics. A brief introduction to using the Calcomp Plotter included. **Cr 3.**

Courses in Music

Associate Professor Klocko

MUS 101A Listening to Music

Development of intelligent music listening through the study of musical elements, instruments, mediums, and principles of musical forms in classical, popular and non-Western music. Listening to records and tapes; live and TV concerts integrated with class discussion. **Cr 3.**

MUS 110A PopRockSoul

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; 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

Music in America from colonial times to the present. Emphasis on the development of the musics unique to America, including American Indian, country and western, spirituals, gospel, blues, ragtime, and the different styles of jazz. **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 of the instructor. **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. Application through participation in public performance. Prerequisite: audition. **Cr 3.**

Courses in Natural Sciences

Associate Professors Benson, Naber, Storch

BIO 105A Human Biology

An introductory level course in biology for non-science majors. Essential concepts and principles of life are emphasized; the human species is the central theme. Lec 3. Lab 3. **Cr 3 or 4.**

BIO 110A Introduction to Biological Science

A basic biology survey course dealing with principles of life common to animals, plants and micro-organisms. Properties of cells, cellular genetics, and structure and function of plant and animal systems. Lec 3, Lab 3. **Cr 4.**

BIO 115A Integrated Health Science

Provides introductory information in general biology, microbiology, anatomy and physiology, and biochemistry in an integrated manner. Course is team taught by appropriate instructors in the Math-Science Division. Lec 3, Lab 6. **Cr 5.**

BIO 135A Introduction to Botany and Zoology

A basic biology course dealing with the diversity of life. It examines representative plants and animals, from the simple to the complex, and their interrelationships. Lec 3, Lab 3. **Cr 4.**

BIO 160A Anatomy and Physiology

The structural and functional relationships of the human body systems. Concepts of the regulatory process that integrate body cells, tissues, and organs. Lec 3, Lab 3. **Cr 4.**

BIO 210A Ecology

Principles and processes of natural ecosystems from the biological perspective. The relationships of organisms to each other and their environment. Selected aspects of human ecology will be considered but are not the major emphasis. Investigative laboratory and field work. Lec 3, Lab 3. **Cr 4.**

BIO 260A Animal Behavior

An introductory level course to the biology of behavior. The course includes the mechanisms (genetics, physiology), ecology, and evolution of behavior and sociobiology. An evolutionary approach to human behavior is included. Pre-

requisites: BIO 110A, or BIO 210A or BIO 135A, or permission of instructor. Lec 3, Lab 3. Lec.=3 cr; Lab.=1 cr. **Cr 1-4.**

BIO 280A Pathophysiology

The study of mechanisms by which disease occurs in humans, the response of the body to disease processes and the effects of these mechanisms on normal function. The course will cover general principles and responses of specific organ systems. Restricted to Medical Records Technology students, others by permission. Prerequisite: BIO 160A. **Cr 3.**

BIO 298A Topics in Biology

An independent study undertaken by a student 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 in ecology about the systems necessary for human life on earth. Topics include energy, resources, population, pollution, and technology. Prerequisite: any college science course or science placement exam. **Cr 3.**

MCB 160A Medical Microbiology

Cell structure, metabolism, and the role of microorganisms in disease. 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

The fundamental principles of normal nutrition, the functions of various nutrients and their sources, deficiencies and food values. Prerequisite: BCH 160A or permission. 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

An introductory study of the major principles, structures, and processes of the U.S. National government. A study of 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

An introductory study on the structure and operation of state and local governments. An examination of state constitution, the state-federal relationship, the governor's office, state legislators and state judiciary. 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. Nomination procedures, political parties, campaigns, and election results. The role of the new technology in campaigns and the impact and responsibility of the press will be analyzed. Provides an opportunity for the student to gain an insight into the election process by practical experience in an actual campaign. Part of the class time will be devoted to the practical lab experience. **Cr 3.**

POS 204A Introduction to British Government

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. Prerequisite: none. It is advisable, but not required, that students take either POS 100A or POS 102A or POS 200A before taking this course. **Cr 3.**

Courses in Psychology

Associate Professor Pare

PSY 101A Introduction to Psychology

Introduction to the scientific study and interpretation of behavior. Psychological development, emotion, motivation, perception, learning, thinking and cognitive processes, intelligence, personality and animal behavior. Basic principles and their practical application. **Cr 3.**

PSY 103A Psychology of Adjustment

The study of processes involved in the adjustment of the individual to the problems of everyday living. Emphasis on techniques of adjustment to meet conflict situations in the social environment and to those aspects of adjustment directly related to personal growth. **Cr 3.**

PSY 105A The Growing Years

The development of the child from earliest womb environment through adolescence. Interplay of biological factors, human interaction, social structure and cultural forces in shaping the growing child. Major psychological theories introduced, followed through various stages of development. Course developed in a series of 30 television programs supported by coordinating textual material and by additional print materials. Film programs will be broadcast by MPBN in half-hour segments twice weekly for 15 weeks. No prerequisite. **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 maturity. Prerequisite: PSY 101A. **Cr 3.**

PSY 205A Abnormal Psychology

An introduction to and understanding of behavior disorders and insight into the personality of the disturbed person. Historical perspective of changing classification and therapy. The prevention, analysis and rehabilitation of disturbed individuals, the resources of assistance for the individual with emotional difficulties. Prerequisites: an introductory psychology course or permission of the instructor. **Cr 3.**

PSY 253A Adolescent Psychology

Biological, social, affective, and cognitive aspects of the development of adolescents from puberty to young adulthood. The research, theories, concepts, and principles pertaining to adolescent psychology are presented. Prerequisites: PSY 101A and PSY 103A or permission of instructor. **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. Students participate in design projects, and field trips. Lec 3. **Cr 3.**

SCI 289A Topics in Physical Science

An independent study undertaken by a student 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

Physical characteristics of the earth, the solar system and the universe. Rock forming processes, processes shaping the earth, and man's action and reaction to procedures to alter the processes. Continuous processes in the universe and their effect on man's future. Class discussion with minimum lectures. Study of an area of each student's choice by the use of lab exercises, field trips, and a mandatory research paper describing the geological processes of the area selected. Lec 3, Lab 3. **Cr 4.**

PHY 155A Principles of Physics

Fundamentals of mechanics, energy, properties of matter, heat, and wave characteristics. Emphasis on developing ability to understand 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

A survey of major topics in general chemistry. Descriptive and qualitative approaches are used to develop an understanding of chemical principles. Quantitative relationships that strengthen the principles covered emphasized. 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

An introductory semester course which presents the fundamentals of sociology; 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

An introduction to the fundamental concepts and perspectives of culture. This course surveys the dynamics of cultural evolution and its significance to man. Special attention will be directed toward cultural theory, language and culture, the social, economic, political and ideological aspects of the organization of culture, culture and personality and the dynamics of culture change. **Cr 3.**

SOC 110A Courtship, Marriage, and the Family

A sociological analysis of the historical and contemporary American courtship, marriage, and family patterns and related controversies. The course will also examine crosscultural courtship, marriage and family patterns. Prerequisite: SOC 101A or permission of the instructor.

