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College of Forest Resources

Fred B. Knight, Dean

The mission of the College of Forest Resources is to provide education, conduct research, and supply other public services in forest engineering; forest management; forest biology; parks, recreation and tourism; wildlife; and wood science and technology in an academic unit with a proven and continuing reputation of superior performance. The College of Forest Resources provides a wide range of professional opportunities related to the management and utilization of renewable natural resources. Maine's forest resource is the foundation of the State's economy. One reason for the existence of the College is to insure a continuous flow of well-educated professionals and technicians to manage this important resource.

The forest resources programs are a combination of basic sciences and mathematics, humanities and communication, and required professional courses. The programs in forestry, forest engineering, forest management technology, recreation and park management, wood technology, and wildlife management are accredited or certified by their respective professional associations. The programs require supervised summer field sessions and/or experience.

The College of Forest Resources 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 Food, Agriculture and Applied Sciences.

In Wildlife Management.
Concentrations may include, but are not limited to, Communications; Education; Fisheries; Forestry; Honors; Law Enforcement; Math; Statistics and Computer Science; Resource Management; and other sciences.

In Recreation and Park Management.
Concentrations in Management, Interpretation and Tourism.

In Wood Technology.
Concentration in Wood Science and Technology.

Associate of Science

In Forest Management Technology

Admission Requirements

Four-Year Degree Program

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>4</td>
</tr>
<tr>
<td>Algebra</td>
<td>2</td>
</tr>
<tr>
<td>Plane Geometry</td>
<td>1</td>
</tr>
<tr>
<td>Trigonometry* (Required for Forest Engineering)</td>
<td>1/2</td>
</tr>
<tr>
<td>Laboratory Sciences</td>
<td>2</td>
</tr>
<tr>
<td>History OR Social Science</td>
<td>1</td>
</tr>
<tr>
<td>Academic Electives</td>
<td>5</td>
</tr>
<tr>
<td>Recommended: Trigonometry*</td>
<td>1/2</td>
</tr>
<tr>
<td>Computer Science</td>
<td>1</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>17 1/2</strong></td>
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</table>

Two-Year Degree Programs

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>4</td>
</tr>
<tr>
<td>Algebra</td>
<td>2</td>
</tr>
<tr>
<td>Plane Geometry</td>
<td>1</td>
</tr>
<tr>
<td>Laboratory Sciences</td>
<td>2</td>
</tr>
<tr>
<td>(one must be biology)</td>
<td></td>
</tr>
</tbody>
</table>

In Forest Engineering
Cooperative with the College of Engineering and Science and the College of Food, Agriculture and Applied Sciences.

In Wildlife Management.
Concentrations may include, but are not limited to, Communications; Education; Fisheries; Forestry; Honors; Law Enforcement; Math; Statistics and Computer Science; Resource Management; and other sciences.

In Recreation and Park Management.
Concentrations in Management, Interpretation and Tourism.

In Wood Technology.
Concentration in Wood Science and Technology.

Associate of Science

In Forest Management Technology

Admission Requirements

Four-Year Degree Program

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>English</td>
<td>4</td>
</tr>
<tr>
<td>Algebra</td>
<td>2</td>
</tr>
<tr>
<td>Plane Geometry</td>
<td>1</td>
</tr>
<tr>
<td>Trigonometry* (Required for Forest Engineering)</td>
<td>1/2</td>
</tr>
<tr>
<td>Laboratory Sciences</td>
<td>2</td>
</tr>
<tr>
<td>History OR Social Science</td>
<td>1</td>
</tr>
<tr>
<td>Academic Electives</td>
<td>5</td>
</tr>
<tr>
<td>Recommended: Trigonometry*</td>
<td>1/2</td>
</tr>
<tr>
<td>Computer Science</td>
<td>1</td>
</tr>
<tr>
<td>Fine Arts</td>
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</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>17 1/2</strong></td>
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</tbody>
</table>

Two-Year Degree Programs

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
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<tr>
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<tr>
<td>Laboratory Sciences</td>
<td>2</td>
</tr>
<tr>
<td>(one must be biology)</td>
<td></td>
</tr>
</tbody>
</table>
University of Maine

History
OR
Social Science 1 unit
Electives 5 1/2 units
TOTAL 15 1/2 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 two field courses, and the Recreation and Park Management degree requires 130 credit hours. In addition, each student must achieve a grade point average of at least 2.0 and receive a passing grade or waiver of all required courses in the program of study.

Associate of Science Degree Candidates
For the Associate of Science degree, students must satisfactorily complete a prescribed technical curriculum with 63 credit hours earned at an accumulated grade point average of at least 2.0.

The Honors Program (HON)
College Honors Secretary: Ray B. Owen, Jr.

Freshmen and Sophomores 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 Corcoran (Chairperson) Ashley, Brann, Field, Hoffman, Shottafer; Associate Professors Hale, Kimball, Newby, Risk, Robbins, Sader, Seymour, Shepard; Assistant Professor Forster; Instructor Morin; Faculty Associates Coffman, Irland, Philp, Solomon, Vicary

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 Forest Business Administration is offered jointly with the College of Business Administration. An Associate of Science degree (2-year) is offered in Forest Management Technology.

Professional 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 concentrations leads to a Bachelor of Science in Forestry degree. Graduates qualify for membership in the Society of American Foresters, for civil service positions with public agencies, and for employment with forest industries and other private forestry enterprises.

Forestry is, by nature, interdisciplinary, 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 100</td>
<td>Basic Biology</td>
<td>4</td>
</tr>
<tr>
<td>BOT 201</td>
<td>Plant Biology</td>
<td>4</td>
</tr>
<tr>
<td>BOT 233</td>
<td>Dendrology</td>
<td>4</td>
</tr>
<tr>
<td>CHY 111</td>
<td>General Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHY 112</td>
<td>General Chemistry II (1)</td>
<td>4</td>
</tr>
<tr>
<td>PHY 111</td>
<td>General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PSS 150</td>
<td>Forest Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>ENG 101</td>
<td>College Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENG</td>
<td>Writing Elective</td>
<td>3</td>
</tr>
<tr>
<td>SPC</td>
<td>Speech Elective</td>
<td>3</td>
</tr>
<tr>
<td>MAT 122</td>
<td>Algebra and Trigonometry, Pre-Calculus</td>
<td>4</td>
</tr>
<tr>
<td>MAT 151</td>
<td>Calculus for Life Sciences</td>
<td>4</td>
</tr>
<tr>
<td>ECO</td>
<td>Economics Elective</td>
<td>3</td>
</tr>
<tr>
<td>COS</td>
<td>Computer Science Elective</td>
<td>3</td>
</tr>
<tr>
<td>FTY 101/102</td>
<td>Introduction to Forest Resources I, II</td>
<td>4</td>
</tr>
<tr>
<td>FTY 204</td>
<td>Statistical Inference in Forest Resources</td>
<td>3</td>
</tr>
<tr>
<td>FTY 205</td>
<td>Forestry Biometry</td>
<td>3</td>
</tr>
<tr>
<td>FTY 208</td>
<td>Surveying and Mapping Requirement</td>
<td>3</td>
</tr>
<tr>
<td>FTY 241</td>
<td>Field Practice on Small Woodlots</td>
<td>3</td>
</tr>
<tr>
<td>FTY 341</td>
<td>Field Practice on Large Forests</td>
<td>3</td>
</tr>
<tr>
<td>FTY 407</td>
<td>Forest Ecology</td>
<td>3</td>
</tr>
<tr>
<td>FTY 408</td>
<td>Silviculture</td>
<td>2</td>
</tr>
<tr>
<td>FTY 409</td>
<td>Forest Ecology and Silviculture Field Lab</td>
<td>2</td>
</tr>
<tr>
<td>ENT 227</td>
<td>Introductory Entomology for Foresters</td>
<td>3</td>
</tr>
<tr>
<td>BOT 456</td>
<td>Forest Pathology</td>
<td>4</td>
</tr>
<tr>
<td>WTY 212</td>
<td>Wood Technology I</td>
<td>4</td>
</tr>
<tr>
<td>FTY 444</td>
<td>Forestry Economics</td>
<td>3</td>
</tr>
<tr>
<td>FTY 446</td>
<td>Forest Policy and Planning</td>
<td>3</td>
</tr>
<tr>
<td>FTY 448</td>
<td>Timber Management Lab</td>
<td>1</td>
</tr>
<tr>
<td>FTY 449</td>
<td>Timber Management</td>
<td>2</td>
</tr>
<tr>
<td>FTY 450</td>
<td>Forest Resource Valuation</td>
<td>3</td>
</tr>
<tr>
<td>Humanities/Social Sciences Electives</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Free electives</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>TOTAL HOURS</td>
<td></td>
<td>114</td>
</tr>
</tbody>
</table>

NOTES:
1. CHY 112 required in Forest Biology Concentration.
2. May enter MAT requirement directly by testing.

Additional Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTY 305</td>
<td>Forest Inventory and Growth</td>
<td>3</td>
</tr>
<tr>
<td>FTY 210</td>
<td>Wildland Fire Management</td>
<td>2</td>
</tr>
<tr>
<td>FTY 410</td>
<td>Artificial Regeneration</td>
<td>3</td>
</tr>
<tr>
<td>FTY 457</td>
<td>Forest Watershed Management</td>
<td>3</td>
</tr>
<tr>
<td>FOE 206</td>
<td>Photogrammetry and Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>FOE 453</td>
<td>Harvesting of Forest Crops</td>
<td>2</td>
</tr>
<tr>
<td>RPM 352</td>
<td>Forest Recreation Management</td>
<td>3</td>
</tr>
<tr>
<td>WLM 320</td>
<td>Introduction to Wildlife Conservation</td>
<td>2</td>
</tr>
<tr>
<td>WLM 420</td>
<td>Forest Wildlife Management</td>
<td>1</td>
</tr>
<tr>
<td>BOT 456</td>
<td>Forest Pathology</td>
<td>4</td>
</tr>
<tr>
<td>ENT 227</td>
<td>Introductory Entomology for Foresters</td>
<td>3</td>
</tr>
<tr>
<td>WLM 320</td>
<td>Introduction to Wildlife Conservation</td>
<td>2</td>
</tr>
<tr>
<td>WLM 420</td>
<td>Forest Wildlife Management</td>
<td>1</td>
</tr>
<tr>
<td>BOT 456</td>
<td>Forest Pathology</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL HOURS</td>
<td></td>
<td>26</td>
</tr>
</tbody>
</table>
Forest Business Administration

Professor Field, Coordinator

Forest 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.

Forest Business Administration Concentration (Undergraduate)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBA majors must complete the same basic core requirements as other forestry majors. The program requirement's beyond the core courses are as follows:</td>
<td></td>
</tr>
<tr>
<td>BUA 201 Principles of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>BUA 202 Principles of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>BUA 220 The Legal Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>BUA 325 Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>BUA 335 Business Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>BUA 350 Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>BUA 370 Marketing</td>
<td>3</td>
</tr>
<tr>
<td>FOE 453 Harvesting of Forest Crops</td>
<td>2</td>
</tr>
<tr>
<td>FOE 471 Production Analysis in Forestry</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL HOURS</td>
<td>25</td>
</tr>
</tbody>
</table>

University of Maine
Forest Engineering

Professors Ashley, Brann, Corcoran, Hoffman, Riley, Smith; Associate Professors Christensen, Hedstrom, Soule

The Forest Engineering curriculum, a joint administrative responsibility of the Bio-Resource Engineering Department and the Department of Forest Management, combines study of basic physical sciences, mathematics, engineering, and forestry to provide students with the in-depth education necessary in a career emphasizing the design, planning, and management of tree harvesting systems, logging equipment, and environmental engineering in general.

Forest engineering is engineering in a natural environment. Forest engineers are involved in reforestation methods, systems for wood production and harvesting, handling and transportation, forest road systems, design of improvised bridges, soil-water control, and conservation and recreational development.

A unique feature of the forest engineering curriculum is that it provides the academic background necessary for full association with both professional engineering and forestry societies. Founded upon intensive study in the physical and natural sciences, the professional subject matter contained in the program is directed toward off-campus as well as on-campus study. The realities encountered in the use of mechanized logging equipment in a natural environment are recognized as the inherent constraints imposed by the interaction of technology, biology, and social order.

In addition to basic engineering and forestry courses, four specific areas of forest engineering are dealt with: forest machinery, soil and water control, forest roads and structures, and logging systems planning.

Graduates may find employment as forest engineers with companies producing forest machinery and equipment, with pulp and paper and lumber firms, and with federal and state agencies. Positions are open in research and development work, or in direct wood production and processing fields. Opportunities are nationwide in this area.

The curriculum in forest engineering is a joint offering of the Colleges of Engineering and Science, Applied Sciences and Agriculture, and Forest Resources. It is accredited by the Society of American Foresters and the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The curriculum requires completion of 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

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Semester</td>
<td>Second Semester</td>
</tr>
<tr>
<td>AEN 220 Principles of Mechanization</td>
<td>AEN 255 Materials in Agricultural Engineering</td>
</tr>
<tr>
<td>FTY 200 Introduction to Forest Resources</td>
<td>AEN 257 Computer Applications in Agricultural and Forest Engineering</td>
</tr>
<tr>
<td>MAT 126 Analytic Geometry and Calculus</td>
<td>COS 220 Introduction to Computer Science (3)</td>
</tr>
<tr>
<td>PHY 121 Physics for Engineers and Physical Scientist I</td>
<td>MAT 127 Analytic Geometry and Calculus</td>
</tr>
<tr>
<td>Elective</td>
<td>PHY 122 Physics for Engineers and Physics Scientists II</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
</tr>
<tr>
<td>TOTAL HOURS</td>
<td>TOTAL HOURS</td>
</tr>
<tr>
<td>15</td>
<td>18</td>
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</table>
## Forest Engineering Curriculum

### Basic Sciences and Math

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHY 113</td>
<td>Chemical Principles I</td>
<td>4</td>
<td>MAT 259</td>
<td>Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHY 121</td>
<td>Physics for Engineers and Physical Scientists I</td>
<td>4</td>
<td>AEN 257</td>
<td>Computer Applications in Agricultural and Forest</td>
<td>3 OR</td>
</tr>
<tr>
<td>PHY 122</td>
<td>Physics for Engineers and Physical Scientists II</td>
<td>4</td>
<td>COS 220</td>
<td>Introduction to Computer Science I</td>
<td>(3)</td>
</tr>
<tr>
<td>MAT 126</td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
<td>FTY 204</td>
<td>Statistical Inference in Forest Resources</td>
<td>3</td>
</tr>
<tr>
<td>MAT 127</td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
<td>Bio-Earth Science Electives*</td>
<td>10</td>
<td></td>
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<tr>
<td>MAT 228</td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
<td>TOTAL HOURS</td>
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<td>44</td>
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### Basic Engineering

<table>
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<tr>
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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AEN 281</td>
<td>Elementary Plane Surveying</td>
<td>1</td>
<td>MEE 270</td>
<td>Applied Mechanics, Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
<td>MEE 360</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>SVE 111</td>
<td>Plane Surveying</td>
<td>(4)</td>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEE 230</td>
<td>Thermodynamics I</td>
<td>3</td>
<td>CIE 350</td>
<td>Hydraulics</td>
<td>(4)</td>
</tr>
<tr>
<td>MEE 150</td>
<td>Applied Mechanics: Statics</td>
<td>3</td>
<td>AEN 268</td>
<td>Computer Aided</td>
<td>3</td>
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<tr>
<td>MEE 251</td>
<td>Strength of Materials</td>
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<td>TOTAL HOURS</td>
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<td>19</td>
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</table>

### Forest Engineering

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOE 206</td>
<td>Photogrammetry and Remote Sensing</td>
<td>3</td>
<td>FOE 471</td>
<td>Production Analysis in Forestry</td>
<td>2</td>
</tr>
<tr>
<td>FOE 453</td>
<td>Harvesting of Forest Crops</td>
<td>2</td>
<td>FOE 472</td>
<td>Planning and Control of Forestry Operations</td>
<td>2</td>
</tr>
<tr>
<td>AEN 220</td>
<td>Principles of Mechanization</td>
<td>3</td>
<td>FOE 473</td>
<td>Forest Roads and Structures</td>
<td>3</td>
</tr>
<tr>
<td>AEN 255</td>
<td>Materials in Agricultural Engineering</td>
<td>3</td>
<td>FOE 474</td>
<td>Forest Machinery</td>
<td>3</td>
</tr>
<tr>
<td>AEN 465</td>
<td>Soil and Water Engineering</td>
<td>3</td>
<td>AEN 491</td>
<td>Design Project I</td>
<td>1</td>
</tr>
<tr>
<td>FOE 467</td>
<td>Agricultural and Forest Power</td>
<td>3</td>
<td>AEN 492</td>
<td>Design Project II</td>
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<td>AEN 493</td>
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### Forestry

<table>
<thead>
<tr>
<th>Course Code</th>
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<tr>
<td>FTY 200</td>
<td>Introduction to Forest Resources</td>
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</tr>
<tr>
<td>FTY 205</td>
<td>Forestry Biometry</td>
<td>3</td>
</tr>
<tr>
<td>FTY 407</td>
<td>Forest Ecology</td>
<td>3</td>
</tr>
<tr>
<td>FTY 408</td>
<td>Silviculture</td>
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</tr>
<tr>
<td>FTY 409</td>
<td>Forest Ecology and Silviculture Field Lab</td>
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<td>TOTAL HOURS</td>
<td>3</td>
</tr>
<tr>
<td>FTY 241</td>
<td>Field Practice on Small Woodlots</td>
<td>3</td>
</tr>
<tr>
<td>FTY 341</td>
<td>Field Practice on Large Forests</td>
<td>3</td>
</tr>
<tr>
<td>FTY 446</td>
<td>Forest Policy and Planning</td>
<td>3</td>
</tr>
<tr>
<td>FTY 449</td>
<td>Timber Management</td>
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<td>FTY 450</td>
<td>Forest Resource Valuation</td>
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### Humanities, Social Sciences and Communications

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<tr>
<td>Economics</td>
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</table>

**TOTAL CREDIT HOURS REQUIRED FOR GRADUATION: 135 plus 6 (May Term)**

*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: e.g., BOT 456 Forest Pathology; ENT 227 Introductory Entomology for Foresters
Wood Science and Technology

Faculty of the Forest Products Laboratory: Professors Jagels, Shottafer; Associate Professors 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 addition to a central core of professional courses in wood science and forestry, students are required to choose a professional emphasis in such areas as the sciences, engineering, economics and business management. The off-campus training phase of this program provides for approved employment experience followed by a comprehensive report as an alternative to Summer Session courses FTY 241/341.

The program leads to a Bachelor of Science in Wood Technology. This is not a professional forestry degree; however, the program is subject to accreditation by the Society of Wood Science and Technology in cooperation with and under the auspices of the Society of American Foresters.

Wood Science and Technology Curriculum

<table>
<thead>
<tr>
<th>Basic Sciences and Mathematics (1)</th>
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<tbody>
<tr>
<td>BIO 100 Basic Biology</td>
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<tr>
<td>BOT 201/202 Plant Biology</td>
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<tr>
<td>CHY 111 General Chemistry</td>
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<td>PHY 111 General Physics</td>
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<tr>
<td>WTY 212 Wood Technology I</td>
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<tr>
<td>WTY 425 Wood Technology II</td>
<td>3</td>
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<tr>
<td>WTY 416 Wood Anatomy</td>
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<tr>
<td>Material Properties and ...</td>
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<tr>
<td>WTY 317 Wood Drying and ...</td>
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<td>WTY 429 Research Methods in</td>
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<tr>
<td>Wood Technology</td>
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<td>WTY 396 Field Experience</td>
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<td>Wood Products and Processes:</td>
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<td>OR</td>
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<tr>
<td>WTY 215 Process Analysis in ...</td>
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<td>FTY 241/341 Field Practice</td>
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<tr>
<th>Professional Requirements (3)*</th>
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<tbody>
<tr>
<td>FTY 101 Introduction to Forest Resources</td>
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<tr>
<td>FTY 204 Statistical Inference in Forest Resources</td>
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<tr>
<td>FTY 205 Forestry Biometry</td>
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<tr>
<td>FTY 208 Surveying and Mapping Requirement</td>
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<td>OR</td>
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<tr>
<td>GEE 101 Introduction to ...</td>
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<tr>
<td>FTY 407 Forest Ecology</td>
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<td>FTY 444 Forestry Economics</td>
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<td>FOE 471 Production Analysis in Forestry</td>
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<tr>
<td>FOR 460 Seminar</td>
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</tr>
<tr>
<td>ENT 227 Introductory Entomology for Foresters</td>
<td>3</td>
</tr>
<tr>
<td>BOT 456 Forest Pathology</td>
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<tr>
<td>BUA 201 Principles of Accounting I</td>
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<td>TOTAL HOURS</td>
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*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.
<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>COS Computer Programming Requirement</td>
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<tr>
<td>ENG 101 College Composition</td>
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<tr>
<td>ENG 317 Advanced Professional Exposition</td>
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<tr>
<td>ECO 110 Introduction to Economics</td>
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<td>SPC 103 Fundamentals of Public Communication</td>
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<td>Humanities Elective Requirement</td>
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TOTAL HOURS REQUIRED TO GRADUATE: 139
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, environmental interpretation and tourism fields.

Rapidly changing social phenomena associated with leisure time, energy problems, population distributions, socioeconomic changes, and land use are creating a favorable demand for personnel trained in the management of recreation and park resources. Employment opportunities are expected to maintain a modest but steady increase over the next several years, especially in the tourism field.

In this baccalaureate degree program, students are required to take a basic core of courses in the physical, biological, and social sciences as well as in the humanities. Additional technical and professional courses in the area of specialization will be required to fulfill the requirements for a B.S. degree in Recreation and Park Management.

Recreation and Park Management Curriculum

<table>
<thead>
<tr>
<th>Mathematics and Physical Sciences</th>
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<tbody>
<tr>
<td>MAT 113 Mathematics for Business and Economics</td>
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<table>
<thead>
<tr>
<th>Biological Sciences</th>
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<tbody>
<tr>
<td>BIO 100 Basic Biology</td>
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<tr>
<td>BIO 203 Field Natural History of Maine</td>
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<td>3</td>
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<tr>
<td>BOT 233 Dendrology</td>
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<tr>
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<table>
<thead>
<tr>
<th>Earth Science</th>
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<tbody>
<tr>
<td>GES 101 Aspects of the Natural Environment I</td>
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<td>PSS 150 Forest Soil Science</td>
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<table>
<thead>
<tr>
<th>Social Sciences and Humanities</th>
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</thead>
<tbody>
<tr>
<td>ARE 148 Principles of Agricultural Economics</td>
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<tr>
<td>BUA 201 Principles of Accounting I</td>
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<tr>
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<tr>
<td>BUA 325 Principles of Management and Organization</td>
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</tr>
<tr>
<td>POS 100 American Government</td>
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<td>OR</td>
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<tr>
<td>PAA 200 Introduction to Public Management and Bureaucracy</td>
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### Communications

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<tr>
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<tr>
<td>ENG 101</td>
<td>College Composition</td>
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<td>SPC 103</td>
<td>Fundamentals of Public Communication</td>
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<tr>
<td>Electives (select one:)</td>
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<tr>
<td>ENG 317</td>
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### Professional Preparation

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<tr>
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<tbody>
<tr>
<td>AEN 230</td>
<td>Park Service and Maintenance</td>
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<tr>
<td>ARE 371</td>
<td>Introduction to Natural Resource Economics and Policy</td>
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<tr>
<td>RPM 225</td>
<td>Readings in Outdoor Recreation</td>
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<tr>
<td>FTY 349</td>
<td>Principles of Forest Management</td>
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</tr>
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<td>RPM 352</td>
<td>Forest Recreation Management</td>
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<tr>
<td>RPM 452</td>
<td>Environmental Interpretation I: Principles</td>
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<tr>
<td>RPM 454</td>
<td>Cultural Resource Management</td>
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<tr>
<td>RPM 470</td>
<td>Principles of Tourism</td>
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<td>PSS 429</td>
<td>Park Planning and Design</td>
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<tr>
<td>TOTAL HOURS</td>
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### Areas of Concentration

(select one: )

#### Park Management

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>ARE 474</td>
<td>Land Use Planning</td>
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<tr>
<td>BUA 220</td>
<td>The Legal Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>RPM 355</td>
<td>Visitor Behavior and Management</td>
<td>3</td>
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<tr>
<td>RPM 471</td>
<td>Commercial Recreation</td>
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<tr>
<td>RPM 480</td>
<td>Wilderness and Wild and Scenic River Management</td>
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<tr>
<td>BUA 350</td>
<td>Business Finance</td>
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<td>BUA 370</td>
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#### Environmental Interpretation

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<tr>
<td>ANT 102</td>
<td>Introduction to Anthropology II</td>
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<td>ANT 217</td>
<td>Introduction to Archaeology</td>
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<td>ANT 425</td>
<td>Oral History and Folklore: Fieldwork Training</td>
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<td>BOT 201</td>
<td>Plant Biology</td>
<td>3</td>
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<tr>
<td>CHY 111</td>
<td>General Chemistry I</td>
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<tr>
<td>ENG 241</td>
<td>American Literature Survey: Beginnings Through Romanticism</td>
<td>3</td>
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<tr>
<td>ENT 226</td>
<td>Introductory Entomology</td>
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<tr>
<td>RPM 453</td>
<td>Environment Interpretation II: Methods</td>
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<td>ZOL 204</td>
<td>Animal Biology</td>
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<td>Electives (select three):</td>
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<td>AST 109</td>
<td>Introduction to Astronomy</td>
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<td>INM 433</td>
<td>Instructional Media</td>
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<td>JBR 216</td>
<td>Introduction to Photojournalism</td>
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<tr>
<td>OCE 270</td>
<td>Oceanography Today</td>
<td>(3)</td>
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</table>
are 474 Land Use Planning 3
BUA 325 Principles of Management and Organization 3
BUA 326 Dynamics of Organization and Behavior 3
BUA 330 Personnel Management and Industrial Relations 3
BUA 370 Marketing 3
BUA 372 Advertising 3
PSS 120 Herbaceous Land Plants 3
PSY 100 General Psychology 3
RPM 355 Visitor Behavior and Management 3
RPM 471 Commercial Recreation and Tourism 3
RPM 480 Wilderness and Wild and Scenic River Management 3
Free Electives 8(7)

MINIMUM HOURS REQUIRED FOR GRADUATION: 130

Forest Management Technology
Professor Kimball, Coordinator
Forest industries, federal and state resource agencies, consulting forestry and landscape management firms indicate a need for highly trained forest technicians on a continuing basis. Most positions are salaried and many are supervisory in nature. Duties may include timber cruising and marking, administration of timber sales and recreation areas, or assisting in forest management and research. Much of the work is in attractive outdoor surroundings.

The curriculum stresses communications, data collection and data processing skills as well as technical forestry training. Three credits of practical field training are included. The faculty are experienced field foresters with a deep commitment to teaching and individual student advising.

Forest Management Technology Curriculum

<table>
<thead>
<tr>
<th>Communications and Mathematics</th>
<th>Technical Forestry</th>
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<tbody>
<tr>
<td>ENG 101A Critical Written Expression 3</td>
<td>MAT 141A Elementary Algebra and Trigonometry 3</td>
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<td>SPE 101A Oral Communications 3</td>
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<tr>
<td>ENG 230A Business, Professional and Technical Writing 3</td>
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<tr>
<td>FMT 108A Silviculture and Harvesting 3</td>
<td>FMT 210A Urban Forestry and Arboriculture 2</td>
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<tr>
<td>FMT 101A Multiple Use and Management of Forests 2</td>
<td>FMT 211A Forest Protection 2</td>
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<tr>
<td>FMT 206A Aerial Photo Interpretation 3</td>
<td>FMT 209A Forest Management Seminar 1</td>
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<tr>
<td>FMT 105A Forest Measurements 4</td>
<td>FMT 201A Field Measurements and Inventory 2</td>
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<tr>
<td>FMT 204A Wood Products Utilization 3</td>
<td>FMT 203A Forest Resources Field Trip 1</td>
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<tr>
<td>FMT 106A Forest Ecology and Dendrology 4</td>
<td>FMT 212A Forest Laws and Regulations 2</td>
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Forest Biology

Professors Greenwood (Chairperson), Brown, Jagels, Knight; Associate Professors Carter, White; Assistant Professors Goodell, Jellison, Livingston, Murdoch, Ostrofsky; Faculty Associates Blum, Frank, Grimble, Safford, Saviello

Undergraduate students may pursue a B.S. degree in Forestry with a concentration in the area of Forest Biology. This curriculum concentration meets the accreditation requirements of the Society of American Foresters, and prepares students for employment with public and private organizations in the fields of forestry and natural resources, or for further academic study at the graduate level. The Forest Biology concentration emphasizes the underlying biological basis for forestry practice, as well as providing the technical skills of forestry. Forest Biology students complete the same basic core requirements as other forestry majors, as well as the concentration requirements listed in this catalog (see index).

The Department of Forest Biology offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees. Graduate education and research are available in the areas of forest ecology, forest genetics, woody plant physiology, forest entomology, forest pathology, biology of wood decay and protection, and environmental physiology/morphology.

TOTAL HOURS REQUIRED TO GRADUATE: 63
Wildlife

Professors Owen (Chairperson), Gilbert, Sherburne; Associate Professors Hunter, Krohn, O'Connor; Assistant Professors Griffith, Harrison, Servello; Faculty Associates Corr, Crawford, Dressier, Elowe, Hutchinson, Larouche, Longcore, Matula, Melvin

Maine offers diverse opportunities to study wildlife in a variety of natural environments ranging from the coast with its sea birds, marine mammals, and eagles, to the more mountainous northern boreal forest occupied by moose, loons and marten. The goal of the wildlife program is to offer an education with emphasis on basic sciences and principles of natural resource management so students can develop responsible citizenship and a sound basis for individual employment as a professional wildlife biologist. Students are exposed to wildlife issues in national parks, wildlife refuges, state management areas, and small and large tracts of privately-owned land representing a diversity of ecological systems.

All students receiving a bachelor of science degree in wildlife management meet the education requirements established by The Wildlife Society and are eligible for professional certification. In addition, students also will meet the civil service requirements for federal and state positions. The curriculum is designed to permit students to emphasize one of several specialties in wildlife management or wildlife biology. Students must use at least 15 hours of free electives to study an area of concentration that is professionally related (e.g. fisheries, computer science, forestry, communications, honors, law enforcement, or teaching). Courses in these areas may be used to obtain an official minor. Also, majors must take at least two field courses.

The faculty stresses personal advising and career planning. Internships and cooperative education opportunities are available with state, federal, and private organizations and efforts are made to provide professional experience throughout the program. Students must have one approved summer professional job or internship to complete their degree. Students also are encouraged to take advantage of several exchange programs with other universities during their junior year. Student organizations such as the University of Maine Student Chapter of The Wildlife Society provide chances to work together on career-related projects and are also a focal point for social activities.

A very active wildlife graduate program, offering both M. S. and Ph. D. degrees, enables undergraduates to interact with graduate students from schools across the country. Many graduate students are affiliated with the Maine Cooperative Fish and Wildlife Research Unit, a cooperative program with the University, the Maine Department of Inland Fisheries and Wildlife, the U.S. Fish and Wildlife Service, and the Wildlife Management Institute.

Specimen Curriculum

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>BIO 100 Basic Biology</td>
<td>ZOL 204 Animal Biology</td>
</tr>
<tr>
<td>FTY 101 Introduction to Forest Resources</td>
<td>CHY 112 General Chemistry II</td>
</tr>
<tr>
<td>WLM 100 Introduction to Wildlife Resources</td>
<td>ARE 148 Principles of Agricultural Economics</td>
</tr>
<tr>
<td>CHY 111 General Chemistry</td>
<td>WLM 101 Microcomputer Use in Wildlife Studies</td>
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<tr>
<td>MAT 151 Calculus for Life Sciences</td>
<td>ENG 101 College Composition</td>
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### Sophomore Year

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<tr>
<td>ZOL 329/331 Vertebrate Biology I/Laboratory</td>
<td>ZOL 330/332 Vertebrate Biology II; Laboratory</td>
</tr>
<tr>
<td>FTY 204 Statistical Inference in Forest Resources</td>
<td>BOT 464 Taxonomy of Vascular Plants</td>
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<tr>
<td>WLM 200/201 Ecology /Laboratory</td>
<td>History, Government Elective</td>
</tr>
<tr>
<td>SPC 103 Fundamentals of Public Communication</td>
<td>Social Science Elective</td>
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<tr>
<td></td>
<td>Elective</td>
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<td>TOTAL HOURS 15</td>
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**May Term**

| WLM 250 Wildlife Field Survey                       | 3 |

### Junior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>FTY 408 Silviculture</td>
<td>WLM 410 Management of Wildlife Populations</td>
</tr>
<tr>
<td>FTY 409 Forest Ecology and Silviculture Field Laboratory</td>
<td>ENG 317 Advanced Professional Exposition</td>
</tr>
<tr>
<td>PSS 150 Forest Soil Science</td>
<td>Literature / Fine Arts Electives</td>
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<tr>
<td>ENT 226 Introductory Entomology</td>
<td>Electives</td>
</tr>
<tr>
<td>OR</td>
<td>TOTAL HOURS 16</td>
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<tr>
<td>ZOL 353 Invertebrate Zoology (4)</td>
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<tr>
<td>Electives</td>
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<td>TOTAL HOURS 17</td>
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### Senior Year

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<tr>
<th>First Semester</th>
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<tr>
<td>WLM 450 Wildlife Habitat Relationships</td>
<td>WLM 470 Wildlife Policy and Administration</td>
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<tr>
<td>ZOL 470 Fishery Biology / Laboratory</td>
<td>Communications Elective</td>
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<tr>
<td>ARE 371 Introduction to Resource Economics and Policy</td>
<td>Electives</td>
</tr>
<tr>
<td>Electives</td>
<td>TOTAL HOURS 15</td>
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<td>TOTAL HOURS 16</td>
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**PROGRAM TOTAL FOR THE B. S. DEGREE 132**
Courses in Forestry

FTY 101 Introduction to Forest Resources
Orientation to forest resources. An overview of the forestry profession. Cr 1.

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 105 Introduction to Forest Measurements
Basic field measurements for determining the volume of standing and felled timber. Basic field data collection methods and data recording techniques. Cr 3.

FTY 200 Introduction to Forest Resources
Same content as FTY 101 except no lecture. Orientation is given. Transfer students only. No 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 208 Forest Surveying and Mapping
An introductory course presenting fundamental plane surveying concepts and mapping techniques including: distance and angular measurements, traverse computations, area determination, land surveying and recording systems, basic skills of map preparation, and computer-assisted cartography. Prerequisite: Algebra and trigonometry. Lab 1. Cr 3.

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 multidimensional 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 241 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 the staff. Open to high-ranking juniors and seniors. Cr Ar.

FTY 349 Principles of Forest Management
A survey of forestry, including the historical development of forestry in Europe and the U. S., basics of forest biology, multiple-use forest resources management, the production of wood products, and elements of forest economics and policy. Open without prerequisite to the University community, except for majors in programs leading to a B. S. in Forestry or Forest Engineering. Rec 3. Cr 3.

FTY 394 Cooperative Education
Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: learning experience. (Pass/Fail Grade Only). Cr 1-16.

FTY 395 Internship
A professional activity under the general supervision of an experienced professional with a high degree of responsibility placed on the student. Learning objectives are pre-established and agreed upon between the faculty coordinator and the placement supervisor. Not normally repeated. Cr Ar.

FTY 396 Field Experience
A field experience is a professional activity participated in by students under the supervision of a practicing professional in the field. A high degree of responsibility is placed on the student for developing learning objectives and securing the approval of a faculty member for academic credit for the learning involved. May be repeated. (Pass/Fail Grade Only). Cr Ar.
FTY 407 Forest Ecology
Biological principles and environmental factors governing the natural establishment and development of forest trees and stands. Prerequisite: BOT 233 or BOT 464; FTY 241 or permission; concurrent enrollment in FTY 409 or permission. Lec 4, Rec 1. (During 8-week block). Cr 3.

FTY 408 Silviculture
Theory and practice of controlling the composition, growth, quality and regeneration of forest stands. Prerequisite: FTY 307. Lec 4, Rec 1. (During 6-week block). Cr 2.

FTY 409 Forest Ecology and Silviculture Field Laboratory
Measurement, assessment and analysis of forest vegetation from a biological and silvicultural perspective. Designed to develop understanding and proficiency in: silvical properties of northeastern tree species; forest regeneration, succession and stand dynamics; prescribing silvicultural treatments; and formulating silvicultural systems. Weekly labs and several one-day field trips. Prerequisites: Concurrent enrollment in FTY 408; WLM 200 or concurrent enrollment in FTY 407. Cr 2.

FTY 410 Artificial Regeneration
The planting, care, and selection of stock in nursery and field plantings. Seed collecting and processing. Mechanical planting and field techniques. One-day field trip required. Prerequisite: FTY 241. Rec 2, Lab 3. Cr 3.

FTY 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. Rec 3. Cr 3.

FTY 450 Forest Resources Valuation
Fundamentals of financial analysis, evaluation of priced and unpriced forest resources for acquisition, taxation, management and disposal. Prerequisite: Senior majors in Forest Resources or permission. Cr 3.

FTY 455 Remote Sensing and Computer-Assisted Image Processing
Advanced remote sensing concepts are presented including fundamentals of multispectral remote sensing, characteristics of satellite multispectral scanners, digital image processing and applications of geographic information in natural resources management. The laboratory exercises in the second half of the semester allow students to perform digital image processing on Landsat imagery using a personal computer software package. Lec 2, Lab 1. Cr 3.

FTY 457 Forest Watershed Management
Relationship between forests and the water resource. Effects of forest activities and other aspects of land use on water yield and quality. Overview of current water resource problems and conflicts. Prerequisite: PSS 150, FTY 407. Cr 3.

FTY 470 Forest Management
Integration of biophysical and socioeconomic sciences for the multiple-use management of the products and services of forest lands. Administration of private, state and federal forestry enterprises. Prerequisites: FTY 408, FTY 450 (previously of concurrently). Cr 3.

FTY 470L Forest Management Laboratory
Preparation of a management plan for an actual parcel of forest land. Exercise designed to accompany FTY 470 (Forest Management), which must be taken concurrently or have been taken previously. Cr 3.

FTY 480 Applied Geographic Information Systems
An introduction to the methods and processes for the application of geographic information system to natural resource management. Emphasis is placed on project planning and hands-on experience in system operation. Prerequisites: FTY 208 or FOE 206 or SVE 251 and permission of instructor. Lec 2, Lab 1. Cr 3.

FTY 508 The Industrial Spruce-Fir Ecosystem
Biological and socioeconomic issues related to the ecology and management of Maine's spruce-fir resource. Lec 2. Four 1/2 day field trips. Cr 4.

FTY 509 Advanced Silviculture (Seminar)
Applied silvicultural practices and results of current silvicultural research in important forest types of the United States. Prerequisite: FTY 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, interspecies hybridization, provenance testing, and the introduction of exotic species are examined. Prerequisites: FTY 308, FTY 310 or permission. Lec 3. Cr 3.

FTY 519 Environmental Influences on Woody Plant Structure
Tree morphology and structure reflect evolutionary, recent historical and current environmental influences. Understanding the nature of these influences, how they operate, and the cytological and structural consequences for the living tree provide the biologist with tools needed to manipulate or conserve the forest resource. Prerequisite: Plant Anatomy or Wood Anatomy or permission of instructor. Offered alternate years. Cr 3.

FTY 520 Developmental Physiology of Woody Plants
Understanding plants as production systems for foliage, fruits, and wood. Structure and function of apical meristems and the cambium, reproductive biology and embryogenesis, developmental changes. Developmental physiology of organogenesis both natural and in vitro, with an introduction to gene expression as it relates to development. Prerequisite: BOT 434 or 454 or permission. Offered alternate years (odd). Lec 2, Rec 1. Cr 3.

FTY 526 Image Processing for Natural Resource Monitoring
Geo-based digital image processing on a microcomputer. Environmental monitoring case studies resulting in resource inventory maps and tabular outputs for decision making. Prerequisites: FOE 206, FTY 455 or permission. Offered alternate years. 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 535 Forest Vegetation Management with Herbicides
Ecological, technological and sociological issues related to the use of herbicides in forest management. Cr 3.

FTY 536 Forest Stand Dynamics
Tree growth and stand development from a quantitative ecological and silvicultural perspective. Critical review of representative growth simulation models in terms of biological realism. Prerequisites: prior instruction in silviculture/forest ecology and forest biometry, or permission. Lec 2, Lab 1. Cr 3.

FTY 540 Timber Procurement/Marketing
Introduction to the theory and practice of procuring raw material to supply the forest products industry. Procurement examined from the perspective of the wood user as well as the reverse process, marketing by sellers. Prerequisites: FOE 313 and FTY 450 or equivalent. Cr 3.

FTY 546 Forest Policy Analysis
Methods of economics and management science suitable for the assessment of priced and unpriced forest resource values. Analytical methods for individual and social decision making in the allocation and management of forest resources. Applications to problems posed by current Maine, U.S. and international forest management problems and forest policy issues. Prerequisite: permission. Cr 3.

FTY 547 Advanced Biometry
Sampling methods and the principles of regression analysis as applied to forest resources and the biological sciences. Prerequisite: FTY 205 and MAT 337 or permission. Rec 3. Cr 3.

FTY 549 Wood Supply Analysis
An applications-oriented review of forest dynamics (growth, mortality, harvesting, management) in the context of predicting and analyzing wood supply. Student projects and seminars provide experience with microcomputer models used in the Maine and eastern Canada. Prerequisite: FTY 449 or equivalent. Lec 2, Lab 1. Cr 3.

FTY 550 Advanced Forest Finance
Application of principles of advanced valuation and investment analysis to the practice of forestry. Special emphasis on both complex short-term financial decisions and the very-long-term decisions that are peculiar to forestry investments. Evaluation, forecasting, probabilistic analysis, strategic planning. Both theory and case studies. Prerequisite: FTY 450 or equivalent. Cr 3.

FTY 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 Forest Engineering

**FOE 206 Photogrammetry and Remote Sensing**
Vertical and horizontal measurements from air photos and topographic maps. Construction of planimetric map, interpretation and mapping of forest types, introduction to non-photographic remote sensing systems. Cr 3.

**FOE 345 Special Problems**
Original investigation in forest engineering, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.

**FOE 394 Cooperative Education**
Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

**FOE 395 Internship**
A professional activity under the general supervision of an experienced professional with a high degree of responsibility placed on the student. Learning objectives are pre-established and agreed upon between the faculty coordinator and the placement supervisor. Not normally repeated. Cr Ar.

**FOE 396 Field Experience**
A field experience is a professional activity participated in by students under the supervision of a practicing professional in the field. A high degree of responsibility is placed on the student for developing learning objectives and securing the approval of a faculty member for academic credit for the learning involved. May be repeated. Cr Ar.

**FOE 413 Utilization Trip**
One-week field trip to New England and adjacent Canadian provinces to inspect and study timber harvesting operations and wood utilization installations. Cr 1.

**FOE 453 Harvesting of Forest Crops**
Harvesting methods in the various regions of the United States and Canada, with special emphasis on the Northeast. Discussion on organization, costs, equipment, and trends. Prerequisite: FTY 341 or permission of the instructor. Rec 2. Cr 2.

**FOE 467 Forest Power**
Heat engine and electric power units for mobile and stationary application; mechanical and hydraulic power transmission; interactions between cross country vehicles, implements, and the ground; application of new energy sources to agricultural and forest power needs. 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 improved 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 Forest Technology

**FMT 101A Multiple Use and Management of Forests**
An introduction to forest technology stressing the role of forest technicians in managing for-
ests for renewable supplies of wood, water, wildlife, recreation and range. Lec 2. Cr 2.

FMT 105A Forest Measurements

FMT 106A Forest Ecology and Dendrology
An introduction to the taxonomy and ecology of temperate forest trees and ecosystems with emphasis on those systems of importance to New England and the Maritimes for the sustained production of clean water, wildlife habitat and wood products. Lec 3, Lab 4. Cr 4.

FMT 108A Silviculture and Harvesting
An introduction to the vocabulary, principles and practice of silviculture and forest harvesting. The course provides a survey of silviculture and harvesting across North America with emphasis on northeastern forests. Daylong field laboratories provide a chance to implement prescriptions while learning basic harvesting skills. Prerequisite: FMT106A. Lec 2, Lab 4. Cr 2.

FMT 196A Placement Training
Provides "on-the-job" training in the field related to program of study. Work is to be under supervision of employer and appropriate department in the College of Forest Resources. Prerequisite: C average. (Pass/Fail Grade Only). Cr Ar.

FMT 201A Field Measurements and Inventory
Surveys of boundary and compartment lines, field practice in inventory methods, calculations of inventory data, gathering growth data. Prerequisite: FMT 105A, FMT 106A. Cr 2.

FMT 203A Forest Resources Field Trip
A one-week field trip following the second semester of the program. It includes visits to publicly and privately owned forest lands, illustrating multiple-use management. It also includes visits to a variety of wood products industries. Prerequisite: FMT 105A, FMT 106A. Cr 1.

FMT 204A Wood Products Utilization
A survey of the major forest products industries to give the student an understanding of how the products of the forest are utilized and marketed. Effect of wood quality requirements on forest management. Inspection trips to local wood-using plants. Prerequisite: FMT106A, FMT105A. Rec 2, Lab 3. Cr 3.

FMT 206A Aerial Photo Interpretation
Use of aerial photography in connection with forest inventory techniques, locating and mapping forest areas resources, and improvements. Prerequisite: FMT201A, FMT203A. Rec 2, Lab 3. Cr 3.

FMT 209A Forest Management Seminar

FMT 210A Urban Forestry and Arboriculture
An introduction to the culture and management of trees in urban environments with special emphasis on practical applications. Topics will include: urban vegetation and ecosystems, plant selection, planting, diagnosing disease and insect-related problems, pruning and preventative maintenance, tree valuation, ordinances and laws, tree surveys, and safety programs. Laboratory exercises will include field application of lecture material. Lec 2, Lab 2. Cr 2.

FMT 211A Forest Protection
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 Recreation and Park Management

RPM 225 Readings in Outdoor Recreation
Selected authors and literature will be studied and discussed to familiarize RPM majors with the breadth and complexity of the field. No prerequisites. Rec 2. Cr 2.

RPM 300 Global Wilderness Survival
An ecologically oriented course in techniques for coping with outdoor emergencies in environments found throughout the world. A strong emphasis will be given to the psychological aspects of stress management under emergency conditions. The content will be
especially useful for those whose vocations, travel or leisure take them into the outdoors. Topics will include: the psychology of stress and survival; animal food procurement and preparation; edible, toxic and useful plants; temperate forest and mountain areas; arctic and high mountain areas; desert and tropic environments; marine and aquatic environments. Prerequisite: None. Required Field Trip. Cr 3.

RPM 345 Special Problems
Original investigation in Natural Resources, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.

RPM 352 Forest Recreation Management

RPM 355 Visitor Behavior and Management
Study of outdoor recreation user behavior as it impacts the planning, design and management of outdoor recreation opportunities. Emphasis on social/psychological principles which alter behavior and satisfaction in recreation experiences. Rec 3. Cr 3.

RPM 394 Cooperative Education
Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, 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 452 Environmental Interpretation I: Principles
An overview of the field of environmental interpretation with special emphasis on the principles inherent in all effective presentations and exhibits. Topics will include: origins of interpretation, interpretive planning, conducted walks and tours, living history interpretation, interpretive publications, self-guided activities, urban interpretation, cultural resource interpretation, collections, museums, marine interpretation, sky interpretation and photography. Principles of interpretive supervision and evaluation will also be discussed. Prerequisites: None. Cr 3.

RPM 453 Environmental Interpretation II: Methods
A course intended to follow RPM 452, Environmental Interpretation I: Principles, focusing on methods of interpretation. Class projects permit students to gain experience in: the development of interpretive master plans and prospecti, presenting illustrated talks, designing and writing interpretive publications, writing and narrating message repeater tapes and the design of interpretive facilities, exhibits and trails. Cr 3.

RPM 454 Cultural Resource Management
Study of social and legislative mandate to preserve the nation's cultural heritage. Emphasis on the total management of cultural resources through study of existing management systems. Prerequisite: RPM 352, RPM 353 and RPM 453. Rec 3. Cr 3.

RPM 470 Principles of Tourism
An introductory overview of the field of tourism. Topics will include the organization of tourism nationally and internationally, commercial recreation, motel and hotel operations, travel agencies, tour companies and other industry segments, supply and forecasting demand, research, current growth factors in the tourism industry, types of tourist destinations and tourist motivation and sociology. Emphasis will be given to the economic costs and benefits of tourism at local, regional, state and national levels. Cr 3.

RPM 471 Commercial Recreation
Development of a basic understanding of the knowledge, skills, and values associated with successful management of commercial recreation organizations and services. Emphasis on conceptual, theoretical and practical application principles necessary to establish and
operate a commercial recreation business. Rec. 3.  

RPM 480 Wilderness and Wild and Scenic River Management  
Development of a historical overview of wilderness and river management in the United States. Basic concepts of the unique management problems and opportunities associated with wilderness and wild and scenic river systems.  

RPM 540 Cultural History Interpretation  
Theory and practice of interpreting cultural history in park, recreation sites and museums. Topics include visitor centers, on-site areas, living history re-enactment, research, libraries, archives, special collections, cemetery interpretation, site reconstruction and stabilization. Prerequisites: RPM 452, RPM 453 or permission.  

RPM 554 Forest Recreation Planning  
Measuring, analyzing, and forecasting recreational use of forest lands. Concepts of planning, and their application to forest recreation management problems. Prerequisite: RPM 352 or permission.  

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. Rec 2.  

WLM 101 Microcomputer Use in Wildlife Studies  
An introduction to the basics of microcomputer use. Covers introductory word processing, database management and spreadsheet skills and their uses in professional wildlife work, and familiarizes students with basic computing concepts. Wildlife majors only. (Credit not allowed for both COS 100 or ARE 123 and this course). Lec 1, Rec 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 freshman. Prerequisite: BIO 100. Rec 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).  

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.  

WLM 250 Wildlife Field Survey  
Three week field course stressing the use and application of wildlife research and management techniques. Collection and analysis of biological data and the recognition of wildlife species and their habitats. Wildlife Majors Only. Prerequisites: WLM 100, WLM 200, WLM 201, ZOL 330.  

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.  

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.  

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.  

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.  

WLM 330 Wildlife Law Enforcement  
A survey of wildlife law enforcement including fish and wildlife laws, search and seizure, court
WLM 410 Management of Wildlife Populations
Characteristics of wildlife populations and principles for protection and manipulation of populations as part of a wildlife management program. Prerequisites: WLM 210, WLM 250. Rec 3, Lab 3. Cr 4.

WLM 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 4.

WLM 430 Cooperative Education
Cooperative education in wildlife involves a work experience related to the student's academic program. It involves two or more academic terms of work experience, either full-time alternating with on-campus coursework, or part-time while taking a part-time class load on campus of approximately equal significance. (Pass/Fail Grade Only). Cr Ar.

WLM 435 Field Experience
A field experience in wildlife is a professional activity participated in by students under the supervision of a practicing professional in the field. A high degree of responsibility is placed on the student for developing learning objectives and securing the approval of a faculty member for academic credit for the learning involved in the experience. It may be paid or unpaid, and it may last any length of time, and it may be repeated. Cr Ar.

WLM 440 Undergraduate Wildlife Seminar
Current topics of interest will be explored in a seminar format. Wildlife majors or permission. Cr Ar.

WLM 450 Wildlife-Habitat Relationships
A study of the interrelationships among wildlife species and their habitats stressing application to resource planning and management. Prerequisites: WLM 250 and WLM 410. Rec 3, Lab 2. Cr 4.

WLM 460 Wildlife Management Plan

WLM 470 Wildlife Policy and Administration

WLM 480 International Conservation
Loss of biological diversity, human overpopulation, desertification, sustainable forestry and agriculture, and similar topics will be covered in an examination of the biological, political, social and economic basis of international conservation. Prerequisite: Junior Standing. Cr 1-2.

WLM 490 Special Problems
Original investigation in wildlife work, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.

WLM 510 Wildlife Population Dynamics

WLM 515 Ecological Modeling in Wildlife Studies
Computer modeling techniques in the ecological sciences and their applicability to wildlife studies. Prerequisite: Permission. Lec 2, Rec 1. Cr 3.

WLM 520 Resource Issues on Public and Private Lands
Resource concerns for managers of public and private lands, and integration of wildlife management with forestry and recreation. Numerous field trips. Prerequisite: WLM 420, WLM 450, WLM 470 or permission. Alternate years. Cr 2.

WLM 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 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 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. Lec 2, Lab 3. Cr 4.

WTY 315 Process Analysis in Forest Utilization
Processing control and development problems and review of current methods of analysis and solution. Application of process design, systems analysis and materials technology in the industrial situation. Prerequisite: WTY 314 or permission of instructor. Rec 2, Lab 2. Cr 3.

WTY 317 Wood Drying and Preservation

WTY 345 Special Problems
Original investigation in wood science and technology, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.

WTY 394 Cooperative Education
Practical experience for the undergraduate student, combining work in a business firm, 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. (Pass/Fail Grade Only). Cr 1-16.

WTY 395 Internship
A professional activity under the general supervision of an experienced professional with a high degree of responsibility placed on the student. Learning objectives are pre-established and agreed upon between the faculty coordinator and the placement supervisor. Not normally repeated. Cr Ar.

WTY 396 Field Experience
Practical experience for the undergraduate student, combining work in a business firm, industry or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. Open to Wood Products students only. Cr 1-16.

WTY 416 Wood Anatomy
Structural characteristics of wood and wood fibers, and the use of these features to identify species, determine wood and paper properties and assess wood quality. Prerequisite: WTY 212 or BOT 435 or permission. Lec 2, Lab 4. Cr 3.

WTY 425 Wood Technology II
The mechanical properties of wood and wood composites and their use in structural applications. The relationship of mechanical and physical properties to basic processing techniques. Prerequisite: WTY 212 or permission. Rec 2, Lab 2. Cr 3.

WTY 429 Research Methods in Wood Technology

WTY 515 Research Techniques in Wood Anatomy
Preparation of woody tissue for microscopic examination and recording, including microtechniques and photomicrographic methods. Introduction to electron microscopy and interpretation of wood ultrastructure. Prerequisites: WTY 416 or permission. Lec 2, Lab 4. (4 credits with project). Cr 3-4.

WTY 530 Wood Physics
Study and evaluation of non-mechanical physical properties of wood; response to liquids, vibrational stimulation, heat, electricity and ionizing radiation. Prerequisite: under-
standing of basic physics, wood anatomy or permission. Lec 2, Lab 2.

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<th>INT 256 (BOT, ENT, FTY) Forest Protection</th>
<th>Cr 4.</th>
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<tbody>
<tr>
<td>Principles of forest protection involving disease, insects and fire with emphasis on understanding the identification, ecology, and control of tree pests. Prerequisites: BIO 100, BOT 233 or BOT 464. Lec 3, Lab 1.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INT 375 (BOT, FOR, OCE, WLM, ZOL) Field Studies in Ecology</th>
<th>Cr Ar.</th>
</tr>
</thead>
<tbody>
<tr>
<td>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 may 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.</td>
<td></td>
</tr>
</tbody>
</table>
College of Sciences

Dagmar R. Cronn, Dean

General Information
There are nine departments, with approximately 120 faculty and 1000 students majoring in a science, within the College of Sciences. The objectives of the College are: to provide a sound education in the sciences and liberal arts; to advance understanding of mathematical, computational, biological, and physical concepts through research; and to assist the public and private sectors on local, state, and national levels to solve problems of significance to our society.

The following degrees are offered in the College of Sciences. (B. A. = Bachelor of Arts; B. S. = Bachelor of Science; M. S. = Master of Science; M. P. S. = Master of Professional Studies; Ph. D. = Doctor of Philosophy). All degrees are designated in the discipline (e.g. Bachelor of Science in Biochemistry) except as noted.

Biochemistry: B. S., M. S., M. P. S., Ph. D. (in Biological Sciences)
Biology: B. A., B. S.
Botany: B. S., M. S., Ph. D. (in Biological Sciences or Plant Science)
Chemistry: B. A., B. S., M. S., Ph. D.
Computer Science: B. A., M. S.
Geological Sciences: B. A., M. S., Ph. D.
Mathematics: B. A., M. S.
Microbiology: B. S., M. S., M. P. S., Ph. D. (in Biological Sciences)
Molecular and Cellular Biology: B. S.
Oceanography: M. S., Ph. D.
Physics and Astronomy: B. A., M. S., M. S. (in Engineering physics), Ph. D.
Zoology: B. A., M. S., Ph. D.

The B. A. and B. S. degrees in Biology are administered through an interdepartmental arrangement among the Departments of Biochemistry, Botany, and Plant Pathology, Entomology, Microbiology, and Zoology. The B. S. degree in Molecular and Cellular Biology is an interdepartmental program of the Department of Biochemistry and Microbiology and is administered by the Department of Biochemistry. The Department of Zoology administers a program leading to the degree of Bachelor of Arts and Master of Science in Medical Technology.

Most students have found the sciences to be the appropriate major area of study in preparation for medical school. The Biological/Chemical Sciences offer the best preparation for the allied health professions and for medical research.

Other special programs are described in the section of the catalog describing the B. A. degree and its requirements.

Degree Requirements
Requirements for the B. A. degree are described in a separate section dealing with all B. A. degrees at the University of Maine. Requirements for the B. S. degree are described in detail under the degree name or the department.

Students may choose to major in a specific B. A. or B. S. degree program on entering the University. In such cases, students will be assigned an academic advisor within the College of Sciences freshman advising programs. Students are encouraged to select a major as soon as possible.

Questions pertaining to degree programs in the College of Sciences should be directed to the appropriate Department Chairperson or to the Biology Program Coordinator.

Entrance Requirements
The requirements for admission to the College of Sciences are the same as those of the University and are described in the Admission section of this catalog. Although not required at this time, students are encouraged to have at least three years of high school science, four years of mathematics, and to develop their writing skills prior to coming to the University. Two years of a single foreign language, such as Spanish, French, German, or Russian, are encouraged.
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.

The discipline is concerned with the study of living systems at the cellular and molecular levels and is therefore fundamental to all of the life sciences. In addition to the traditional concerns with the structure of biomolecules and the understanding of metabolism, the field has come to encompass molecular biology, molecular genetics, and many areas of biotechnology. It forms a major component of modern medical research and practice, bioengineering and of contemporary agricultural research.

The program of study leading to the bachelor of science degree is designed to prepare students for entry-level positions in industry, research, education, and for post-graduate programs in biological sciences and medicine. To qualify for the degree, a minimum of 120 hours, distributed as outlined below, must be completed with an accumulative grade point average of 2.0 or higher.

Curriculum in Biochemistry

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCH 451</td>
<td>Principles of Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>BCH 460</td>
<td>Advanced Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BCH 463</td>
<td>Introduction to Biochemical Laboratory Methods</td>
<td>2</td>
</tr>
<tr>
<td>BCH 464</td>
<td>Advanced Biochemical Laboratory Methods</td>
<td>4</td>
</tr>
<tr>
<td>BCH 491</td>
<td>Biochemical Research I</td>
<td>6</td>
</tr>
<tr>
<td>BCH 467</td>
<td>Physical Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td>CHY 372 Physical Chemistry II</td>
<td>(4)</td>
</tr>
</tbody>
</table>

TOTAL HOURS 23

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 100</td>
<td>Basic Biology</td>
<td>4</td>
</tr>
<tr>
<td>ZOL 204</td>
<td>Animal Biology</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td>BOT 201 Plant Biology</td>
<td>(3)</td>
</tr>
<tr>
<td>MCB 300/301</td>
<td>Microbiology/Laboratory</td>
<td>5</td>
</tr>
<tr>
<td>CHY 111/112</td>
<td>General Chemistry I/II</td>
<td>8</td>
</tr>
</tbody>
</table>

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.

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.

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 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.

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, mutagenesis, 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. Pre-
requisites: BCH 450, 460, COS 220 or equivalents or permission.

**BCH 491 Biochemical Research I**
Problems in biological chemistry and molecular biology. A comprehensive report is required. Seniors and graduate students only.

**BCH 492 Biochemical Research II**
Problems in biological and molecular biology. A comprehensive report is required. Seniors and graduate students only.

**BCH 500 Nucleic Acids**
Biological, chemical and physical properties and structure-function relationships of nucleic acids. Prerequisites: BCH 460.

**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.

**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.

**BCH 525 Proteins and Enzymes**
Emphasis is on contemporary principles of protein structure and interactions, enzymes and catalysis, and membrane function. Prerequisite: BCH 460 or permission. Rec 3. Cr 3.

**BCH 530 Regulation of Growth in Eukaryotes**
Genetic and cellular mechanisms which regulate growth in eukaryotic systems. Normal growth and cancer, the interactions of growth factors and receptors, and oncogenes. Prerequisite: BCH 460 or permission.

**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.

**BCH 545 Plant Molecular Biology**
Current research topics in plant molecular biology. Molecular techniques used to address regulatory mechanisms of plant gene expression. Prerequisite: BCH 451, BCH 460, BCH 310, BCH 510 or permission.

**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.

**BCH 572 Graduate Seminar**
Bachelor of Science in Biology

The B. S. in biology is offered cooperatively by the Departments of Biochemistry, Botany and Plant Pathology, 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 100 Basic Biology</td>
<td>4</td>
</tr>
<tr>
<td>BOT 201/202 Plant Biology</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>BOT 203 The Plant Kingdom</td>
<td>4</td>
</tr>
<tr>
<td>ENT 226 Introductory Entomology</td>
<td>4</td>
</tr>
<tr>
<td>MCB 300 General Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MCB 305 General Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>ZOL 204 Animal Biology</td>
<td>4</td>
</tr>
<tr>
<td>BOT 445 Plant Genetics</td>
<td>3</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>ZOL 462 Principles of Genetics</td>
<td>3</td>
</tr>
<tr>
<td>ZOL 465 Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BCH 322/322L Introductory Biochemistry/Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>BCH 451/463 Principles of Biochemistry/Introduction to Biochemical Laboratory Methods</td>
<td>6</td>
</tr>
<tr>
<td>INT 319 General Ecology</td>
<td>3</td>
</tr>
</tbody>
</table>

Group Requirements

Taxonomy

Students choose one from among the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT 464 Taxonomy of Vascular Plants</td>
<td>4</td>
</tr>
<tr>
<td>BOT 473 Biology of Algae</td>
<td>4</td>
</tr>
<tr>
<td>ENT 440 Insect Biology and Taxonomy</td>
<td>4</td>
</tr>
<tr>
<td>ENT 453 Biology and Taxonomy of Advanced Orders</td>
<td>4</td>
</tr>
<tr>
<td>MCB 410 Determinative Bacteriology</td>
<td>4</td>
</tr>
<tr>
<td>ZOL 329/331 Vertebrate Biology I/Laboratory</td>
<td>5</td>
</tr>
<tr>
<td>ZOL 353 Invertebrate Zoology</td>
<td>4</td>
</tr>
<tr>
<td>ZOL 458/459 Animal Parasitology/Laboratory</td>
<td>4</td>
</tr>
</tbody>
</table>

Physiology

Students choose one from among the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT 452/453 Plant Physiology/Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BOT 454 Intermediate Plant Physiology</td>
<td>4</td>
</tr>
<tr>
<td>MCB 430 Bacterial Physiology</td>
<td>4</td>
</tr>
<tr>
<td>ZOL 377/378 Animal Physiology/Laboratory</td>
<td>5</td>
</tr>
</tbody>
</table>

Anatomy

Students choose one from among the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT 435 Plant Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>ZOL 333 Comparative Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>ZOL 336 Developmental Biology</td>
<td>4</td>
</tr>
</tbody>
</table>

TOTAL HOURS 46(53)

Other Sciences

Mathematics

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 126 Analytic Geometry and Calculus</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>MAT 151 Calculus for the Life Sciences I</td>
<td>4</td>
</tr>
<tr>
<td>(Many students will need MAT 122, Algebra and Trigonometry, as preparation)</td>
<td></td>
</tr>
</tbody>
</table>

TOTAL HOURS 4

Chemistry

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHY 111/112 General Chemistry I/II</td>
<td>8</td>
</tr>
<tr>
<td>BCH 221/221L Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>CHY 251/253 Organic Chemistry I Lecture/Laboratory</td>
<td>5</td>
</tr>
</tbody>
</table>

TOTAL HOURS 5
AND
CHY 252/254 Organic Chemistry II Lecture/Laboratory (5)
TOTAL HOURS 12

Physics
PHY 111/112 General Physics I/II 8
TOTAL HOURS 8
TOTAL HOURS 24(30)

Other Areas
Communications (***)
ENG 101 College Composition 3
SPC 103 Fundamentals of Public Communication 3
TOTAL HOURS 6

Humanities and Social Sciences (***)
Students must select a total of 15 credit hours of courses in the humanities and/or social sciences.
TOTAL HOURS 15

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

FAA 117 Issues and Opportunities 1
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 Sciences for the sections marked above(***). See the introduction to 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. Credit cannot be earned for both BIO 100 and ZOL 101. Lec 3, Lab 2. Cr 4.

BIO 203 Field Natural History of Maine
The plant and animal life and physical features of aquatic, wetland, and terrestrial ecosystems in Maine, observed in a series of afternoon field trips and two all-day Saturday trips. Lec 1, Field 4. Cr 3.

BIO 260 Interactions Between Humans and Their Environment
The interrelationships between human beings 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, alternated with academic coursework. Students are provided opportunities to integrate theory with practice, to gain practical work experience, and to develop future placement opportunities. Prerequisite: junior standing and permission. (Pass/Fail Grade Only). Cr 1-16.

BIO 396 Field Experience in Biology
An approved work experience 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 Biometry
Design and quantitative analysis of biological experiments, including practical applications of quantitative models and statistics. 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 470 Wetland and Aquatic Biology
A multidisciplinary approach to the study of wetlands and shallow water aquatic systems, covering major life forms and their environments. Field, lecture and laboratory work. Pre-requisites: BIO 100; one semester each of botany and zoology. Cr 4.

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, Schwintzer, Tjepkema; Associate Professors Campbell, Cronan, Jacobson, McAlice, Neubauer, Steneck, Tavantzis; Assistant Professors Davison, Lambert, Liles; Cooperating Professors Greenwood, Jagels, Langille; Cooperating Assistant Professor Jellison; Faculty Associates Leach, Ostrofsky: Emeritus Professors Cooper, McCrum, Richards, Campana.

The B.S. in Botany is designed to provide a rigorous background in the fundamental aspects of plant biology while allowing considerable flexibility in planning the direction of specialization for student majors. The department offers particularly strong programs of study in ecology and systematics, plant pathology, plant physiology, and aquatic biology which range in approach from the molecular and cellular levels to systematic and ecological studies on freshwater, marine, and terrestrial ecosystems.

The program of study leading to the B.S. is designed to prepare students for entry-level research positions (e.g., Plant Biotechnology) in government and industry. It also provides opportunities for teaching at various levels and for post-graduate study in the biological sciences.

One of the special aspects of the program for students is the strong interaction with individual faculty members. Students are exposed first-hand to the professional and research activities of members of the faculty. This leads to more informal discussions of classic and modern approaches to plant biology useful in planning for professional and career development.

Curriculum in Botany

**Botany and Biology**

<table>
<thead>
<tr>
<th><strong>Specific Requirements</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 100 Basic Biology</td>
<td>4</td>
</tr>
<tr>
<td>BOT 203 The Plant Kingdom</td>
<td>4</td>
</tr>
<tr>
<td>BOT 435 Plant Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BOT 445 Plant Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BOT 452/453 Plant Physiology and Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BOT 481 Seminar</td>
<td>2</td>
</tr>
<tr>
<td>BCH 322/322L Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>Botany and Biology Lecture/Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

**OR**

<table>
<thead>
<tr>
<th><strong>AND</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BCH 451 Principles of Biochemistry</td>
<td>(4)</td>
</tr>
<tr>
<td>BCH 463 Introduction to Biochemical Laboratory Methods</td>
<td>(2)</td>
</tr>
</tbody>
</table>

**INT 319 General Ecology**

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.

<table>
<thead>
<tr>
<th><strong>Histology and Genetics</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT 233 Dendrology</td>
<td>4</td>
</tr>
<tr>
<td>BOT 391/392 Problems in Botany I/II</td>
<td>2</td>
</tr>
<tr>
<td>BOT 450 Botanical Microtechnique</td>
<td>4</td>
</tr>
<tr>
<td>BOT 454 Intermediate Plant Physiology</td>
<td>4</td>
</tr>
<tr>
<td>BOT 456 Forest Pathology</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
</tbody>
</table>
University of Maine

Botany

BOT 457 Plant Pathology (4)
BOT 458 Bryology 3
BOT 464 Taxonomy of Vascular Plants 4
BOT 473 Biology of Algae 4
BOT 475 Algal Growth and Seaweed Mariculture 3
BIO 203 Field Natural History of Maine 3
BIO 468 Limnology 3
BIO 469 Limnology Lab and Field 2
BIO 470 Wetland and Aquatic Biology 4
BCH 310 Introductory Molecular Biology 3
BCH 451 Principles of Biochemistry 4
BCH 463 Introduction to Biochemical Laboratory Methods 2
BCH 464 Advanced Biochemical Laboratory Methods 4
ENT 226 Introductory Entomology 4
ENT 227 Introductory Entomology for Foresters (3)
GES 101 Aspects of the Natural Environment I 4
MCB 300/305 General Microbiology/Laboratory 5
OCE 370 Introduction to Oceanography 3
PSS 140 Soil Science 3
ZOL 204 Animal Biology 4
ZOL 213 An Introduction to Marine Science 3
ZOL 353 Invertebrate Zoology 4
ZOL 465 Evolution 3
ZOL 472 Aquatic Food Webs 2
INT 375 Field Studies in Ecology Arr. TOTAL HOURS 16

Other Sciences

Chemistry

CHY 111/112 General Chemistry I/II 8
OR
CHY 113/114 Chemical Principles I/II (8)
BCH 221 Organic Chemistry/Laboratory 4
OR
CHY 251/253 Organic Chemistry I Lecture/Laboratory (5)
AND
CHY 252/254 Organic Chemistry II Lecture/Laboratory (5) TOTAL HOURS 12-18

Physics

PHY 111/112 General Physics I/II 8 TOTAL HOURS 8

Mathematics*

MAT 151 Calculus for the Life Sciences I 4
OR
MAT 126 Analytic Geometry and Calculus (4)
OR
BIO 451 Biometry (3)
OR
MAT 232 Principles of Statistical Inference (3) TOTAL HOURS 3-4

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
FAA 117 Issues and Opportunities 1

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 31-22

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

*For students planning a research career and/or graduate school program, a calculus course and a statistics course are strongly recommended.
BOT 457 Plant Pathology 4
BCH 451 Principles of Biochemistry 4
BCH 463 Introduction to Biochemical Laboratory Methods 2
BCH 464 Advanced Biochemical Laboratory Methods 4
MCB 300/305 General Microbiology/Laboratory 5
CHY 251 /253 Organic Chemistry I Lecture/Laboratory 5
AND
CHY 252 /254 Organic Chemistry II Lecture/Laboratory 5
MAT 151 Calculus for the Life Sciences I 4
OR
MAT 126 Analytic Geometry and Calculus (4)
BIO 451 Biometry 3
OR
MAT 232 Principles of Statistical Inference (3)

Ecology
BOT 464 Taxonomy of Vascular Plants 4
OR
ZOL 465 Evolution (3)
BIO 203 Field Natural History of Maine 3
BIO 468 Limnology 3
BIO 470 Wetland and Aquatic Biology 4
ENT 226 Introductory Entomology 4
OR
ENT 227 Introductory Entomology for Foresters (3)
OCE 370 Introduction to Oceanography 3
PSS 140 Soil Science 3
AND/OR
GES 101 Aspects of the Natural Environment I (4)
ZOL 204 Animal Biology 4
MAT 151 Calculus for the Life Sciences I 4
OR
MAT 126 Analytic Geometry and Calculus (4)
BIO 451 Biometry 3
OR
MAT 232 Principles of Statistical Inference (3)
INT 375 Field Studies in Ecology Arr.

Marine Biology
BOT 473 Biology of Algae 4

BOT 475 Algal Growth and Seaweed Mariculture 3
OCE 370 Introduction to Oceanography 3
ZOL 204 Animal Biology 4
ZOL 213 An Introduction to Marine Science 3
ZOL 353 Invertebrate Zoology 4
ZOL 472 Aquatic Food Webs 2
MAT 151 Calculus for the Life Sciences I 4
OR
MAT 126 Analytic Geometry and Calculus (4)
BIO 451 Biometry 3
OR
MAT 232 Principles of Statistical Inference (3)

Plant Pathology
BOT 456 Plant Pathology 4
OR
BOT 457 Plant Pathology (4)
BOT 464 Taxonomy of Vascular Plants 4
ENT 226 Introductory Entomology 4
OR
ENT 227 Introduction to Entomology for Foresters (3)
MCB 300/305 General Microbiology/Laboratory 5
PSS 140 Soil Science 3
MAT 151 Calculus for the Life Sciences I 4
OR
MAT 126 Analytic Geometry and Calculus (4)
BIO 451 Biometry 3
OR
MAT 232 Principles of Statistical Inference 3

Plant Physiology
BOT 454 Intermediate Plant Physiology 4
BCH 451 Principles of Biochemistry 4
BCH 463 Introduction to Biochemical Laboratory Methods 2
BCH 464 Advanced Biochemical Laboratory Methods 4
MCB 300/305 General Microbiology/Laboratory 5
CHY 251 /253 Organic Chemistry I Lecture/Laboratory 5
AND
CHY 252 /254 Organic Chemistry II Lecture/Laboratory 5
MAT 151/152 Calculus for the Life Sciences I/II 8
OR
MAT 126/127 Analytic Geometry and Calculus (8)

Systematics and Evolution
BOT 464 Taxonomy of Vascular Plants 4
BIO 203 Field Natural History of Maine 3
OR
BIO 470 Wetland and Aquatic Biology (4)
ENT 226 Introductory Entomology 4
OR
ENT 227 Introductory Entomology for Foresters (3)

GES 101 Aspects of the Natural Environment I 4
ZOL 465 Evolution 3
BIO 451 Biometry 3
OR
MAT 232 Principles of Statistical Inference (3)
Two or more of the following:
BOT 233 Dendrology 4
BOT 458 Bryology 3
BOT 473 Biology of Algae 4

Courses in Botany

BOT 201 Plant Biology
An introduction to seed plants emphasizing plant structure and physiology and their relationship to the ecology of plants. Prerequisite: BIO 100. Lec 3. Cr 3.

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
Identification and natural history of trees and native shrubs of North America. Prerequisite: BIO 100. Lec 2, Lab 3. Cr 3.

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
This course combines field studies of natural ecosystems and laboratory experimentation to illustrate ecological principles and to provide technical experience in ecology. Saturday field trips. Prerequisites: INT 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 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 457 Plant Pathology
Principles of plant disease. Open to juniors and seniors. Prerequisite: BIO 100. Lec 3, Lab 2. Cr 4.

BOT 458 Bryology
Identification and classification of liverworts and mosses. Prerequisite: BOT 203 or an equivalent with the permission of instructor. Lec 1, Rec 1, Lab 2. Cr 3.

BOT 464 Taxonomy of Vascular Plants
Identification and evolutionary biology of flowering plants. Prerequisite: BIO 100. Lec 2, Rec 1, Lab 2. Cr 4.

BOT 473 Biology of Algae
Comparative morphology and reproduction, identification and classification of algae. Laboratory and field work emphasize 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 are stressed including: culture media, nutrient requirements, physical factors, and nutrient cycling. Emphasis is given to growth, biomass and productivity. Laboratory exercises emphasize “hands on” experience in isolating, growing and calculating yields of micro and macro algae. Two Saturday field trips. 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 501 Physiology of Aquatic Macrophytes
Physiology of fresh water and marine aquatic macrophytes, including photosynthesis, osmoacclimation and carbon metabolism, growth regulation, translocation, nitrogen metabolism, and response to water motion. Prerequisite: BOT 452 or permission of instructor. Cr 3.

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 523 Evolutionary Biology of Plants
Theories of evolution, genetic and molecular aspects of evolution, speciation, and reproductive biology, with special emphasis on flowering plants. Cr 2.

BOT 530 Biology of the Fungi
The major taxon of fungi emphasizing ecology and physiology. Prerequisite: BIO 100 or equivalent and/or basic Ecology course or permission. Cr 3.

BOT 531 Fungal Biology Laboratory

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 are used to examine the important processes of element cycling, including atmospheric deposition, canopy processes, plant nutrient circulation, decomposition, animal-insect interactions, soil chemical phenomena, weathering, leaching, gaseous fluxes, forest hydrology and overall watershed biogeochemical responses to disturbance. 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 or BOT 457. Lec 3. Cr 3.

BOT 557 Advanced Topics in Plant Virology
Topics in plant virology related to virus structure, replication, genetics and plant cell-virus interactions at the molecular level. May be repeated for credit. Cr 1-3.

BOT 558 Advanced Plant Physiology

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
The physiology and biochemistry of photosynthesis. Chloroplast structure, chlorophyll synthesis, photolysis of water, electron transport, photophosphorylation, path of carbon in photosynthesis, C3, C4, C3-C4 intermediates, CAM, photosynthesis and plant productivity. Prerequisite: BOT 452, or permission of instructor. 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.

BIO 100 Basic Biology
An introduction to fundamental principles of structure and function in living systems, both plants and animals. Open to students of all colleges. Credit cannot be earned for both BIO 100 and ZOL 101. Lec 3, Lab 2. Cr 4.