Cr 3.

SOC 151A Contemporary Social Problems

An analysis of contemporary social problems of the United States. Emphasis on problems of social deviance, conflict and inequality, and human progress. Prerequisite: SOC 101A. Cr 3.

SOC 155A Sociology of Death

An analysis of the topics of death and dying from a sociological point of view. The course

will examine death and dying as a biological reality, as a social and cultural phenomenon, as a spiritual and religious occurrence, and as an economic reality. Prerequisite: SOC 101A.

Cr 3.

SSC 289A Topics in Social Science

Exploration in any area of the social sciences approved by the social science faculty. Topics may vary from semester to semester 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, such as: women in politics, the urban environment, the American city, perspectives on death and dying. Prerequisite: permission of the social science staff.

Cr 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 freshmen 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 freshman/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 freshman/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 six 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.

Additional information about the Honors Program and a full description of courses may be found in this catalog. (See index.)

Bachelor of University Studies

(Offered only through the Continuing Education Division and Summer Session of University College)

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 at Orono into an individually planned degree program. Approved by the faculties of all

the colleges of the University of Maine at Orono, this program is designed specifically and solely for adult part-time students in the Continuing Education Division at Orono.

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 of 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 at Orono 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. It is designed to be flexible and adaptable to the needs of the individual part-time adult student.



Academic Assessment and Support Services

Developmental Studies Program

Professor Smith (Chairperson); Associate Professors Pinette, Schonberger; Assistant Professor Holden

Courses offered by this program provide students opportunities to improve or to review 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

This course 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, Basic Writing Skills II. **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. Writing expository papers is a major emphasis. **Cr 3.**

DSI 011A Developmental Studies Skills

Provides the student opportunities to improve specific skills in such areas as reading, writing, math and study habits. It is principally designed to extend or to integrate the instruction offered

in other developmental studies courses. Prerequisite: Permission of instructor. (Pass/Fail Grade Only). **Cr 1-3.**

DSI 015A Individual Mathematics Preparation

Designed primarily for those who need assistance in gaining specific math skills normally required of students interested in pursuing the following career areas: physical sciences, biological sciences, allied health, agriculture, business, clerical trades, and general trades (construction, electrical and electronics, drafting, etc.). Weakness in math competences required in specific career goals will be determined, and these deficiencies will be incorporated into an individualized program of study. **Cr 3.**

DSM 025A Fundamentals of Mathematics

An arithmetic review along with an introduction to algebra and informal geometry. Problem solving is stressed. **Cr 3.**

DSM 035A Algebra

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

This course is designed for students whose educational backgrounds and admission test results indicate that they will likely need two semesters of basic skills instruction in those reading and study skills necessary to cope successfully with the academic demands of college. After the successful completion of this course, students are required to take DSR 061A College Reading and Study Skills II. Prerequisite: Development Studies testing. **Cr 3.**

DSR 061A College Reading and Study Skills II

To help the student deficient in reading and study skills. Individualized instruction with

emphasis on reading comprehension, rate and flexibility, vocabulary, and study techniques.

Cr 3.

DSR 071A Academic Reading and Writing Skills

This course presents the opportunity to strengthen the mutually reinforcing skills involved in reading and writing. Instruction concentrates upon how to read critically and how to turn reading into writing. Prerequisite: Successful completion of DSR 061a and DSE 021A; permission of the Developmental Studies chairperson.

Cr 3.

DSS 020A Fundamentals of General Chemistry

Designed primarily for those who need assistance in gaining specific chemistry competencies

normally required of students interested in pursuing the following careers: physical sciences, biological sciences, allied health, engineering and agriculture. Weakness in chemistry competencies required in specific career goals will be determined, and these deficiencies will be incorporated into an individualized program of study.

Cr 3.

DSS 030A Fundamentals of General Physics

Designed primarily for those who need assistance in gaining specific physics competencies normally required of students interested in pursuing the following careers: physical sciences, biological sciences, allied health, engineering and agriculture. Weakness in physics competencies required in specific career goals into an individualized program of study.

Cr 1-3.

Onward Special Services Program

Director Herlihy; Associate Director Ellis; Assistant Professors Green, Herbald, Nichols, Stearns; Counselors Atkinson, Logue; Tutor Coordinator Doucette

The Onward Special Services Program offers special academic services to students enrolled at the University of Maine. Services include developmental courses in reading, writing, science, and mathematics; individual and group counseling; tutoring; and services to physically handicapped students. All program services are designed to meet the needs of nontraditional and low-income academically disadvantaged students. For more information call the Onward Program Office (581-2320) or stop in at the offices on Flagstaff Road.

Counseling

Personal counseling and testing are available for all University College students at the Center for Counseling Services at 139 Eastport Hall, Bangor 581-6100.

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 are encouraged to assist Program counselors in providing support and orientation activities for the new student. Contact the Onward Program, 581-2320.

Tutoring

The Onward Program also reaches out to students through tutorial services. Any student enrolled at the University of Maine who wants academic assistance may request one-on-one or small group tutoring. Students receive one hour of tutoring per week, per degree credit hour, for a maximum of two courses per semester. Contact the Onward Program, 581-2320.

Writing/Math Laboratories

Another vital tutorial service at University College involves the writing and math laboratories. A sizable number of students entering University College have serious writing and/or math deficiencies or limited experience writing or math. As an adjunct to the Developmental Studies and Onward Programs, these students, as well as others, are provided additional personalized instruction by trained staff at the laboratories. The laboratories are located in Eastport Hall, Bangor, 581-6081.