BIO 203 Field Natural History of Maine
The plant and animal life and physical features of aquatic, wetland, and terrestrial ecosystems in Maine, observed in a series of afternoon field trips and two all-day Saturday trips. Lec 1, Field 4. Cr 3.

BIO 468 Limnology
The ecology of inland waters, with emphasis on the physical, chemical and biological characteristics of lakes. Prerequisite: ZOL 204 and BIO 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 470 Wetland and Aquatic Biology
A multidisciplinary approach to the study of wetlands and shallow water aquatic systems, covering major life forms and their environments. Field, lecture and laboratory work. Pre-
requisites: BIO 100; one semester each of botany and zoology. Cr 4.

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 256 (BOT, ENT, FTY) Forest Protection
Principles of forest protection involving disease, insects and fire with emphasis on understanding the identification, ecology, and control of tree pests. Prerequisites: BIO 100, BOT 233 or BOT 464. Lec 3, Lab 1. Cr 4.

INT 319 (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 375 (BOT, FOR, OCE, WLM, 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 may 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 450 (BOT, ENT, PSS) Agricultural Pest Ecology
An examination of the intrinsic and extrinsic principles of weed, plant disease, and insect pest interrelationships. Integrated pest management strategies and crop ecosystem models will be emphasized. Prerequisites: Must have completed an introductory course in two of the three pest sciences-PSS 403, BOT 456/457, or ENT 226/227/228 or permission. 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. Rec 2. (Offered Spring and Fall Semesters). Cr 2.

INT 539 (ANT, BOT, QUS) Ice Ages and Humankind
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 people. Laboratory and field studies emphasize late- and postglacial changes, and include analyses of the pollen and other microfossil content of Maine lake sediments. Prerequisite: permission; a course in ecology and a year of chemistry. Lec 2, Lab and Rec 5, 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 distributions, zonation, biotic interactions, food webs, succession, hypothesis testing, problems of scale, recruitment community structure and organization. Prerequisite: a course in ecology, Lec 2, Rec 1. Cr 3.
Chemistry

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

The Department of Chemistry offers programs of study leading to the degrees of Bachelor of Arts and Bachelor of Science in Chemistry in the College of Sciences.

Because a knowledge of chemistry is fundamental to success in so many fields, the chemistry curriculum affords an unusual opportunity for a wide choice of electives so that the chemistry major may adapt his or her program to individual interests and needs. A brochure describing a number of such individualized programs, such as technical writing, industrial management, computer applications, or medical school preparation, is available in the Department office, 288 Aubert Hall.

A curriculum leading to American Chemical Society certification, such as the specimen below, prepares the student for employment in the chemical industry or for graduate or professional school. The prospective chemistry major should discuss his or her educational goals with a Departmental advisor as early as possible, so as to incorporate requisite courses at their appropriate places in the curriculum.

In addition to the courses in the curriculum below, B. A. students will need to complete a set of social science and humanities electives specified by the Faculty Assembly and B. S. candidates will satisfy requirements as specified by the College of Sciences.

Cooperative Work Experience

A program is available which allows students to accept opportunities for temporary employment provided by cooperating industries. The student may work during the summer or part of one summer and either the following or immediately preceding semester. Credit will be allowed for this work under course numbers CHY 394 and CHY 594. This will be a supervised and paid professional experience.

Five-Year Combined B. S. /M. S. Program

Selected students may apply for this option, which permits completion of both the B. S. and the M. S. degrees in five years. Work completed as part of the Honors Program may be included. Application should be made by letter to the Department early in the junior year.

Graduate Work in Chemistry

The Department of Chemistry offers a program of study and research leading to the M. S. and Ph. D. degrees. The general requirements of these programs are described in the Graduate School catalog.

Specimen Curriculum

Courses are arranged in the recommended sequence. See departmental advisors for variations.

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* Programming for Engineers
### Sophomore Year

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<tr>
<td>CHY 242 Principles of Quantitative Analysis</td>
<td>CHY 252 Organic Chemistry</td>
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<td>CHY 251 Organic Chemistry Lecture I</td>
<td>CHY 254 Organic Chemistry Laboratory II</td>
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<td>CHY 253 Organic Chemistry Laboratory I</td>
<td>CHY 393 Undergraduate Seminar in Chemistry</td>
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<tr>
<td>MAT 228 Analytic Geometry and Calculus</td>
<td>MAT 259 Differential Equations in Chemistry</td>
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<td>Other</td>
<td>SPC 103 Fundamentals of Public Communication</td>
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<td><strong>TOTAL HOURS</strong></td>
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<td>CHY 372 Physical Chemistry II</td>
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<td>CHY 373 Physical Chemistry Laboratory I</td>
<td>CHY 374 Physical Chemistry Laboratory II</td>
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<td>CHY 385 Chemical Literature</td>
<td>CHY 453 Intermediate Organic Chemistry Laboratory</td>
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<td>GER 101 Elementary German I**</td>
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<td>CHY 461 Advanced Inorganic Chemistry</td>
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<td>GER 203 Intermediate German I**</td>
<td>CHY 443 Instrumental Analysis</td>
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<td>Other</td>
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**Chemistry Major Requirements**

The chemistry major must take a minimum of 43 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 461/462; either CHY 443 or CHY 254 and CHY 374; and CHY 393 three times. Additional requirements are: 12 credit hours of mathematics: MAT 126, MAT 127 and MAT 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. At least one year of study of a major foreign language (French, German, or Russian) is strongly recommended if the student plans to enter graduate school.

**Courses in Chemistry**

**CHY 111 General Chemistry I**

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 pe-
riodic 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.

**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, thermodynamics 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: Credit or concurrent registration in CHY 372, 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 394 Field Experience/Cooperative Education**
Supervised employment with relevance to the study of chemistry in the public or private sector. A proposed program of study, mutually agreed upon by the student, 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 399 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 443 Instrumental Analysis

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 I
Advanced theoretical and descriptive inorganic chemistry emphasizing periodic relationships. Corequisite CHY 373 or equivalent. Lec 3. Cr 3.

CHY 462 Advanced Inorganic Chemistry II

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

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

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

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

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

CHY 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 I
Introduction to the foundations of quantum theory and molecular quantum mechanics.

Cr 3.

CHY 576 Intermediate Physical Chemistry II

Introduction to classical mechanics, thermodynamics and statistical thermodynamics with application to simple chemical systems. Cr 3.

CHY 577 Chemical Thermodynamics
A study of the laws of thermodynamics as applied to chemical problems. Given on sufficient demand. Prerequisite: CHY 372. Cr 3.

Interdisciplinary Course
INT 398 (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.
Computer Science

Associate Professor Byther (Acting Chairperson); Professor Markowsky (on leave 1989-90), Northam; Associate Professors Dube, Ferguson; Assistant Professors Kopec, Latour; 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. Students who already have a bachelor's degree need not complete a concentration. Concentration areas are business (pre-MBA program), economics, electrical engineering or mathematics. The concentrations help prepare students for work or graduate school, and are a key component of the program.

A minimum of 36 hours in computer science are required, including COS 220 and COS 221 with a grade of "C" or better, COS 230, COS 250, COS 301, COS 310 OR COS 315, COS 331, and COS 350. Furthermore, at least 12 additional hours of COS courses are required from COS 305, COS 335, COS 398 or any computer science course numbered 400 or higher.

At least 18 hours of required computer science courses numbered 300 or above must be taken at Orono. All courses taken elsewhere for the degree must be approved in advance by the department.

Concentrations

A business concentration (pre-MBA) student must take: COS 100, COS 211, COS 310, ECO 120, ECO 121, BUA 201, BUA 202, BUA 220, BUA 325, BUA 337, BUA 350, BUA 370. COS 100 and COS 211 do not count toward the 36 credits of computer science required for the bachelor's degree. COS 310 does count toward the required 36 credits.

The business concentration satisfies the course requirements for admission to most MBA programs. Successful completion of these requirements and meeting the other admission requirements of an MBA program allows the student to earn both a B. A. in Computer Science and an MBA in five years.

An economics concentration student must take: ECO 120/121, ECO 421, BUA 201, ECO 420, ECO 485, and at least four of the following: ECO 433, ECO 437, ECO 438, ECO 439, ECO 444, ECO 453, ECO 470, ECO 471, ECO 475, ECO 480

An electrical engineering concentration student must take: PHY 121/122, MAT 126/127, MAT 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 434 and at least four courses from three different categories:

- Differential Equations: MAT 259, MAT 453 OR MAT 459 (one only), MAT 454;
- Statistics: MAT 437 or MAT 439 (one only), MAT 438, MAT 435;
- Operations Research: MAT 455, MAT 456;
- Numerical Analysis: MAT 487;
- Simulation: MAT 457, MAT 458;
- Pure Mathematics: MAT 425, MAT 463;
- Discrete Mathematics: MAT 481, MAT 488.

In addition to the courses in computer science and the concentration area, each major must complete SPC 102, ECO 120/121, ENG 317 with a grade of "C" or better, MAT 126 with a grade of "C" or better, MAT 127 or MAT 162 with a grade of "C" or better, MAT 215 or MAT 434.

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

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; use of a spreadsheet. Special emphasis is placed on understanding sources of error in computer operation. A goal of this course is to prepare students sufficiently well so they can operate a personal computer with a minimum of outside help. Does not meet Arts and Sciences Core Distribution Area III requirement. Cr 3.
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 221 Introduction to Computer Science II
Continuation of COS 220 with emphasis on the development of non-numeric algorithms. Topics include program efficiency, text processing, sorting and data structures. Prerequisite: COS 220. Cr 3.

COS 230 Computer Architecture and Assembly Language
Introduction to concepts of modern computers, instruction formats, addressing techniques. Input-output processes and interrupt handling. Programming aspects include assembler program segmentation and linkage. A specific assembler used to illustrate various topics. Prerequisite: COS 220 or equivalent. Cr 3.

COS 250 Discrete Structures
Introduction to discrete structures used in various areas of computer science. Topics include logic, sets, relations, functions, cardinality, enumeration, and computability. The topics will be presented in a framework useful for further study in computer science. Prerequisites: MAT 114 or MAT 127. Corequisite: COS 221. 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 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 221 or equivalent. Cr 3.

COS 305 Numerical Methods with FORTRAN
Introduces the use of numerical methods for solving engineering and science problems, and the development of and management of large programs on a mainframe operating environment using FORTRAN 77. Topics will include rounding errors, locating roots of equations, matrix mathematics, simultaneous linear equations, numerical differentiation, and curve fitting. Prerequisites: Semester of programming experience in FORTRAN or a comparable language such as Pascal. Cr 3.

COS 310 Systems Analysis With Business Applications
Provides the knowledge and tools necessary to analyze problems of information gathering and processing, and to develop logical and physical designs in a business setting. Problems in this course will be done using the COBOL language. Prerequisite: COS 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 310. (Credit will not be given for both COS 310 and COS 315). Cr 4.

**COS 331 Operating Systems**
Study of the structure of current computer operating systems. Topics include I/O management, memory management, multiprogramming, linking loaders, real and virtual systems, batch and time sharing. Prerequisite: COS 221, COS 230 or permission. Cr 3.

**COS 335 Computer Organization and Architecture**
The internal organization of typical computers, both microcomputers and mainframes. Addressing modes. Computer arithmetic. Introduction to digital logic. Prerequisite: COS 331. Cr 3.

**COS 350 Data Structures and Algorithms**
Introduction to abstract data types as a unifying concept in the study of data structures. Topics include lists, queues, multi-linked lists, priority queues, trees, and graphs. The impact of these structures on algorithm design is explored. External memory management is discussed. Prerequisite: COS 301. Cr 3.

**COS 398 Topics in Computer Science**
Topics not regularly covered in other courses. Content is not fixed, but can be varied to suit current needs. May be taken more than once. Prerequisite: permission. Cr 1-3.

**COS 400 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 350. 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 411 The Use of Statistical Packages**
An introduction to some of the programs available for statistical analysis of data and the problems inherent in computer usage. Examples of both mainframe and microcomputer programs are introduced, their proper use explained, and their relative merits discussed. Not acceptable for credit towards a Computer Science major. Prerequisite: At least one course in statistics. 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 460 Interactive Computer Graphics**
Topics include graphic 1/0 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 surveys 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 covers 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 350. Cr 3.

**COS 490 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: COS 221 and junior standing. Cr 3.

**COS 492 Computer Related Law**  
This course will acquaint the student with the basic legal concepts that a computer professional might reasonably expect to encounter. Practice in the analysis of judicial opinions dealing with computer-related issues will be included along with an introduction to legal research. Students will be required to analyze fact situations to identify legal problems and the means of addressing these problems. Prerequisite: COS 330. 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**  
PROLOG programming techniques, natural language parsing and comprehension, and expert systems including detailed study of some successful expert systems. Prerequisites: COS 470. 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.
Geological Sciences

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

The geological sciences are concerned with the physical and chemical characteristics of minerals and rocks, with their occurrence, arrangement, and surface expression, and with the history of the Earth and its inhabitants. The curriculum provides for a basic understanding of the geological sciences and is sufficiently flexible to allow students with interests in geochemistry, geophysics, paleontology, and oceanography to pursue additional courses in appropriate ancillary sciences.

A geology major is prepared to enter directly into industry or survey work, or to enter graduate school in geology. In addition, if ZOL 204, CHY 251/252, and CHY 253/254 are taken, the requirements for medical or dental schools are met.

The requirements for the major include: GES 101 or 106, GES 102, GES 311, GES 312, GES 314, GES 315, GES 416, GES 455, three elective geology courses, MAT 126/127, MAT 232, CHE 111/112 or 113/114, PHY 111/112 or 121/122, and COS 215 or COS 220. An approved summer field camp is required between the junior and senior years. For students contemplating graduate work in geology, mathematics through MAT 228 and attainment of proficiency in French, German, or Russian is recommended.

The specimen curriculum is somewhat flexible and may be altered for individuals with previous geological training. Special interdisciplinary programs may be arranged after consultation with the departmental undergraduate advisor.

Geology Specimen Curriculum

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<tr>
<th>Freshman Year</th>
<th>Second Semester</th>
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<tr>
<td><strong>GES 101</strong> Aspects of the Natural Environment</td>
<td>GES 102 Aspects of the Natural Environment</td>
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<tr>
<td>CHY 113 Chemical Principles</td>
<td>CHY 114 Chemical Principles</td>
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<td>OR</td>
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<tr>
<td>CHY 111 General Chemistry I (4)</td>
<td>CHY 112 General Chemistry II (4)</td>
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<tr>
<td>ENG 101 College Composition (if necessary)</td>
<td>MAT 232 Principles of Statistical Inference</td>
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<td>OR</td>
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<td>Elective (or MAT 126)</td>
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<th>Sophomore Year</th>
<th>Second Semester</th>
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<tr>
<td><strong>GES 311</strong> Mineralogy</td>
<td>GES 312 Introduction to Petrology</td>
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<tr>
<td>PHY 111 General Physics I</td>
<td>PHY 112 General Physics II</td>
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<tr>
<td>OR</td>
<td>OR</td>
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<tr>
<td>PHY 121 Physics for Engineers and Physical Scientists I (4)</td>
<td>PHY 122 Physics for Engineers and Physical Scientists II (4)</td>
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<tr>
<td>MAT 126 Analytical Geometry and Calculus</td>
<td>MAT 127 Calculus</td>
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<td>Elective</td>
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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. Society’s place in and utilization of its environment. Laboratory work includes preparation for two compulsory field trips in April and May. Prerequisite: GES 101 or GES 106. Lec 3, Rec, Lab and field trips. Cr 4.

GES 106 Geology for Engineers
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

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 4.

GES 325 Ore Deposits-Origin and Exploration
The chemical and physical factors controlling the formation of metallic mineral deposits. Information derived from experimental work is considered and related to field observations. Techniques employed in ore deposit exploration explained as they apply to specific geologic situations. Prerequisite: GES 312, GES 416 or permission. Lec 4.  Cr 4.

GES 416 Introduction to Structural Geology
Principles of structural geology, with emphasis on the integration of field observations and theory. Three weekend field trips. Prerequisite: GES 312, PHY 111, PHY 112 or PHY 121, PHY 122, MAT 126. Lec 2, Lab 3.  Cr 4.

GES 455 Optical Mineralogy-Petrography
Application of the polarizing microscope in determining the optical properties of non-opaque minerals in crushed-grain mounts and in thin sections. Study of textural and mineralogical relationships in igneous, sedimentary, and metamorphic rocks. Prerequisite: GES 311, PHY 111, PHY 112 or PHY 121, PHY 122. Lec 2, Lab 6.  Cr 4.

GES 510 Special Topics
One to two week intensive treatment of specialized geologic topics by scientists from Government and other Institutions. 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 3.

GES 526 Experimental Petrology
An introduction to high temperature-pressure research and its application to the study of geologically 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, stratigraphic 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 society. 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 paleooceanographic 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
Covers various aspects 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 Actuopaleontology
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

GES 586 Structure and Tectonics of the Earth
Evaluation of petrologic and tectonic models
Evaluation of petrologic and tectonic models related to the origin and evolution of ocean basins. Prerequisite: GES 416 and OCE 560 and permission.

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.

Mathematics

Professor Murphy (Chairperson); Professors Balakrishnan, Beard, Bresinsky, Dodge, Farlow, Feichtinger, P. Gupta, R. Gupta, Mairhuber, Pogorzelski, Puri, Wohlgenuth; Associate Professors Bray, Franzosa, Geiger, Hannula, Locke, Snyder, Soule, Stearns; Assistant Professors Curtis, Halteman, Ozluk, Slavin; Instructor Saada; Lecturer Van Steenberghe,

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
MAT 123 Enriched Calculus and Analytic Geometry I
OR
MAT 126 Analytic Geometry and Calculus
MAT 124 Enriched Calculus and Analytic Geometry II
OR
MAT 127 Analytic Geometry and Calculus
MAT 225 Enriched Calculus and Analytic Geometry III
OR
MAT 228 Analytic Geometry and Calculus
MAT 261 Introduction to Abstract Mathematics
MAT 262 Linear Algebra
COS 220 Introduction to Computer Science I
19 Math Hours

Basic Core Courses: Junior and Senior Years
MAT 259 Differential Equations
OR
MAT 481 Discrete Mathematics
MAT 434 Introduction to Statistics
MAT 425 Advanced Calculus I
MAT 463 Introduction to Abstract Algebra I
13/14 Math Hours

Mathematics Area Concentration
At least three mathematics courses will be taken from one of the areas of concentration below. Starred courses are required within each area. Students planning graduate work should take MAT 426 and MAT 464.

A. Pure Mathematics
MAT 452 Introduction to Complex Variables
MAT 465 Theory of Numbers
MAT 474 Projective Geometry
MAT 475 Higher Geometry I
MAT 426 Advanced Calculus II*
MAT 464 Introduction to Abstract Algebra II*
MAT 471 Differential Geometry

B. Continuous Applied Mathematics
MAT 452 Introduction to Complex Variables
MAT 453 Partial Differential Equations I*
MAT 454 Partial Differential Equations II
MAT 487 Numerical Analysis*

In addition to three of the above four mathematics courses, PHY 121, Physics for Engineers and Physical Scientists I and PHY 122, Physics for Engineers and Physical Scientists II must be taken for the Continuous Applied Mathematics Option.

C. Discrete Applied Mathematics
MAT 455 Introduction to Operations Research I*
MAT 456 Introduction to Operations Research II
MAT 457 Introduction to Mathematical Modeling
MAT 488 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 445 History of Mathematics Before the 17th Century
OR
MAT 446 History of Mathematics The 17th Century and After
MAT 465 Theory of Numbers
MAT 372 Complex Numbers
OR
MAT 474 Projective Geometry
OR
MAT 475 Higher Geometry I
MAT 505 Selected Topics in Mathematics for High School Teachers of Mathematics
F. Optional Three courses generally numbered 300 or above, which provide a mathematical concentration approved in advance by the Department chairperson.

Concentration Area Outside of Mathematics
In addition to the core and area of concentration coursework in mathematics, each mathematics major must complete an 18 hour concentration or two 12 hour concentrations of approved courses in an area outside of mathematics. The outside concentration should be in an area where mathematics can be applied or 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 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 week of classes. 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 week of classes. 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 week of classes.     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. Prerequisite: the equivalent of MAT 122. Admission depends upon performance on a departmental qualifying examination given during summer orientation and the first week of classes.     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. Admission depends upon performance on a departmental qualifying examination given during summer orientation and the first week of classes. Prerequisite: 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 151.     Cr 4.

MAT 2_0 Topics in Mathematics
Topics in mathematics not regularly covered in other courses. Content is varied to suit current needs. The course may, with permission of the department, be taken more than once for credit. Prerequisite: consent of the department.     Cr 1-3.

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, multi-variable differential and integral calculus, applications. Prerequisite: MAT 127 or MAT 124.     Cr 4.

MAT 229 Freshman-Sophomore Mathematics Seminar
A discussion of topics not covered in the usual calculus course, such as application of calculus to various physical and social sciences and 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 reason-
ing, 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 258 Introduction to Differential Equations and Linear Algebra
An introduction to elementary linear algebra and ordinary differential equations. Applications. Prerequisite: Mat 228. (Not open to students who have already taken MAT 262 or MAT 259). Cr 4.

MAT 259 Differential Equations
An introduction to ordinary differential equations; 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. Prerequisite: MAT 127 or permission. Cr 3.

MAT 262 Linear Algebra
An introduction to theory and applications of vector spaces and linear transformations. Prerequisite: MAT 228 or MAT 225. Cr 4.

MAT 3_0 Topics in Mathematics
Topics in mathematics not regularly covered in other courses. Content is varied to suit current needs. The course may, with permission of the department, be taken more than once for credit. 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 332 Statistics for Engineers
Statistical methods applicable to engineering. Both classical and nonparametric methods are presented with sufficient theory to assure understanding of the material. Prerequisite: MAT 228. Cr 3.

MAT 372 Complex Numbers
The basic properties of the complex numbers and their applications to algebra, geometry, trigonometry, and vector forces. Especially appropriate for mathematics and science teachers. Offered in spring of alternate years. Prerequisite: MAT 127 or MAT 124 or one year college mathematics and permission. Cr 3.

MAT 4_0 Selected Topics in Mathematics
Advanced topics in mathematics not regularly covered in other courses. The content is varied to suit current needs. The course may, with permission of the department, be taken more than once for credit. Prerequisite: consent of the department. Cr 1-3.

MAT 425 Advanced Calculus I
Study of the major ideas of real-variable theory. Emphasis on limits, continuity and differentiability. Prerequisite: MAT 228 or 225; MAT 262 is also helpful. Cr 3.

MAT 426 Advanced Calculus II
A continuation of the material in MAT 425. Prerequisite: MAT 425. Cr 3.

MAT 434 Introduction to Statistics
Topics include probability, random variables, continuous and discrete distributions, point and interval estimation, tests of hypotheses, linear regression and correlation, analysis of variance. Prerequisite: MAT 228 or MAT 225. Cr 4.

MAT 435 Introduction to Mathematical Statistics
Topics include moment generating functions, distributions of functions of random variables including sampling distributions, principles of estimation and hypothesis testing, limit theorems, order statistics. Prerequisite: MAT 434. 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 434 or MAT 437. Cr 3.
MAT 437 Statistical Methods in Research
An introduction to analysis of variance and regression analysis using a unifying approach to theory; application and illustrations from many fields. Prerequisite: MAT 232 or MAT 434 or permission. Cr 3.

MAT 438 Design of Experiments
Continuation of MAT 437, with consideration of nonorthogonal designs in analysis of variance, and an introduction to other experimental design techniques which are widely applicable. Prerequisite: MAT 437. Cr 3.

MAT 439 Regression and Analysis of Variance
Topics include the multivariate normal distribution, quadratic forms and projections, least squares estimation, hypothesis testing and confidence regions. Application to linear regression and analysis of variance models using matrix algebra. Prerequisite: MAT 434. Cr 3.

MAT 445 History of Mathematics—Before the 17th Century
Basic developments in mathematics from its origins up to the 17th century. Cr 3.

MAT 446 History of Mathematics—the 17th Century and After
Basic developments in mathematics from the invention of analytic geometry up to our times. Prerequisite: MAT 227 or MAT 224 or permission. Cr 3.

MAT 447 Foundations of Mathematics I
Fundamental concepts and methods of mathematics; viewpoints on the foundation of mathematics. Not given every year. Prerequisite: MAT 228 or permission. Cr 3.

MAT 448 Foundations of Mathematics II
Fundamental concepts and methods of mathematics; viewpoints on the foundation of mathematics. Not given every year. Prerequisite: MAT 228 or permission. Cr 3.

MAT 452 Introduction to Complex Variables
An introduction to functions of complex variables including differentiation, integration, series, mappings and applications. Prerequisite: MAT 228 or MAT 225. Cr 3.

MAT 453 Partial Differential Equations I
Introduction to general properties of partial differential equations followed by solutions of specific equations. Techniques include eigen function expansions, operational methods, and Green's functions. Prerequisite: MAT 259. Cr 3.

MAT 454 Partial Differential Equations II
A continuation of the material in MAT 453. Prerequisite: MAT 453. Cr 3.

MAT 455 Introduction to Operations Research I
Introduction to linear programming, including various algorithms, transportation and assignment problems, duality. Network and game theory. Emphasis on modelling problems arising in business and industry. Prerequisite: COS 210 or equivalent. Cr 3.

MAT 456 Introduction to Operations Research II
A continuation of the material in MAT 455. Prerequisite: MAT 455. Cr 3.

MAT 457 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 458 Seminar in Mathematical Modeling
Students will be expected to report on models in their own disciplines. Prerequisite: MAT 457. Cr 1.

MAT 459 Methods of Applied Mathematics I
Intensive study of methods for solving problems in the physical sciences: vector and tensor analysis, series solution of differential equations near singular points, linear algebra and determinants. Prerequisite: MAT 259 or permission. Cr 3.

MAT 463 Introduction to Abstract Algebra I
Abstract algebraic structures including groups, rings, ideals, integral domains and fields. Prerequisite: MAT 262. Cr 3.

MAT 464 Introduction to Abstract Algebra II
A continuation of the material in MAT 463, with emphasis on properties of rings and fields. Prerequisite: MAT 463. Cr 3.
MAT 465 Theory of Numbers
Elementary properties of integers: divisibility, uniqueness of prime factorization. Prerequisite: One year of college mathematics. Cr 3.

MAT 471 Differential Geometry
Applications of calculus to the study of space curves and surfaces. Not given every year. Prerequisite: MAT 228 or MAT 225. Cr 3.

MAT 474 Projective Geometry

MAT 475 Higher Geometry I

MAT 476 Higher Geometry II
A continuation of the material in MAT 475. Prerequisite: MAT 475. Cr 3.

MAT 481 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 487 Numerical Analysis
Computational methods for electronic computers; exercises on the IBM 370 for interpolation, simultaneous linear algebraic equations, non-linear and polynomial equations, numerical integration, ordinary and partial differential equations. Prerequisite: MAT 228 or MAT 225 and COS 220. Cr 3.

MAT 488 Graph Theory
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 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

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 425, MAT 434 or permission. Cr 3.

MAT 532 Mathematical Statistics II

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 434. Cr 3.

MAT 554 Topics in Discrete Optimization
An introduction to the theory and algorithms of discrete optimization, centered around considerations of computational complexity. Prerequisite: MAT 262 or MAT 455. Cr 3.
MAT 557 Mathematical Programming I
Study of linear, nonlinear, and integer programming. Topics include simplex and dual simplex algorithms, duality and complementary slackness, post optimality analysis, convexity, constrained optimizations, optimality conditions, constraint qualifications, convex programming, Wolfe dual, quadratic programming, enumerative, cutting plane and partitioning methods, location problems, etc. Prerequisite: MAT 262 and either MAT 425 or MAT 456. 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 459. Complex variables, including conformal mapping and transform analysis, Sturm-Liouville theory, variational calculus, stability, theory and asymptotics. Prerequisite: MAT 459 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 487 or equivalent. Cr 3.
Bachelor of Science in Microbiology

Professors Nicholson (Chairperson), Bain, Gershman; Associate Professors DeSiervo, Jerkofsky, King, Moody, Reno; Assistant Professor Singer; Research Assistant Professor Findlay.

Cooperating Faculty: Professor Slabyj (Food Science), Associate Professors Tavantzis (Plant and Soil Sciences), Zilbilske (Plant and Soil Sciences); Assistant Professor Schroeder (Food Science).

Affiliated Cooperating Faculty: Jackson Laboratory, Bar Harbor: E. Leither, L. Schultz; Colby College: F. Fekete; University of Southern Maine and Foundation for Blood Research: N. Rote.

The Department of Microbiology offers work leading to the degrees of Bachelor of Science in Microbiology, Bachelor of Science in Biology, Master of Science in Microbiology, Master of Professional Studies in Microbiology, and the Doctor of Philosophy (Biological Sciences).

In 1989, the program of study for the B. S. Degree in Microbiology was one of only 20 out of 200 such programs in the United States certified by the American Society for Microbiology (ASM) as meeting the requirements established by the Society for a comprehensive undergraduate curriculum. The ASM is the largest single biological society in the world.

No discipline of the biological sciences in recent times has become as prominent in the public eye as microbiology, the science involved with microscopic forms of life such as bacteria and viruses and the immune response to these microorganisms. Exciting discoveries involving microorganisms have important and far reaching implications for biotechnology, molecular biology, and allied health professions. Microbiologists work in: government and hospital clinical and research laboratories, pharmaceutical and chemical industries, environmental research laboratories, colleges and universities, and a variety of existing as well as emerging genetic engineering and biotechnology industries.

The undergraduate degree program in Microbiology provides an excellent preparation for advanced, graduate study in a variety of important fields of science in addition to microbiology such as molecular and cellular biology, biochemistry, medicine, epidemiology and public health, and environmental studies.

Facilities

The facilities for teaching and research are located predominantly in the recently constructed (1987) addition to Hitchner Hall. This building contains one of the newest and most modern facilities in New England for teaching and research in microbiology, including specialized equipment and laboratories for teaching virology, pathogenic microbiology, immunology, animal cell culture, and molecular biology.

Close proximity to research laboratories within the Department enables students to participate in independent study and undergraduate research projects using state-of-the-art equipment and methods in microbiology and molecular biology.
Health Professions

A major in microbiology is one of the best preparations for further study in medicine, dentistry, osteopathy, optometry, podiatry, veterinary medicine, and other health related fields. Students interested in these careers should register in their freshman year with the Health Professions Career Committee which provides information and assistance in selecting appropriate supporting courses and the application process.

Degree Requirements

Requirements for a B. S. degree are satisfactory completion of at least 120 degree hours at an accumulated grade point average of not less than 2.0 overall and in courses in the major, in a course of study that conforms to the following curriculum.

Curriculum in Microbiology

**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 1-2 OR
- MCB 480 Seminar and MCB 487 Independent Study 2

**Organic Chemistry and Biochemistry**
- CHY 251/253 Organic Chemistry I Lecture/Laboratory 5
- CHY 252/254 Organic Chemistry II Lecture/Laboratory 5
- BCH 451 Principles of Biochemistry 4
- BCH 463 Introduction to Biochemical Laboratory Methods 2

**TOTAL HOURS** 16

**Mathematics**
- MAT 126 Analytic Geometry and Calculus 4
- MAT 232 Principles of Statistical Inferences 3
- COS 220 Introduction to Computer Science I 3

**TOTAL HOURS** 10

**Communication**
- ENG 101 College Composition 3
- ENG 212 Intermediate Composition 3
- SPC 103 Fundamentals of Public Communication 3

**TOTAL HOURS** 9

**Humanities and Social Sciences**
- Electives 15

**TOTAL HOURS** 15

**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

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. Microscopy, cultivation, biochemical activities and
control of microorganisms. Prerequisite: or corequisite: MCB 300.

MCB 305 General Microbiology Laboratory

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 or 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 or 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.

MCB 598 Special Topics in Microbiology
A flexible course covering selected topics or areas within the field of Microbiology. Prerequisite: Permission. May be repeated for graduate credit. Cr 1-3.

Interdisciplinary Course
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 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 having enormous impact on all fields of biology, including basic research, medicine, agriculture and environmental and evolutionary studies. The curriculum is designed to give ambitious students the a rigorous, basic background in chemistry, physics and mathematics and to provide the knowledge of and practical experience with systems and technology for carrying out such manipulations. At the same time, there is sufficient flexibility to allow people with interests in any particular area of the biological sciences to develop knowledge of that field in parallel with their study of molecular and cellular biology. This program is appropriate for students wishing to enter the developing biotechnology industries or to continue in graduate programs in any of a wide variety of biological or medical fields.

For further, detailed information about course offerings, consult the program listings of participating departments, e.g. Biochemistry, Botany, Microbiology, elsewhere in this catalog.
# Curriculum in Molecular and Cellular Biology

## Molecular Biology and Biochemistry

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCH 310 Introductory Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BCH 451 Principles of Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>BCH 460 Advanced Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BCH 463 Introduction to Biochemical Laboratory Methods</td>
<td>2</td>
</tr>
<tr>
<td>BCH 464 Advanced Biochemical Laboratory Methods</td>
<td>4</td>
</tr>
<tr>
<td>BCH 500 Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BCH 510 Laboratory in Molecular Biology</td>
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</tr>
<tr>
<td>Molecular Biology Seminar</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL HOURS</strong></td>
<td><strong>26</strong></td>
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</table>

## Physical Chemistry (choose one)

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BCH 467 Physical Biochemistry</td>
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<tr>
<td>CHY 371 Physical Chemistry I</td>
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<tr>
<td>PHY 447 Biophysics</td>
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<tr>
<td><strong>TOTAL HOURS</strong></td>
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## Cell Biology (choose one)

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>MCB 430 Bacterial Physiology</td>
<td>4</td>
</tr>
<tr>
<td>ZOL 480 Cell Physiology</td>
<td>(4)</td>
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<td><strong>TOTAL HOURS</strong></td>
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## Genetics (choose one)

<table>
<thead>
<tr>
<th>Course Title</th>
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<tr>
<td>MCB 490 Introduction to Microbial Genetics</td>
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<tr>
<td>BOT 445 Plant Genetics</td>
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<td>ZOL 462 Principles of Genetics</td>
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<td><strong>TOTAL HOURS</strong></td>
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</table>

## Program Electives

Courses are selected from the following list:

## Physiology

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>BOT 452 Plant Physiology</td>
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<tr>
<td>BOT 453 Plant Physiology Laboratory</td>
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<tr>
<td>BOT 454 Intermediate Plant Physiology</td>
<td>4</td>
</tr>
<tr>
<td>MCB 430 Bacterial Physiology</td>
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<tr>
<td>ZOL 377 Animal Physiology</td>
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<tr>
<td>ZOL 480 Cell Physiology</td>
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## Techniques

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>BCH 481 Radiation Biology</td>
<td>2</td>
</tr>
<tr>
<td>BCH 483 Laboratory in Radiation Biology</td>
<td>2</td>
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</tbody>
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## Supporting Sciences and Mathematics

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>BIO 100 Basic Biology</td>
<td>4</td>
</tr>
<tr>
<td>BOT 201 Plant Biology</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>ZOL 204 Animal Biology</td>
<td>(4)</td>
</tr>
<tr>
<td>MCB 300 General Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CHY 111/112 General Chemistry I/II</td>
<td>8</td>
</tr>
<tr>
<td>CHY 251/252 Organic Chemistry Lecture I/II</td>
<td>6</td>
</tr>
<tr>
<td>CHY 253/254 Organic Chemistry Laboratory I/II</td>
<td>4</td>
</tr>
<tr>
<td>PHY 111/112 General Physics I/II</td>
<td>8</td>
</tr>
<tr>
<td>MAT 126/127 Analytic Geometry and Calculus</td>
<td>8</td>
</tr>
<tr>
<td><strong>TOTAL HOURS</strong></td>
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## Communications

<table>
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<tr>
<th>Course Title</th>
<th>Hours</th>
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<tr>
<td>ENG 101 College Composition</td>
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<tr>
<td>SPC 103 Fundamentals of Public Communication</td>
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<td><strong>TOTAL HOURS</strong></td>
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## Humanities and Social Sciences

Students choose courses from a wide variety of offerings.

<table>
<thead>
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<th>Course Title</th>
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<tbody>
<tr>
<td>FAA 117 Issues and Opportunities</td>
<td>1</td>
</tr>
<tr>
<td><strong>MINIMUM HOURS REQUIRED FOR GRADUATION:</strong></td>
<td><strong>120</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>COS 220 Introduction to Computer Science I</td>
<td>3</td>
</tr>
<tr>
<td>COS 460 Interactive Computer Graphics</td>
<td>3</td>
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</table>

## Biochemistry

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BCH 525 Proteins and Enzymes</td>
<td>3</td>
</tr>
<tr>
<td>BCH 542 Biochemical Mechanisms</td>
<td>3</td>
</tr>
<tr>
<td>BCH 488 Seminar in Computer Applications in the Biochemical Sciences</td>
<td>1</td>
</tr>
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## Other Areas

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BOT 557 Plant Virology</td>
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</tr>
<tr>
<td>MCB 440 Introductory Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MCB 540 Advanced Immunology</td>
<td>3</td>
</tr>
<tr>
<td>ZOL 465 Evolution</td>
<td>3</td>
</tr>
<tr>
<td>ZOL 436 Biological Ultrastructure</td>
<td>3</td>
</tr>
<tr>
<td>MCB 450 Virology</td>
<td>4</td>
</tr>
<tr>
<td>MCB 550 Advanced Topics in Animal Virology</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL HOURS</strong></td>
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</tr>
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</table>

## Minimum Hours Required for Graduation: 120
Program in Oceanography

(Not an Undergraduate Degree Program)
Professors Mayer, Pearce, Schnitker (Graduate Coordinator), Vadas; Associate Professors Fink (Coordinator), Belknap, Kelley, King, McAlice, Steneck, Watling.

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 planktonology, 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 population dynamics, distributions and trophic relationships. Prerequisite: MAT 126, OCE 501 or equivalent. Lec 3, Lab 2. Cr 4.

OCE 520 Chemical Oceanography
Distribution and cycling of elements in the marine system with emphasis on geochemical and biochemical interactions. Prerequisite: CHY 113, CHY 114. Cr 3.

OCE 525 Marine Biogeochemistry

OCE 541 (OCE, CIE) Physical Oceanography
Physical properties of sea water; waves and
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 Actuopaleontology
Study of living and fossil organisms and relationships to their sedimentary environment. Course normally conducted in four full-weekend 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 Paleoceanography
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, WLM, 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 may 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 353 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 distributions, zonation, biotic interactions, food webs, succession, hypothesis testing, problems of scale, recruitment community structure and organization. Prerequisite: a course in ecology, Lec 2, Rec 1. Cr 3.
Physics and Astronomy

Professors Smith (Chairperson), Brownstein, Camp, Carr, Csavinszky, Grunze, Hess, Kleban, Krueger, Morrow, Tarr, Unertl; Associate Professors Comins, Harmon, Mountcastle; Assistant Professors Batuski, Clark, Cook, Lad, McClymer, McKay

The department offers major work leading to the degree of bachelor of arts in Physics in the College of Sciences, and also major work leading to the degree of bachelor of science in Engineering Physics in the College of Engineering and Technology.