Onward Developmental Courses

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 who have had limited experience with writing. Tutors are available for extra help. **Cr 3.**

ONE 012A Onward Writing

Students whose writing samples and verbal achievement scores indicate some proficiency in writing and linguistic development, but who need practice in controlling paragraphs and developing ideas in prose, will 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. **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. **Cr 3.**

ONI 011A Independent Study **Cr 1-3.**

ONM 011A Basic Arithmetic

Operations including addition, subtraction, multiplication and division are reviewed and then applied to fractions, decimals, percents and basic geometry. The course concludes with a brief introduction to signed numbers and simple linear equations. **Cr 3.**

ONM 012A Introductory Algebra

Graphing, writing equations of and solving linear equations, including fractional equations. Solving quadratic equations by factoring and by the quadratic formula. Applications are included. **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. **Cr 3.**

ONM 014A Advanced Algebra and Introductory Trigonometry

Graphs and properties of exponential, logarithmic, polynomial and rational functions are examined. Almost 1/2 of the course is spent on trigonometry. **Cr 3.**

ONO 011A Onward Orientation

A basic survey course covering topic areas in Career Exploration, Study Skills and Selected Topics, such as Sexuality, Substance Abuse and Financial Aid, etc. This course will develop skills that can prepare students for the academic, social and personal challenges of college life. (Pass/Fail Grade Only). **Cr 1.**

ONR 011A Developmental Reading

For students whose level of reading and analytical skills need significant improvement before they enter regular university courses. Development of positive reading and study habits, as well as vocabulary building will be stressed. Activities will 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. Text analysis and methods of critical thinking will be introduced and developed over the semester. Activities will include discussion of assigned readings, short papers, as well as some emphasis on effective reading skills, vocabulary building, and exam preparation. **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 will include concentrated text analysis, oral and written presentations and independent library research. **Cr 3.**

ONS 011A Introduction to Chemistry

A basic course that covers the metric system, the properties and structure of matter, chemical bonding, chemical equations, liquid mixture, gas laws and some organic chemistry. **Cr 3.**

ONS 012A Biology

This course is the final phase of Onward Science. It begins with a review of the organ systems and the cell, and studies topics such as cellular reproduction, Medelian genetics, molecular genetics, photosynthesis, respiration, etc. **Cr 3.**

ONS 013A Advanced Chemistry

A more in-depth chemistry course covering topics such as gas laws, liquid mixtures, acids and

bases, salts, ionization, organic chemistry, carbohydrates, proteins, etc. **Cr 3.**



University/Community Support Services

Conferences and Institutes Division

Established in 1973, this office coordinates public service short courses, workshops, seminars,

conferences and institutes. The office is located in Chadbourne Hall, 581-4092.

Continuing Education Division

The Continuing Education Division coordinates the part-time study of adults on the Orono and Bangor campuses and in a wide geographical area surrounding the Orono campus. Courses are held 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 occu-

pations, 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 in the program of the Continuing Education Division. Courses offered may be for degree credit or non-degree credit.

Personnel are available to advise students on course selection and registration procedures. Regular tuition rates are charged for programs 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 University offers a wide variety of courses during the 10-week Summer Session designed to meet the general and specific needs of educators, regularly enrolled undergraduate and graduate students, and those who seek cultural and professional growth in specific fields.

Teachers and school administrators who desire to take professional courses in the field of education or to pursue other subjects which may be helpful to them in their work will find that special attention is given to teachers in the various subjects offered. Professional courses in elementary and secondary education are offered throughout the Summer Session. Several conferences on special educational problems, usually lasting a week, also are offered.

The Summer Session offers a wide variety of academic courses to regularly enrolled students

at the University of Maine and other collegiate institutions for credits toward a degree, thus enabling them to accelerate their undergraduate program. Other undergraduate students enroll in this session to make up work which they may have missed during previous semesters or to explore new fields of study.

The facilities of the Summer Session are open to both men and women, and students are admitted without examination. The requirements for admission are, in general, the same as those for the other sessions of the University. Students are expected to have completed as a minimum preparation a standard high school course or its equivalent.

As an integral part of the University organization, the Summer Session has similar standards of academic achievements. The faculty

consists of members of the University staff and numerous visiting professors from other institutions.

Transcripts for work previously done are necessary only when the student plans to become a candidate for a degree at the University of Maine. New students who expect to become candidates for the master's degree should communicate with the Dean of the Graduate School.

The Summer Session begins in mid-June and ends in mid-August. The bulletin describing courses offered during this period is issued about February 15. For further information concerning the program address Director of the Summer session, 122 Chadbourne Hall, University of Maine, Orono, Maine 04469.

Cooperative Education/Field Experience

Cooperative Education/Field Experience at the University of Maine include 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 daily 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 or senior standing for the awarding of credit. The Cooperative Education Office is located in Wingate Hall, Orono, 581-1344.

Special Programs

Through its Office of Special Programs, University College realizes its mission as an access college by offering a full schedule of evening courses for busy adults and by taking courses to selected communities. Committed to providing access for part-time and older students, the College has developed approaches that make it possible for people with family and work obligations to coordinate schooling with other commitments. Degree programs in both Business Management and Liberal Studies currently are available. The Office of Special Programs also sponsors a number of short-term opportunities, both credit and non-credit, as genuine community needs are identified. Direct all inquiries to the Office of Special Programs, Acadia Hall, Bangor, 581-6192.

Of particular value to beginning or returning adult students is SPS 100A, Student Development and Learning Resources.

SPS 100A Student Development and Learning Resources

Designed to help students make the most of their college experience by developing their confidence

and competence through instruction and exercise in essential academic skills and assistance with academic and career planning. Specific topics covered include: confidence building strategies; understanding and making use of University resources; time management; study skills, improving reading, writing and mathematics skills; assessing career interests, aptitudes and possibilities; and developing sensible academic plans. This is a Pass/Fail course which grants three credits acceptable to every program on campus. Especially recommended for students who have been away from school for some time and for those who did not prepare to go on to college. No prerequisites but permission of the program chairperson for degree candidates and the Dean's office for non-degree students. **Cr 3.**

University-wide Programs

Canadian Studies

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, 18 credit hours are required for the minor. CAN 101, Introduction to Canadian Studies, is a prerequisite accounting for 3 credit hours. CAN 101 acquaints freshman and sophomores with varied aspects of the Canadian experience: society, culture, history, native peoples, environment, education, business, economy, and diplomacy. A field trip to Canada is included. University of Maine faculty and visiting scholars contribute to the course. An additional 9 credit hours must derive from the core Canadian courses listed below. The remaining credit hours may be selected from related Canadian courses (also listed below). In addition to the core and related courses, alternatives may be considered from Canada Year credits and other courses with Canadian content.