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 447, PHY 451, PHY 454, PHY 455, PHY 462, PHY 463, PHY 470, PHY 472, PHY 475, and PHY 480. (In order to accommodate premedical 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 a professional environment at a job selected by mutual agreement with the student, the employer, and the Cooperative Education coordinator of the Department of Physics and Astronomy. Academic credit is received through enrollment in PHY 495 Engineering Physics Practice or 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.

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>PHY 111 General Physics I</td>
<td>PHY 112 General Physics II</td>
</tr>
<tr>
<td>OR</td>
<td>4</td>
</tr>
<tr>
<td>PHY 121 Physics for Engineers and Physical Scientists I</td>
<td>OR</td>
</tr>
<tr>
<td>MAT 126 Analytic Geometry and Calculus</td>
<td>PHY 122 Physics for Engineers and Physical Scientists II</td>
</tr>
<tr>
<td>Electives**</td>
<td>MAT 127 Analytic Geometry and Calculus</td>
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<tr>
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<tr>
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<td></td>
<td>14</td>
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<tr>
<td>First Semester</td>
<td>Second Semester</td>
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<tr>
<td>PHY 229 Physical Measurements Laboratory I</td>
<td>PHY 238 Mechanics</td>
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<tr>
<td>PHY 236 Introductory Modern Physics</td>
<td>PHY 230 Physical Measurements Laboratory II</td>
</tr>
<tr>
<td>MAT 228 Analytic Geometry and Calculus</td>
<td>CHY 114 Chemical Principles II*</td>
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<tr>
<td>CHY 113 Chemical Principles I*</td>
<td>MAT 259 Differential Equations</td>
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<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>PHY 441 Electricity and Magnetism I</td>
<td>PHY 455 Electricity and Magnetism II</td>
</tr>
<tr>
<td>PHY 441 Physical Electronics Laboratory</td>
<td>PHY 472 Geometrical and Fourier Optics</td>
</tr>
<tr>
<td>MAT 453 Partial Differential Equations I</td>
<td>PHY 442 Modern Experimental Physics</td>
</tr>
<tr>
<td>Electives</td>
<td>MAT 454 Partial Differential Equations II</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>PHY 469 Quantum and Atomic Physics</td>
<td>PHY 488 Physics Seminar I</td>
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<tr>
<td>PHY 488 Physics Seminar I</td>
<td>Physics Elective</td>
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<td>Elective</td>
<td>Electives</td>
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<tr>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

| | 16 |

*Taken in the freshman, sophomore, or junior year.
**The student must include among elective courses those courses needed to satisfy the distribution requirements for the B. A. degree in the College of Sciences.

A student preparing for graduate work in physics is advised to take some or all of the following electives in his or her junior or senior year: PHY 462, Physical Thermodynamics; PHY 463, Statistical Mechanics; PHY 480, Physics of Materials; PHY 470, Nuclear Physics; as well as additional courses in mathematics.

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 distribution requirements for the B. A. degree in College of Sciences.
### Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>PHY 111 General Physics I</td>
<td>PHY 112 General Physics II</td>
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<tr>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td>PHY 121 Physics for Engineers and Physical Scientists I</td>
<td>PHY 122 Physics for Engineers and Physical Scientists II</td>
</tr>
<tr>
<td>MAT 126 Analytic Geometry and Calculus</td>
<td>MAT 127 Analytic Geometry and Calculus</td>
</tr>
<tr>
<td>Electives</td>
<td>Electives</td>
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<tr>
<td>4</td>
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### Junior Year

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>PHY 229 Physical Measurements Laboratory I</td>
<td>PHY 238 Mechanics</td>
</tr>
<tr>
<td>PHY 236 Introductory Modern Physics</td>
<td>PHY 230 Physical Measurements Laboratory II</td>
</tr>
<tr>
<td>MAT 228 Analytic Geometry and Calculus</td>
<td>PHY 472 Geometrical and Fourier Optics</td>
</tr>
<tr>
<td>Electives</td>
<td>MAT 259 Differential Equations</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
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### Senior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>PHY 454 Electricity and Magnetism I</td>
<td>PHY 455 Electricity and Magnetism II</td>
</tr>
<tr>
<td>PHY 441 Physical Electronics Laboratory</td>
<td>PHY 442 Modern Experimental Physics</td>
</tr>
<tr>
<td>PHY 488 Physics Seminar I</td>
<td>PHY 489 Physics Seminar II</td>
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<td>Electives</td>
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<td>15</td>
<td>6</td>
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</tbody>
</table>

### Graduate Work in Physics

The degrees of Master of Science and Doctor of Philosophy are offered in Physics. The Department also offers the degree of Master of Science in Engineering Physics. See section on Graduate Study for detailed requirements. Also consult the Graduate School catalog.

### Courses in Physics

**PHY 103 Descriptive Physics**
A non-mathematical introduction to basic physical principles for the non-science student. Designed to develop an appreciation for the concepts and applications of physics. May be taken without PHY 104. No Prerequisites: Lec with dem 3.

**PHY 104 Descriptive Physics Laboratory**
Laboratory exercises to accompany PHY 103 Fundamental Physics, which is a corequisite. Lab 2.

**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.

**PHY 110 Meteorology**
A descriptive course treating the physics involved in the weather. Topics include radiation balance, atmospheric motion, precipitation...
College of Sciences

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 predental 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 Physics for Engineers and Physical Scientists 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 Physics for Engineers and Physical Scientists 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 Physical Measurements Laboratory I

PHY 230 Physical Measurements 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 441 Physical Electronics Laboratory
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 442 Modern Experimental Physics
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 447 Molecular 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 451 Advanced Meteorology

PHY 454 Electricity and Magnetism I
An intermediate level course in the fundamentals of the theory of electricity and magnetism. Treats electrostatics and magnetostatics, both in vacuum and in matter. Prerequisites: PHY 112 or PHY 122, MAT 259. Rec 3. Cr 3.

PHY 455 Electricity and Magnetism II
A continuation of PHY 454. Treats electrodynamics by developing Maxwell's equations and applying them to systems of general interest. Prerequisite: PHY 454. Rec 3. Cr 3.
PHY 462 Physical Thermodynamics
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 Statistical Mechanics
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 Quantum and Atomic Physics
Introductory quantum mechanics applied to simple atoms and molecules. Radiation, Schroedinger 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 Geometrical and Fourier 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 Project Laboratory in 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 Project Laboratory in 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. Cr 1.

PHY 495 Engineering Physics Practice
Supervised engineering practice in an industrial setting. Placement is off campus and usually of several months duration. Prior approval of department chairperson is required. Prerequisite: Sophomore standing in Engineering Physics. Cr 1-6.

PHY 496 Field Experience in Physics
Supervised research or development in an academic laboratory, government laboratory, or industrial environment. Placements are usually off-campus and of several month’s duration. Prior approval of the department chairman is required. Prerequisite: completion of 16 hours of physics. Cr 1-6.

PHY 497 Topics in Physics
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

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.

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

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

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. Pre-
Zoology

Professors J. McCleave (Chairperson), Allen, Dearborn, DeWitt, Gilmartin, Haines, Kornfield, C. Major, Ringo, Roberts, Shick, Sidell, Valleeau, Wood; Cooperating Professor Wilson; Associate Professors Glanz, Kass, Moring, M. Tyler, S. Tyler, Watling, Wood; Associate Research Professor Revelante; Assistant Professor Dowse; Assistant Research Professor Hunter; Instructors B. Cook, M. Major

Cooperating Faculty: Vadas (Department of Botany and Plant Pathology)

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 Presque Isle-Professor Gelder
Jackson Laboratory, Bar Harbor-Professors Bailey, Barker, Eicher, Mobraaten
Eastern Maine Medical Center, Bangor-Lecturers Beauregard, LaMarche, McGlauffin
Maine Medical Center, Portland-Lecturers Corriveau, Pusch

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.

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, evolution, behavior and cell biology. A curriculum can be tailored to meet the needs of the individual student. Each major student is assigned a faculty member as an academic advisor, emphasizing a close faculty/student relationship.

Areas of Specialization

Aquatic and Marine Sciences:

Biology of Fishes

The Department of Zoology is internationally recognized for its research on the biology of fishes. Research emphases in this area include fish evolution and genetics, fisheries management, aquatic food webs, fish physiology, behavior of migratory fishes, and systematics of various fish groups. Zoology majors interested in fish biology may supplement their basic program with advanced courses in each of these areas. This option of the zoology major provides a strong background for research and management jobs at private, state, and federal levels, and for continued graduate-level research.

Marine Biology

Marine Science is a primary area of emphasis on the UM campus, and the Department of
Zoology includes a large proportion of the University's faculty in marine-oriented biological research. Undergraduate zoology majors with marine interests may take both basic and advanced courses in ecology, fish biology, invertebrate zoology, and physiology. The zoology major with emphasis in marine biology offers excellent preparation for employment in marine research, education, and administration in marine industries and aquaculture, and for further graduate study and research.

Ecology and Field Biology
The Department of Zoology offers a wide variety of courses for undergraduate majors with ecological interests. In addition to basic courses in ecology, parasitology, behavior, evolution, invertebrate zoology, and vertebrate biology, more advanced courses are available in physiological, population, and community ecology, aspects of the biology of birds, mammals, fishes and various invertebrate groups, and on aquatic food webs.

Genetics and Evolutionary Biology
The department offers basic undergraduate courses in general and human genetics and evolution and more advanced courses in selected aspects of genetics such as population biology and mammalian genetics. Students with interests in these areas may have the opportunity to interact with researchers in genetics at the Jackson Laboratory.

Cell Biology
Zoology majors with interest in cellular biology may take structural courses such as histology, biological ultrastructure, microtechnique, and electron microscopy, and process-oriented courses in cell physiology, morphogenesis, and development. Such a curriculum emphasis prepares the student for further cellular research at the graduate level or for technical positions in biomedical research.

Anatomy and Physiology
The zoology curriculum offers a diversity of courses in organismic biology, including comparative anatomy, developmental biology, morphogenesis and differentiation, animal physiology, comparative physiology, neurobiology, pharmacology, and endocrinology. Specialized courses in fish physiology, physiological ecology, and experimental endocrinology are also available to advanced students. These courses are taken by students preparing for careers in biological or medical research and the health professions.

Health Professions
A zoology major may prepare for further study in medicine, dentistry, osteopathy, optometry, podiatry, veterinary medicine, and other health related fields. Courses useful in preparing the professional include comparative anatomy, developmental biology, morphogenesis and differentiation, animal physiology, biological ultrastructure, histology, principles of genetics, neurobiology, experimental endocrinology, cell physiology, and various advanced courses in genetics, physiology and electron microscopy.

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 for the practicum. A student must have a G. P. A. of 2.5 overall and 2.5 in the sciences to be considered for admission to the 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.

Facilities and Affiliations
The Department of Zoology occupies all of Murray Hall, a structure of approximately 60,000 square feet of floor space, which provides well-equipped teaching and research laboratories.

Special Facilities
The electron microscope facility houses a scanning and two transmission electron microscopes, EDS microanalytical equipment, a GE 250KVP x-ray machine, and a Packard liquid scintillation counter. A microtechnique facility
for standard histological procedures, an ultrastructure preparation laboratory, and several aquatic laboratories supplied with well water are available for teaching and research. Darkrooms for photography and autoradiography are available, as is a 10-100 KVP X-ray facility for whole specimen radiography. Air-conditioned animal quarters are provided for breeding colonies and are maintained by a full-time attendant. Preserved fish, bird and mammal collections are maintained for teaching and research purposes. Small boats are available for use on lakes, rivers and estuaries.

Affiliations
The department maintains a cooperative graduate program (Mammalian Genetics) with the Jackson Laboratory, Bar Harbor. The Ira C. Darling Center in Walpole, a branch of the University, provides facilities for marine-oriented studies. The Maine Cooperative Fish and Wildlife Research Unit provides opportunities for training and research in fishery science. It is operated under a cooperative agreement among the University of Maine, the U. S. Fish and Wildlife Service and the Maine Department of Inland Fisheries and Wildlife. Fishery unit staff members are on the departmental faculty. The Department houses the National Fisheries Contaminant Research Center, a field station of the U. S. Fish and Wildlife Service, which conducts research on aquatic pollutants. Cooperative research and educational programs are underway with members of the staff at Huntsman Marine Science Center, St. Andrews, New Brunswick, Canada, and the Mt. Desert Island Biological Laboratory, Salisbury Cove, Maine.

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 319. Evolution may be used to satisfy only one area requirement.
Additional hours to fulfill the 22-hour requirement may be chosen from zoology courses at the 300-, 400-, or 500-level. Neither ZOL 303 (Pathophysiology), nor ZOL 404 (Pharmacology) may be used to fulfill this requirement.

Department of Zoology majors must pass a Junior English Proficiency Examination, which is offered in the fall semester. This requirement is not satisfied by ENG 101. Writing Experience and Writing Intensive courses are offered to help majors (and non-majors) meet the writing requirements for the B. A. degree. (See description of ZOL 400 - Zoology Writing Intensive below).

A minimum of 12 hours of zoology courses must be taken in residence. Students must have a G. P. A. of 2.0 or better in zoology courses, including BIO 100 and ZOL 204, and a 2.0 or better in all science requirements for the major. Students can count only six credit hours of research problems (ZOL or Honors) toward the requirements for the major.

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 319 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
| ZOL 336 Developmental Biology
| BOT 435 Plant Anatomy
| Taxonomy
| ZOL 329 Vertebrate Biology I
| ZOL 331 Vertebrate Biology Laboratory I
| ZOL 353 Invertebrate Zoology
| ZOL 458 Animal Parasitology
| MCB 410 Determinative Bacteriology
| BOT 459 General Mycology
| BOT 464 Taxonomy of Vascular Plants
| BOT 473 Biology of Algae
| ENT 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 English Proficiency Examination must be passed. Writing Experience and Writing Intensive courses are offered to help majors (and non-majors) meet the writing requirements for the B.A. degree. (See description of ZOL 400 - Zoology Writing Intensive below).

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)

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<tr>
<th>Freshman Year</th>
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<tbody>
<tr>
<td>Foreign Language</td>
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<tr>
<td>MAT 126 Analytic Geometry and Calculus</td>
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<td>CHY 111/112 General Chemistry I and II</td>
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<th>Sophomore Year</th>
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<tr>
<td>ZOL 333 Comparative Anatomy</td>
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<td>ZOL 336 Developmental Biology</td>
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<td>CHY 251 Organic Chemistry Lecture I</td>
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<td>CHY 253 Organic Chemistry Laboratory I</td>
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<th>Junior Year</th>
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<td>ZOL 377 Animal Physiology</td>
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<td>ZOL 378 Animal Physiology Laboratory</td>
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<td>ZOL 480 Cell Physiology</td>
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<td>OR</td>
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<td>ZOL 485 Comparative Animal Physiology</td>
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### Senior Year

**ZOL 451 Histology Zoology Electives**

**Medical Technology**

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<tr>
<th>Freshman Year</th>
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<tr>
<td>MAT 122 Algebra and Trigonometry, Pre-Calculus</td>
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<td>MAT 126 Analytic Geometry and Calculus</td>
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<td>BIO 100 Basic Biology</td>
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<td>ZOL 208 Anatomy and Physiology</td>
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<td>CHY 111/112 General Chemistry I and II OR CHY 113/114 Chemical Principles I and II</td>
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<td>OR ENG 101 College Composition</td>
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<td>OR ZOL 207 Orientation in Medical Technology</td>
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<td><strong>BCH 221 Organic Chemistry</strong></td>
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<td><strong>MCB 300 General Microbiology</strong></td>
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<td><strong>MCB 305 General Microbiology Laboratory</strong></td>
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<td><strong>MCB 440 Introductory Immunology</strong></td>
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<td><strong>ZOL 458 Animal Parasitology</strong></td>
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<td><strong>ZOL 427 Methods in Quantitative Biology</strong></td>
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<td><strong>ZOL 451 Histology</strong></td>
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<td><strong>ZOL 489 Introduction to Human Pathology</strong></td>
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**Senior Year (At affiliated hospital medical technology programs)**

| ZOL 422 Clinical Hematology |
| ZOL 423 Clinical Microbiology |
| ZOL 424 Clinical Immunohematology |
| ZOL 425 Clinical Chemistry |
| ZOL 426 Clinical Microscopy |

### Environmental/Ecology/Marine

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<td><strong>INT 319 General Ecology</strong></td>
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<td><strong>ZOL 329 Vertebrate Biology I</strong></td>
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<td><strong>ZOL 330 Vertebrate Biology II</strong></td>
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<td><strong>ZOL 332 Vertebrate Biology Laboratory II</strong></td>
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<td><strong>Electives</strong></td>
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<td><strong>ZOL 377 Animal Physiology</strong></td>
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<td><strong>ZOL 485 Comparative Animal Physiology</strong> OR <strong>INT 319 General Ecology</strong></td>
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<tr>
<td><strong>ZOL 462 Principles of Genetics</strong> OR <strong>ZOL 353 Invertebrate Zoology</strong></td>
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<td><strong>Electives</strong></td>
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</table>
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Senior Year

ZOL 433 Mammalogy  
OR  
ZOL 434 Avian Biology and Ecology  
OR  
ZOL 471 Fishery Biology Laboratory  
OR  
ZOL 472 Aquatic Food Webs  
Zoology electives

Biology Option

Freshman Year

Foreign language  
MAT 126 Analytic Geometry and Calculus  
CHY 111/112 General Chemistry I and II  
OR  
CHY 113/114 Chemical Principles I and II  
BIO 100 Basic Biology  
ZOL 208 Anatomy and Physiology  
ENG 101 College Composition

Sophomore Year

BCH 221 Organic Chemistry  
BCH 322 Biochemistry  
BOT 203 The Plant Kingdom  
ENT 226 Introductory Entomology  
Electives

Junior Year

MCB 300 General Microbiology  
MCB 305 General Microbiology Laboratory  
Anatomy group elective  
Physiology group elective  
ZOL 462 Principles of Genetics  
PHY 111/112 General Physics I and II

Senior Year

ZOL 465 Evolution  
INT 319 General Ecology  
Taxonomy group elective  
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 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.

Credit cannot be earned for both ZOL 101 and BIO 100. 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  

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. 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 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 306 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 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 337 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 338 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 339 Biology of Behavior Laboratory
Prerequisite: ZOL 338 or concurrently. Lab 4. Cr 2.

ZOL 341 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 342 Animal Physiology
Physiological processes in vertebrates with emphasis on the integration of organ systems. Offered fall semesters. This is the preprofessional 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

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.

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.

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 regular Zoology courses and sections designated in each semester's Schedule of Classes. Prerequisite: Permission of instructor. Cr 1.

ZOL 404 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. Zoology majors cannot receive credit within the zoology major for both ZOL 316 and ZOL 404. Cr 3.

ZOL 421 Introduction to Clinical Laboratory Methods

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

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

ZOL 424 Clinical Immunohematology
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 425 Clinical Chemistry
Lectures and laboratory exercises in basic techniques of clinical chemistry proceeding to advanced theories and methodology and including theory and technique of immunochromy. (EMMC, MMC).

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

ZOL 427 Methods in Quantitative Biology
The principles underlying basic laboratory techniques in biology and their practical implementation. Basics of electricity are reviewed, and the electronics of instruments is introduced. The use of the computer for direct data acquisition and analysis is emphasized, with applications. Prerequisites: ZOL 204, or ZOL 208 or equivalent, or permission of instructor. PHY 103 or PHY 111, PHY 112 highly recommended. Lec 2, Lab 3. Cr 3.

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 438 Morphogenesis and Differentiation
Analysis of interacting systems in development: study of regulation of morphogenesis and differentiation at the organ, tissue and cellular levels, with emphasis on experimental approach towards problems in development.
Prerequisites: ZOL 336 or permission of instructor. Lec 3. Cr 3.

ZOL 441 Electron Microscopes—Theory and Use
Principles of operation of transmission and scanning electron microscopes and their use in examining biological material; interpretation of electron micrographs. Prerequisites: 1 year chemistry, 1 year physics, 1 year biology. Lec 2. Cr 2.

ZOL 443 Animal Microtechnique
Histological and histochemical techniques for the preparation of animal tissues and cells for microscopic study. Prerequisite: ZOL 204. Lec 1, Lab 4. Cr 3.

ZOL 451 Histology
Microscopic anatomy of animal tissues. Prerequisite: ZOL 204. Lec 2, Lab 4. Cr 4.

ZOL 458 Animal Parasitology
The life histories, economic importance, methods of control, host necropsy, and the preparation of parasites. Prerequisite: ZOL 204. Lec 2, Lab 3. Cr 4.

ZOL 462 Principles of Genetics
The nature of hereditary factors and the mechanisms by which they are transmitted and expressed. Prerequisite: BIO 100 and junior standing. Lec 3. Cr 3.

ZOL 464 Genetics Laboratory
Fundamental experiments illustrating genetic analysis, with emphasis on eukaryotes. Prerequisite: ZOL 462 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 319 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 3. Cr 3.

ZOL 479 Experimental Endocrinology

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 physiology 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; ZOL 453. Lec 2, Lab 3. 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 353 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 353 and INT 319 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 353, INT 319 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 319 (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 319 or equivalent. Lec 3. Cr 3.

ZOL 526 Malacology
Emphasis on structure and function of bivalves with laboratory studies using living, local fauna. Prerequisite: ZOL 353 or permission 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 353 or permission of instructor. Lec 2, Lab 2. Cr 3.

ZOL 530 Physiology of Fishes
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. Corequisites: ZOL 333, 336, 538, 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 441 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 410 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 353 or equivalent. Lec 1, Lab 4. Cr 3.

**ZOL 570 Advanced Topics in Aquatic Biology**
In-depth study of various aspects of freshwater or marine biology. Students select topic, prepare critical papers and organize discussion. May be repeated for credit. Prerequisite: permission. Cr 2.

**ZOL 573 Fisheries Science**
Exercises and training in applying scientific techniques and approaches to the study of fishes and fish populations. Particular emphasis 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 environmental 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.

BIO 100 Basic Biology
An introduction to fundamental principles of structure and function in living systems, both plants and animals. Open to students of all colleges. Credit cannot be earned for both BIO 100 and ZOL 101. Lec 3, Lab 2. Cr 4.

BIO 451 Biometry
Design and quantitative analysis of biological experiments, including practical applications of quantitative models and statistics. Prerequisite: MAT 122 and BIO 100. 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. 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 319 (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 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 420, ZOL 204 or permission of instructor. Cr 3.

INT 375 (BOT, FOR, OCE, WLM, 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 may 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 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 distributions, zonation, biotic interactions, food webs, succession, hypothesis testing, problems of scale, recruitment community structure and organization. Prerequisite: a course in ecology, Lec 2, Rec 1. Cr 3.
General Information
The College of Social and Behavioral Sciences is composed of disciplines that focus on understanding the effect of social and cultural forces on individuals and the world. A liberal arts education is seen as the foundation for developing this understanding.

A major goal of the College is to provide students with the ability to think independently, to analyze, and to achieve independent judgment. Social and behavioral sciences emphasize development of problem-solving methods within the context of strong academic skills. The College provides students with the intellectual breadth needed to understand the United States and the surrounding world, and with the skills necessary to think analytically and to communicate effectively.

Another major goal is to develop greater understanding and knowledge of social and behavioral events. The College encourages faculty and students to apply their knowledge and discoveries to issues faced by individuals, social institutions, and policymakers.

The College is composed of ten departments and the School of Nursing with 108 faculty, and approximately 1000 students majoring in a discipline represented in the College. The following degrees are offered in the College:
- Anthropology: B.A.
- Economics: B.A., M.A.
- International Affairs: B.A.
- Journalism and Mass Communications: B.A.
- Nursing: B.S.
- Political Science: B.A.
- Psychology: B.A., Ph.D.
- Public Administration: B.A., M.P.A.
- Sociology: B.A.
- Social Work: B.A., M.S.W.
- Speech Communication: (including communication disorders)

The International Affairs program offers a major in anthropology, economics, foreign languages, history, or political science.

An individualized Ph.D. is available in several disciplines.

School of Nursing
The baccalaureate program is designed to prepare a professional generalist practitioner of nursing who, through the nursing process, assists individuals, families and groups in various settings to achieve and maintain optimal health. Education for the practice of professional nursing demands a substantial knowledge of the social, behavioral and biological sciences as a theoretical basis.

Degree Requirements
Requirements for the B.A. degree are described in a separate section describing B.A. degree requirements at the University of Maine. Requirements for the B.S. in Nursing are described in the Nursing section of the catalog. Requirements for graduate degrees are described in the Graduate School Bulletin. Questions pertaining to programs or degree requirements in the College of Social and Behavioral Sciences should be directed to the appropriate Director or Department Chairperson.

Entrance requirements:
Requirements for admission to the College of Social and Behavioral Sciences, except for the School of Nursing, are the same as those for admission to the University. They are described in the Admissions section of this catalogue. The School of Nursing requirements are described in the Nursing section of the catalog.
Anthropology

Professors Acheson (Chairperson), Emerick, Ives, Sanger; Associate Professors Bonnichsen, Faulkner, Konrad, Munson; Assistant Professors Hornsby, Roscoe; Faculty Associates Ross, Sorg

Anthropology is the study of human cultures, societies, and behavior in all parts of the world throughout all periods of history. There are four sub-disciplines: archaeology, the study of historic and prehistoric cultures and civilizations; socio-cultural anthropology, which is concerned with current cultures of all degrees of complexity; physical anthropology, the biological aspects of the human species; and anthropological linguistics, which is concerned with the scientific study of language and its relationship to thought and society. In the past, anthropologists tended to study people in small, tribal societies. In recent decades, more attention has been given to peasantry and industrialized, urban societies and to applying anthropology to solving problems of these societies.

The Department of Anthropology focuses on archaeology and socio-cultural anthropology. Training in linguistics may be obtained through the linguistics course concentration. Courses in biological/physical anthropology also are offered from time to time. In addition, the Department offers courses in folklore, oral history, and geography, which are closely related to socio-cultural anthropology.

Degree Programs

The Anthropology Department offers two majors leading to the following undergraduate degrees.
1. B.A. in Anthropology
2. B.A. in International Affairs in Anthropology

Requirements for Anthropology Majors

A minimum of 36 hours of anthropology is required. In some cases, double majors may be able to apply six hours of collateral courses to the major. Majors must pass the following courses with at least a "C" grade:
ANT 215 Social Anthropology
ANT 217 Introduction to Archaeology
ANT 499 Current Issues in Modern Anthropology and any one of the following:
ANT 221 Introduction to Folklore
INT 410 Introduction to the Study of Linguistics

Because these courses are frequently prerequisite to advanced level courses, students should take them as early in their program as possible. Note: ANT 215 can not be taken by senior majors and ANT 499 will normally be taken only by senior majors.

Advanced study in anthropology normally requires use of quantitative methods and foreign language competency. Consequently, courses in quantitative methods, such as statistics and computer science, are highly recommended, as is foreign language competency at the intermediate level.

The anthropology major emphasizes a broadly based undergraduate curriculum. In consultation with his or her advisor, the student should select courses to sample effectively the sub-disciplines of anthropology, and avoid over-specialization at the BA level. Several interdisciplinary course concentrations (see index) are very appropriate for the anthropology major. These include: Canadian Studies, Franco-American Studies, Geography, Latin American Studies, Linguistics, and Religious Studies.

Requirements for the International Affairs Major in Anthropology

A minimum of 30 hours in anthropology is required for this major, together with a minimum of nine hours of appropriate courses in each of the following departments: History, Political Science, and Economics. In addition, the student must take six hours of a modern foreign language beyond the intermediate level. (See International Affairs in index.)

Students majoring in International Affairs in Anthropology must pass the following courses with at least a "C" grade: ANT 215, ANT 217, ANT 499 and any one of the following: ANT 221, INT 410. Students in this major normally will concentrate in social and cultural anthropology. Since the number of required courses is relatively high, International Affairs in Anthro-
pology majors should plan their programs early in their college careers.

Graduate Training in Archaeology

The Department of Anthropology cooperates with the Institute of Quaternary Studies and the Department of History to train graduate students in prehistoric and historic archaeology (see History and Quaternary Studies in index). Application is made through these cooperating departments (See also, Graduate School Catalog).

Career Opportunities

Anthropology provides very broad training in the social sciences. Therefore, a background in anthropology is useful in any career in which an understanding of people or the societies in which they live is important. Due to the broad nature of the field, students trained in anthropology have followed a wide range of careers. In recent years, our majors have pursued advanced training in anthropology and folklore. They also have gone on to advanced training in law, social work, business, theology, library science, museum work, nursing, computer programming, clinical psychology, 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**

**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 cross-cultural. 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. Required for majors. Cr 3 or 4.

ANT 221 Introduction to Folklore
A survey of the different genres of folklore, its forms, uses, functions and modes of transmission. Emphasis on belief, custom and legend. Cr 3.

ANT 302 Human Evolution
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 405 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 415 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 415 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 415. Cr 4.

ANT 422 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 423 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, worksongs, etc.). Emphasis on listening to and analysis of field recordings. No musical background or training required. Prerequisite: Permission of instructor. Cr 3.

ANT 424 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 425 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 426 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 437 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 439 Psychological Anthropology
An introduction to the concepts, theories and techniques involved in anthropological investigations of the relationships of culture, society,
and the individual. Prerequisite: ANT 102 or ANT 215 or permission of instructor. Cr 3.

ANT 441 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 442 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 444 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 450 Hunters and Food Gatherers
A survey of the vanishing people whose subsistence economy has remained at the hunting and gathering level. Focus on groups in all major geographical and cultural areas. Unique and common problems. Emphasis on ethnohistorical, environmental, and acculturation factors. Prerequisite: ANT 102 or ANT 215 or permission of instructor. Cr 3.

ANT 451 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 453 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 454 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 455 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, economic, and religious institutions in their traditional and contemporary contexts; impact of culture change; response to colonialism and nationalism; ethnicity and plural societies. Prerequisite: ANT 102 or ANT 215 or permission of instructor. Cr 3.

ANT 457 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 460 Peoples and Cultures of the Circumpolar Area
The development of northern cultures in both the Old and the New Worlds traced from prehistoric times to the present. Problems of economics, social structure, and cultural organization. Prerequisite: ANT 102 or ANT 215 or permission of instructor. Cr 3.

ANT 461 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 462 Numerical Methods in Anthropology
Introduction to how numerical methods are used in anthropological research. Topics in-
include: survey and history of numerical methods in anthropology; presentation and description of quantitative and qualitative anthropological data; probability; testing anthropological hypotheses using parametric and nonparametric statistics; advanced numerical methods available to anthropological analysis; the pitfalls and potential of numerical methods in anthropology. Prerequisites: 200 level course in anthropology or permission of instructor. MAT 232 recommended but not required.

**ANT 463 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 464 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 465 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 466 Economic Anthropology**
Comparative study of production, consumption and exchange in selected non-Western societies. Emphasis on factors influencing economic decisions in a variety of social and cultural settings. Prerequisite: ANT 102 or ANT 215 or permission of the instructor. Cr 3.

**ANT 467 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 468 Social Anthropology of Complex Societies**
An examination of selected problems and theoretical approaches in the study of complex societies and civilizations. Includes village studies in Europe and North America; urbanization, modernization, studies in migration, and ethnicity in developing and developed countries. Prerequisite: ANT 102 or ANT 215 or permission of instructor. Cr 3.

**ANT 469 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 470 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 471 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 472 North American Prehistory**
The history of North American Native Peoples from the first evidence to the arrival of the Europeans. Emphasis on major issues such as glacial and postglacial adaptation, development of agriculture, and the emergence of sedentism. Prerequisite: ANT 217 or permission of the instructor. Cr 3.

**ANT 473 Historic Archaeology**
A review of methods used in historic archaeology to investigate the spread of European culture to the New World, principally during colonial and early American periods. Course work covers excavation techniques, analytical methods, and documentary research. Case studies will be taken principally from sites in Maine, which boasts numerous French and English colonial sites that have survived little affected by the urban sprawl characteristic of much of the northeast. The course will also help prepare you for work in the field (see ANT 477,
FIELD RESEARCH IN ARCHAEOLOGY. NO PREREQUISITES. CR 3.

ANT 474 ANALYSIS OF HISTORIC ARTIFACTS
A laboratory course covering the identification, classification, and interpretation of artifacts from historic sites. Both hand crafted and mass-produced materials will be considered, especially the glass, iron and ceramic artifacts most commonly recovered on colonial and early American sites. Class projects will generally focus on collections from sites in Maine. No prerequisites. Lec 3, Lab 2. CR 4.

ANT 475 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 477 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 478 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 479 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 481 LANGUAGE AND CULTURE
Introduction to the writings of key figures in the field, exploring their broader implications in such areas as non-linguistic communication, semantics, linguistic relativity, structural anthropology, and general problems in Cognitive Anthropology. Prerequisite: ANT 102 and INT 310 or permission of instructor. CR 3.

ANT 490 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 491 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 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 497 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 415 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 472 or equivalent and permission. CR 3.

ANT 573 ADVANCED METHODS IN HISTORIC ARCHAEOLOGY
A seminar devoted to researching American lifeways of historic periods using archaeological and historical data. Emphasis given to interpreting current UM excavations. Prerequisite: ANT 474 or ANT 477. CR 3.

ANT 576 MODELS IN ARCHAEOLOGY
A seminar designed to consider current theoretical approaches to prehistoric archae-
ology. Prerequisite: ANT 472 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

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-making, 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 302 Geographical Perspectives on Atlantic Canada
A survey of the main themes in the geographical development of Atlantic Canada. Particular attention will be paid to immigration, ethnicity, the cultural landscape, economic growth, and urban and rural development. Prerequisite: Junior standing or permission of instructor. 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 410 (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 414 (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 458 (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 480 (ANT, SOC, SPC) Sociolinguistics
Relationships between language and society, emphasizing societal rules or norms that ex-
plain 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: INT 410 or permission of instructor.

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).

INT 501 (ANT, PSY, SPC) Discourse Analysis
Sociological, linguistic, ethnographic, and cognitive sciences approaches to the study of discourse. Emphasis on spoken discourse: Narrative, conversation, talk in courtroom, classroom, and clinical settings. Prerequisite: INT 410 or permission.

INT 539 (ANT, BOT, QUS) Ice Ages and Humankind
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).

Economics

Professors Burke, Clark, Coupe, Devino (Dean, College of Business Administration), Duchesneau, Huq, Lutz, Wilson; Associate Professors Breece, Morici, Townsend, Wihry; Assistant Professors De Los Santos, Isenberg.

The Department of Economics offers two degree programs: The Bachelor of Arts in Economics and the Bachelor of Arts in Economics/International Affairs.

Bachelor of Arts in Economics

Departmental Requirements
To receive the Bachelor of Arts degree in Economics the student must satisfy all requirements of the College of Social and Behavioral Sciences, complete the economics core courses and 21 additional hours of courses in economics, and satisfy the math and statistics requirement. The grade-point average for courses in economics must be 2.0 or higher. Required economics courses consist of the following:

A. Economics core courses: ECO 120, Principles of Microeconomics and ECO 121, Principles of Macroeconomics, 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. Only 6 hours may be earned for introductory courses. ECO 421 Intermediate Macroeconomics ECO 420 Intermediate Microeconomics ECO 421 and ECO 420 should be taken early in the student program of study.

B. Twenty-one additional credit hours of courses in economics. ECO 435, History of Economic Thought, is recommended but not required.

The economics major must also complete a course in mathematics and a course in statistics. These may be selected from the following lists:

1. Mathematics: MAT 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.


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 Social and Behavioral Sciences and complete at least nine hours each in anthropology, history and political science from a list of courses with an international focus, take six hours of a modern foreign language beyond the intermediate level, and complete the following requirements:

A. Economics Courses ECO 120, Principles of Microeconomics, and ECO 121, Principles of Macroeconomics, or the equivalent; ECO 421, Intermediate Macroeconomics; ECO 420, Intermediate Microeconomics; ECO 437, Comparative Economic Systems; ECO 438, Economic Development; ECO 439, International Trade and Commercial Policy; and two additional economics courses.

B. Math and Statistics Requirements are the same as indicated for the economics major.

Additional information is presented under the International Affairs section.

Courses in Economics

Introductory Courses

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

Courses in Economic Theory

ECO 420 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.

ECO 421 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 435 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.

Courses in Contemporary Perspectives in Economics

ECO 428 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 420 or ECO 435. Cr 3.

ECO 430 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 420. Cr 3.

ECO 431 Contemporary Alternatives in Political Economy
Development and critique of alternative contemporary theories of political economy. Alternative political economic paradigms, including, among others, the Chicago School, the Cambridge School, Neo-Marxian Economics and Radical Political Economy. Prerequisite: ECO 420. Cr 3.

ECO 436 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.

Courses in Economic Policy

ECO 433 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 420. Cr 3.

ECO 434 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 420. Cr 3.

ECO 444 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 420. Cr 3.
ECO 445 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 453 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 467 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 468 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 471 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 420. Cr 3.

ECO 472 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 475 Industrial Organization

ECO 476 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.

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 420, ZOL 204 or permission of instructor. Cr 3.

Courses in 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 437 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 Marxist and non-Marxist 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 438 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 439 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 421 or ECO 420. Cr 3.

ECO 440 Canadian Economics: Issues and Policies
Survey of the structure and functioning of the Canadian economic system, its problems and the policies used to solve them. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission of department. Cr 3.

INT 458 (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.

Courses in Topics and Applications
ECO 470 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 496 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: 400-level economics course in relevant area of work. Cr 3.

ECO 499 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.

Courses in Analytical Tools
ECO 480 Introduction to Mathematical Economics
Mathematics used as a language in presenting concepts of economic theory. Prerequisite: ECO 432, ECO 420, MAT 114 or MAT 126. Cr 3.

ECO 485 Introduction to Economic Statistics and Econometrics
Surveys the application of probability and statistics to economic problems. 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 432 or ECO 420, 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 512 Alternative Economic Theories and Perspectives
Major alternatives in economic theory to neoclassical economics. Applies alternative schools of thought (e.g. Marxist, post-Keynesian, institutionalist) to theoretical and policy issues in contemporary microeconomics and macroeconomics. Prerequisites: ECO 420 and ECO 432 or 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 Advanced Topics in Alternative Economic Theory
An in-depth examination of one or two alternative approaches to economic theory and policy beyond the treatment in ECO 512. Such approaches may include Marxist economics, institutional economics, and post-Keynesian economics. With departmental permission, course may be repeated for credit. Prerequisite: permission.

Cr 3.

ECO 595 Graduate Internship in Economics
Limited to graduate students who choose the internship option of the graduate program in economics. Internships in public or private institutions in situations that require application of economic theories and methodologies. Written report(s) are required. Prerequisites: Prior approval of student’s graduate committee.

Cr 3-6.

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 485 or permission.

Cr 3.

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, unemployment, and growth; and international aspects of macroeconomic performance.

Cr 3.

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 420 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.