In the College of Arts and Sciences, 12-hour concentrations are offered in French Canada, Modern Canada, Canadian Culture, and New England and the Atlantic Provinces. CAN 300, Seminar in Canadian Studies, is recommended for seniors in the program.

For twenty years the center has sent students in the Canada Year Program to Canadian Universities. University of Maine students have studied at the University of Toronto, McGill University, l'Université Laval, University of New Brunswick, Dalhousie University, Acadia University, University of Prince Edward Island, Memorial University of Newfoundland, University of British Columbia, Simon Fraser University, University of Victoria, University of Calgary, York University, University of Guelph, l'Univer-

sité de Sherbrooke, l'Université du Québec Chicoutimi, Carleton University, Concordia University and Mount Allison University.

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.

Students who are considering graduate study on Canada should contact the Center regarding the M.A. and Ph.D. programs at the University of Maine.

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

Canadian Core Courses

- CAN 101 Introduction to Canadian Studies
- CAN 300 Seminar in Canadian Studies
- CAN 401 Readings in Canadian Studies
- ARH 168 Canadian Art
- ANT 322 Folklore of Maine and the Maritime Provinces
- ANT 351 North American Indian Ethnology
- ANT 357 North American French Cultures and Societies
- ANT 360 Peoples and Cultures of the Circumpolar Area
- ANT 372 North American Prehistory
- ANT 390a Topics in Anthropology: French Canadian Immigration
- ANT 390b Topics in Anthropology: The Arts of Native Canada
- ECO 340 Canadian Economics: Issues and Policies
- 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 350 The Geography of Canada
 HTY 457 France in America to 1763
 HTY 458 History of French Canada and Franco-Americans
 HTY 459 History of Canada I
 HTY 460 History of Canada II
 HTY 499 Contemporary Problems in History — Anti-American Sentiments in Canada, 1774 to Present
 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 (Contemporary Canadian 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 325 Oral History and Folklore
 ANT 351 North American Indian Ethnology
 ANT 372 North American Prehistory
 ANT 373 Historic Archaeology
 ANT 374 Analysis of Historic Artifacts
 ANT 570 Seminar in Northeastern North American Prehistory
 ANT 573 Advanced Methods in Historic Archaeology
 BUA 345 International Management
 BUA 376 International Marketing
 ECO 339 International Trade and Commercial Policy

ECO 345 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 500 Seminar in Quaternary History
 JBR 214 The Foreign Media
 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

To Maine and the United States generally, Canada is often a misunderstood nation. Yet Canada is vital to this country's future, in areas such as trade, energy, pollution and cultural relations. The course is designed to acquaint students with varied aspects of the Canadian experience: society, culture, history native peoples, environment, education, technology, economy and diplomacy. Participating faculty will include Canadian-American Center staff, visiting scholars from Canada, and faculty members from UM Colleges. Requirements will include a field trip to Canada and examinations. Prerequisite: Freshman 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 advanced course covering selected topics in Canadian Studies. The course examines issues and problems not studied in regular offerings. Prerequisite: CAN 101 plus 6 hours of core courses in Canadian Studies or permission. **Cr 3.**

The University Honors Program

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 other 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 director. The policy-making body for the program is the Honors Council, consisting of the Associate Vice President for Academic Affairs as chairman, the director, the secretaries of the seven college honors committees, three at-large faculty members, and four honors students. Each of UM's seven colleges has a college honors committee chaired by a college honors secretary; these currently are: A&S—Professor Cathleen Bauschatz, Little Hall; BA—Professor Robert Strong, South Stevens Hall; UC—Professor Kay Surpless, Eastport Hall; ED—Professor David Bishop, Shibles Hall; E&S—Professor Kenneth Mummé, Jenness Hall; FOR—Professor Ray B. Owen, Nutting Hall; and LSA—Professor Melvin Gershman, Hitchner 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 freshmen 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 high 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 freshmen 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 freshman year, students 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, resulting in the choice of a thesis topic. 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.

Students who entered the program in fall 1985 or later must have a minimum of 15 hours of Honors work: HON 301 or 302, HON 498, HON 499, and six hours of Honors electives. Students entering Honors in fall 1987 must have a minimum of 18 hours of Honors work. HON 301 or 302, HON 498, HON 499, at least one departmental course for Honors credit, and six hours of HON electives.

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—no Honors, Honors, High Honors, or Highest Honors—depends on the quality of the senior thesis or project and the performance on the senior oral examination. Honors designations are recommended by the 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 seven colleges. In some colleges, HON 101 and HON 102 substitute for the freshman 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

Students and faculty may request a detailed program handbook by calling or writing the Honors Center. All questions about the University Honors Program should be addressed to the Director, University Honors Program, Thomson Honors Center.

Honors Courses

HON 101 Honors Seminar I

Readings and discussion on basic texts in Western civilization, from early creation myths through the Renaissance. **Cr 3.**

HON 102 Honors Seminar II

Readings in and discussion on basic texts in Western civilization, from the Enlightenment to contemporary issues. **Cr 3.**

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. With

permission, for students wanting to supplement their work in HON 101 and 102. **Cr 1.**

HON 201 The Science of Nature: Darwin and Einstein

A study of thinkers who have radically altered the way we perceive and conceive the world around us, with attention to their influence in philosophy, literature, and the arts. **Cr 3.**

HON 202 The Science of the Individual and Society: Freud and Marx

A study of thinkers who have radically altered the way we perceive and conceive the world around us, with attention to their influence in science, philosophy, history, sociology, literature, and the arts. **Cr 3.**

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. With permission, for students wanting to supplement their readings in HON 201 and 202. **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. The project may not be substituted for the senior research project or thesis; it may be related to it, or it may be in another field of study. 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 degree credit with permission of the director of the Honors Program. **Cr 3.**

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 degree credit with the permission of the director of the Honors Program. **Cr 3.**

HON 350 Honors Seminar

Topics in such subject areas as the arts, philosophy, history of science, the study of society, etc.

Content varies with each offering. Usually offered summers. **Cr 3.**

HON 397 Honors Specialized Study

A tutorially conducted study in the student's major field, usually resulting in the choice of a thesis topic. 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. Offered only occasionally. **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. **Cr 3.**

Women's Studies

A Women's Studies program for the University of Maine is being developed as part of the Women in the Curriculum Program. The goals of the program are: to teach and learn about all women's experience, past and present; to make women more visible in their similarities and differences; to value personal experience as a way of knowing; and to create new knowledge about women and apply it to personal, political and institutional change. Related goals are to strengthen links among women's programs in the community and on campus and, ultimately, to increase choices in all women's lives. Below is a list of courses which focus on women offered by various departments. For course descriptions, consult the relevant departmental section in this catalog.

CHF 452 Violence in the Family
 ENG 255A Women in Literature
 ENG 470 Feminist Literary Criticism
 EDL 420 Changing Roles of Men and Women in Education
 LBS 500 Perspectives on Art and Culture
 LET 255A The Legal Rights of Women
 NUR 308 Women in Health

PHI 439 Feminist Theory
 SOC 345 Women, Crime, and Criminal Justice
 SOC 329 Sociology of Sex Roles
 SOC 330 Perspectives on Women
 SPA 413 Hispanic Women Writers
 SPC 405 Women and Communication

More courses are offered on an occasional basis under departmental topics numbers. Such topics courses offered in Spring 1987 were "The Image of Women in American Art Before 1900" and "Black Women in America: Double Jeopardy." The Honors Program also sometimes offers group tutorials on Women's Studies topics, such as "Patriarchy: An Investigation" and "Testimony of Hispanic Women."

Students may design a Women's Studies major in the College of Arts and Sciences under the Bachelor of Arts in Special Studies (BASS) option. Requirements for this option can be obtained in the Office of the Dean of Arts and Sciences.

For additional information about the BASS option and for complete details about Women's Studies courses, contact the Women in the Curriculum Program, 325 Shibles Hall.



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- Gillespie, J. Duff** (1950-1985). B.S., Bradley University, 1949; M.A., 1951. Associate Professor Emeritus of Speech Communication.
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- Piper, Edward H.** (1956-1985). B.S., Maine, 1943; M.S., Cornell University, 1948. Assistant Director, Maine Agricultural Experiment Station and Administrative Officer of the College of Life Sciences and Agriculture Emeritus.
- Ploch, Louis A.** (1954-1986). B.S., Pennsylvania State University, 1950; M.S., 1951; Ph.D., Cornell University, 1954. Professor Emeritus of Rural Sociology.
- Plummer, Bernie Elliott, Jr.** (1925-1968). B.S., Maine, 1924; M.S., 1925. Associate Professor Emeritus of Biochemistry.
- Plummer, Henry Almon** (1946-1974). B.S., Maine, 1930; M.F., Yale University, 1950. Associate Professor Emeritus of Forest Resources.
- Pratt, Darrell B.** (1967-1985). B.S., Maine 1942; M.S., Purdue University, 1945; Ph.D., Harvard University, 1951. Professor Emeritus of Microbiology.
- Prescott, George Arthur** (1961-1976). B.S., Boston University, 1941; Ed.M., 1948, Ed.D., 1950. Professor Emeritus of Education.
- Pullen, Winston Eugene** (1946-1982). B.S., Maine, 1941; M.S., Cornell University, 1942; Ph.D., 1950. Professor Emeritus of Agricultural and Resource Economics and Emeritus Associate Dean of Resident Instruction.
- Ramsdell, Gordon Estey** (1947-1982). B.S., Maine, 1942; M.S., 1951. Associate Professor of Food Science.
- Randall, Arthur G.** (1946-1977). B.S., Yale University, 1933; M.F., 1934. Associate Professor Emeritus of Forest Resources.
- Randel, William Pierce** (1965-1974). B.S., Columbia University, 1932; A.M., University of Michigan, 1933; Ph.D., Columbia University, 1945. Professor Emeritus of English.
- Reed, Frank Dudley** (1938-1972). B.S., University of New Hampshire, 1929. Extension Economist (Marketing) Emeritus.
- Reed, Mary Florence** (1930-1971). B.A., Maine, 1929; B.S., Simmons College, 1930. Assistant University Librarian Emerita.
- Reynolds, Cecil John** (1935-1972). B.Sc., Mount Allison University, 1926; B.A., 1927; B.A., Oxford University, England, 1929; B.Litt., 1930; A.M., Harvard University, 1932. Professor Emeritus of English.
- Richards, Charles David** (1952-1982). B.A., Wheaton College, 1943; M.A., University of Michigan, 1947; Ph.D., 1952. Professor Emeritus of Botany.
- Robinson, James Arthur** (1956-1979). B.S., Maine, 1950. Associate Extension Educator