ECO 421 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 428 Foundations of Economic Science and Method
Contemporary and historical aspects concerning the nature of economics as a science. Positive economics is compared with more tra-
ditional 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 420 or ECO 435.

ECO 430 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 420. Cr 3.

ECO 431 Contemporary Alternatives in Political Economy
Development and critique of alternative contemporary theories of political economy. Alternative political economic paradigms, including, among others, the Chicago School, the Cambridge School, Neo-Marxian Economics and Radical Political Economy. Prerequisite: ECO 420. Cr 3.

ECO 433 Labor Markets and Human Resource Development
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 420. Cr 3.

ECO 434 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 420. Cr 3.

ECO 435 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.

ECO 436 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.

ECO 437 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 438 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 439 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 421 or ECO 420. Cr 3.

ECO 440 Canadian Economics: Issues and Policies
Survey of the structure and functioning of the Canadian economic system, its problems and the policies used to solve them. Prerequisite: ECO 120 and ECO 121 or the equivalent with permission of department. Cr 3.

ECO 444 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 420. Cr 3.

ECO 445 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 453 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 467 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 468 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 470 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 471 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 420. Cr 3.

ECO 472 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 475 Industrial Organization

ECO 476 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.

ECO 480 Introduction to Mathematical Economics
Mathematics used as a language in presenting concepts of economic theory. Prerequisite: ECO 432, ECO 420, MAT 114 or MAT 126. Cr 3.

ECO 485 Introduction to Economic Statistics and Econometrics
Surveys the application of probability and statistics to economic problems. 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 432 or ECO 420, MAT 215. Cr 3.

ECO 496 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: 400-level economics course in relevant area of work. Cr 3.

ECO 499 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.

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.

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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 485 or permission. Cr 3.
Journalism and Mass Communication

Associate Professor Bullion (Chairperson); Professors Hamilton (Emeritus), Miller; Associate Professors Craig, Guesman, Jacobs; Assistant Professors Olmstead, Steele, Wallace-Whitaker

The objective of the Department of Journalism and Mass Communication is to provide a sound academic foundation for the student who intends to make a career in professional journalism, advertising or broadcasting. It seeks to achieve this goal by offering a comprehensive 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 media of Maine and elsewhere, to other educational institutions of the state (including the high schools), and to the public at large.

Career Opportunities

The world of journalism and mass communication 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 Mass Communication 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.

Admission

First and second year students with a wide variety of interests may find professional satisfaction in a mass communication career and should seek an advisor in the Department early to develop the most useful interdisciplinary program of study.

The program offers advertising, broadcast journalism, and news-editorial sequences leading to a bachelor of arts degree in journalism and a broadcasting sequence leading to a bachelor of arts degree in broadcasting.

The majors offered in the department are limited admission programs. This means that students wishing to major in the department must apply for admission and that selection is made based on past academic performance. Acceptance into a departmental sequence is not guaranteed. Students in the final semester of their sophomore year and those wishing to transfer from other departments or institutions should contact the department for application instructions well in advance of the date they wish to begin classes. Requirements for the declaration of a major in the department are as follows:

1. Completion of at least 53 credits of undergraduate coursework.
2. Completion of JBR 100 with a minimum of a "C minus"
3. An overall grade point average in the first two years of college work of at least 2.5.

Students not meeting the above criteria will generally not be allowed to declare a major in the department. Occasionally, however, especially talented students or those with other exceptional circumstances may be admitted with a lower grade point average. Students who feel they fall into such a category may petition the department for a waiver of the grade point average requirement by submitting a written request to the department chair. Such requests should include compelling evidence documenting the special circumstances. Students transferring from other institutions may be admitted as majors before taking JBR 100, provided they satisfactorily meet all other admission criteria. In such cases, JBR 100 must be completed as soon as possible after admission.

Prospective majors are expected to be able to type. All departmental course papers must be typewritten.

General Skills and Education Requirements

The department emphasizes a broad, liberal arts curriculum. In keeping with national accreditation standards, students are required to complete approximately 75% of their degree coursework outside the department including the following curriculum of general education and skills courses. A minimum grade of "C
minus” is required in courses taken to fulfill the department’s general education and skills requirements.

**General Education**

**History: 6 credits**
Required: Any one of the following sequences:
HTY 103/104 United States History
HTY 105/106 History of European Civilization
HTY 107/108 Asian History

**Behavioral Science: 6 credits**
Required:
PSY 100 General Psychology
Required: Any one of the following:
SOC 101 Introduction to Sociology
ANT 101 Introduction to Anthropology
ANT 102 Introduction to Anthropology II

**Political Science: 6 credits**
Required:
POS 100 American Government
Plus: One other POS course

**Economics: 6 credits**
Required:
ECO 120 Principles of Microeconomics
ECO 121 Principles of Macroeconomics

**Arts and Humanities: 12 credits**
Required:
1 survey level course in Philosophy
1 survey level course in Literature
2 additional Philosophy or Literature courses above the survey level

**Science and Mathematics: 11 credits minimum**
Required:
MAT 232 Principles of Statistical Inference
1 science course with associated laboratory
1 additional course in physical science or math

**Computer Skills: 3 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

**Professional Course Requirements**

Students may choose one of the four professional sequences. Majors completing the advertising, broadcast journalism, or new editorial sequence are awarded the bachelor of arts in journalism. Students completing the broadcasting sequence are awarded the bachelor of arts in broadcasting.

Students may also pursue a second major in another department. To double major, all requirements for both majors must be met. Double majors should consult advisors in both departments on a regular basis. Double majors within the department (i.e., advertising and broadcasting) are not permitted.

To satisfy the requirements for the bachelor of arts degree, students must complete a minimum of 24 credits of JBR courses within the framework of one of the four sequences. A maximum of 33 credits of JBR courses can be applied to the 120 needed for graduation (except for up to three credits earned in a second internship (JBR 495) and up to three credits earned in JBR 145 or JBR 146).

For students transferring equivalent courses from other colleges, a minimum of 12 credits of JBR courses must be taken for the degree, regardless of the number of equivalent courses accepted in transfer. The chair and faculty of the department will determine the equivalency (if any) of transfer courses in the discipline.

All majors must demonstrate intermediate proficiency in a foreign language before graduation, and must also satisfy the degree requirements of the College of Social and Behavioral Sciences.

Some departmental courses require the completion of one or more prerequisite courses. Some of these prerequisites must be completed with a grade of “B” or higher, and the remainder must be completed with a grade of “C minus” or higher before subsequent coursework is taken (see course listings for details).

A minimum grade of “C minus” is required in all departmental courses required for graduation and in all courses submitted to satisfy department requirements.

**Advertising Sequence: Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>JBR 100 Introduction to Mass Communication</td>
<td>3</td>
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<tr>
<td>JBR 250 Introduction to Advertising</td>
<td>3</td>
</tr>
<tr>
<td>JBR 251 Media Operation and Management</td>
<td>3</td>
</tr>
<tr>
<td>JBR 355 Advertising Copywriting and Layout</td>
<td>3</td>
</tr>
</tbody>
</table>
JBR 356 Advertising Media 3
JBR 357 Retail Advertising 3
OR
JBR 358 Advanced Copywriting (3)
JBR 459 Advertising Campaigns 3
JBR 375 Mass Media Law and Ethics 3
ENG 317 Technical Writing 3
OR
Approved upper level writing course 27

Broadcast Journalism 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 342 Video Production Techniques 3
JBR 370 Mass Media Law and Ethics 3
JBR 433 Electronic News Laboratory 3
Journalism or Broadcasting Elective 3 24

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: Media Ethics and Issues 3 24

The student should also consider the many electives offered in the department 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 requirement, 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 Mass Communication 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 “C minus” 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 at least twelve hours at the intermediate level or above of a foreign language. These hours are included in the required 18 hours for the option. If additional hours are needed, other suggested courses should be in international and comparative courses in history, political science, anthropology 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 B. A. distribution 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. (See also the departmental business option, below).

Behavioral Science. Students should take eighteen hours of courses in the upper level in anthropology, sociology or psychology.
Broadcasting Sequence: Required Courses

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 342 Video Production Techniques 3
JBR 370 Telecommunication Law and Policy 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)
ENG 317 Technical Writing (3)
OR
Approved upper level writing course

The student should also consider the many electives offered in the department to round out the program. Students also may receive credit for working at WMEB-FM by registering for JBR 145, Radio Laboratory, a one-credit course repeatable up to a maximum of three credits.

Business Option and Pre-MBA Program

The department, in cooperation with the College of Business Administration, offers majors the opportunity to combine a core of business courses with their journalism or broadcasting degree program. Students who complete this option will be well prepared to enter media careers where business and management skills are essential. Additionally, students completing Business Option courses may, upon graduation, apply for entrance to the University of Maine’s Master of Business Administration degree program. If accepted, the student will be able to complete the M.B.A. with approximately one calendar year of additional coursework. Students declaring the Business Option will be given preferential placement in business courses during early registration.

Business Option Courses

The following courses are required for completion of the Business Option:

BUA 201 Principles of Accounting I
BUA 202 Principles of Accounting II
BUA 220 The Legal Environment of Business
BUA 325 Principles of Management and Organization
BUA 350 Business Finance
BUA 370 Marketing
COS 211 Principles of Data Processing
MAT 113 Mathematics for Business and Economics I
MAT 114 Mathematics for Business and Economics II
MAT 215 Introduction to Statistics for Business and Economics

Students who declare the Business Option early in their degree program can complete these courses within the 120 credits required for graduation. Courses taken to fulfill the Business Option also fulfill departmental math, statistics, and elective requirements.

Option Admission Requirements

To declare the Business Option, students must meet the following requirements:

1. Be at least a sophomore with an intention of majoring in one of the Department of Journalism and Mass Communication’s four degree sequences.
2. Have and maintained at least a 2.5 overall grade point average.
3. Declare the Business Option by completing the appropriate application form and submitting it to the department office.

Internships

Internships offering the student professional experience for academic credit are available from all areas of Maine and New England’s mass communications media. The location of the Orono campus, just 10 miles from Bangor, affords 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.

Internships are available to students who
have completed 53 credit hours of college work, have been accepted as a declared major in the department, and who have at least a 2.5 overall grade point average with at least a 2.5 in JBR courses. Students wishing to participate in the internship program should contact the department office for guidelines on other specific requirements.

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 student 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.

The University of Maine System also operates the non-commercial Maine Public Broadcasting Network (MPBN), an affiliate of the Public Broadcasting Service (PBS) and of National Public Radio (NPR). MPBN operates a statewide system of radio and television transmitters and its network headquarters and major studio facility are located on the Bangor campus, some eight miles south of Orono. MPBN studios are often used for department production courses and MPBN staff frequently serve as adjunct faculty or guest lecturers.

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 145 WMEB Laboratory
Practical experience in assigned duties with the student radio station, WMEB-FM. Repeatable up to 3 credits. Cr 1.

JBR 146 Maine Campus Laboratory
Practical experience in the production of the student newspaper, the Daily Maine Campus. 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 News-gathering
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. Ex-
exercises in commercial and public service copywriting, continuities and promotion, newswriting, editorial copy and short features.  

JBR 241 Audio Production Techniques  
The creative application of audio techniques as applied to radio and television. Prerequisite: JBR 236 or JBR 231. 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 342 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 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 Telecommunication Law and Policy  
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; declared JBR Majors or permission of instructor. 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 with C- or better. Cr 3.

JBR 398 Topics in Journalism and Broadcasting  
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.

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; declared JBR Majors or permission of instructor. 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; declared JBR Majors or permission of instructor. Cr 3.
JBR 432 Newspaper Laboratory II
Continuation of JBR 431. Declared JBR Majors or permission of instructor. 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. Declared JBR Majors or permission of instructor. 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
Students wishing to register for an internship must first complete an application and receive approval from the department chair before the internship begins. Credit will not be given for work completed before the approval process. Prerequisite: Declared majors only with permission. Cr 1-3.

JBR 497 Problems in Telecommunication
Special topics and problems in Broadcasting and Cable, including criticism and analysis. Prerequisite: permission. Cr 3.
Political Science

Professors Collins (Chairperson), Hayes, Horan, Mawhinney, K. Palmer, Schoenberger; Associate Professor Warhola; Assistant Professors Bakhtiari, Cody, Moen, M. Palmer.

Students may major in Political Science or in International Affairs (Political Science).

Specific Requirements for Majors

Political Science

I. 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.

II. 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)

A. 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. Majors within the department may not receive more than a total of 12 credit hours toward graduation for any combination of internships and field experience, and not more than 6 credit hours may be used toward the departmental major.

B. International Relations
   POS 223 Political Geography
   POS 224 Applied Political Geography
   POS 252 United States-Canadian Relations
   POS 373 International Relations
   POS 374 U. S. Foreign Policy
   POS 387 International Law
   POS 388 World Order Through International Organization and Law
   POS 475 National Security Analysis
   POS 477 Politics of the Middle East
   POS 478 Foreign Policy of the Soviet Union
   POS 485 Theory and Methodology of International Relations
   POS 573 Problems in International Politics
   POS 587 Problems in International Law

Three credit hours of an internship or field experience course related to International Relations may be used toward satisfying this sub-field requirement.

C. Comparative Politics
   POS 241 Politics in Contemporary Societies
   POS 243 Canadian Government and Politics
   POS 335 Democratic Governments of Europe
   POS 336 The Communist Government of the Soviet Union
   POS 344 Public Policy in Canada
   POS 456 Canadian Political Parties
   POS 465 Governments of South Asia
   POS 466 Governments of East Asia
   POS 467 African Politics
   POS 468 Contemporary Politics of Latin America
   POS 531 Topics in Comparative Politics
   POS 537 The Evolution and Development of Canadian Government and Politics

D. Political Theory
   POS 212 Introduction to Political Theory
POS 389 Classical Political Thought  
POS 390 Modern Political Thought  
POS 391 Late Modern Political Thought  
POS 480 Scope of Political Science  
POS 392 American Political Ideas  
POS 589 Topics in the History of Political Philosophy  
POS 594 Topics in Political Theory  
POS 595 Methods of Political Science

III. Related Area Requirement
Fifteen hours from at least two related fields, as follows: Anthropology, Computer Science, Economics, Foreign Language (intermediate and beyond), Journalism and 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; ana-
lyses of major public policy issues in contemporary Canada. Cr 3.

POS 252 United States-Canadian Relations
An examination of relations between the United States and Canada, stressing those issues of current controversy which affect Maine and New England. These issues may include acid rain, fishing rights, free or freer trade, North American security agreements, and growing relations between states and provinces. Cr 3.

POS 335 Democratic Governments of Europe
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 344 Public Policy in Canada
An analysis of policy making structures in Canada. Emphasis is placed on the Prime Minister, the Prime Minister’s Office, the Cabinet, the Privy Council Office, and other central agents. Relations between the federal and provincial executives are also discussed. Policy making in specific issue areas of current interest is considered. Prerequisite: Six hours of political science. 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: 6 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 reorganization, and social and environmental policies. Prerequisite: Junior or Senior Standing. 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 6 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: 6 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: no freshmen. Cr 3.

POS 383 Constitutional Law
The political development of the Constitution through Supreme Court decisions. Cases in ju-
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: 6 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: 6 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 392 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 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 398 Topics in Political Science
Readings, research and discussion relating to selected topics in political science. Topics will vary depending on faculty and student interest and must be approved by a designated departmental committee by the end of the preceding semester. Junior and Senior departmental majors in residence. Cr 3.

POS 456 Canadian Political Parties
An examination of the historical development and present structure and function of Canadian political parties. Emphasis on the influence of 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: 6 hours of Political Science. Cr 3.

POS 466 Governments of East Asia
A study of the contemporary political systems of China and Japan. Prerequisite: 6 hours of Political Science. Cr 3.

POS 467 African Politics
Analysis of the transition from colonialism to independence in selected countries of Sub-Saharan Africa. Discussion of nation-building,
the one-party system, military intervention in politics, and neo-colonialism. Prerequisite: 6 hours of Political Science. Cr 3.

POS 468 Contemporary Politics of Latin America
Concentration on "political styles," the contemporary struggle between tradition and revolution, political elites, economic and political problems. Selected case studies, not necessarily the same each year. Prerequisite: 6 hours of Political Science. Cr 3.

POS 475 National Security Analysis
An examination of national and international factors affecting the survival and security of international political units. Emphasis on components and use of military power, arms control, cause and resolution of conflict, negotiation and decision-making processes and structures. Prerequisite: junior or senior standing. Cr 3.

POS 477 Politics of the Middle East
The politics of the Middle East from World War I to the present. Special attention to problems of Palestine and the creation of Israel, the interplay between the politics of the great powers and Middle East conflicts, and problems of nationalism, modernization, and revolution. Prerequisite: junior standing or permission. Cr 3.

POS 478 Foreign Policy of the Soviet Union
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 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 Theory 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 par-
Public Administration

Professor Taylor (Chairperson); Associate Professors Ahn, Blunt, Laverty, Thai; Assistant Professor 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 administration 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 Augusta. It is the largest M. P. A. program in Northern New England, is a member of the National Association of Schools of Public Affairs and Administration (NASPAA), conforms with NASPAA standards, and is one of eighty-three accredited programs from over two hundred and thirty throughout the country. The department faculty is comprised of nationally and internationally recognized publishing scholars, who are dedicated to quality teaching of the highest standards.

The Public Management Major

The Public Management program requires a minimum of 36 credit hours, in addition to prerequisites and electives.

A. Prerequisites 9 hours

1. Choose two of the following:
   - PAA 100 Foundations of Public Administration
   - POS 100 American Government
   - PAA 200 Public Management

2. ECO 110 Principles of Economics or ECO 120/121 Principles of Microeconomics/Macroeconomics

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 Technical Writing
   - SPC 245 Small Group Communication
   - SPC 257 Business and Professional Communication

2. Accounting Skills
   - PAA 240 Introduction to Governmental Accounting
   - BUA 201 Principles of Accounting I
   - ARE 138 Agribusiness Accounting I

3. Statistical Knowledge
   - PAA 315 Methods and Computers for Public Management and Policy Analysis
   - MAT 232 Principles of Statistical Inference
   - PSY 341 Statistics in Psychology I

4. Computer Knowledge
   - COS 100 Introduction to Personal Computers
   - COS 215 Introduction to Computing Using FORTRAN

   Or
   - 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 or PAA 425 Health Care and Human Services

2. Urban Context
   - POS 233 Urban Politics* or ECO 444 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 Resources 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 472 State and Local Government Finance

3. Organization Behavior and Management
   - PAA 430 Public Organization and Management
   - BUA 326 Dynamics of Organization and Behavior

4. Law and Management
   - PAA 405 Administrative Law or 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
- PAA 400 Issues in Public Administration

F. Electives (a total of 9 hours and at least 3 outside of the department)
Any POS or PAA courses from Parts A-E above, that were not selected to meet core requirements.

PAA 498 Independent Readings in Public Administration

PAA 505 Intergovernmental Relations***

PAA 515 Computer Applications in Public Administration and Policy***

PAA 520 Policy Studies***

PAA 540 Seminar in Public Financial Management I***

PAA 550 Seminar in Public Personnel Management***

PAA 560 State Administration***

PAA 580 City and Regional Planning***

PAA 585 Comparative Administrative Systems***

POS 361 American Legislative Process

POS 362 Maine Government and Politics

POS 462 American Executive Process

ARE 371 Introduction to Natural Resource Economics and Policy

ARE 486 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 325 Transportation Engineering

CIE 331 Environmental Quality Control

ECO 421 Macroeconomics

ECO 434 Economics of Labor Unions

ECO 471 Public Finance and Fiscal Policy

ECO 476 Health Economics

JBR 100 Introduction to Mass Communication

JBR 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

SVE 321 Cadastral Systems

SWK 320 Introduction to Social Work and Social Welfare

SWK 440 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 Social and Behavioral Sciences are required to develop and administer an English proficiency examination for their majors. Each public management major within the Department of Public Administration must take at least two of the following Writing Experience courses with the Department of Public Administration: PAA 200, PAA 370, POS 233, PAA 405, PAA 350, PAA 430. These courses have a substantial writing experience component. A complete statement of the policy is available in the department office.

Courses in Public Administration

PAA 100 Foundations of Public Administration

Theoretical and pragmatic bases for the administrative state in America. Topics include the evolution of bureaucracy, representation, centralization, and executive discretion. Ideas, 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 or PAA 100 or permission. Cr 3.

PAA 240 Introduction to Governmental Accounting

The historical developments of governmental accounting, basic principles of governmental...
accounting, and details of the theory and practice of accounting for revenues and expenditures. \( Cr \ 3. \)

**PAA 315 Methods and Computers for Public Management and Policy Analysis**

This course introduces the student to the statistical procedures and computer skills that are used in policy and management settings. The class conducts a research project from the design, data collection, and data entry stages to the analysis, interpretation, and report writing stages. All topics are presented with application in mind. \( Cr \ 3. \)

**PAA 340 Public Budgeting and Financial Administration**

An analysis of the budgeting process including political aspects. The budget is considered as an instrument of fiscal policy; budget preparation and classification are discussed with special emphasis given to program and performance budgeting. Prerequisite: PAA 200, juniors and seniors only. \( Cr \ 3. \)

**PAA 370 Urban Policy and Management**

An analysis of the formation and implementation of urban public policy. Municipal management concerns with human and financial resources, city planning, programs and urban services are considered. In-depth cases are utilized throughout. Prerequisite: POS 233 or PAA 233. \( Cr \ 3. \)

**PAA 390 Critical Analysis in Public Administration**

Designed to provide public management majors with an opportunity to coordinate knowledge of particular aspects of the discipline with effective and scholarly writing. A balance between scholarly writing within the discipline and administrative writing will be part of the format. Multiple submissions will be required and topics will address issues of relevance in the area of public administration. Prerequisite: PAA 200. \( Cr \ 3. \)

**PAA 400 Issues in Public Administration**

An examination of basic issues in Public Administration. Case studies in such areas as public policy implementation and public management at the international, national, state, sub-state, and local levels in public and non-profit organizations. Prerequisite: Juniors and Seniors only. \( Cr \ 3. \)

**PAA 405 Administrative Law**

Primarily case studies of the legal adjustment of administrative authority and individual liberty, including: judicial control over administration, personal liability of officers, scope and limits of administrative powers and the due process measurement of administrative procedure. Prerequisite: PAA 200. \( Cr \ 3. \)

**PAA 410 Local Government Law**

Fundamentals of law relating to local government, viewed from the perspective of the public administrator. Prerequisite: PAA 200. \( Cr \ 3. \)

**PAA 425 Health Care and Human Services**

Provides a historical and current overview of public/non-profit/for-profit health care and human services systems administration in the U.S. Addresses the evolution of the health care and human services delivery systems, their structures and dynamics, basics of financing, functions and roles of public and private institutions in policy implementation and administration, and ethical issues. Prerequisite: PAA 200. \( Cr \ 3. \)

**PAA 430 Public Organization and Management**

Builds on the introduction to concepts of organization and management science in PAA 200. Topics may include, among others, bureaucratic politics, public organization design, organizational information and control systems, and organizational innovation. Prerequisite: PAA 200. \( Cr \ 3. \)

**PAA 470 Topics in City and Town Management**

Considers such specialized topics in municipal administration as the development of the city management profession, unique concerns of town management, the local economy and economic development, public works and the local infrastructure, and municipal service delivery. Seminar format supplemented with lectures by visiting governmental officials. Prerequisite: Public Management senior or permission. \( Cr \ 3. \)

**PAA 493 State Government Internship II**

Professional experience in a department or agency of state government. Open to selected students. Reports and readings required. Available under the Maine State Government Intern-
ship 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. Prerequisite: PAA 200 or permission. Cr 3.

PAA 540 Seminar in Public Financial Management I
Examines governmental financial conditions, revenue collection and spending processes, and specialized topics such as cash management, risk management, debt management and capital budgeting. Special emphasis on financial management in state and local governments. Prerequisite: Graduate students or permission. Cr 3.

PAA 550 Seminar in Public Personnel Management
Consideration of selected problems in the public personnel management process. Emphasis on empirical theories of motivation, satisfaction, productivity, supervisory patterns, and organizational conditions. 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.
Psychology

Associate Professor Kulberg (Chairperson); Professors M. Elias, Farthing, Garvey, Gold, Hammer, Martindale, Pliskoff, Ryckman, Stone, Stubbs; Associate Professors Frey, Haynes, Lenney, Smith, Thorpe; Assistant Professors Fisher, Gershanik, O'Donahue, Randell, Rosenwasser; Director of Psychological Service Center Hecker; Cooperating Assistant Professors LaRae, Peddicord; Cooperating Associate Professors Homann, Hirshfield, Whipple; Clinical Associate Professors Hess, Keefe; Adjunct Professor Allen; Clinical Associates Acker, Elliott, McLean, Pierce, Righthand, Rogers, Sattin, Stahl, Zellinger; Faculty Associates Russ, Thornton; Research Associates P. Elias, Robbins

The instruction offered by the Department of Psychology is designed to acquaint the student with psychology as a biological science and as a social science. The department offers courses that introduce the student to psychological theory, methodology, research findings, and applications of psychological principles.

Requirements for a Major in Psychology

A. A minimum of 36 hours in psychology courses (Note: 48 hours in psychology is the maximum amount of credit that will count toward the 120 hours needed to graduate.)

B. The following required courses must be passed with a grade of "C-" or better.

PSY 100 General Psychology - prerequisite for all other psychology courses
PSY 341 Statistics in Psychology I
PSY 345 Principles of Psychological Research - prerequisite: PSY 341.
PSY 347 Laboratory in Experimental Psychology - prerequisite: PSY 345 (these courses must be taken prior to the senior year.)

PSY 470 History and Systems of Psychology (may be taken in the junior or senior year)

Three courses selected from the following alternatives:
PSY 363 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. Psychology majors planning on attending graduate school in psychology are encouraged to take PSY 420 and PSY 421 (Child Study Labs), all the courses offered in psychology methodology (PSY 341, PSY 342, PSY 345, PSY 347), several courses in general experimental psychology, and PSY 492. PSY 492, Problems in Psychology, affords students an opportunity to pursue psychological research in conjunction with one or more faculty members. A minimum grade of "B" in these courses indicative of ability to do graduate work.

Students who plan to enter vocations focusing on children can obtain a specialized background for that work by taking courses in the developmental psychology area. These include: PSY 323, PSY 324, PSY 420, PSY 421, PSY 425, PSY 426, PSY 428, PSY 429, PSY 522, PSY 524, PSY 525, PSY 526 and PSY 527.

Selected students may participate in the University Affiliated Program (UAP) in the Department of Pediatrics at Eastern Maine Medical Center. An Interdisciplinary concentration in Developmental Disabilities is required. (See UAP and Interdisciplinary Concentrations in Index.)

Students interested in the area of social psychology have many available courses including: PSY 330, PSY 331, PSY 332, PSY 338, PSY 339, PSY 561, PSY 563, and PSY 565.

Courses numbered 500-599 are graduate courses that are open to both undergraduate
and graduate students. Junior and/or senior psychology majors are encouraged to enroll in some of these courses (especially 522, 524, 557, and 561) if possible. Undergraduates do not compete with graduate students for grades in such courses. Undergraduates require permission of the instructor to register for 500-level courses.

Courses in Psychology

**PSY 100 General Psychology**
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.

**PSY 301 Psychology and Photography**
A survey of the impact of photographs on our behavior, covering art, documentary, commercial and "snapshot" images. Topics include the perception and memory of photographs as well as issues about uses of and attitudes towards photographs. Prerequisite: PSY 100. Cr 3.

**PSY 302 Psychology of Literature**
Psychological approaches to the study of art and literature. Psychoanalytic and Marxist theories, experimental aesthetics, investigations of literary change, and the application of the methodology of the behavioral sciences to the study of literary phenomena. Prerequisite: PSY 100. Cr 3.

**PSY 303 Applications of Behavior Principles**
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. Prerequisite: PSY 100. Cr 3.

**PSY 304 Psychology of Musical Sound**
A survey of the relationships among the physical dimensions of sound, the structure and functions of the ear and the perceptions of psychological dimensions related to music. Some psychophysics and psychological scaling are covered, as well as introductory discussion on the reproduction of recorded music. Prerequisite: PSY 100. Cr 3.

**PSY 305 Psychological Aesthetics**
Topics 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. Prerequisite: PSY 100. 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. Prerequisite: PSY 100. 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 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. Prerequisite: PSY 100. Cr 3.

**PSY 330 Social Psychology**
An introduction to the study of social behavior
from a psychological perspective. Representative topics include culture and personality, attitude formation and change, conformity, leadership and prejudice. Prerequisite: PSY 100.

**Cr 3.**

**PSY 331 Applied Social Psychology**
Application of the concepts and research methods of social psychology to problems in American society. Topics may include racism, international conflict, pollution, poverty, mass media effects, the legal system, and health-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 crowding, personal space, privacy, architectural design of space and self-control and development phenomena. Prerequisite: PSY 100.

**Cr 3.**

**PSY 338 Research in Personality**
Research studies related to current personality theorizing. Topics may include dogmatism, locus of control, Machiavellianism, need for achievement, and self-esteem. Prerequisite: PSY 208 or equivalent or permission.

**Cr 3.**

**PSY 339 Political Psychology**
Study of the mutual influence of politics and individual psychology. Topics include the motivation and ideology of political actors, decision-making, authoritarian personality, between-group conflict and nuclear war. A writing experience course. Prerequisite: PSY 100 or POS 100.

**Cr 3.**

**PSY 341 Statistics in Psychology I**
A survey of techniques used to obtain, display, analyze, and interpret data in psychology. Prerequisite: PSY 100.

**Cr 3.**

**PSY 342 Statistics in Psychology II**
A consideration of techniques of practical value to the psychologist in analyzing psychological experiments. Prerequisite: PSY 241 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 241.

**Cr 3.**

**PSY 347 Laboratory in Experimental Psychology**
Development of skills in designing, conducting and evaluating experiments to answer questions about human cognitive performance. Topics include classic experiments in Cognition and Perception. Prerequisite: PSY 345 or permission of instructor; also, PSY 350 recommended.

**Cr 3.**

**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. Prerequisite: PSY 100.

**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. Prerequisite: PSY 100.

**Cr 3.**

**PSY 353 Learning and Motivation Laboratory**
(Optional) Prerequisite: Concurrent with PSY 352. Lab 2.

**Cr 1.**

**PSY 356 Theories of Learning**
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 363 Mechanisms of 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: PSY 100 and a basic course in zoology or biology or permission. Cr 3.

**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 physiological processes and psychological activity. Prerequisite: a basic course in zoology. 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 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 223 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 223. 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 223 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 223, junior standing. 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 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. Prerequisite: PSY 100, Junior or Senior. 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. Prerequisite: PSY 100. 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 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. Prerequisite: Permission. Cr 3.

**PSY 522 Social Development in Children**
An advanced survey of current theories and research pertaining to social behavior in children. 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 223, PSY 345 or equivalent. Cr 3.

**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. Prerequisite: 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.

**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 241 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 241 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 241. 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 241 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.

**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.

**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.

**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.

**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.

**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.

**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 230 or permission.

**PSY 565 Attitudes and Opinions**
Nature, development, and measurement of social attitudes. Applications to understanding, prejudice, intergroup conflict, political and religious behavior. Prerequisite: PSY 230.

**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.

**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 241 and PSY 480 or permission.

**PSY 592 Directed Readings: (area)**
Opportunity to read in a particular area of psychology under faculty direction. Prerequisite: permission.

**Interdisciplinary Course**
**INT 501 (ANT, PSY, SPC) Discourse Analysis**
Sociological, linguistic, ethnographic, and cognitive sciences approaches to the study of discourse. Emphasis on spoken discourse: Narrative, conversation, talk in courtroom, classroom, and clinical settings. Prerequisite: INT 410 or permission.
Sociology

Associate Professor Barkan (Chairperson); Professors Cohn, Markides, Marks; Associate Professors Gallagher, Grzelkowski; Assistant Professors Carter, Gardner;

The major in Sociology offers two options: general sociology, and applied sociology. Students wishing to explore either of these areas should consult the departmental secretary (201 Fernald Hall) who will direct them to an appropriate advisor (including career options).

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 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 SOC 460 in the spring of the sophomore year; SOC 490 in the fall of the junior year; and SOC 491 and SOC 491L in the spring of the junior year. Along with these basic courses, an additional eighteen hours of electives in sociology 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. This program of study focuses on developing the skills and knowledge which will allow the student to translate sociology into action. Students who complete the requirements of the applied sociology option will have a notation on their transcripts and diplomas identifying that they have been trained in applied sociology.

The sociology major who chooses this option is required to complete a minimum of 40 hours in sociology. These hours include:

SOC 101 Introduction to Sociology 3
Core courses listed below 25
A senior seminar 3
One course on social inequality (SOC 329, SOC 330, SOC 338, SOC 347) 3
Two sociology elective courses 6
TOTAL 40

Core courses required in the applied sociology option are:
SOC 301 Social Organization: The Micro Picture
SOC 302 Social Organization: The Macro Picture
SOC 350 Organizations in Modern Society
SOC 420 Applied Sociology
SOC 490 Logic of Sociological Inquiry
SOC 491 Practicum in Sociological Research
SOC 495 Internship in Applied Sociology (6 hours required) In addition to the above, students are required to take one course in policy development: either SWK 440 or PAA 220. Students in the applied program are also encouraged to take a course in statistics, a course in communities, and a range of courses outside the Department of Sociology which will provide some interdisciplinary depth of knowledge in their area of interest.

For more information regarding this applied sociology option and for course sequencing,
students should consult the departmental secretary.

Graduation Requirements

A grade of "C" or better is mandatory in all required courses for the major. The GPA for all courses, required and elective, taken for the sociology major must be at least 2.0.

The Junior English Proficiency requirement, which must be completed during the junior year by all majors, is met by passing, with a "C" grade or better, ENG 212, Intermediate Composition, or ENG 317, Technical Writing.

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
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
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 or 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 contribute 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 feminity and masculinity within American culture. Emphasis upon the interpersonal and institutional dimensions of these phenomena. The desirability and means 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: SOC 101 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 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 350 Organizations in Modern Society Formal or complex organizations are the immediate setting or context for much of modern social life. This course examines the structures, processes, impacts and environments of organizations, using both mainstream and critical theoretical perspectives. Topics will include: hierarchy and mobility within organizations, organizational behavior, processes of innovation and diffusion, and the role of gender, race, and class. The course will also explore the relationship of organizations to the wider societal context, formal and informal power, and the development of non-hierarchical organizational models. Prerequisite: SOC 101 or permission 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.

**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 420 Applied Sociology**
Examines the role of applied sociology within the discipline and the greater context of social change. Exploration of: the history and development of applied sociology; the roles of applied sociologists; skills and knowledge needed for working in applied settings; the integration of sociological theory, knowledge and methods with strategies for social action; problems, issues, and ethics related to applying sociology in non-academic settings. Prerequisite: SOC 301 or SOC 302 or permission. Cr 3.

**SOC 431 Canadian Society**
Provides the non-Canadian student with an overview of the structure of Canadian society. Focus on two broad areas: social institutions and social processes. Prerequisite: SOC 101 and at least one semester of Canadian history, or permission of instructor. Cr 3.

**SOC 439 Sociology of Health and Medicine**
Explores issues of health, illness and medicine from a sociological perspective. Topics will include: the organization of U.S. health care; causes of, and possible solutions to, problems in the health care system; definitions of health and illness; social factors in illness and disease; history and dynamics of health care professions; the doctor/patient relationship; and gender, race and class inequalities in health care delivery. Prerequisite: SOC 101 or permission. Cr 3.

**SOC 442 Population and Society**
Population processes and their effects on society. Includes fertility, migration, mortality; population, resources and technology; population, social change and economic development; family planning and population policy. Prerequisite: SOC 101 or permission of instructor.

**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**

**SOC 490 Logic of Sociological Inquiry**
The relationship between theory and research. Specific topics will include the nature of scientific proof in the social sciences, measurements of variables, hypothesis and theory testing, sampling, research design, ethical issues in research, and the relationship between research and policy-making. Prerequisite: Junior and Senior Sociology majors only. Cr 3.

**SOC 491 Practicum in Sociological Research**
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 sam-
planning, questionnaire design, indices and scales, tabular analysis, and measures of association. Prerequisite: SOC 490 or permission of instructor.  

**SOC 495 Internship in Applied Sociology**  
A supervised internship in an area of Applied Sociology, providing practical experience in a field placement and requiring parallel readings and study. Emphasis will be on the guided application of concepts and principles from related courses and structured readings to applied situations in the field. Students attend an internship seminar. Students in the applied concentration must take a minimum of 6 credit hours, and can take up to 12 credit hours; not more than 6 credit hours may be used toward the departmental major. Prerequisite: SOC 420, major in Sociology with senior standing (or by special permission), and permission of the faculty internship supervisor.  

**SOC 497 Departmental Projects I**  
By permission of an instructor only.  

**SOC 498 Departmental Projects II**  
By permission of an instructor only.  

**Interdisciplinary Courses**  

**INT 224 (ARE, SOC, SWK) 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.  

**INT 324 (ARE, SOC, SWK) 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.  

**INT 329 (ARE, SOC, SWK) 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.  

**INT 480 (ANT, SOC, SPC) 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: INT 410 or permission of instructor.  

**Cr 4.**  

**Cr 3.**
Social Work

Associate Professor Whitaker (Chairperson and Undergraduate Program Director); Professor Watkins; Associate Professors Berkun (Graduate Program Director), Ojanuga; Assistant Professors Werrbach, Veit.

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 upon receipt of which graduates are qualified to take the test for licensing as Licensed Social Workers in the State of Maine.

Social workers help people cope with complex interpersonal and social problems, obtain the resources they need to live with dignity, and work for the social changes necessary to make society more responsive to people's needs. Based in a strong liberal arts background, social work majors acquire the knowledge, skills and values necessary for the professional practice of social work. Study for the social work major includes courses in 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.

Graduates of the program are employed in public and voluntary social agencies in settings such as child and adult protective services, family planning, group homes, half-way houses, schools, correctional institutions, medical facilities and many others. Graduates of this program are given credit toward work in many master's level social work programs, thus shortening the time needed to complete the requirements for the MSW.

Declaring the Social Work Major

Students considering the social work major should seek early advisement from a member of the social work faculty to explore their interests and assure correct course sequencing. In order to be admitted to the social work program, students must have at least a 2.0 grade point average, be of sophomore standing, enrolled in the College of Social and Behavioral 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 Social and Behavioral 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.

Requirements for the Social Work Major

SOC 101 Introduction to Sociology
SWK 320 Introduction to Social Work and Social Welfare
SWK 440 Social Welfare Policy and Issues
SWK 350 Human Behavior and the Social Environment
SWK 361 Social Work Methods I
SWK 397 Independent Projects in Social Welfare I
SWK 398 Independent Projects in Social Welfare II
SWK 462 Social Work Methods II
SWK 463 Social Work Methods III
SWK 490 Social Work Research I
SWK 495 Field Practicum in Social Work (2 semesters)

In addition to the above, each social work major is required to complete:
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

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.

Graduation Requirements
A grade of "C" or better is mandatory in all required courses.

The Junior English Proficiency requirement, is met by passing with a "C" grade or better, ENG 212, Intermediate Composition, or ENG 317, Technical Writing.

University Affiliated Program
Social work majors with particular interest in developmental disabilities may apply for participation in the University Affiliated Program (UAP), an interdisciplinary concentration. UAP students do their field practicum in agencies serving 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 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 350 Human Behavior and the Social Environment
Examines normative development, development of sense of self, behaviors, attitudes and values of adults in relationship to the social structures, organizations, institutions and societal groups with which they interact. Connections are made to social work theory, social welfare institutions and social work practice. Prerequisite: PSY 100, SOC 101 and PSY 223 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 prac-
tice, and the processes of providing service are explored. Prerequisite: SWK 440 and SWK 350 or permission of instructor. Cr 3.

SWK 365 Problems of Child Abuse and Neglect: A Multidisciplinary Approach
This course examines the roles of the major disciplines, agencies and professions involved in the prevention, early detection, assessment, intervention, treatment and management of child abuse and neglect. Focus is on victims and their families. Prerequisite: SOC 101 or permission of instructor. (CED only). Cr 3.

SWK 368 Psychosocial Aspects of Disability
Examines the impact of disability, including hidden disabilities, on people's development, self-concept, and self-esteem. The effects of societal attitudes, structures, legislation and institutions on the disabled individual also are examined critically. Prerequisite: SOC 101 or permission of instructor. (C. E. D. only). Cr 3.

SWK 375 Hunger As An Issue in Social Welfare
Examines the social issue of hunger from a political and social policy perspective, compares hunger in the United States with that in third world nations, and investigates governmental and private organizational strategies for the reduction of hunger. Prerequisite: SOC 101 or permission 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 440 Social Welfare Policy and Issues
Provides an analytic perspective on the provision of social services and the interrelatedness of practice and policy analysis. The dimensions of choice in social welfare policy and major issues in provision of services are examined. Prerequisite: SWK 320 or permission of instructor. Cr 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 490 Social Work Research I
Beginning methods of social work research. Topics include integration of social work theory, practice and research; problem formulation; ethical concerns; research design; program evaluation. Cr 3.

SWK 495 Field Practicum in Social Work
Generalist social work practice in community agencies designed to provide students the opportunity to apply social work knowledge and skills directed toward planned intervention and change efforts. Prerequisite: Limited to social work majors who have completed at least 75 course credit hours. Taken concurrently with SWK 462 and SWK 463. Twelve credit hours required; six per semester, variable by permission only. Cr 1-6.

SWK 597 Advanced Topics in Social Work
Content varies to suit student needs. May be repeated for credit. Prerequisite: Permission. Cr 1-3.

Interdisciplinary Courses

INT 224 (ARE, SOC, SWK) 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, SOC, SWK) Contemporary Rural Problems
A problem-oriented, class participation course focusing on the trends in contemporary rural society. Rural population displacement and mobility, poverty, industrialization; consequent changes in occupational compositions, and related changes. Prerequisite: INT 224 or equivalent. Rec 3. Cr 3.

INT 329 (ARE, SOC, SWK) 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 Peterson (Chairperson); Professors Dopheide, McKerrow, Pettit, Pickering; Associate Professors Burns, Langellier; Assistant Professors Kertoy, Kuhn, Sherblom, Tonn, Yonovitz; Lecturer/Staff Speech Pathologist Riley; Faculty Associates Henri, Kerr, Olsen

Departmental studies lead to a B. A. in Speech Communication. The programs offered by the department are designed to expand the student's awareness and understanding of the genesis, development, functions, roles, and uses of spoken communication. Departmental majors may concentrate in either Communication Studies or in Communication Disorders. The undergraduate program in Communication Studies prepares majors in the theory, research, and pragmatics of spoken communication between persons, whether the communicating occurs within one-to-one, small group, organizational, or public contexts. The undergraduate program in Communication Disorders equips majors with pre-professional competencies that should enable them to undertake master's study recommended for entrance to the professions of speech-language pathology or audiology (Accredited by the American Speech-Language-Hearing Association).

The department offers programs leading to the Master of Arts degree. Further details may be found in the Graduate School Catalog.

Requirements for Majors

All departmental majors are required to complete 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 distribution requirements for the B. A. degree as well as departmental requirements (A list of acceptable courses for meeting B. A. distribution requirements is available in the Dean’s Office). Students taking department courses to satisfy requirements within the speech 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 the Communication Studies program, students develop a broad understanding of communication and how people communicate in a variety of contexts. Students are encouraged to explore the diversity of perspectives on communication and to concentrate on areas of interest. They examine the aesthetic, interpersonal, political, professional, rhetorical, and socio-cultural dimensions of communication in order to prepare themselves for careers that emphasize communication.

Speech Communication majors in the Communication Studies program are required to complete a minimum of 36 hours from the following courses:

1. Required Introductory Courses.
   Students must complete the following:
   SPC 102 Fundamentals of Interpersonal Communication
   SPC 103 Fundamentals of Public Communication
   SPC 106 Oral Communication of Literature

2. Intermediate Courses.
   Students must complete TWO of the following:
   SPC 245 Small Group Communication
   SPC 247 Argumentation and Critical Thinking
   SPC 256 Speech Play and Performance
   SPC 257 Business and Professional Communication
   SPC 266 Nonverbal Communication
   SPC 267 Public Relations: Oral Communication Strategies
   SPC 277 Interviewing

3. Required Upper Level Courses.
   Students must complete the following:
   SPC 380 Language and Speech Development
   SPC 409 Communication and Human Behavior
SPC 411 Communication and Society 9

4. 300 Level Courses.
Students must complete TWO of the following:
SPC 301 Persuasive Communication
SPC 303 Criticism of Public Discourse
SPC 324 Interpersonal Communication in Everyday Life
SPC 366 Narrative and Communication
SPC 368 Teaching of Speech Communication 6

5. 400 Level Courses.
Students must complete TWO of the following:
SPC 405 Women and Communication
SPC 410 Mass Communication and Human Interaction
SPC 444 Communication Strategies in Political Campaigns
SPC 454 Communication Development in Children
SPC 470 Communication in Organizations
SPC 484 Introduction to Speech Science 6

TOTAL 36

6. Additional Coursework. Students MAY take up to 12 additional credits in department courses beyond the requirements for a major. In addition to courses listed above, students may select:
SPC 110 Introduction to Human Communication
SPC 493 Topics in Speech Communication
SPC 496 Field Experience in Speech Communication
SPC 497/498 Problems in Speech Communication

Program in Communication Disorders

This program is accredited by ASHA, the American Speech-Language-Hearing Association. Students who declare a major in Speech Communication and desire to concentrate in Communication Disorders must meet a set of special entrance requirements to that program. The requirements are as follows: An overall G. P. A. of at least 2.5, an essay explaining the student’s rationale for choosing the major in Communication Disorders, and a statement of future professional goals. All materials are due before April 1 of the academic year preceding desired entrance to the program. Rationale and application materials are available in the departmental office (315 Stevens Hall) or at the Conley Speech and Hearing Center (North Stevens). Special provisions are made for transfer students.

All students in Communication Disorders are expected to take advantage of the laboratory and service opportunities provided through the Conley Speech and Hearing Center. The Center provides training opportunities for those preparing for careers as speech-language clinicians and provides services for persons who are speech, language, or hearing impaired.

Required Courses for Students in Communication Disorders Program:
SPC 130 Introduction to Communication Disorders
SPC 381/382 Fundamentals of Speech Pathology
SPC 483 Anatomy and Physiology of the Speech Mechanism
SPC 486 Clinical Practicum I
SPC 388 Hearing Impairment
Plus either:
SPC 487 Organic Speech Disorders
SPC 389 Introduction to Audiology

Other departmental courses appropriate for students in Communication Disorders include SPC 102, Fundamentals of Interpersonal Communication; SPC 110, Introduction to Human Communication; SPC 245, Small Group Communication; SPC 277, Interviewing; SPC 324, Interpersonal Communication in Everyday Life; SPC 496, Field Experience; SPC 454 Communication Development in Children; and SPC 493, Topics in Speech Communication.

The undergraduate has the background which can lead to the advanced study necessary in the attainment of Professional Certification in the State of Maine and/or the Certificate of Clinical Competency which is awarded by the American Speech and Hearing Association.

Courses in Speech Communication

SPC 102 Fundamentals of Interpersonal Communication
The basic elements of interpersonal communication, with special emphasis on developing knowledge and skills applicable to face-to-face interactions between individuals and in small groups. Participation in research to a maximum of 3 hours is expected. Cr 3.

SPC 103 Fundamentals of Public Communication
The nature and problems of public speech com-
munication, 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 Critical Thinking
An introduction to the principles of decision-making through critical thinking as it applies to reasoned advocacy. Practical application of these principles through classroom experience. Prerequisites: SPC 102 or SPC 103 or SPC 106 or SPC 110 or permission. Cr 3.

SPC 256 Speech Play and Performance
Study of creative and aesthetic dimensions of communication and language. Examines how people use speech play and performance (for example, word play, joking, advertising, jingles, storytelling, performing literature) and what happens when they do. Course focuses on performance as a cultural event in everyday life as well as in society and the media. Students develop both analytic and performance skills. Prerequisites: SPC 102 or SPC 103 or SPC 106 or SPC 110. 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 Everyday Life
The advanced study of interpersonal communication as it functions across a range of human relationships, such as family, friends, professions and organizations. Examines perspectives, theories, and research on communication in everyday life. Prerequisite: SPC 102 or SPC 110 or by permission. Cr 3.

SPC 366 Narrative and Communication
A study of narrative, or storytelling, as a way of communicating in conversation, oral performance and literature: what stories are told to whom, how stories are told, and the forms and functions of narrative. Narrative will be considered in a variety of communication settings, for example, in the family, in organizations, in friendship groups and subcultures. Prerequisites: SPC 102 or SPC 103 or SPC 106 or SPC 110 or by 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, microteaching, 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 inter-relationships 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 454 Communication Development in Children
Examines the development of pragmatic communication behaviors in children (primarily preschool through grade 8). Strategies for assessing, researching, and facilitating children’s communicative development are considered. Prerequisite: Juniors or seniors. Cr 3.

SPC 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 two client contact hours each week, plus weekly supervisory conference. May be repeated for a maximum of eight credits. Prerequisite: SPC 381, SPC 382 and permission of Coordinator. Cr 1-4.

SPC 487 Organic Speech Disorders

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.

PC 496 Field Experience in Speech Communication
Approved work experience for departmental majors in the application of speech communication to practical, theoretical or research problems in any public service agency, business, or other setting approved by the department. Requirements include an initial written application showing the projected experience and its relevance to speech communication, conferences with faculty supervisor, periodic logs or summaries, plus a final written report. May be repeated up to 6 hours. Prerequisites: 2.0 overall grade point average with at least a 2.5 in SPC courses, 9 hours beyond 100 level courses in SPC and permission of the departmental field experience committee. Cr 1-3.

SPC 497 Problems in Speech Communication I
For the advanced student desiring to study a particular problem under the guidance of a member of the staff. Prerequisite: permission of department chairperson. Cr 1-3.

SPC 498 Problems in Speech Communication II
A continuation of SPC 497. Cr 1-3

SPC 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

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

SPC 579 The Theory of Composition
A study of rhetorical, stylistic, and cognitive perspectives, from classic formulations to current research, on the nature of written composition and issues in composition teaching. (This course is identical with ENG 579).

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.

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.

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.

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.

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.).

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.

SPC 593 Topics in Speech Communication
Advanced study of selected topics in speech communication. Prerequisite: Permission.

Interdisciplinary Courses

INT 480 (ANT, SOC, SPC) 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: INT 410 or permission of instructor.

INT 501 (ANT, PSY, SPC) Discourse Analysis
Sociological, linguistic, ethnographic, and cognitive sciences approaches to the study of discourse. Emphasis on spoken discourse: Narrative, conversation, talk in courtroom, classroom, and clinical settings. Prerequisite: INT 410 or permission.
School of Nursing

Lea Acord, Director and Associate Professor

Associate Professor Valerie Hart-Smith; Assistant Professors Elizabeth Bicknell, Mary Regan Brakey, Judy Kuhns-Hastings, Jill Perrone, Mickey Pike, Terese Shipp, Shirley Starrett, Mary Ellen Symanski, Jean Symonds, Carol Wood; Instructors Sally Carlisle; Manager, Learning Resource Center and Cooperating Assistant Professor of Nursing Irene Marshall

Purpose

The purpose of the baccalaureate program is to prepare a professional generalist practitioner of nursing who, through the use of the nursing process, can assist individuals, families and groups in a variety of settings to achieve and maintain optimal health.

Curriculum Overview

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tbody>
<tr>
<td><strong>Freshman Year</strong></td>
<td><strong>Sophomore Year</strong></td>
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<tr>
<td>BCH 207 Fundamentals of Chemistry</td>
<td>BCH 208 Elementary Physiological Chemistry</td>
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<tr>
<td>BIO 100 Basic Biology</td>
<td>ZOL 208 Anatomy and Physiology</td>
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<tr>
<td>PSY 100 General Psychology</td>
<td>SOC 101 Introduction to Sociology</td>
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<td>ENG 101 Freshman Composition</td>
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<td>Fine Arts</td>
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<table>
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<tr>
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<tr>
<td><strong>Sophomore Year</strong></td>
<td><strong>Junior Year</strong></td>
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<tr>
<td>MCB 300 General Microbiology</td>
<td>NUR 305 Nursing Care</td>
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<tr>
<td>MCB 305 General Microbiology Laboratory</td>
<td>Management of Women and Newborns</td>
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<tr>
<td>PHI Philosophy</td>
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<tr>
<td>Growth and Development I</td>
<td>NUR 307 Nursing Care</td>
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<tr>
<td>Fine Arts</td>
<td>Management of Infants and Children</td>
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<tr>
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<tr>
<td><strong>Junior Year</strong></td>
<td><strong>Junior Year</strong></td>
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<tr>
<td>NUR 300 Health Assessment Through the Lifespan</td>
<td>NUR 305 Nursing Care</td>
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<tr>
<td>NUR 301 Nursing Care Management of Adults I</td>
<td>Management of Women and Newborns</td>
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<tr>
<td>ZOL 303 Pathophysiology</td>
<td>NUR 307 Nursing Care</td>
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<tr>
<td>PSY 312 Abnormal Psychology</td>
<td>Management of Infants and Children</td>
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<tr>
<td><strong>Junior Year</strong></td>
<td><strong>Junior Year</strong></td>
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<tr>
<td>NUR 305 Nursing Care</td>
<td>ZOL 404 Fundamentals of Pharmacology</td>
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<tr>
<td>NUR 410 Health Related Research</td>
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</table>
PROGRESSION TO THE JUNIOR YEAR IN THE SCHOOL OF NURSING IS CONTINGENT UPON SUCCESSFUL COMPLETION OF ALL PREREQUISITES WITH "C" GRADES AND A GRADE POINT AVERAGE OF 2.25.

Education for the practice of professional nursing demands a substantial knowledge of the social, behavioral and biological sciences as a theoretical base. Beginning in the sophomore year, nursing courses are taken concurrently with courses from other disciplines, thus contributing to the development of the liberally educated practitioner.

The freshman year establishes a foundation for the study of nursing with an introduction to concepts and theories related to understanding the principles of nursing practice. The first nursing course is given in the sophomore year with focus on introducing the student to the professional role of the nurse. Clinical study begins in the junior year, continues throughout the senior year and includes care of patients/clients in a variety of settings such as hospitals, community health agencies, long-term care facilities, schools and industry.

During the senior year, student experiences are planned to encourage synthesis of the knowledge of the preceding years as it affects individuals, families, groups, and communities. The role of the professional nurse that is introduced in the sophomore year and augmented during the junior year is expanded during the senior year.

The program provides a foundation for graduate and continuing education in nursing and serves as a stimulus for continuing intellectual and personal development. Students who successfully complete the undergraduate program of studies (123-126 credits) are eligible to take the licensure examination administered by the Maine State Board of Nursing or comparable Boards in other states. Graduates who successfully pass the licensure examination are eligible to practice nursing as Registered Nurses (R.N.) in the state in which the examination was written.

Program Objectives

The graduate of the undergraduate program will:
1. synthesize theoretical and empirical knowledge from nursing, the behavioral and the physical sciences and humanities, to provide rationale for professional nursing practice.
2. utilize the nursing process to assist individuals, families, groups and communities throughout the life cycle to promote, maintain, and restore optimal health.
3. demonstrate ethical responsibility, professional accountability, and client advocacy in the practice of nursing.
4. utilize principles of teaching and learning to assist clients to achieve optimal health.
5. analyze the findings of health-related research in planning his/her own professional nursing practice.
6. develop a commitment to life-long learning.
7. utilize leadership skills in collaboration with consumers and health professionals to effect needed changes in the health care delivery system.
8. develop and identify a personal philosophy of nursing which incorporates a commitment to the profession.

Admission

In keeping with the mission of the University of Maine, the School of Nursing admits students from a variety of settings; directly from high schools, those transferring from other programs within the University system, those transferring from other colleges and universities, and Registered Nurse graduates from diploma and Associate Degree programs in nursing. All students who wish to be con-
Considered for acceptance into the nursing program should file an application with the University of Maine Office of Admissions.

R. N. Students

An "R. N. Studies" program differs from the traditional curriculum in that the School of Nursing has developed a process to assess prior learning. Inherent within the process is the recognition that R. N. s may have attained knowledge and skills in selected which can be demonstrated through specific examinations. In addition, two courses designed for R. N. students assist the student to successfully meet the objectives of the baccalaureate nursing program. Please contact the School of Nursing for further details.

Grading System

All students enrolled in the nursing program must achieve a minimum accumulative Grade Point Average of 2.25 in order to progress to the junior year. Nursing students must earn a minimum grade of "C" (2.00) in all courses, and may take a maximum of (3) credits in the general elective area on a Pass/Fail basis. Clinical courses are sequential and must be passed with a grade of "C" before progression in the program is permitted. Refer to SON Student Handbook for additional policies.

To be eligible for graduation with a Bachelor of Science degree with a major in Nursing, the student must have successfully completed all requirements, have a minimum of 123-126 credit hours and a Grade Point Average of at least a 2.00.

Accreditation

The nursing program is approved by the Maine State Board of Nursing and is accredited by the National League for Nursing. The School is a member of the Council of Baccalaureate and Higher Degree Programs of the National League for Nursing and a member of the American Association of Colleges of Nursing.

General Information

Nursing majors are required to have a medical history and physical examination completed and a report on file at the Cutler Health Center before enrolling in clinical courses. In addition, cardiopulmonary resuscitation (CPR) certification is required prior to clinical experience. Nursing majors must purchase uniforms before entry into the junior year. In addition, a $15.00 course fee is required per semester in the junior and senior years. Clinical learning experiences take place in a variety of settings and geographic locations. It is the student's responsibility to provide her/his own transportation for sophomore, junior and senior clinical experiences. Professional liability and health insurance is strongly recommended for all nursing students.

Courses in Nursing

NUR 200 Professional Concepts in Nursing
This course introduces the student to the professional role of nursing. Knowledge and beginning skills fundamental to nursing and application of nursing science within the health care system is developed by building on students' knowledge in the humanities and the social and physical sciences and by presenting concepts based to nursing theory. Prerequisite: Sophomore standing or by permission. Cr 3.

NUR 300 Health Assessment Through the Lifespan
This course presents the student with content related to health assessment of all age groups. In the laboratory setting, the student is expected to develop the knowledge and skills necessary to conduct an individual assessment utilizing functional health patterns. Emphasis is placed on data collection through the development of communication, interviewing, history-taking and physical examination skills. Prerequisites: Junior standing in School of Nursing or by permission. Cr 3.

NUR 301 Nursing Care Management of Adults I
The course presents the student with scientific knowledge as the basis for professional practice of the art and science of nursing. Functional health patterns are used as the basis for course organization. The student demonstrates psychomotor skills in the learning resource laboratory and begins clinical application of the nursing process in varied inpatient settings. Prerequisites: Junior standing in School of Nursing, NUR 200. NUR 300 or concurrent. Cr 6.

NUR 304 Concepts in Nursing for the Practitioner
This course offers the registered nurse an opportunity to explore the theoretical base of nursing practice. The adult learner is encouraged to explore the use of functional health pattern assessment, the nursing process frame-
work and various nursing theories in his/her understanding of nursing. Prerequisite: Registered Nurse, Junior standing in School of Nursing.

**NUR 305 Nursing Care Management of Women and Newborns**

This course presents the student with a comprehensive coverage of the aspects of reproductive function and sexuality in women from menarche through the childbearing years. Emphasis will be placed upon the holistic care for women and newborns. Functional health patterns are used to identify need for nursing intervention for individuals and families. Students will implement the nursing process in inpatient and outpatient settings. Prerequisites: Junior standing in School of Nursing. NUR 200, NUR 300, NUR 301, ZOL 303. Lec 2, Lab 2. Cr 4.

**NUR 307 Nursing Care Management of Infants and Children**

This course provides students with the knowledge base to develop a comprehensive approach to care for sick children and their families using functional health patterns for holistic assessment. Content focuses on health care needs for sick children and their families within a developmental framework. Clinical experience for practical application is provided via inpatient and outpatient settings. Prerequisite: Junior standing in School of Nursing. NUR 200, NUR 300, NUR 302, ZOL 303. Lec 2, Lab 2. Cr 4.

**NUR 312 Clinical Assessment Test**

The purpose of this course is to validate the prior learning and clinical functioning of Registered Nurse students who are seeking a Baccalaureate Degree in Nursing. This clinical evaluation provides the student an opportunity to demonstrate ability to apply the nursing process to care of individual clients in a safe, appropriate, organized and accountable manner. Prerequisite: Junior standing in the School of Nursing. NUR 200, NUR 300, NUR 301, ZOL 303. Lec 2, Lab 2. Cr 4.

**NUR 400 Health Maintenance and Restoration**

This course provides the student with an opportunity to develop an understanding of complex health problems. Functional health patterns provide the basis for course organization. Nursing strategies relating to health maintenance and restoration are discussed. Independent and collaborative nursing responsibilities are emphasized. Prerequisites: NUR 200, NUR 300, NUR 301, ZOL 303, ZOL 304. Cr 4.

**NUR 401 Nursing Care Management of Adults II**

This course emphasizes the application of the nursing process in care delivery for adult clients with complex needs using functional health patterns. The student gains experience in critical thinking during a series of laboratory sessions. Clinical application occurs in an acute care setting with faculty members. Prerequisites: NUR 200, NUR 300, NUR 301, ZOL 303, ZOL 304. Concurrent: NUR 400. Cr 5.

**NUR 402 Nursing Care Management in the Community**

The student is introduced to the role of the community health nurse and the community as a client. Functional health patterns are used to assess individuals, families and communities. Current issues influencing the health of families and aggregates in the community are examined. The clinical focus includes health promotion, disease prevention, health maintenance and restoration. Clinical experience is offered with clients of different ages selected from a variety of community health agencies. Prerequisites: Senior standing in the School of Nursing. NUR 200, NUR 300, NUR 301, NUR 305, NUR 307, ZOL 303, ZOL 304. Lec 3, Lab 2. Cr 5.

**NUR 406 Management and Leadership in Health Care Systems**

The course provides the student with content focusing on the knowledge and skills essential to the professional role of nursing. Organizational theory is presented as it relates to the practitioner as a member of a group. Theoretical concepts of group structure and interactions in groups are discussed. Issues which affect nursing practice in health care organizations are explored. An experiential component utilizing leadership and management concepts is provided to meet the students' learning objectives. Prerequisites: NUR 200, NUR 300, NUR 301, NUR 305, NUR 307, ZOL 303, ZOL 304. Lec 3, Experiential 3. Cr 4.

**NUR 407 Health Promotion Through the Lifespan**

Students are introduced to the concept health promotion throughout the lifespan. Self-care and health promotion concepts are applied to individuals and families within the framework of functional health patterns. In addition, theoretical material and research findings from nursing and other health-related research provide a basis for understanding the factors which facilitate or inhibit the promotion of health in human beings. Prerequisites: Senior standing in the School of Nursing. NUR 200,
NUR 300, NUR 301, NUR 305, NUR 307, ZOL 303, ZOL 304.  

NUR 408 Psychiatric-Mental Health Nursing  
The professional dimensions of psychiatric nursing, and specific components of psychiatric nursing practice, including interventions in various practice settings, are explored. Nursing diagnosis and research are utilized as the rationale for nursing intervention. Prerequisites: Senior standing in the School of Nursing. NUR 200, NUR 300, NUR 301, PSY 312, ZOL 303, ZOL 304. Lec 2, Lab 6.  

NUR 410 Health Related Research  
Various types and methods of research and concepts basic to the research process will be introduced. Qualitative and quantitative approaches will be addressed. The student will evaluate research studies and consider the implications of research for nursing practice. Students will gain an appreciation of the role of research in the development of the discipline and profession of nursing. Prerequisite: Basic Statistics.  

NUR 411 Senior Seminar for R. N.’s  
A senior synthesis seminar and clinical course for R. N. students. The course builds on concepts from NUR 304 and NUR 410, as well as clinical experience and general education of the participants. Opportunity is provided through an independent clinical experience and seminars to synthesize clinical judgement skills, discuss critical reasoning, apply ethical decision making and to integrate concepts of health promotion throughout the lifespan. Sem 2, Clin 3.  

NUR 420 Women In Health  
This seminar will explore and analyze political, economic and social factors influencing women’s health and social factors influencing women’s health from a feminist perspective. The philosophic emphasis of the course is on concepts of creativity, humanistic care, the autonomy and unique individuality of each participant, and the growth and development of all participants. Prerequisite: Junior standing or by permission.  

NUR 422 Historical Perspectives in the Nursing Profession  
A survey of historical events in nursing and relates selected aspects to current concerns in the profession. Explores at least one component of the history of nursing in the State of Maine. Prerequisite: Junior standing or by permission.  

NUR 423 Ethical Issues in Health Care  
The course is designed to provide the student the opportunity to analyze selected contemporary ethical issues confronting health care professionals. Major ethical theories and principles are introduced and opportunity is provided for students to use a framework when discussing ethical issues. Prerequisite: Junior standing or by permission.  

NUR 424 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 the aged. An experiential component allows the student to broaden learning objectives and specific interest areas. Prerequisite: Junior standing or by permission.  

NUR 426 Conceptual Models for Nursing Practice  
This course considers the theoretical and humanistic basis of nursing practice and education. Explores selected models which address a holistic concept of nursing and health care and which elaborate the perspective of man and environment in interaction. Theories and models are analyzed and informed judgements are made about application to health care. Prerequisite: Junior standing in the School of Nursing or by permission.  

NUR 427 Clinical Judgement  
Clinical problem-solving will be the focus of this 2 credit course. Didactic teaching will utilize the case study method. Learners need not only information, but an opportunity to use the information in a non-threatening manner that results in improved decision-making skills. Prerequisites: Senior standing in the School of Nursing or a minimum of one years’ clinical experience or permission. Lec 2.  

NUR 495 Independent Study in Nursing  
Individualized study in an area of nursing with the permission of the instructor. May or may not have an experiential component. Prerequisite: Junior standing in the School of Nursing.  

NUR 497 Projects in Nursing  
Individualized project in an area of nursing with the permission of the instructor. May or may not have an experiential component. Prerequisite: Junior standing in the School of Nursing.
University College

Charles R. MacRoy, Dean

P. David DeFroscia, 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, Health Information Technology, Human Services, Legal Technology, Liberal Studies, 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
Health Information Technology
Human Services (programs in chemical addiction counseling, child and youth services, developmental disabilities, gerontology, and mental health)
Legal 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.

New applicants and transfer students are normally required to take diagnostic tests in reading, writing, and mathematics. The Liberal Studies, Business Management, and Legal Technology programs require such testing after admission for course placement purposes. The Dental Hygiene, Health Information Technology, and Human Services programs require testing prior to admission determination. All candidates are notified of the testing schedule when they submit their admission applications.
Liberal Studies students who need three or more preparatory courses in reading, writing, and mathematics will be offered a conditional admission to the degree program with the understanding that (a) they will initially be students in the Developmental Studies or Onwards Program (depending on the campus) and (b) they will remain in either program until they earn a "certificate of skills preparation" by passing the required preparatory courses in a mandated semester-by-semester time sequence. After earning this certificate, applicants will then be students in good standing in the Liberal Studies program. Conditional status can generally be satisfied in two semester.

In certain cases, applicants in career programs who require such development work will be referred to the conditional admission status. Such referrals are the prerogative of the applicable chairperson.

For detailed information on University College, contact:
Director of Admissions
University College
Acadia Hall
Bangor, Maine 04401
Telephone: 207-581-6161

Advanced Placement

In certain subjects, candidates who have completed advanced work in secondary schools or have had training and/or experience in certain professional or semi-professional fields, may apply for advanced placement and credit at University College. Candidates interested in advanced placement and credit may take the College Level Examination Program (CLEP) tests, administered by the College Entrance Examination Board. The Office of Testing and Research at UM has established a CLEP Testing Center in Alumni Hall. Inquiries on procedure should be directed to this office.

Duplicate credit may not be granted. For example, credit may not be granted for passing an examination in a field in which a student has already taken the equivalent or a more advanced course. Once the examination is passed, the score and the credit granted by the college dean are entered by the registrar on the student's permanent record. Each case will be considered individually on its own merits.

The Human Services Program offers an Assessment of Prior Learning Program (APLP) in which human service degree candidates may receive advanced standing by demonstrating human service knowledge and competencies. Inquiries should be made to the Human Services Program, Caribou Hall, 581-6030.

Academic Advising

A successful academic performance is enhanced by intelligent, intensive, and meaningful academic advising.

Career students at University College are assigned a specific faculty academic advisor. Liberal Studies students receive academic assistance through faculty-personed advising centers located on both the Orono and Bangor campuses. The faculty academic advisor is responsible for the management of all academic matters for their student advisees. The faculty advisor assists the University College student in course selection and sequence, registration, add/drop transactions, policy information, referral, transfer, and graduation requirements. Periodic meetings during the semester between the faculty advisor and advisee is the norm at University College and academic advising is a personally intensive experience.
Academic Degree Programs

Business Management

Associate of Science Degree Program

Professor King (Chairperson), Assistant Professors Criner and Roper

The Business Management Program is designed to prepare men and women for employment or advancement in business, industry, government, or service organizations as managers or administrative assistants, and to provide an opportunity for self-employed persons to further develop managerial skills.

The Program is offered at the Bangor campus both during the day and in the evening. It will also be offered in the evening at various off-campus locations as sufficient interest is generated.

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 (60) credits are required for the degree. A minimum Program and overall grade point average of 2.0 is also required. Students transferring to the Program must complete at least 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 preparatory courses may be required in appropriate cases. These courses may be taken along with regular program courses but may extend the time required to get a degree.

Specimen Program

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<th>First Semester</th>
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<td>First Year</td>
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<tr>
<td>BUS 101A Economics</td>
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<td>BUS 158A Data Processing I</td>
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<tr>
<td>BUS 104A Financial Accounting</td>
<td>3</td>
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<tr>
<td>ENG 101A Critical Written Expression</td>
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<tr>
<td>BUS 201A Marketing</td>
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<tbody>
<tr>
<td>Second Year</td>
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<tr>
<td>BUS 230A Statistics</td>
<td>3</td>
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<tr>
<td>BUS 155A Introduction to Taxation</td>
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<tr>
<td>POS 102A State and Local Government</td>
<td>3</td>
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<tr>
<td>BUS 202A Business Management II</td>
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<td>Elective*</td>
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<tr>
<td>TOTAL HOURS</td>
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*Suggested Electives include:
- BUS 106A Introduction to Real Estate
- BUS 206A Real Estate Law
- BUS 210A Insurance and Risk Management
- BUS 216A Real Property Valuation
- BUS 220A Personal Selling
- BUS 226A Real Estate Practice
- BUS 258A Data Processing II
- BUS 260A The Role of the Designated Broker
- BUS 289A Topics in Business Management
- BUS 294A Cooperative Education/Field Experience
Courses in Business Management

BUS 101A Economics
Economic principles applied to the economy as a whole and to the business firm. Topics include: supply and demand, economics of the firm and resource allocation, business cycle, national income accounting, fiscal and monetary policy. Prerequisite: None. 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

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 106A Introduction to Real Estate
The purpose of this course is to equip the student with an entry level competency in real estate. The course is one of two methods of qualifying for a Sales Agent license under the revised Real Estate License law. As Sales Agents, those who complete the course will be eligible to perform all brokerage services under the supervision of a designated broker. It is the entry level course in the licensing program the university offers. Prerequisite: None. 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 I
Introduction to the principles and techniques of electronic data processing. Emphasis is on practical business applications through an introduction to the use of word processing, data base management, and spread sheet software. Cr 3.

BUS 201A Marketing
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
The course is designed to provide concepts and perspectives which build upon the material covered in BUS102A. Attempts to integrate social sciences as they affect people at work. Students will explore the ways in which people relate to each other in the workplace and relate to the business organization. Prerequisite: BUS102A. 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: BUS103A. 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: BUS104A. Cr 3.

BUS 206A Real Estate Law
This course 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. Course content covers the prescribed aspects of Real Estate Law. Prerequisite: Sales Agent License. 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: BUS102A or instructor’s permission. Cr 3.

BUS 212A Business Management Seminar
A seminar composed of second year students and a faculty member meeting on a regular basis in small groups for analysis and discussion of concepts and topics in business management. The topics discussed will vary from time to time depending upon the students en-
rolled in the course and availability of faculty. Prerequisite: second year students only. 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: BUS104A or by permission of instructor. Cr 3.

BUS 216A Real Property Valuation
One of three courses for those preparing for the Maine Real Estate Associate Brokers' License. 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. Prerequisites: BUS206A. Cr 3.

BUS 220A Personal Selling
The course is a basic course in salesmanship or selling. The objective is to develop basic persuasive abilities, especially those which underlie leadership. The role of selling in the management of the business firm is emphasized. Cases, role playing and projects are used. The students develop sales presentations. Cr 3.

BUS 226A Real Estate Practice
One of three courses for those preparing for the Maine Real Estate Associate Brokers' License. This course covers all the general functions of real estate brokerage in Maine including listings, sales, financing, mathematics, advertising, and closing procedures. Prerequisite: BUS206A. Cr 3.

BUS 230A Statistics
The nature and use of statistics, including methods of collecting, organizing, interpreting, and reporting data for business management decisions. An introductory course including such topics as graphical and numeric data description, probability, estimation, and hypothesis testing. Prerequisite: MAT101A and second year students only. Cr 3.

BUS 240A Starting and Developing a Business
This course explores the steps required to develop a rigorous plan for starting and operating a business. The objective is for the student to gain experience in developing a business plan and to understand how the planning, production, marketing, and financial aspects of the business organization relate to each other. 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
Professional level microcomputer applications. Students will achieve proficiency in professional level word processing, data base, and spread sheet packages on the microcomputer. Prerequisite: BUS158A or equivalent. Cr 3.

BUS 260A The Role of the Designated Broker
This course is designed to equip the student with the skills required to fill the role of Designated Broker for an agency. Upon successful completion of this course and completion of one year as a full-time licensed Associate Broker, the student will qualify for a Real Estate Broker license in the state of Maine. This course is now a requirement for the Broker's License under the new Real Estate License law. Prerequisite: BUS226A or an Associate Broker license. 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: BUS268A 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.

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**Dental Health Programs**
Associate Professor Graham, Chairperson

**Dental Hygiene**

Associate of Science Degree Program

Associate Professors Bearor, Graham, Lee; Assistant Professor Marsh Perry

A program in dental hygiene provides an attractive opportunity to men and women interested in health careers. The main concern of the dental hygienist is the maintenance of good oral health. The student is educated to perform those duties which can be delegated to dental hygienists according to the Maine Dental Practice Act. These duties include a variety of clinical services, such as patient assessment, instrumentation, dental radiography and application of fluorides and sealants. The student also learns to be an oral health educator, to teach patients and the community the principles of preventive oral health care. The program emphasizes the dental hygienists’ role in the prevention of oral disease. Laboratory equipment and a modern dental hygiene clinic are among the facilities provided 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.

The curriculum is designed to give the student a well-rounded foundation in health sciences, specific knowledge and clinical skills in the dental sciences, and an understanding in the humanities. The courses are particularly suited to those who have a sincere interest in science and enjoy working with people.

The Dental Hygiene Program is accredited by the commission on Dental Accreditation of the American Dental Association, a specialized accrediting body recognized by the Council on Postsecondary Accreditation and by the United States Department of Education.

Applicants must have a high school diploma or GED certificate. Recommended for admission to the Program is a college preparatory course in high school, including laboratory courses in biology and chemistry. Scholastic Aptitude tests of the College Entrance Examination Board are recommended. Additional diagnostic testing in reading, writing and math may be recommended upon receipt of the application. Students accepted for admission are further required to have a complete physical examination, including dental, optical and hearing examinations, within 3 months prior to entering the program and be certified in Cardiopulmonary Resuscitation (CPR). It is solely the responsibility of the applicant to ensure that the completed application and related materials (high school transcript, any transcripts of grades beyond high school, test scores, recommendations, etc.) are received by the Admissions Office. Early application is encouraged because class size is limited. The deadline for applications is July 15.

**Fee**

Each Dental Hygiene student purchases an instrument kit, a lab coat, clinical uniforms, safety glasses and name pin. Transportation costs to attend extramural clinical sites within the Bangor area are the student’s responsibility as are the licensing examination fees.

The estimated cost including books, beyond room, board, and tuition is approximately $1500 total. 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. Seventy-six (76) credits are required for the degree. All courses in a semester must be passed before the student is admitted to the next semester, with a "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 Food, Agriculture and Applied Science, which enables dental hygiene students to complete a baccalaureate degree in two additional years.