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- Ross, Ruth Velma** (1960-1972). B.S., Massachusetts State Teachers College, 1928. Extension Agent Emerita.
- Russell, Olga W.** (1966-1978). B.A., Connecticut College, 1934; M.A., University of California—Berkeley, 1939; A.M., Harvard, 1944; Ph.D., 1957. Professor Emerita of French.
- Sass, Bernard** (1947-1976). B.S., City College, 1934; M.A., Columbia University, 1936. Associate Professor Emeritus of Zoology.
- Sezak, Samuel** (1939-1971). B.A., Maine, 1931; M.Ed., 1953. Professor Emeritus of Physical Education and Athletics.
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- Simard, Gerald L.** (1967-1977). B.S., Bates College, 1933; Ph.D., Massachusetts Institute of Technology, 1937. Associate Professor Emeritus of Chemical Engineering.
- Simpson, Geddes Wilson** (1931-1974). A.B., Bucknell University, 1929; M.A., Cornell University, 1931; Ph.D., 1935. Professor Emeritus of Entomology.
- Snyder, Mary Ella** (1936-1962). A.B., Gooding College, 1919; M.S., Iowa State College, 1936. Associate Professor Emerita of Food and Nutrition.
- Sparrow, Evelyn T.** (1926-1972). Associate Registrar Emerita.
- Speicher, Benjamin Robert** (1937-1974). A.B., Denison University, 1929; M.S., University of Pittsburgh, 1931; Ph.D., 1933. Professor Emeritus of Zoology.
- Stevens, Francis R.** (1957-1986). B.S., Maine, 1951. Extension Educator Emeritus.
- Stevens, Margaret F.** (1951-1977). B.S., Simmons College, 1934. Youth Education Specialist Emerita.
- Stewart, Alice Rose** (1947-1980). B.S., Maine, 1937; A.M., Radcliffe College, 1938; Ph.D., 1946; LL.D., University of New Brunswick, Canada, 1979. Professor Emerita of History.
- Stiles, Dwight G.** (1968-1985). B.S., University of New Hampshire, 1942; M.Ed., 1970. Extension Educator Emeritus.
- Structemeyer, Roland A.** (1946-1983). B.S., University of Missouri, 1939; M.A., 1941; Ph.D., Ohio State University, 1951. Professor Emeritus of Soils and Forest Soils.
- Styrna, Edmund** (1956-1986). B.S., University of New Hampshire, 1948. Associate Professor Emeritus of Physical Education.
- Supple, Robert V.** (1948-1985). Ed.B., State University of New York, 1943; A.M., New York University, 1945; Ph.D., 1951. Professor Emeritus of Education.
- Tatem, David** (1965-1985). B.A., Randolph-Macon College, 1942; B.S., North Carolina State University, 1953; M.A., Columbia University, 1946. Associate Professor Emeritus of Classical Languages and Literature.
- Taylor, Frank Melroy** (1940-1973). B.S., Lafayette College, 1928; C.E., 1937; M.S., Maine, 1951; Professor Emeritus of Civil Engineering.
- Taylor, Roger F.** (1946-1983). Dipl., Massachusetts State College, 1937. Forest Superintendent Emeritus.
- Terrell, Carroll** (1948-1982). A.B., Bowdoin College, 1940; M.A., Maine, 1950; Ph.D., New York University, 1956. Professor Emeritus of English.
- Thornbury, Margaret** (1961-1983). B.S., State University of New York at Oneonta, 1954; M.S., Ohio State University, 1957; Ph.D., 1961. Professor Emerita of Food and Nutrition.
- Todd, Frank Harold** (1946-1970). B.S., Bowdoin College, 1935; M.A., Maine, 1936. Associate Professor Emeritus of Physics.
- Trafford, David W.** (1947-1979). A.B., Maine, 1939; M.A., Indiana University, 1940; Ph.D., 1947. Professor Emeritus of History.
- Trevett, Moody Francis** (1946-1972). B.S., Massachusetts State, 1929; M.S., 1940. Professor Emeritus of Plant and Soil Science.
- Tripp, Marland E.** (1951-1956) (1957-1980). B.S., Maine, 1950. Extension Educator Emeritus.
- Trubov, Herman** (1962-1973). B.F.A., Ohio University, 1947; M.A., Columbia University, 1948; Ph.D., Syracuse University, 1956. Professor Emeritus of Education.
- Wade, Edward A.** (1962-87). A.B., San Diego State College, 1949; M.A., University of Oregon, 1952; Ph.D., University of Wisconsin, 1955. Professor Emeritus of Psychology.
- Wakelin, Edmund Friedrich** (1963-1981). B.A., Dartmouth College, 1939. Associate Extension Educator Emeritus.
- Walkup, Mary J.** (1967-1983). B.S., University of Houston, 1955; M.S., Springfield College, 1960; Ph.D., University of Iowa, 1966. Associate Director Emerita of Physical Education and Women's Athletics.
- Wave, Herbert E.** (1967-1986). B.S., Maine, 1952; M.S., Rutgers University, 1960; Ph.D., 1961. Fruit Specialist, Extension Educator Emeritus.
- Wells, William Carl** (1931-1945; 1947-1972). B.A., Maine, 1931. Director Emeritus of Residence and Dining Halls.

- Westerman, Harold S.** (1949-1982). B.A., University of Michigan, 1946. Director Emeritus of Physical Education and Athletics.
- Whelden, Harry C., Jr.** (1948-1979). University of Connecticut, 1948. Poultry Specialist and Extension Educator Emeritus.
- Whitney, Harry F.** (1955-1983). B.S., Maine, 1954; M.S., Cornell University, 1955. Associate Extension Educator Emeritus.
- Wilson, Edith Grace** (1931-1970). B.A., University of Southern California, 1923; M.A., 1928; L.H.D., Maine, 1970. Dean Emerita of Women.
- Wilson, Sara C.** (1946-1983). B.S., Farmington State Normal School, 1938. Associate Extension Educator Emerita.
- Wolfhagen, James L.** (1952-1986). A.B., Linfield College, 1946; Ph.D., University of California-Berkeley, 1951. Professor Emeritus of Chemistry.
- Wood III, George W.** (1976-1986). M.D., Cornell University, 1946. Director Emeritus of the Cutler Health Center.
- Woodbury, Harold Mace** (1937-1978). B.S., Maine, 1937; M.A., 1948. Professor Emeritus of Men's Physical Education.
- Worrick, Roberta Smith** (1959-1981). B.S., Boston University, 1943. Coordinator Emerita of the Maine Continuing Education and Community Service Program.
- Young, Harold Edele** (1948-1982). B.S., Maine, 1937; M.F., Duke University, 1946; Ph.D., 1948. Professor Emeritus of Forest Resources.
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Faculty