Specimen Curriculum

<table>
<thead>
<tr>
<th>First Year</th>
<th>Second Year</th>
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<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
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<tr>
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<tr>
<td>BIO 160A Anatomy and Physiology</td>
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<td>DEH 212A Pharmacology and Anesthesiology</td>
<td>DEH 252A Dental Specialties</td>
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<td>DEH 254A Ethics, Jurisprudence and Office Management</td>
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## Three Year Option

### First Year

#### First Semester

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#### Second Semester

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### Second Year

#### Third Semester

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<td>DEH 111A Preclinical Dental Hygiene Theory</td>
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<td>DEH 112A Oral, Head and Neck Anatomy</td>
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<td>DEH 113A Dental Radiology</td>
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#### Fourth Semester

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### Third Year

#### Fifth Semester

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<td>DEH 212A Pharmacology and Anesthesiology</td>
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#### Sixth Semester

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<td>DEH 250A Clinical Dental Hygiene III</td>
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<tr>
<td><strong>TOTAL HOURS</strong></td>
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Courses in Dental Hygiene

**DEH 102A Chairside Dental Assisting II**  
Presents the fundamental concepts of endodontics, oral surgery, orthodontics, prosthodontics, periodontics, and pediatric dentistry. Students will gain a knowledge and appreciation for the specialty practices, with theories and functions. Emphasis placed on the dental assistant's role in these areas. Prerequisite: DEA 100A, DEA 101A, DEA 104A, DEH 213A or permission of instructor. Lec 2, Lab 2. **Cr 3.**

**DEH 110A Preclinical Dental Hygiene**  
Practical experience in techniques of instrumentation, operation and maintenance of chairside and support equipment and data gathering procedures. (Pass/Fail grade only). **Cr 3.**

**DEH 111A Preclinical Dental Hygiene Theory**  
Essentials of dental hygiene theory and practice as it relates to clinical experience. Prerequisite: enrollment in Dental Hygiene Program. Lec 3. **Cr 3.**

**DEH 112A Oral, Head and Neck Anatomy**  
A study of tooth morphology and function, structures of the oral cavity, and gross anatomy of the head and neck. Prerequisite: Enrollment in Dental Hygiene Program. Lec 2, Lab 2. **Cr 3.**
DEH 113A Dental Radiology
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: DEH110A, DEH111A, DEH112A, DEH113A, BIO160A, BIO280A, BCH160A. Clinic 8 hours. (Pass/Fail Grade Only). Cr 2.

DEH 151A Clinical Dental Hygiene Theory I

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: DEH112A, BIO160A, BIO280A, BCH160A. 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: DEH112A, BIO160A, BCH160A. 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: BIO160A, BCH160A; DEH150A 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: DEH150A, DEH151A, DEH152A, DEH153A, DEH154A, DEH155A, MCB160A. Clinic 12 hours. (Pass/Fail Grade Only). Cr 3.

DEH 211A Clinical Dental Hygiene Theory II

DEH 212A Pharmacology and Anesthesiology

DEH 213A Dental Materials
Various dental procedures, materials and devices commonly used in dental practice. Prerequisite: Enrollment in the Dental Health Programs. Lec 2. Cr 2.

DEH 214A Periodontology

DEH 216A Dental Materials Lab
(Dental Hygiene Lab)
Cr 1.

DEH 217A Dental Materials Lab
(Dental Assisting Lab)
Cr 2.

DEH 239A Special Topics in Dental Auxiliary Education
Specialized theory and skills in auxiliary disciplines. Topics vary from semester to semester, depending upon expressed interests or identified needs. Designed to fill specialized needs of a given student population or address immediate dental auxiliary issues and trends outside of current course offerings. Prerequisite: Permission 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: DEH210A, DEH211A, DEH212A, DEH213A, DEH214A. 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: DEH211A, DEH212A, DEH213A, DEH214A. Lec 1. Cr 1.

DEH 252A Dental Specialties

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: DEH210A, DEH211A. 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: DEH250A, DEH251A. 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 Professors Graham, Lee

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, including dental radiography, oral health education and business office responsibilities, as expressed in the Maine Dental Practice Act. Students gain practical experience through clinical and laboratory sessions and through assignments to private practices, specialty practices, 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 curriculum includes content in five areas: liberal studies, biomedical sciences, dental sciences, clinical sciences and clinical practice. The program emphasizes the knowledge and skills necessary for chairside dental assisting, but also prepares students to perform clinical support services, selected laboratory procedures and basic business office procedures.

The Dental Assisting Program is accredited by the Commission on Dental Accreditation of the American Dental Association, a specialized accrediting body recognized by the Council on Postsecondary Accreditation and by the United States Department of Education.

Admission

To be eligible for admission, the applicants must have a high school diploma or its equivalent. Applicants are required to have taken one year of a laboratory science, preferably biology or chemistry and have satisfactorily completed courses in mathematics and typing. Students accepted for admission are further required to have a complete physical examination (including dental, hearing, 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. Early application is encouraged because class size in limited. The deadline for making application is July 31.

Fees
Beyond the expense for tuition, room, board, and books, students will purchase a laboratory coat, clinical uniforms, safety glasses and name pin. 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. Thirty-nine (39) credits are required for the certificate. Professional conduct and attitude are expected at all times.

Certification
Upon graduation students will be eligible to take the Certification Examination in General Chairside Assisting and Radiation Health and Safety administered by the Dental Assisting National Board. Successful completion of the examination carries with it the credential of Certified Dental Assistant (CDA) and qualifies the candidate for licensure in Dental Radiography from the Maine Board of Dental Examiners.

Specimen Curriculum

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<tr>
<th>First Semester</th>
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<tr>
<td>BIO 105A Human Biology 4</td>
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<td>DEA 100A Introduction to Dental Assisting 1</td>
<td>DEA 105A Biodental Sciences II 3</td>
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<td>DEA 101A Chairside Dental Assisting I 4</td>
<td>DEA 150A Clinical Practice II 6</td>
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<td>DEA 104A Biodental Sciences I 3</td>
<td>DEA 152A Dental Office Management 3</td>
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<td>DEA 113A Dental Radiology for Dental Assistants 3</td>
<td>DEA 153A Dental Health Education 2</td>
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<td>DEH 213A Dental Materials 4</td>
<td>HUS 103A Interpersonal Relationships in the Helping Professions 3</td>
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<td><strong>TOTAL HOURS</strong> 19</td>
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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 or permission of instructor. Lec 1. Cr 1.  

DEA 101A Chairside Dental Assisting I
Introduces the dental assisting student to the care and use of dental equipment and dental assisting skills, with emphasis on operative dentistry procedures. Prerequisite: enrollment in the Dental Assisting Program or permission of instructor. Lec 2, Lab 4. Cr 4.  

DEA 104A Biodental Sciences I
The essentials of microbiology, dental and oral anatomy, general pathology, pharmacology and medical/dental emergencies as they relate to the dental assistant’s role in patient care. Prerequisite: enrollment in the Dental Assisting Program or permission of instructor. Lec 3. Cr 3.
DEA 105A Biodental Sciences II
A continuation of the study of basic and dental sciences, including the essentials of oral histology, oral embryology, head and neck anatomy, oral pathology, and human nutrition. Prerequisite: BIO 105A or permission of instructor. Lec 3. Cr 3.

DEA 113A Dental Radiology For Assistants
Ionizing radiation, the history of x-rays, their production and properties, radiation measurement, radiation hazards and principles of radiation safety, and interpretation of dental radiographs. The theory and practice of exposing, processing and mounting dental radiographs. Prerequisite: Enrollment in the Dental Assisting Program or permission of instructor. Lec 1.5, Lab 3. Cr 3.

DEA 150A Clinical Practice
Provides the opportunity for experience in chairside dental assisting under direct supervision in private practice offices, community and hospital clinics. Prerequisite: DEA100A, DEA101A, DEA104A, DEA113A, DEH213A, BIO105A. 24 hours clinic. Cr 6.

DEA 151A Dental Therapeutics and Office Emergencies
The essentials of drug action, administration and toxicity of drugs. Emphasis on analgetics, 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: DEH112A, BIO115A. Lec 2. Cr 2.

DEA 152A Dental Office Management
A survey of various aspects of dental office management including communications, appointment control, business and patient record keeping, dental payment plans and inventory control. Information on seeking employment is also included. Prerequisite: enrollment in the Dental Assisting Program or permission of instructor. Lec 3. Cr 3.

DEA 153A Dental Health Education
Emphasis is placed on the theories and techniques of patient education and motivation. Discusses prevention and control of dental diseases, and the role of the dental assistant in dental health education. Prerequisite: DEA104A and enrollment in DEA105A, or permission of instructor. Lec 2. Cr 2.

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: DEA110A, DEA102A, DEA151A, DEH152A, DEH153A, DEH154A. Lec 1. Cr 1.
Health Information Technology

Assistant Professor Benson, (Chairperson); Instructors Livingston, Black, and Gerrie

The Health Information Technology (HIT) program prepares graduates to meet the need for information specialists in health care and related fields. Accreditation by the Committee on Allied Health Education and Accreditation (CAHEA) of the American Medical Association (AMA), in conjunction with the American Medical Record Association (AMRA), allows graduates of the program to take the national accreditation examination for designation as an Accredited Record Technician (A.R.T.).

Graduates of the HIT program will demonstrate entry level competencies to perform technical skills such as organizing, analyzing, and technically evaluating medical records according to established standards; compiling various administrative and health statistics; coding symptoms, diseases, operations, procedures and other therapies according to recognized classification systems; maintaining and using a variety of health record indexes, special registries and storage and retrieval systems; transcribing medical reports; entering and retrieving computerized health data; and controlling the usage and release of health information.

The HIT curriculum is designed to meet entry level competencies in nine basic areas: management, legal aspects, personnel administration, health information systems, health records, information and retention and retrieval, health statistics, quality assurance systems, and classification and indexing systems. Required courses include 38 credit hours of technical courses, 18 credit hours of general liberal studies, and 7 credit hours of science. Sixty-three (63) credits are required for the Associate of Science degree in Health Information Technology. Within the technical courses, there are three directed clinical experiences in which the students are placed in clinical sites where, with the guidance of a clinical supervisor, they demonstrate competencies in predetermined technical skills. To facilitate the clinical learning experience, the HIT program has affiliation agreements with Maine health care facilities including acute care, long term care, ambulatory care, psychiatric care and various special care sites. Students are required to have a complete physical examination prior to their first clinical experience and to provide transportation to and from the clinical site.

Admission

Applicants must have a high school diploma or equivalent. Recommended high school subjects include English, laboratory science, and algebra. Applicants should be able to type at 35 words per minute (this requirement may be fulfilled within the first semester). Admission testing, administered on campus and a personal interview will be required of all applicants. If pre-college preparation courses are indicated, the student will be expected to complete the necessary course work in addition to the required courses of the program. Full and part-time students are accommodated.

Academic Progress

HIT students must earn a grade of "C" or better in all technical (HIT) courses and an overall average of 2.0 or better to graduate. Sixty-three (63) credits are required for the degree. Professional behavior and attitude is expected at all times.
## Specimen Curriculum

### First Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>HIT 101A</td>
<td>Introduction to Health Information Technology</td>
<td>4</td>
</tr>
<tr>
<td>HIT 111A</td>
<td>Health Care Delivery Systems</td>
<td>3</td>
</tr>
<tr>
<td>HIT 131A</td>
<td>Medical Terminology</td>
<td>3</td>
</tr>
<tr>
<td>BIO 160A</td>
<td>Anatomy and Physiology</td>
<td>4</td>
</tr>
<tr>
<td>ENG 101A</td>
<td>Critical Written Expression</td>
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<td></td>
<td><strong>TOTAL HOURS</strong></td>
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### Second Semester

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<tr>
<td>HIT 151A</td>
<td>Legal Issues in Health Information</td>
<td>3</td>
</tr>
<tr>
<td>HIT 161A</td>
<td>Medical Transcription</td>
<td>3</td>
</tr>
<tr>
<td>HIT 171A</td>
<td>Directed Clinical Practice</td>
<td>1</td>
</tr>
<tr>
<td>BIO 280A</td>
<td>Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>BUS 158A</td>
<td>Data Processing</td>
<td>3</td>
</tr>
<tr>
<td>SPE 101A</td>
<td>Oral Communications</td>
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### Third Semester

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<tr>
<td>HIT 201A</td>
<td>Coding and Data Abstracting</td>
<td>3</td>
</tr>
<tr>
<td>HIT 221A</td>
<td>Directed Clinical Practice II</td>
<td>2-5</td>
</tr>
<tr>
<td>HIT 231A</td>
<td>Health Care Statistics</td>
<td>3</td>
</tr>
<tr>
<td>PSY 101A</td>
<td>Introduction to Psychology</td>
<td>3</td>
</tr>
<tr>
<td>General Elective:</td>
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<tr>
<td>HIT 294A</td>
<td>Cooperative Education</td>
<td>3</td>
</tr>
<tr>
<td>ENG 230A</td>
<td>Business, Professional and Technical Writing OR</td>
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</tr>
<tr>
<td>BUS 258A</td>
<td>Data Processing II</td>
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### Fourth Semester

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<tr>
<td>HIT 251A</td>
<td>Quality Assurance</td>
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<tr>
<td>HIT 261A</td>
<td>Personnel Supervision</td>
<td>3</td>
</tr>
<tr>
<td>HIT 271A</td>
<td>Directed Clinical Practice III</td>
<td>2-5</td>
</tr>
<tr>
<td>HIT 281A</td>
<td>Health Information Technology Seminar</td>
<td>1</td>
</tr>
<tr>
<td>HIT 141A</td>
<td>Data Processing and Management of Health</td>
<td></td>
</tr>
<tr>
<td>SOC 101</td>
<td>Introduction to Sociology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL HOURS</strong></td>
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</tr>
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</table>

**TOTAL HOURS 61**

### Courses in Health Information Technology

**HIT 101A Introduction to Health Information Technology**

An introductory course designed to familiarize the student with the fundamental theories and principles of health information. This course will include material an overview of the health information profession, content and analysis of the health record, standards for accreditation and licensure of the health facility, utilization of the master patient index, various filing and storage methodologies, and maintenance of the paper, automated and microfilmed record. Prerequisite: Health Information Technology students only. Lec 3, Lab 2. **Cr 4.**

**HIT 111A Health Care Delivery Systems**

A course designed to introduce students to health care delivery system: the health care industry; governmental, voluntary and for-profit organizations; the various types of health care facilities, occupations and delivery of services; the medical staff organization and bylaws; and ethical issues facing health care today. No prerequisite: **Cr 3.**

**HIT 131A Medical Terminology**

A study of the definitions and construction of medical terms through analysis of word structure. Basic prefixes, suffixes, roots and abbreviations, as well as symptomatic, disease, and operative terminology are covered. Terms related to basic disease processes pathophysiology, patient examination and diagnostic and
surgical procedures, as well as specialized terminology encountered in such areas as respiratory therapy, nuclear medicine, anesthesiology, physical medicine, oncology, psychiatry and pharmacy are also studied. Cr 3.

HIT 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: BUS158A or permission. Lec 2, Lab 2. Cr 3.

HIT 151A Introduction to Legal Issues in Health Information
This course focuses on the legal issues affecting health information such as the patient's rights, an overview of the legal system, confidentiality of patient information, the appropriate release of information, the use of informed consents and malpractice issues. Lec 2, Lab 2. Cr 3.

HIT 161A Medical Transcription
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: HIT131A and typing competency. Lec 2, Lab 2. Cr 3.

HIT 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: HIT101A, HIT111A, HIT131A. Cr 1.

HIT 201A Coding and Data Abstracting
This course focuses on nomenclatures, classification systems, data abstracting and retrieval methodologies, utilizing automated and manual systems. An exploration of recent reimbursement schemes and their effect on health information is offered. Prerequisite: HIT151A, BIO160A, BIO280A. Cr 3.

HIT 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: HIT101A, HIT171A. Cr 2-5.

HIT 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 Health Information Technology students only or with permission, HIT101A. Lec 2, Lab 2. Cr 3.

HIT 251A Quality Assurance
The functions of quality assurance will be inspected through the development of a facility wide Q. A. plan, the development of studies utilizing new and pre-set criteria, problem identification and the follow-up communication system to facilitate resolution of identified problem areas within individual health care departments. Included in this course will be information pertaining to the functions of utilization review and forms design. Prerequisite: HIT201A. Lec 2, Lab 2. Cr 3.

HIT 261A Personnel Supervision
An introductory study of personnel supervision in the health information environment, this course focuses on the principles of authority and responsibility, delegation and effective communication; organizational charts, job descriptions and policies and procedures; employee motivation, discipline and performance evaluations. Prerequisite: Health Information Technology students only or permission. Cr 3.

HIT 271A Directed Clinical Practice III
The third 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: HIT201A, HIT221A. Cr 2-5.

HIT 281A Health Information 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. Health Information Technology students only. Cr 1.
HIT 294A Cooperative Education
A professional activity under general supervision of an experienced professional in the field. Opportunity for the student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. A high degree of responsibility is placed on the student for developing learning objectives and securing the approval of a faculty member for academic credit for the learning involved. Prerequisite: No first semester freshmen. Cr 1-3.

Human Services
Associate of Science Degree Programs

Professor Mary L. Cormier (Chairperson); Associate Professors Scott, Setter; Assistant Professor Samuelian.

Human Service Programs are offered in chemical addiction counseling, children and youth services, developmental disabilities, early childhood, gerontology, and mental health. The Programs are occupational programs designed to prepare generalists for direct-care and first-level supervisory positions in human services. Graduates are employed as human service workers in a wide variety of human service programs such as mental health institutes, mental retardation facilities, mental health centers, day care centers, general hospitals, group homes, nursing homes, half-way houses, and community-based programs. Human service workers function as mental health workers, recreation workers and activity directors, outreach workers, community support workers, child-care workers, 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. Sixty-three (63) credits are required for the degree.

The faculty and administration reserve the right to admit and retain only those students who, in their judgment, possess academic, health, and personal suitability for the Human Service Programs. Health and personal suitability criteria will be communicated to each student in writing at the beginning of the student’s program. Student assessment is carried out by the faculty on a monthly basis.

The Human Services Program faculty and administration reserves the right to make curriculum and policy changes as necessary for
continued high level professional education. Students will be apprised of such changes and informed of available options.

Admission
A high school diploma or its equivalent is required for admission. In addition to testing and a successful personal interview, two positive letters of recommendation are also required for admission. The letters of recommendation must be from human services professionals who can attest to the applicant’s potential to be effective in helping relationships. If testing indicates the need for college preparatory courses, the student will be advised to take a lighter load which may result in an extension of the program beyond the usual 2 year period.

Degree
Upon successful completion of this Program, the student will be awarded the Associate of Science in Human Services.

Transportation
Transportation to and from classes and practicum locations is the student’s responsibility.

Registration
It should be noted that any HUS student wishing to register in any one semester for more than 16 semester hours (exclusive of Physical Education) must obtain permission from his or her advisor.

Chemical Addiction Counseling
This career program provides the graduate with skills necessary to work as a generalist human service worker in areas of prevention, treatment, rehabilitation, and after-care programs related to chemical addiction.
Candidates for admission must be committed to a career of working with people whose lives have been touched by alcoholism or drug addiction. Individuals recovering from alcoholism or other addictions are particularly encouraged to apply. Former alcoholics or drug addicts must have demonstrated quality sobriety or abstention to be admitted to the Program.

Specimen Curriculum

<table>
<thead>
<tr>
<th>First Year</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>ENG 101A Critical Written Expression</td>
<td>3</td>
</tr>
<tr>
<td>HUS 100A Introduction to Human Services</td>
<td>3</td>
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<tr>
<td>HUS 101A Group Processes</td>
<td>3</td>
</tr>
<tr>
<td>PSY 101A Introduction to Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 101A Introduction to Sociology</td>
<td>3</td>
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<tr>
<td><strong>TOTAL HOURS</strong></td>
<td>15</td>
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</table>
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

<table>
<thead>
<tr>
<th>First Year</th>
<th>Second Year</th>
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<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>ENG 101A Critical Written Expression</td>
<td>HUS 102A Practicum in Human Services</td>
</tr>
<tr>
<td>HUS 100A Introduction to Human Services</td>
<td>PSY 301A Developmental Psychology</td>
</tr>
<tr>
<td>HUS 101A Group Process</td>
<td>BIO 105A Human Biology and Lab</td>
</tr>
<tr>
<td>PSY 101A Introduction to Psychology</td>
<td>HUS 120A Child Mental Health</td>
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<tr>
<td>SOC 101A Introduction to Sociology</td>
<td>1 Introductory Course</td>
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<td>TOTAL HOURS 15</td>
<td>TOTAL HOURS 17</td>
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<table>
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<tr>
<th>Third Semester</th>
<th>FOURTH Semester</th>
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<tbody>
<tr>
<td>HUS 203A Practicum in Human Services</td>
<td>HUS 204A Practicum in Human Services</td>
</tr>
<tr>
<td>SPE 101A Oral Communications</td>
<td>HUS 207A Behavioral Research Methodology</td>
</tr>
<tr>
<td>HUS 205A Interviewing and Counseling</td>
<td>HUS 211A Alcohol Treatment and Rehabilitation</td>
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<tr>
<td>HUS 221A Adolescent Mental Health</td>
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<tr>
<td>1 Introductory Course</td>
<td>TOTAL HOURS 15</td>
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<td>TOTAL HOURS 16</td>
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Gerontontology

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.

Specimen Curriculum

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>ENG 101A Critical Written Expression</td>
<td>HUS 102A Practicum in Human Service</td>
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<tr>
<td>3</td>
<td>4</td>
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<tr>
<td>HUS 100A Introduction to Human Services</td>
<td>PSY 301A Child and Developmental Psychology</td>
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<tr>
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<td>3</td>
</tr>
<tr>
<td>HUS 101A Group Processes</td>
<td>BIO 105A Human Biology</td>
</tr>
<tr>
<td>3</td>
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<tr>
<td>PSY 101A Introduction to Psychology</td>
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<td>3</td>
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<tr>
<td>HUS 203A Practicum in Human Services</td>
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<tr>
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<tr>
<td>HUS 140A Introduction to Gerontology</td>
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<td>SPE 101A Oral Communications</td>
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<td>Elective*</td>
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<td>3</td>
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<td>TOTAL HOURS</td>
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The first semester is offered during the spring semester. Applications are accepted during the summer and fall semesters.

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.
### 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.

**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, psychodrama, and sociodrama. Small group studies itself and puts communication and sensitivity skills into practice.

**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 rela-
Interpersonal Relationships in the Helping Professions
Theories of behavior management, learning, and motivation are presented as a foundation of helping; followed by related skill development. The development of verbal and nonverbal interpersonal relationship skills will include listening and attending skills, cognitive and affective responses, leading responses, and self-involving responses. Principles of interviewing. Assertiveness skills.

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.

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.

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.

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.

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.

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: permission of instructor. Divided between field experience and seminar.

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 majors, HUS 102A.

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; HUS203A. 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: PSY101A 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. Prerequisite: PSY101A or permission of instructor. 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: PSY101A. 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. Prerequisite: PSY101A. 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: HUS110A. Cr 3.

HUS 212A Prevention and Early Detection of Substance Abuse
An indepth 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 affects 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: HUS211A. Cr 3.

HUS 213A Drugs: Use and Abuse
An introductory course that approaches the drug issue from both the medical and psychosocial 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 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: PSY101A 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: HUS101A or permission of the instructor. Cr 3.
HUS 216A Supervision in Human Services
The focus of this course is to establish an understanding of the theoretical concepts of supervision 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: PSY101A. 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: HUS120A or permission of instructor. 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: HUS130A 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: 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: BIO105A. 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: HUS130A, HUS150A. Cr 3.

HUS 260A Senior Seminar
Subjects will be selected that augment the human service curriculum. 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: Human Services Degree Candidates. 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: HUS102A, HUS203A, HUS204A 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, paralegal or legal assistant, criminal justice planner, witness advocate, municipal police officer, state police officer, sheriff, insurance investigator, claims adjustor, private security investigator, security systems specialist, fish and game warden, coastal warden, park ranger, forest ranger, U. S. customs officer, U. S. border patrol officer, Internal Revenue Service intelligence agent, juvenile officer, probation officer, corrections specialist, social worker, criminal justice instructor.

The curriculum provides a balanced foundation in liberal arts courses, professional courses, and electives. There are eight required professional courses such as investigations, forensics, organization and management, criminal law for students with career goals in the area of criminal justice and civil litigation, legal research, real estate transfers, and estate administration for students with career goals as paralegals. Required liberal arts courses are in the social and political sciences and the humanities. Career electives are offered to enable students to pursue their own special professional areas of interest in criminal justice or para-legalism such as juvenile justice, business and industrial security, consumer law, and domestic relations. Additional electives also may be used in the liberal arts and other areas.

Sixty (60) credits are required for the degree. A minimum Program and overall grade point average of 2.0 is also required. Students transferring to the Program must complete at least 15 hours of the professional courses as well as satisfying all other program requirements.

Applicants must have a high school diploma or its equivalent. Scholastic aptitude and professional or college ability tests may be recommended or required. Pre-college preparatory courses may be required in appropriate cases. These courses may be taken along with the regular program courses but may extend the time required to get a degree.

The Legal Technology Program also offers a Certificate in Paralegal Studies upon the completion of eight courses. Five of these courses are required by the department: LET 100A, Introduction to the Legal System; LET 105A, Legal Research and Materials; LET 212A, Real Estate Transfers; LET 216A, Principles of Litigation; and LET 218A, Estate Administration. The other three may be chosen from the following: LET 120A, Principles of Criminal Law; LET 260A, Constitutional Law; LET 222A, Domestic Relations; BUS 103A, Business Law I; BUS 158A, Data Processing I; and other courses approved by the department.

Specimen Program

Following are suggested sequences for students with differing career goals. These sequences represent the usual schedule of course offerings.
## Criminal Justice

### First Year

#### First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>LET 100A Introduction to the Legal System</td>
<td>3</td>
</tr>
<tr>
<td>LET 110A Principles of Organization and Management I</td>
<td>3</td>
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<tr>
<td>LET 120A Principles of Criminal Law</td>
<td>3</td>
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<tr>
<td>ENG 101A Critical Written Expression</td>
<td>3</td>
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<tr>
<td>SPE 101A Oral Communications</td>
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<td><strong>TOTAL HOURS</strong></td>
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#### Second Semester

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>LET 150A Principles of Organization and Management II</td>
<td>3</td>
</tr>
<tr>
<td>LET 160A Introduction to Forensics</td>
<td>3</td>
</tr>
<tr>
<td>LET 170A Legal Technology Report Writing</td>
<td>3</td>
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<tr>
<td>Career Elective</td>
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<td>Liberal Arts Elective</td>
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<tr>
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<tbody>
<tr>
<td>LET 200A Principles of Investigation</td>
<td>3</td>
</tr>
<tr>
<td>ENG 230A Business, Professional and Technical Writing</td>
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<tr>
<td>Career Elective</td>
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#### Fourth Semester

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<tr>
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<tbody>
<tr>
<td>LET 260A Constitutional Law</td>
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<tr>
<td>Career Elective</td>
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<tr>
<td>Liberal Arts Elective</td>
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<td>Free Elective</td>
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<td><strong>TOTAL HOURS</strong></td>
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## Paralegal

### First Year

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<tr>
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<tr>
<td>LET 105A Legal Research and Materials</td>
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<tbody>
<tr>
<td>LET 216A Principles of Litigation</td>
<td>3</td>
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<tr>
<td>LET 218A Estate Administration</td>
<td>3</td>
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<td>Career Elective</td>
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<td>Liberal Arts Elective</td>
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<td>ENG 230A Business, Professional and Technical Writing</td>
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</tbody>
</table>
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: LET110A, LET120A. 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: LET100A 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 3.**

**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: LET100A. **Cr 3.**

**LET 294A Cooperative Education/Field Experience**  
Pre-planned work experience for the Legal Technology student, combining suitable paid work and/or volunteer work in the community and academic courses and supervision. The student may hone the skills learned in academic course work while obtaining job experience and evaluating his/her chosen career. Prerequisite: 30 hours credit and permission from chairperson. (Pass/Fail grade only). **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.**
Liberal Studies

Associate of Arts Degree Program

Associate Professor Kay S. Storch (Chairperson)

The Liberal Studies Program offers every Maine citizen access to two years of high quality college education in the best liberal arts tradition. The Program endeavors to provide a foundation in the humanities, social sciences, mathematics, and natural sciences.

Candidates for admission must have a high school diploma or its equivalent. Exceptions may be made in rare cases by the Chairperson of the Admission Policy committee. It is strongly recommended that recent high school graduates complete the College Entrance Examination Board Scholastic Aptitude Test (SAT). Placement testing is required in the areas of reading, writing, and mathematics. The deadline for fall application is July 31.

Liberal Studies students who need three or more preparatory courses in reading, writing, and mathematics will be offered a conditional admission to the degree program with the understanding that (a) they will initially be students in the Developmental Studies or Onwards Program (depending on the campus) and (b) they will remain in either program until they earn a "certificate of skills preparation" by passing the required preparatory courses in a mandated semester-by-semester time sequence. After earning this certificate, applicants will then be students in good standing in the Liberal Studies program. Conditional status can generally be satisfied in two semesters. Normally, the number of semesters to complete the degree will be more than four for those students who are required to complete two or more preparatory courses.

Students in the Liberal Studies Program will be expected to maintain the same academic level of standing as is currently in effect in other associate degree programs offered by various colleges or divisions of the University.

Upon successful completion of this program, the student will be awarded the degree of Associate of Arts in Liberal Studies. 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*

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>ENG 101A Critical Written Expression (required) 3</td>
<td>SPE 101A Oral Communications (required) 3</td>
</tr>
<tr>
<td>MUS 101A Listening to Music 3</td>
<td>SOC 101A Introduction to Sociology 3</td>
</tr>
<tr>
<td>MAT 110A Problem Solving Using Intermediate Algebra and Geometry 3</td>
<td>BIO 110A Introduction to Biological Science 4</td>
</tr>
<tr>
<td>HTY 105A United States History to 1865 3</td>
<td>HTY 155A United States History from 1865 3</td>
</tr>
<tr>
<td>PSY 101A Introduction to Psychology 3</td>
<td>Elective 3</td>
</tr>
<tr>
<td>TOTAL HOURS 15</td>
<td>TOTAL HOURS 16</td>
</tr>
</tbody>
</table>

*The Specimen Program is one of many which will meet the requirements for the degree. Students will consult with an 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: DRA101A 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: DRA101A 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 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: ENG101A. **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: ENG101A 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: ENG110A or permission of the division. **Cr 3.**

**ENG 225A Intermediate Critical Written Expression**
A continuation of ENG101A 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: ENG101A or equivalent. Open only to UC students. Cr 3.

ENG 230A 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 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: ENG110A or permission of the division. Cr 3.

ENG 245A Survey of American Literature
Thematic analysis of American literature which examines the differences between neoclassic, 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: ENG101A 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: ENG110A, ENG101A 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.

SPE 102A Interpersonal Communication
A basic course concerned with exploring the interactions between people and the management of communication skills which facilitate healthy relationships. Emphasis is placed on human communication theory and skills development. It also examines communication dynamics within helping professions. Prerequisite: SPE101A. 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 normally 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: ENG101A 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 DeFrosia

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. HTY105A and/or HTY155A 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: ENG101A. Cr 3.

**HUM 298A Topics**
A flexible elective in any aspect of literature or language approved by the Humanities staff. Prerequisite: ENG101A and approval of the Humanities staff. Cr 1-3.

**Courses in Mathematics**

Professor Hsu; Associate Professor Zoldi; Assistant Professor Drelles

**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 104A Fundamental Concepts of Mathematics**
This course is an introduction to mathematical thought through the study of fundamental concepts. Topics will be chosen from set theory, logic, number theory, graph theory, topology and groups among others. Prerequisite: One year high school algebra. Cr 3.

**MAT 110A Problem Solving Using Intermediate Algebra and Geometry**
Emphasizes 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: DSM035A 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 pre-
diction 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. Prerequisite: Forest Management Technology. Cr 3.

MAT 142A Algebra and Trigonometry
Algebra and trigonometry, including factoring and fractions, exponents and radicals, linear, quadratic, and fractional equations and inequalities, graphs and functions, linear, quadratic, rational, higher degree and trigonometric functions and solutions to triangles. Prerequisite: Engineering Technology students. Cr 3.

MAT 160A Algebra and Trigonometry
A 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 DSM035A. Cr 4.

MAT 164A Analytical Geometry and Introductory Calculus
Trigonometric identities and equations, inverse trigonometric functions, exponential and logarithmic function, matrix algebra, determinants, progression, elements of analytic geometry including conic sections, polar coordinates, and introductory calculus including derivative and its applications. Prerequisite: MAT142A. Cr 3.

MAT 246A Introductory Calculus
A basic course concerned with the fundamental concepts and applications of the derivative, an introduction to integration and its applications, derivatives of transcendental functions and a variety of integration techniques. Prerequisite: MAT164A. Cr 4.

MAT 261A Calculus I
An introduction to differential and integral calculus. Limits, continuity, differentiation and integration of algebraic functions, applications. Prerequisite: MAT160A 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

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: MAT246A 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
All organ systems of the human body are discussed, including nerves, senses, digestion, circulation, reproduction and hormones. Limited consideration of cell structure and physiology. Lec 3, Lab available, See BIO106A. Cr 3.

BIO 106A Human Biology Lab
An optional laboratory experience for students in BIO105A. May be taken concurrently or following BIO105A. Lab 3. Cr 1.

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 structure and function. Lec 3, Lab 3. Cr 4.

BIO 160A Anatomy and Physiology

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 examines the genetics, physiology, ecology, and evolution of behavior and sociobiology. An evolutionary approach to human behavior is included. Prerequisites:
BIO110A, or BIO210A or BIO135A, or permission of instructor. Lec 3. Cr 3.

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 Health Information Technology and Dental Hygiene students, others by permission. Prerequisite: BIO160A. 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. 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. 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 Surpless

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 self-government 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 POS100A or POS102A or POS200A before taking this course. Cr 3.

Courses in Psychology
Associate Professor Pare; Assistant Professor Grunder

PSY 101A Introduction to Psychology
Introduction to the scientific study and interpretation of behavior. 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.

**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.

**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: PSY101A.

**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. Prerequisite: an introductory psychology course or permission of the instructor.

**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: PSY101A and PSY103A or permission of instructor.

**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.

**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.

**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.

**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.

**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.

**SOC 105A Culture and Society**
An introduction to the fundamental concepts and perspectives of culture. This course sur-
veys 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.

**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: SOC101A 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: SOC101A. 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: SOC101A. 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 elsewhere in this catalog (see Index.)

Bachelor of University Studies

The Bachelor of University Studies presents to the highly motivated adult part-time student the opportunity to coordinate the offerings of the Continuing Education Division and Summer Session into an individually planned degree program. Approved by the faculties of all the colleges of the University of Maine, this program is designed specifically and solely for adult part-time students in the Continuing Education Division.

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 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 Holden, Pinette, Schonberger

Courses offered by this program provide students opportunities to improve their competencies in mathematics, science, writing, reading, and study skills. Students may elect to take these basic skills courses or, if test results indicate the need, may be required to take developmental courses as a condition of admission. Students needing extensive improvement in basic skills will likely need to spend additional semesters at the college to complete degree requirements.

The number of students in the Developmental Studies classes rarely exceeds 18; instruction, therefore, is provided in a small-group setting. A limited number of credits earned in Developmental Studies courses may be accepted for degree credit by some programs. Grades earned in Developmental Studies courses are included in the computation of a student's overall grade point average.

Courses in Developmental Studies

DSE 020A Basic Writing Skills I
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 DSE021A, 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 1-3.

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 DSR061A. (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 DSR061A College Reading and Study Skills II. Prerequisite: Development Studies testing. Cr 3.

DSR 061A College Reading and Study Skills II
Because reading and study skills significantly influence academic performance, this course is designed to provide students opportunities to improve their abilities in these important areas.
Onward Special Services Program

Director Herlihy; Associate Director Ellis; Assistant Professors Devoe, Grady, Goodwin, Green, Herbold, Merrithew, Stearns; Counselors Atkinson; Coordinator of Services for Students with Disabilities, 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 writing, mathematics, science and reading; individual and group counseling; tutoring; mathematics lab, writing lab; supplemental instruction; and services to students with disabilities.

All program services are designed to assist non-traditional students, low income students and students with disabilities achieve their educational goals. At the heart of the Onward Program is the one-to-one personal involvement and contact, especially the development of a close personal relationship between student and staff.

Any student who wants more information about these services or who feels they could benefit from participation in these services should contact the Onward Special Services Program. Our offices are located in the Onward Building on Flagstaff Road. Our telephone number is 581-2320.

Counseling

The Onward Program counselors help students, through individual and small group counseling, to achieve their academic, vocational and personal goals. Counseling provides students with opportunities to gain information, explore values, make decisions, address concerns and resolve problems. Counselors provide a safe, confidential atmosphere where students may discuss and explore attitudes, feelings, values, plans, life styles and problems. Individuals requiring ongoing therapy will be provided with an appropriate referral. Students who work for the Program are encouraged to assist Program counselors in providing support and orientation activities for the new student. Contact the Onward Program, 581-2319.
Office of Services for Students with Disabilities

The primary purpose of the Office of Services for Students with Disabilities is to facilitate the education of students with physical or learning disabilities by providing a point of coordination for any special services they may need while attending UM.

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

The Office of Services for Students with Disabilities, located in the Onward Building, will be happy to supply further information and answer questions. Students with special needs are urged to contact the Counselor/Coordinator of Services for Students with Disabilities, Onward Building, UM, Orono, ME 04469. Phone (207)581-2319. TTY for the Deaf (207) 581-2311.

Tutoring

The Onward Program provides tutorial services for UM students who need academic assistance related to their course work. Tutorial assignments are made in small groups of three to promote and encourage collaborative learning. By working together, students learn how to process course material by sharpening their reasoning and questioning skills. Sessions are process-oriented, learner centered and require the active participation of each group member.

Requests for tutors are accepted during the first 8 weeks of the semester or until funds are exhausted, whichever comes first. Assignments are made based upon the availability of qualified tutors, funding and course demand. For further information, contact the Onward Tutor Program at 581-2319.

Supplemental Instruction

Supplemental Instruction (SI) is an academic support program designed to help students master the content of specific courses in a “learn by doing” atmosphere. SI is offered as a supplement to designated high-risk courses. Three guided study sessions are offered on a weekly basis and attendance is voluntary. Students may attend as many or as few sessions as they feel necessary. However, students are strongly encouraged to attend at least one session per week.

To benefit from these guided study sessions, students must actively participate in the discussions. Various techniques for processing the course material are used: review of notes and note processing; mapping and sequencing information to show relationships among concepts; using the vocabulary of the discipline; taking practice exams and predicting test questions.

For information on which courses have SI attached, contact the Onward Tutor Program at 581-2319.

Mathematics Lab/Writing Lab

Many students enrolled in developmental math courses and other University College math courses can use extra help in completing math requirements. These students are provided additional personalized instruction from a math teacher at the Math Lab located in the Modular Office Building. The Math Lab telephone number is 581-2324.

The Writing Lab exists to provide supplemental instruction in writing. The Writing lab is located in Room 403 Chadbourne Hall, the telephone number is 2620.

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.

**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.

**ONM 012A Introductory Algebra**  
Graphing, writing equations of an solving linear equations, including fractional equations. Solving quadratic equations by factoring and by the quadratic formula. Applications are included.

**ONM 013A Intermediate Algebra**  
Solving radical and quadratic equations. An introduction to functions and their graphs, including cronics. Logarithms and inequalities are introduced. Applications are stressed.

**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.

**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).

**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.

**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.

**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.

**ONS 011A Onward Biology**  
This course is intended to introduce the student to the study of Biology using a 5 kingdom approach while including a review of basic cytology, heredity, photosynthesis, respiration and ecology. Emphasis will be placed on the need for an appreciation for living systems as well as an increased awareness of their importance to the successful and continued existence of all other lifeforms. Prerequisite: Permission of Instructor.