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- Adelberg, Charles R.** (1985). B.S., 1976, Cornell University; M.S., 1980, University of Minnesota; Ph.D., 1985; Assistant Professor of Agricultural and Resource Economics.
- Ahern, Deborah A.** (1983). B.S., 1974, Ohio State University; M.S., 1976, University of Arizona; Ph.D., 1983, Washington State University; Assistant Professor of Food and Nutrition; Cooperating Assistant Professor of Food Science.
- Ahn, Kenneth K.** (1985). B.A., 1965, University of Hawaii; M.S., 1968, Fort Hays State University; Ph.D., 1975, University of Georgia; Associate Professor of Public Administration; Acting Director, Bureau of Public Administration.
- Alexander, John A.** (1970). B.S., 1956, Purdue University; M.S., 1968, Massachusetts Institute of Technology; Ph.D., 1970; Chair and Professor, Department of Civil Engineering.
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- Allen, Douglas M.** (1974). B.A., 1963, Yale University; M.A., 1967, Vanderbilt University; Ph.D., 1971; Professor of Philosophy.
- Allen, Kenneth W.** (1963). B.S., 1952, Wheaton College; M.S., 1956, Maine; Ph.D., 1959, William Marsh Rice University; Professor of Zoology.
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- Amar, Francois G.** (1983). B.A., 1975, Temple University; M.S., 1977, University of Chicago; Ph.D., 1979; Assistant Professor of Chemistry.
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- Arms, Chadwick C.** (1964). B.S., 1951, University of Vermont; M.S., 1960; Area Dairy Specialist; Associate Extension Educator.
- Arnold, John J.** (1984). Assistant Professor of Naval Science.
- Arrow, Kim D.** (1986). B.S., Temple University; M.F.A., 1975, New York University; Assistant Professor and Coordinator of Dance.
- Ashley, Marshall D.** (1969). B.S., 1965, Maine; M.S., 1968, Purdue University; Ph.D., 1969; Professor of Forest Resources and Forest Engineering.
- Austin, Richard F.** (1982). B.S., 1951, Northeastern University; M.B.A., 1979, Maine; Instructor in Business Administration.
- Babcock, Robert H.** (1975). B.A., 1953, State University of New York at Albany; M.A., 1957; Ph.D., 1970, Duke University; Professor of History.
- Babkirk, Douglas G.** (1977). B.A., 1973, Maine; M.S.P., 1977, Boston College; Extension Agent, Cumberland County; Associate Extension Educator.
- Bain, William M.** (1959). B.A., 1951, Indiana University; M.A., 1953; Ph.D., 1959; Professor of Microbiology.
- Baker, Christina L.** (1978). B.A., 1961, Furman University; M.A.T., 1962, Duke University; Associate Professor of English.
- Baker, William J.** (1970). B.A., 1960, Furman University; B.D., 1963, Southeastern Seminary; Ph.D., 1967, Cambridge University, England; Professor of History.
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- Baranowski, Marc D.** (1979). B.A., 1969, University of Wisconsin; M.S., 1973; Ph.D., 1977, Pennsylvania State University; Associate Professor of Human Development.
- Barkan, Steven E.** (1979). B.A., 1973, Trinity College; M.A., 1976, State University of New York at Stony Brook; Ph.D., 1980; Associate Professor of Sociology.
- Barr, Richard L.** (1968). B.S., 1964, Purdue University; M.S., 1968, Maine; Extension Agent, Franklin County; Assistant Extension Educator.
- Bartlett, Merrill D.** (1961). B.A., 1952, Maine; M.A., 1958; Associate Dean and Associate Professor of Business Administration.
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- Bassano, Louis V.** (1980). B.S., 1971, Delaware State College; B.S., 1974, University of Delaware; M.S., 1975, University of Tennessee at Knoxville; Extension Agent, Washington County; Associate Extension Educator.
- Battick, John F.** (1964). A.B., 1958, Boston University; A.M., 1959; Ph.D., 1967; Associate Professor of History.
- Batty, Harry E.** (1978). B.A., 1966, Washington State University; M.A., 1970, University of Washington; Associate Professor of English.
- Bauschatz, Cathleen** (1983). B.A., 1964, Radcliffe College; M.A., 1965, Columbia University; Ph.D., 1973; Associate Professor of French.
- Bauschatz, Paul C.** (1969). B.S., 1957, Massachusetts Institute of Technology; M.A., 1959, Columbia University; Ph.D., 1972; Associate Professor of English.
- Bayer, Robert C.** (1972). B.S., 1966, University of Vermont; M.S., 1968; Ph.D., 1972, Michigan State University; Professor of Animal and Veterinary Sciences.
- Beard, Earl M. L.** (1972). B.S., 1959, West Chester State College; M.A., 1963, Bowdoin College; Ph.D., 1968, University of Wisconsin-

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- Beard, Ronald E.** (1981). B.S., 1972, Maine; M.S., 1974; Extension Agent; Associate Extension Educator.
- Beator, Dawn M.** (1982). A.S., 1976, Westbrook College; B.S., 1980, Maine; M.Ed., 1982; Associate Professor of Dental Health.
- Beaulieu, Onis A.** (1986). B.S., University of West Florida; B.A., Maine; M.A., University of West Florida; Instructor of Accounting.
- Beenefeldt, Eric P.** (1979). B.S.E.E., 1966, Lafayette College; Lecturer in Electrical Engineering.
- Belknap, Daniel F.** (1982). B.A., 1973, Bowdoin College; M.S., 1975, University of Delaware; Ph.D., 1979; Associate Professor of Geological Sciences and Marine Studies.
- Bell, Margaret S.** (1978). A.S., 1977, Maine; B.S., 1985; Special Instructor, Dental Hygiene Program and Clinic Coordinator.
- Bennett, Jacob** (1963). A.B., 1949, Boston University; M.A., 1950, Columbia University; Ph.D., 1960, Boston University; Professor of English.
- Benson, James M.** (1971). B.S., 1967, University of Rochester; Ph.D., 1974, Brandeis University; Associate Professor of Biological Science.
- Bentley, Michael D.** (1969). B.S., 1963, Auburn University; M.S., 1965; Ph.D., 1969, University of Texas; Professor of Chemistry; Cooperating Professor of Entomology.
- Berkun, Cleo S.** (1979). B.A., 1949, Hunter College; M.S.W., 1951, University of Pittsburgh; D.S.W., 1981, University of California-Berkeley; Associate Professor of Social Work; Coordinator, Social Work Program.
- Bicknell, Elizabeth H.** (1983). B.S., 1972, Maine; M.S., 1982, Boston University; Assistant Professor of Nursing.
- Birnbaum, Dana W.** (1977). A.B., 1970, Vassar College; Ph.D., 1979, Carleton University; Associate Professor of Human Development, LSA Coordinator of Freshman Advising.
- Bishop, David W.** (1962). B.S., 1949, Harvard College; M.A., 1951, Maine; Ed.D., 1970, New York University; Professor of Education.
- Bishop, James J.** (1986). B.A., 1961, Maine; M.A., 1965, Florida State University; Lecturer in English.
- Blake, Richard D.** (1973). B.S., 1958, Tufts University; M.S., 1963, Rutgers The State University; Ph.D., 1967, Princeton University; Professor of Biochemistry.
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- Blotnick, Joseph R.** (1980). B.S., 1975, University of Pennsylvania; M.S., 1978, University of Massachusetts, Amherst; Extension Agent, York County; Assistant Extension Educator.
- Blumenstock, Marvin W.** (1976). B.S., 1955, Rutgers The State University; M.S., 1957, Yale University; M.B.A., 1978, Maine; Forestry Specialist and Extension Educator; Faculty Associate in Forest Resources.
- Blunt, Barrie E.** (1985). B.S., 1976, Michigan State University; M.S., 1979, Florida State University; Ph.D., 1981; Assistant Professor of Public Administration.
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- Bonnichsen, Robson** (1974). B.A., 1965, Idaho State University; Ph.D., 1973, University of Alberta, Canada; Associate Professor, Anthropology and Quaternary Studies; Director, Center for the Study of Early Man.
- Booth, Earl W.** (1978). B.S., 1968, Southern Connecticut State College; M.A., 1972, University of Utah; Ph.D., 1974; Associate Professor of English.
- Borns, Harold W.** (1955). B.S., 1951, Tufts University; M.A., 1955, Boston University; Ph.D., 1959; Professor of Geological Sciences and Director of Quaternary Studies; Cooperating Professor, Maine Agricultural Experiment Station.
- Bost, James S.** (1962). A.B., 1947, University of Illinois; A.M., 1951; Ph.D., 1961, Indiana University; Professor of Theatre.
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- Bresinsky, Henrik** (1969). B.A., 1959, Western State College of Colorado; M.A., 1961, University of Wyoming; Ph.D., 1969, Arizona State University; Professor of Mathematics.
- Bresnick, Penny K.** (1984). R.N., 1969, Millard Fillmore Hospital School of Nursing; B.S., 1981, Lehman College; M.S., 1983, State University of New York at Buffalo; Assistant Professor of Nursing; Junior Level Coordinator.
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- Brightman, Lloyd A.** (1969). B.A., 1950, Brown University; M.A., 1958, University of Rhode Island; Ph.D., 1971, Cornell University; Professor of Human Development and Education.
- Brimmer, Jacqueline** (1964). Lic., 1935, University de Lille, France; Dipl., 1937; Assistant Professor of French.
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- Brody, Michael J.** (1984). B.A., 1974, Boston College; M.S.T., 1979, University of New Hampshire; Ph.D., 1984, Cornell University; Assistant Professor of Education; Cooperating Assistant Professor of Forest Resources.
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- Brown, Gregory N.** (1983). B.S., 1959, Iowa State University; M.F., 1960, Yale University; D.F., 1963, Duke University; Vice President for Research and Public Service.
- Brown, Harold H.** (1968). B.S., 1961, Maine; M.Ed., 1965; 4-H Specialist; Associate Extension Educator.
- Brown, Patrick W.** (1982). B.S., 1974, Central Michigan University; M.S., 1977, Iowa State University of Science and Technology; Ph.D., 1981, University of Missouri; Assistant Professor of Wildlife.
- Brownstein, Andrea M.** (1981). A.B., 1967, Fairfield University; M.A., 1969, Maine; Instructor of English.
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- Bruce, Donald M.** (1966). B.S., 1960, Maine; M.S., 1967; Associate Extension Educator; Extension 4-H Specialist.
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- Brutsaert, Willem F.** (1973). B.S.A.E., 1963, University of Ghent, Belgium; M.S., 1967, University of Illinois; Ph.D., 1970, Colorado State University; Professor of Civil Engineering.
- Bukowski, William M.** (1983). B.A., 1976, Canisius College; M.A., 1980, Michigan State University; Ph.D., 1984; Assistant Professor of Psychology.
- Burke, Melvin** (1966). B.A., 1960, Wayne State University; M.A., 1962; Ph.D., 1967, University of Pittsburgh; Professor of Economics.
- Burnes, Ann P.** (1972). B.A., 1964, Webster College; Ph.D., 1977, Saint Louis University; Associate Professor of English.
- Burns, Warren T.** (1968). A.B., 1950, Muhlenberg College; M.A., 1963, Pennsylvania State University; Ph.D., 1969; Associate Professor of Speech Communication.
- Bushway, Alfred A.** (1978). B.S., 1968, Maine; M.S., 1975, Purdue University; Ph.D., 1978; Chair and Associate Professor of Food Science.
- Bushway, Rodney J.** (1978). B.S., 1971, Maine; M.S., 1973, Texas A&M University; Ph.D., 1977; Associate Professor of Food Science.
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- Butterfield, Stephen** (1984). B.S., 1971, Springfield College; M.Ed., 1980, Keene State College; Ph.D., 1983, Ohio State University;

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- Camp, Paul R.** (1967). B.A., 1941, Wesleyan University; M.A., 1947, Harvard University; Ph.D., 1951, Pennsylvania State University; Professor of Physics.
- Campbell, Christopher** (1983). B.A., 1968, Harvard University; M.S., 1975, Maine; Ph.D., 1980, Harvard University; Associate Professor of Plant Systematics; Cooperating Associate Professor Forest Resources.
- Carlin, Clifford M.** (1984). B.S., 1977, North Carolina State University; Ph.D., 1983; Assistant Professor of Chemistry.
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- Carr, Edward F.** (1957). B.S., 1943, Michigan State University; Ph.D., 1954; Professor of Physics.
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- Chesley, Ross** (1972). B.A., 1971, California State University at Hayward; M.P.A., 1973, Golden Gate University; Associate Professor of Law Enforcement.
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- Christensen, Thomas** (1976). B.S.A.E., 1971, Maine; M.S.A.E., 1973; Associate Professor of Agricultural and Forest Engineering.
- Christianson, Keith A.** (1984). B.S.E.E., 1980, Ohio State University; Ph.D., 1984, Northwestern University; Assistant Professor of Electrical Engineering.
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