**ONS 012A Onward Chemistry**  
This course is intended to introduce the student to a number of the basic fundamental laws and theories that govern matter and its behavior in nature. Included will be an overview of chemical equations, formulas and their manipulation, gas laws, matter state delineations, solutions, reactions, bonding, and a brief introduction to organic chemistry. Prerequisite: ONS011A or permission.

**ONS 013A Onward Physics**  
This course is intended for students having little or no physics background. A review of the metric system, mechanics, motion in one or more directions, energy, momentum, vectors, gas laws, sound, light, and electricity will be covered. Prerequisite: ONM012A or permission.
Other Academic Assessment and Support Services

Counseling and Testing

Personal counseling and testing are available for all University College students at the Center for Counseling Services in Room 139 Eastport Hall, Bangor, 581-6100.

Placement testing is provided on a drop-in basis on the Bangor Campus in Acadia Hall and at Orono in Chadbourne Hall. To find out specific times you should call 581-6161.

Writing and Mathematics Laboratories

Another vital academic service at University College involves the writing and math labs. Many students may need extra assistance in completing their math and writing requirements. These students as well as those who simply want to enrich their skills are provided additional personalized instruction by professional staff. The laboratories are located in Room 136 Eastport Hall.
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. Annually, over 30,000 people participate in more than 350 conferences, seminars, workshops, short courses, institutes, and symposia. The office is located in Chadbourne Hall.

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 conducted during the late afternoon and evening.

The Division provides a source of continuing education for mature and qualified persons who wish to supplement an earlier education. Courses offered may sometimes be applied toward degree programs or may be primarily for professional or personal use. However, all programs offered are designed to prepare adults to meet the challenge of change and to provide experiences in learning which will lead to a fuller and richer life.

Adult students in Continuing Education Division classes have varied backgrounds and interests. Most of them carry on full-time occupations, have graduated from high school some time ago and have determined for themselves the need for earning a degree or specific courses to be used for personal or occupational development. A number of students who are recent high school graduates are beginning their college career by enrollment in C. E. D. classes.

A large variety of degree credit courses are available on the Orono and Bangor campuses as well as at selected outreach centers. Courses offered may be for degree credit or non-degree credit.

Personnel are available to advise students on course selection and registration procedures. Regular tuition rates are charged for courses offered. Adults who wish to enroll in a C. E. D. course are encouraged to visit the C. E. D. office in Chadbourne Hall, 581-3142.

Summer Session

The University offers a wide variety of courses during the 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.

Students are admitted without examination to the Summer Session. 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-May and ends in August. The bulletin describing courses offered during the summer is issued during the second semester. For further information concerning the Summer Session, contact the 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 at Orono 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.

The Office of Special Programs

The Office of Special Programs on the Bangor campus serves as a one-stop access point for anyone wishing to explore personal enrichment and career development opportunities through continuing education. Specific current activities of Special Programs include the following:

1. personal interviews and follow-up assistance for individuals seeking information and advice regarding and access to
postsecondary opportunities for non-traditional students;
2. a Career Development Center for adults wishing to make career decisions and career changes and needing assistance in preparing to pursue career objectives;
3. a special orientation course designed to ease the returning adult student's transition into postsecondary education;
4. course schedules which are very carefully designed to accommodate the time restrictions of adults with family and work obligations while enabling such students to make consistent and dependable progress toward their associate degrees on the Bangor campus on a part-time basis;
5. carefully selected and scheduled baccalaureate level courses on the Bangor campus for CED students pursuing the Bachelor of University Studies degree;
6. a complete sequence of evening courses leading to the Associate of Arts in Liberal Studies degree at the Adult Education Center in Belfast for area residents;
7. selected courses for off-campus activity in such communities as Bucksport, Dexter, Dover, Ellsworth, Guilford and Milo;
8. opportunities for independent study and television courses for those wishing to supplement their academic programs while limiting their travel to and from campus;
9. cooperative arrangements with a number of off-campus organizations (e.g., the local chapter of the American Institute of Banking, Training and Development Corporation, the Greater Bangor Personnel Association, adult education directors, etc.) to foster access to continuing education opportunities for a variety of constituencies; and
10. a quarterly newsletter (i.e., Options) to promote lifelong learning through sharing information about continuing education opportunities and bolstering morale among continuing education participants.

Orientation Course for Returning Adults: SPS100A, Student Development and Learning Resources - credits 3.

Many of those currently enrolling in postsecondary programs are people who have been away from school for some time and people who did not expect to continue beyond a high school diploma. Because they are usually doubtful of their plans and abilities, such people appreciate an opportunity to readjust to the academic experience, to exercise underutilized academic skills, and to take some time to explore possibilities. This course provides an essential orientation to the postsecondary experience and helps returning adults make the most of that experience by developing the confidence and competence necessary for meeting the challenges involved. Specific course objectives include:
1. to address the concerns and adjustments required of returning adult students, and to make recommendations regarding those concerns and adjustments;
2. to consider the purposes, practices and possibilities of postsecondary education in the modern context, and to recommend strategies for making the postsecondary experience effective for the returning adult student;
3. to assess students' basic academic skills and to provide appropriate follow-up advice and assistance;
4. to introduce and exercise specific academic practices in order to prepare students for the academic challenges ahead; and
5. to encourage consistent self-exploration and discovery in order to plan appropriate next steps.

Career Development Center

The Career Development Center is a resource for adults in need of advice and assistance in making career decisions and in preparing to pursue career objectives. Such individuals include: homemakers and anyone else attempting to enter or re-enter the job market after a period of inactivity; those wishing to make career changes of any kind; and those wishing to explore the possibilities of increasing their potential for progress within their current careers. Specific services include:
1. help in identifying the kinds of work that match an individual's values, interests and needs;
2. descriptions of specific career possibilities, what they entail, and what they require in terms of personal qualities and professional qualifications;
3. help in identifying programs of education and training for meeting specific career requirements; and
4. assistance in taking appropriate next steps toward career objectives.
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. (Pass/Fail grade only.) Cr 3.
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 Colleges of Arts and Humanities, and Social and Behavioral 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 in Newfoundland (Memorial University), Prince Edward Island (University of Prince Edward Island), Nova Scotia (Dalhousie University, Acadia University), New Brunswick (University of New Brunswick, Mount Allison University), Quebec (Universite Laval, McGill University, Universite de Sherbrooke, Concordia University, Universite du Quebec a Chicoutimi), Ontario (University of Toronto, York University, Carleton University, University of Guelph), Alberta (University of Calgary) and British Columbia (University of British Columbia, Simon Fraser University, University of Victoria).

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

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 162 Modern Architecture and Design
ARH 168 Canadian Art
ARH 361 Topics in Art History
ANT 422 Folklore of Maine and the Maritime Provinces
ANT 457 North American French Cultures and Societies
ANT 460 Peoples and Cultures of the Circumpolar Area
ANT 472 North American Prehistory
ANT 490 Topics in Anthropology:
  a. French Canadian Immigration
  b. The Arts of Native Canada
ECO 439 International Trade and Commercial Policy
ECO 440 Canadian Economics: Issues and Policies
ECO 445 Regional Economics
ENG 236 Canadian Literature
ENG 436 Topics in Canadian Literature
FRE 254 Popular Culture in French Canada
FRE 256 French Canadian Civilization
FRE 297 French May Term in Quebec City
FRE 442 French Language of North America
University-wide Programs

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
GEO 350 The Geography of Canada
HTY 111 Canada: From Cartier to Trudeau
HTY 199 Problems in History
HTY 272 The Industrial Worker in America
HTY 458 History of French Canada and Franco-Americans
HTY 459 Colonial Canada
HTY 460 Modern Canada
HTY 482 Canada and the American Economy
HTY 499 Contemporary Problems in History
HTY 521 Canada and the United States, 1783 to the Present
HTY 522 Canadian Economic History
HTY 550 Readings in Bibliography and Criticism in Canadian History
HTY 599 Special Topics in History
POS 243 Canadian Government and Politics
POS 456 Canadian Political Parties
POS 496 International Affairs Internship
POS 531 Topics in Comparative Politics
POS 537 Evaluation and Development of Canadian Government and Politics
POS 587 Problems in International Law (Canada)
SOC 431 Canadian Society

Canadian Related Courses

ANT 221 Introduction to Folklore
ANT 425 Oral History and Folklore
ANT 451 North American Indian Ethnology
ANT 473 Historic Archaeology
ANT 474 Analysis of Historic Artifacts
ANT 570 Seminar in Northeastern North American Prehistory
ANT 573 Advanced Methods in Historic Archaeology
BUA 328 Canadian/U. S. Business: A Comparison
BUA 345 International Management
BUA 376 International Marketing
ECO 439 International Trade and Commercial Policy
ECO 445 Regional Economics

FOL 490 Topics in Foreign Languages: Bilingualism and Biculturalism
FRE 440 Franco-American Civilization
GEO 215 Cultural Geography
GES 324 Geology of North America
GES 543 Quaternary History of Northeastern North America
HTY 199 Problems in History
INT 539 Ice Ages and Humankind
JBR 214 The Foreign Media
OCE 270 Oceanography Today
OCE 370 Introduction to Oceanography
POS 387 International Law
SOC 442 Population and Society

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

Courses in Canadian Studies

CAN 101 Introduction to Canadian Studies
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 the United States, 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.
General

The University of Maine offers its Honors Program to all above-average students who are interested in cross- and inter-disciplinary studies. The Program is based on the belief that genuine excellence in college-level studies means broad competence in areas outside a major field of specialization as well as excellence within it; to that end, Honors courses involve students and faculty from all disciplines and fields at UM. Honors course work allows the student both a range and a flexibility not available in any academic major. The double emphasis on learning which both broadens and deepens has been the foundation for the building of courses in the Program: to expand students’ perspectives by exploring areas of thought not closely related to their major fields, and to allow them to work in their majors, during the junior and senior years, with greater depth than would be possible within a conventional course pattern. Honors study begins with interdisciplinary broadness and culminates in a focused, in-depth project in the major field.

Administrative Structure

The Honors Program is university-wide and is administered by a director. The policy-making body for the program is the Honors Council, consisting of the Honors Director chair, 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&H—Professor Cathleen Bauschatz, Little Hall; BA—Professor Robert Strong, South Stevens Hall; UC—Professor Kay Surpless, Eastport Hall; ED—Professor John Maddaus, Shibles Hall; E&T—Professor Kenneth Mumme, Jenness Hall; FOR—Professor Ray B. Owen, Nutting Hall; and ASA—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.
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
All questions about the University Honors Program should be addressed to Dr. William R. Whipple, 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. Writing Experience Credit.  
**Cr 3.**

**HON 102 Honors Seminar II**
Readings in and discussion on basic texts in Western civilization, from the Enlightenment to contemporary issues. Writing Experience Credit.
**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 HON 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.

**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. Writing Intensive Credit.

**Cr 3.**

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**The Women’s Studies Program**

**General Information**

As part of the Women in the Curriculum Program (WIC), an Interdisciplinary Concentration in Women’s Studies has been developed. The goals of the program are 1) to teach and learn about all women’s experiences, past and present; 2) to make women visible in their similarities and differences; 3) to value personal experience as a way of knowing; 4) to create new knowledge about women and apply it to personal, political, and institutional change; 5) to strengthen the links among women and among women’s programs in the community and on campus; and 6) to empower women by increasing choices in all women’s lives.

To work toward these goals, a Women’s Studies program has been created that enables students to achieve a more complete understanding of the roles, contributions, and experiences of women. The structure provided by the four core courses in Women’s Studies, and the guidance available in the selection of Approved Electives, assures the student a focused and coherent experience.

The Interdisciplinary Concentration in Women’s Studies will contribute significantly to the programs of students who plan careers in such fields as social work, medicine, government, journalism, education, communication, counseling, law, business, or management. Even for those planning careers in areas with no direct focus on women, however, an awareness of the history, culture, and experiences of women can help such students better understand our contemporary world, with its changing roles and patterns for women and men alike.

**Administrative Structure**

A university-wide program, the Interdisciplinary Concentration in Women’s Studies is administered by the Director of the Women in the Curriculum program. General policy for the Women’s Studies program is the responsibility of the WIC Director and the Women’s Studies Committee, which is a subcommittee of the WIC Advisory Committee. The membership of the Women’s Studies Committee is drawn from faculty, students, and the community. Decisions about the Women’s Studies curriculum and about staffing, and the monitoring and evaluation of the program’s quality, are the re-
sponsibility of the WIC Director and the faculty members of the Women's Studies.

Requirements

Students electing the Interdisciplinary Concentration in Women's Studies are required to take an 18-hour program of study that consists of the following:

A. Nine hours in three required core (WST) courses:
   WST 101 Introduction to Women's Studies
   WST 410 Feminist Theory
   WST 480 Senior Seminar in Women's Studies

B. Nine hours chosen from the following:
1. WST 210 Topics in Women's Studies
2. Field Experience (three to six hours)
3. Approved Electives: Courses with 100% content on women:
   ENG 256 British Women's Literature
   ENG 246 American Women's Literature
   ENG 471 Feminist Critical Theory
   ENG 481 Topics in Women's Literature
   PHI 439 Feminist Theory
   SOC 330 Perspectives on Women
   SOC 345 Women, Crime, and Criminal Justice
   SPC 405 Women and Communication

A number of “topics” courses in various departments occasionally focus entirely on women, and other courses have partial content on women that may make them suitable as Approved Electives; other courses have been proposed that will have 100% content on women. For lists of such courses and their availability, contact the WIC office.

Core Courses in Women's Studies

The four core (WST) courses described below have been designed to be interdisciplinary and, as much as the topic allows, multicultural. Additionally, each of the four courses recognizes the diversity of women in such areas as race, class, ethnicity, sexual preference, and religion.

All four of the Women's Studies courses have also been designed to meet the requirements for a Writing Experience course, and approval is being sought; students should contact the WIC office for the final determination. WST 480, Senior Seminar in Women's Studies, has been designed to qualify as a Foreign Perspective course; approval is being sought for this designation, and students should contact the WIC office for information. Students may also undertake directed study at an intermediate or advanced level with WST 298 and WST 498.

Advising and Information

All students electing the Interdisciplinary Concentration in Women's Studies will be assigned a Women's Studies advisor to assist them with designing their program and choosing their courses.

Students, faculty, and others desiring information about the Women's Studies program or its WST courses, or its Approved Electives, may contact the office of Women in Curriculum. All questions about the program should be addressed to the Director of the Women in the Curriculum Program, Shibles Hall (581-1228).

Courses in Women's Studies

WST 101 Introduction to Women's Studies
An introduction to Women's Studies, to its perspective, and to its interdisciplinary nature. Using several disciplines, the class will examine women's positions in western culture and will explore the genesis, the genesis, the development, and the impact of our culture's assumptions about women's nature and women's roles.

WST 201 Topics in Women's Studies
This course provides intermediate level study, from an interdisciplinary perspective, of more narrowly focused topics, such as “Women and Creativity,” “Women and Science and Technology,” and “Ethnic American Women.”

WST 298 Directed Study in Women's Studies
Individual study, research and writing projects in Women's Studies and related areas, conducted under the guidance of a faculty member associated with the Women's Studies program, arranged on request. Prerequisite: WST 101 or permission.

WST 410 Feminist Theory
This course provides an advanced interdisciplinary introduction to the main traditions of feminist theory.

WST 480 Senior Seminar in Women's Studies
This integrated, interdisciplinary, and multicultural course will provide advanced study of a specific topic in Women's Studies, such as “Motherhood in Nature and Culture,” “Wo-
men and Aging,” “Women’s Spirituality,” and “Understandings of Feminity.” Cr 3.

WST 498 Directed Study in Women’s Studies
Advanced individual study, research and writing projects in Women’s Studies and related areas, conducted under the guidance of a faculty member associated with the Women’s Studies program, arranged on request. Prerequisite: WST 101 and Junior or Senior standing and permission. Cr Ar.

Sex and Gender Balanced Courses
The following courses have partial content on women; more information can be obtained from the WIC office or the specific department where the course is housed:

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<th>CHF 200 Family Interaction</th>
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<td>CHF 351 Human Sexuality</td>
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<td>CHF 451 Family Relations</td>
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<td>EDL 420 Changing Roles of Men and Women in Education</td>
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<td>NUR 305 Reproductive/Maternal Newborn Health Care</td>
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<td>PHI 102 Philosophy and Modern Life</td>
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<td>PHI 106 Social Issues in Recent Religious and Philosophical Thought</td>
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<td>PHI 107 Existentialism</td>
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<td>PHI 443 Twentieth Century Marxist Philosophy</td>
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<td>PHI 452 Philosophy of Natural Science</td>
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<td>SOC 329 Sociology of Sex Roles</td>
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<td>SOC 319 Domestic Violence and Social Structure</td>
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Administration and Faculty

Officers of Administration

Officers of the University of Maine

Chancellor: Robert L. Woodbury

President: Dale W. Lick, Alumni Hall
Vice President for Academic Affairs: John C. Hitt, Alumni Hall
Vice President for Administration: Thomas D. Aceto, Alumni Hall
Vice President for Research and Public Service: Gregory N. Brown, Alumni Hall
Vice President for Student Affairs: John R. Halstead, Alumni Hall
Vice President for University Development: Robert Holmes, Jr., Crossland Hall
Associate Vice President for Undergraduate Programs: Marisue Pickering, Alumni Hall
Assistant Vice President for Administrative Services: Alden E. Stuart, Alumni Hall
Assistant Vice President for Business, Industrial, and Governmental Relations: F. Philip Dufour, MaineTech Park
Assistant Vice President for Cooperative Ex-

Officers of Divisions of the University of Maine

College of Applied Sciences and Agriculture: Wallace C. Dunham, Dean, Winslow Hall
College of Arts and Humanities: Edward Laverty, Acting Dean, North Stevens Hall
College of Business Administration: W. Stanley Devino, Dean, South Stevens Hall
College of Education: Robert A. Cobb, Dean, Shibles Hall
College of Engineering and Technology: Norman Smith, Dean, Barrows Hall
College of Forest Resources: Fred B. Knight, Dean, Nutting Hall
College of Sciences: Dagmar Cronn, Dean, Aubert Hall
College of Social and Behavioral Sciences: Julia M. Watkins, Dean, Stevens Hall
University College: Charles R. MacRoy, Dean, Schoodic Hall
Graduate School: Charles E. Tarr, Dean, Winslow Hall
Center for Marine Studies: Robert E. Wall, Director, Coburn Hall
Center for Policy Studies: Steven C. Ballard, Director, Coburn Hall
Central Student Academic Services: Elaine Gershman, Associate Dean, Stevens Hall
Conferences and Institutes: Bruce G. Stinson, Director, Chadbourne Hall
Continuing Education and Summer Session: Robert C. White, Acting Director, Chadbourne Hall
Cooperative Education and Field Experience: Ed M. Andrews, Director, Wingate Hall
Counseling Center: Charles O. Grant, Director, Fernald Hall
Department of Industrial Cooperation: Richard C. Hill, Director, Boardman Hall
Development: David Yarington, Director, Crossland Hall
Environmental Studies Center: Gregory K. White, Director, Coburn Hall
Facilities Management: Thomas P. Cole, Director, Service Building
Facilities Planning: Jeanne Ma, Director, Alumni Hall
Franco American Centre: Yvon Labbe, Director, 126 College Avenue
Honors Program: William R. Whipple, Director, Honors Center
Human Resources: Dale MacDonald, Director, Coburn Hall
Institute for Quaternary Studies: George Denton, Director, Boardman Hall
Institutional Studies: Thomas Skaggs, Director, Alumni Hall
Instructional Systems Center: Andrew Abbott, Director, Shibles Hall
International Natural Resources and Agricultural Programs: James A. Sherburne, Coordinator, Coburn Hall
International Research and Educational Programs: John Benoit, Director, Clapp Greenhouse

Katahdin Area Health Education Program: Rene Attean, Executive Director, Coburn Hall
Laboratory for Surface Science and Technology: William B. Unertl, Director, Sawyer Environmental Research Center
Maine Center for the Arts: Joel B. Katz, Executive Director, MCA
Maine Council on Economic Education: Robert Mitchell, Executive Director, MaineTech Park
Maine Technology Experiment Station: Norman Smith, Director, Barrows Hall
Marketing Media: Pamela Dumas Serfes, Director, Chadbourne Hall
Memorial Union: David M. Rand, Director, Memorial Union
National Center for Geographic Information and Analysis: Andrew Frank, Associate Director, Boardman Hall
Public Safety: Alan G. Reynolds, Director, 166 College Avenue
Residential Life: Scott Anchors, Director, Estabrooke Hall
Retention Programs: Robert Whelan, Director, Alumni Hall
Student Aid: Burt F. Batty, Director, Wingate Hall
Student Health Center: Mark Jackson, Director, Cutler Health Center
University Innovations: Owen Gaede, Director, Alumni Hall
University of Maine Foundation: Thomas Harper, Executive Director, 82 Columbia Street, Bangor
University of Maine Pulp and Paper Foundation: Stanley Marshall, Jr., Executive Director, Jenness Hall
University Press: Elizabeth Johns, Director, Alumni Hall
Women In the Curriculum Program: Evelyn Newlyn, Director, Shibles Hall
## Administration and Faculty

### UNIVERSITY OF MAINE SYSTEM

### BOARD OF TRUSTEES

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<th>Name</th>
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<tbody>
<tr>
<td>Mrs. Eve M. Bither</td>
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<td>Mrs. Patricia M. Collins</td>
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<td>Mr. Duane D. Fitzgerald</td>
<td>President, Bath Iron Works Corporation 700 Washington Street Bath, ME 04530</td>
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<td>Mr. David T. Flanagan</td>
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</table>
Living Emeriti and Emeritae


Bobalek, Edward George (1963-1980). B. S. St. Mary’s College, 1938; M. S., Creighton University, 1940; Ph. D., Indiana University, 1942. Professor Emeritus of Chemical Engineering.


Buck, Charles Elon (1951-1982). B. S., North Dakota State University, 1942; M. S., 1947; Ph. D., Ohio State University, 1951. Professor Emeritus of Microbiology.


Cassidy, Margaret Eileen (1937-1973). Diploma, Sargent School of Physical Education, 1928; B. S., Maine, 1939. Associate Professor Emerita of Physical Education.


Clayton, Mary Morris (1934-1956). B. S., Columbia University, 1918; M. S., University of Rochester, 1925; Ph. D., 1928. Nutritionist Emerita, AES.


Dickey, Howard Chester (1947-1976). B. S., Michigan State University, 1934; M. S., West Virginia University, 1936; Ph. D., Iowa State University, 1939. Professor Emeritus of Animal and Veterinary Sciences.


Dow, George Farrington (1927-1969). B. S., Maine 1927; M. S., 1929; Ph. D., Cornell University, 1938. Director Emeritus of the Maine Agricultural Experiment Station.


Durst, Katherine Miles (1946-1969). B. A. Ohio State University, 1925; B. S., 1925; M. A., 1927; Ph. D., University of Minnesota, 1945. Professor Emerita of Child Development.

Durst, Richard Edward (1949-1971). B. S., Otterbein College, 1929; Ph. D., Ohio State University, 1948; P. E. Professor Emeritus of Chemical Engineering.


Flynn, Carl Munro (1933-1936; 1940-1972). B. A., Maine, 1930; M. A., Wesleyan University, 1932; M. A., Harvard University, 1939; Ph. D., 1940. Professor Emeritus of Zoology and Assistant Dean Emeritus, College of Arts and Sciences.


Getchell, Amasa Stanley (1941-1978); B. S., Maine, 1938; M. S., 1940. Associate Chemist Emeritus.


Giddings, Edwin Lathrop (1946-1948; 1968-1977). B. S., Maine, 1933; M. F., Yale University, 1934. Associate Professor Emeritus of Forest Resources.


Hamm, Philip Lord (1946-1949; 1952-1979). B.
S., Maine, 1943; M. S., 1955. Associate Professor Emeritus of Mathematics.

Hankins, John Erskine (1956-1970). B. S., University of South Carolina, 1924; M. S., 1925; Ph. D., Yale University, 1929. Professor Emeritus of English.


Hill, Beryl Barton (1942-1979). B. S., Massachusetts State University, 1940. Associate Extension Educator Emerita.


Hogan, John Matthew (1961-1977). B. Sc., Rutgers The State University, 1941; Ph. D., 1949 Professor Emeritus of Food Science.


MacCampbell, James C. (1957-1982). B. A., Ohio Wesleyan University, 1939; M. A., Ohio State University, 1946; M. S., Simmons College, 1962; Ph. D., Ohio State University
1957. Director Emeritus of University Libraries.


MacLean, Jean (1958-1975). B. S., Boston University, 1930; B. S. N., Yale University, 1933; M. S., University of Chicago, 1948. Professor Emerita of Nursing.


Martin, Frederic Thurman (1934-1969). Ch. E., Lehigh University, 1925; Ph. D., Johns Hopkins University, 1929; P. E. Professor Emeritus of Chemistry.


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.


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.


**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.


**Simard, Gerald L.** (1967-1977). B. S., Bates College, 1933; Ph. D., Massachusetts Institute of Technology, 1937. Associate Professor Emeritus of Chemical Engineering.


**Speicher, Benjamin Robert** (1937-1974). A. B., Denison University, 1929; M. S., University of Pittsburgh, 1931; Ph. D., 1933. Professor Emeritus of Zoology.


**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.

**Styma, Edmund** (1956-1986). B. S., University of New Hampshire, 1948 Associate Professor Emeritus of Physical Education.


**Taylor, Roger F.** (1946-1983). Dipl., Massa-


**Faculty**

**Abbott, Walter H.** (1960). B. S., 1958, Maine; M. Ed., 1965; Associate Professor of Physical Education.


**Aceto, Thomas D.** (1978). B. S., 1961, Southern Illinois University; Ed. D., 1967; Associate Professor of Physical Education.

**Acheson, James M.** (1968). B. A., 1962, Colby College; Ph. D., 1970, University of Rochester; Professor of Anthropology.

**Acord, Lea G.** (1988). Dipl., 1964, Independence Sanitarium and Hospital School of Nursing; B. S. N. S., 1969, Nebraska Wesleyan University; M. N., 1974, University of Pittsburgh; Ph. D., 1981; Director and Associate Professor of Nursing.


**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.


**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.

**Alford, A. Randall** (1982). B. S., 1974, University of Southern Mississippi; M. S., 1976, Louisiana State University; Ph. D., 1980; Associate Professor of Entomology; Cooperating Associate Professor of Forest Resources.


**Allen, Kenneth W.** (1963). B. S., 1952, Wheaton College; M. S., 1956, Maine; Ph. D., 1959, William Marsh Rice University; Professor of Zoology.

**Alpander, Guvenc G.** (1965). B. A., 1962, Middle East Technical University, Turkey; M. P. A., 1963, Michigan State University; Ph. D., 1966; Nicholas M. Salgo Professor of Business Administration.

**Amar, Francois G.** (1983). B. A., 1975, Temple University; M. S., 1977, University of Chicago; Ph. D., 1979; Assistant Professor of Chemistry.


**Anderegg, Robert J.** (1979). B. S., 1973, University of Wisconsin-Madison; Ph. D., 1977, Massachusetts Institute of Technology; Associate Professor of Chemistry; Cooperating Associate Professor of Biochemistry.


**Annis, C. Herbert** (1964). B. S., 1959, Kansas State University of Agriculture and Applied Science; M. S., 1974; Extension Agent, Knox-Lincoln Counties; Associate Extension Educator.


**Arms, Chadwick C.** (1964). B. S., 1951, University of Vermont; M. S., 1960; Area Dairy Specialist; Associate Extension Educator; Cooperating Associate Professor, Animal and Veterinary Sciences.

**Arrow, Kim D.** (1986). B. S., 1972, 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.


Bassano, Louis V. (1980). B. A. , 1971, Delaware State College; B. S. , 1974, University of Delaware; M. S. , 1975, University of Tennessee at Knoxville; Ph. D. , 1987, University of Maryland; Extension Agent, Washington County; Associate Extension Educator.


Batuski, David J. (1988). B. S. , 1970, United States Air Force Academy; M. S. , 1972, Purdue University; Ph. D. , 1986, University of New Mexico; Assistant Professor of Physics.


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, Ronald E. (1981). B. S. , 1972, Maine; M. S. , 1974; Extension Agent; Associate Extension Educator; Faculty Associate, Human Services.

Beard-Tisdale, Mary Kate (1987). B. S. , 1976, Iowa State University; M. S. , 1984, University of Wisconsin; Ph. D. : Assistant Professor of Surveying Engineering.


Bell, Margaret S. (1978). A. S. , 1977, Maine; B.
508 University of Maine

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.

Benson, Susan M. (1984) B. S., 1976, Seattle University; M. P. A., 1988, Maine; Chair and Assistant Professor of Medical Records Technology. 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; Acting Director, Masters 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.


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; Cooperating Professor of Forest Resources.

Blunt, Barrie E. (1985). B. S., 1976, Michigan State University; M. S., 1979, Florida State University; Ph. D., 1981; Associate Professor of Public Administration.

Blunt, Ronni Sue (1988) B. S. W., 1974, State University of New York at Buffalo; M. S. W., 1979, Florida State University; Instructor of Social Work.

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 First Americans.


Borns, Harold W. (1955). B. S., 1951, Tufts University; M. A., 1955, Boston University; Ph. D., 1959; Professor of Geological Sciences and Quaternary Studies; Cooperating Professor, Maine Agricultural Experiment Station.


Boyle, Kevin (1986). B. A., 1978, Maine; M. S., 1981, Oregon State University; Ph. D., 1985, University of Wisconsin; Assistant Professor of Agricultural and Resource Economics; Cooperating Assistant Professor of Wildlife.


Brakey, Mary Regan (1984). R. N., 1974, Saint Francis Hospital School of Nursing; B. S., 1978, Pace University; M. S., 1984, Seton Hall University; Assistant Professor of Nursing.

Brann, Thomas B. (1976). B. S., 1969, University of New Hampshire; M. S., 1974; Ph. D., 1979, Virginia Polytechnic Institute and State University; Associate Professor of Forest Resources and Forest Engineering.


Bregman, Jay A. (1975). A. B., 1968, Hunter College; M. Ph., 1972, Yale University; Ph. D., 1974; Associate Professor of History.


Briggs, Russell D. (1988). B. S., 1979, State University of New York College of Environmental Science and Forestry; M. S., 1982; Ph. D., 1985; Assistant Research Professor of Forest Resources and Cooperating Assistant Professor of Forest Biology.

Brimmer, Jacqueline (1964). Lic., 1935, University de Lille, France; Dipl., 1937; Assistant Professor of French.


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.

Brogunier, Joseph E. (1969). A. B., 1958, Brown University; M. A., 1964, Purdue University; Ph. D., 1969, University of Minnesota; Associate Professor of English.


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; Professor of Forest Resources.
vania 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.


Caccese, Vincent (1986). B. S., 1979, Drexel University; M. S., 1982; Ph. D., 1985; Assistant Professor of Mechanical Engineering.


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; Acting Chair and Associate Professor of Plant Systematics; Cooperating Associate Professor of Forest Resources.

Cappiello, Paul E. (1988) B. S., 1983, Rutgers University; M. S., 1986, University of Illinois; Ph. D., 1989; Assistant Professor of Landscape Horticulture.


Carlisle, Sally S. (1988). B. S., 1976, University of Southern Maine; M. S., 1982, Boston University; Clinical Instructor in Nursing.

Caron, Sandra L. (1988). B. S., 1979, Maine; M. S., 1982; Ph. D., 1986, Syracuse University; Assistant Professor of Family Relationships.

Carr, Edward F. (1957). B. S., 1943, Michigan State University; Ph. D., 1954; Professor of Physics.


Carter, Katherine K. (1981). B. S., 1974, Central Missouri State University; M. A. T., 1976, Duke University; M. F., 1978; Ph. D., 1980; West Virginia University; Associate Professor of Forest Resources.


Carville, Linwood L. (1960). B. S., 1953, Maine; M. Ed., 1954; Associate Director of Physical Education and Athletics; Assistant Professor.


Chapman, Ben R. (1956). B. S., 1952, Maine; M. S., 1963; Associate Professor of Mechanical Engineering.

Cheng, Hsiang-Tai (1988). B. S., 1980, National Taiwan University; M. A., 1984, Ohio State University; Ph. D., 1985, Virginia Polytechnic Institute and State University; Assistant Professor of Agricultural and Resource Economics.


Chesley, Ross (1972). B. A., 1971, California State University at Hayward; M. P. A., 1973, Golden Gate University; Associate Professor of Law Enforcement.

Chiappone, Anthony D. (1967). B. S., 1954, State University of New York College at Geneseo; M. S., 1961, Syracuse University; Ed. D., 1963; Professor of Education.

Chicoin, Edward M. (1988) B. A., 1980, Southeastern Massachusetts University; Assistant Professor of Naval Science.

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., 1985, Northwestern University; Assistant Professor of Electrical Engineering.
Clark, David E. (1987). B. A., 1974, Boston University; M. S., 1979, Maine; Ph. D., 1986; Assistant Professor of Physics.


Clark-McGrath, Rae (1961). B. S., 1958, Maine; M. S., 1970; Program Leader, Family Living; Extension Educator; Cooperating Associate Professor, Human Development.

Cloutier, Dorothea J. (1976). B. S., 1975, Maine; M. S., 1982, University of Southern Maine; Extension Agent, Somerset County; Associate Extension Educator.

Co, Albert (1978). B. S., 1972, University of the Philippines; Ph. D., 1979, University of Wisconsin-Madison; Associate Professor of Chemical Engineering.


Cohn, Steven E (1971). A. B., 1961, Dartmouth College; Ph. D., 1976, Columbia University; Professor of Sociology.


Cole, Barbara J. W. (1986). B. S., 1981, Colorado State University; M. S., 1983, University of Washington; PHC, 1985; Assistant Professor of Chemistry and Cooperating Assistant Professor of Forest Resources.


Collins, Edward (1962). B. A., 1954, Marshall University; M. A., 1957; Ph. D., 1959, Emory University; Chair and Professor of Political Science.

Comins, Neil F. (1978). B. S., 1972, Cornell University; M. S., 1974, University of Maryland; Ph. D., 1978, University College, Wales; Associate Professor of Physics.


Cook, Mark R. (1983). B. A., 1973, University of York, United Kingdom; Ph. D., 1982; Associate Professor of Physics and Cooperating Assistant Professor of Chemistry.

Cook, Richard A. (1965). B. S., 1965, Maine; M. S., 1968; Ph. D., 1973; Director and Associate Professor, School of Human Development.


Corcoran, Thomas J. (1961). B. S., 1955, Michigan Technological University; M. S., 1960, Purdue University; Ph. D., 1962; Chair of Forest Management and Professor of Forest Resources and Forest Engineering.

Corey, Allan (1983). B. S., 1952, Maine; D. V. M., 1956, University of Toronto, Canada; Associate Professor of Veterinary Sciences.


Coulon, Stephen C. (1987). B. S., 1980, Slippery Rock College; M. A., 1985, Ohio State University; Ph. D., 1987; Assistant Professor of Education.

Coupe, John D. (1962). B. S., 1953, Worcester Polytechnic Institute; M. S., 1957, Clark University; Ph. D., 1960; Professor of Economics.


Cox, Dennis K. (1978). B. M. E., 1965, University of Nebraska; M. M., 1969, University of Colorado; M. A., 1974, West Virginia University; D. M. A., 1978, University of Missouri; Director of the Choral Music Program; Associate Professor of Music.

Craig, Rogers S. (1986). B. S., 1969, University of Florida; M. A., 1970; Ph. D., 1977, Florida State University; Chair and Associate Professor of Journalism and Broadcasting.


Cronan, Christopher S. (1980). B. A., 1973, University of Pennsylvania; Ph. D., 1978, Dartmouth College; Associate Professor, Botany and Ecology; Cooperating Associate Professor, Forest Resources.


Crowder, Bruce J. (1986). B. S., 1979, University of New Hampshire; Assistant Coach of Ice Hockey; Lecturer.


Csavinszky, Peter (1970). Dipl., 1954, Technical University of Budapest, Hungary; Ph. D., 1959, University of Ottawa, Canada; Professor of Physics.


Cyrus, Edgar A. (1960). B. A., 1958, West Virginia University; M. A., 1960, Western Reserve University; M. F. A., 1966; Chair and Professor, Department of Theatre/Dance.

Dagher, Habib-J (1985). B. S., 1980, University of Dayton; M. S., 1982, University of Wisconsin-Madison; M. S., 1984; Ph. D., 1984; Assistant Professor of Civil Engineering.


Davis, Shirley L. (1984). B. S., 1955, Indiana University; M. S., 1958, Cornell University; Assistant Professor of Biology.

Davis, William E. (1969). A. B., 1958, Providence College; M. S., 1961, University of Rhode Island; Ph. D., 1968, University of Connecticut; Professor of Education.


Dearborn, Vance E. (1964). B. S., 1949, Maine; M. A., 1969; Finance and Personnel Officer; Associate Extension Educator; Cooperating Associate Professor, Agricultural and Resource Economics.


Defrosia, Patrick D. (1971). B. S., 1958, West Chester State College; M. A., 1967, Temple University; Ph. D., 1976; Associate Dean of University College and Professor of History.

de los Santos, Tomas (1988). B. A., 1971, Universidad Autonoma de Nuevo Leon; B. S., 1981, Brigham Young University; M. S., 1984, Oregon State University; Blueberry Specialist; Associate Extension Educator.


Deller, Steven (1988) B. A., 1983, Western Illinois University; M. S., 1985, University of Illinois; Ph. D., 1988; Assistant Professor of Agricultural and Resource Economics.

Delphendahl, Johannes (1962). Dipl., 1950, University of Hohenheim, Germany; M. S., 1956, University of Massachusetts; Ph. D., 1961, Michigan State University; Professor of Resource Economics.

Delphendahl, Renate (1967). B. A., 1959, Michigan State University; M. A., 1967, Maine; Ph. D., 1975, University of Zurich, Switzerland; Professor of German.

Denton, George H. (1969). B. S., 1961, Tufts University; M. S., 1964, Yale University; Ph. D., 1965; Director of the Institute for Quaternary Studies and Professor of Geological Sciences.

DeSiervo, August J. (1970). B. A., 1963, Rutgers The State University; M. S., 1966; Ph. D., 1968; Associate Professor of Microbiology; Cooperating Associate Professor of Biochemistry.

Dethier, Bernard (1988) B. S., 1946, California Institute of Technology; M. S., 1947; Ph. D., 1958, Johns Hopkins University; Research Professor; State Climatologist. Devino, William S. (1960). A. B., 1951, University of Vermont; M. A., 1953, University of Connecticut; Ph. D., 1959, Michigan State University; Dean, College of Business Administration; Professor of Business and Economics.

Devoe, Mary Ann (1987). B. S., 1959, Saint Mary's College; M. A., 1960, Michigan State University; Assistant Professor of Developmental Mathematics.


Dill, James F. (1981). B. S., 1972, Maine; M. S., 1974; Ph. D., 1979, Purdue University; Extension Specialist, Pest Management; Extension Educator; Cooperating Professor of Entomology.

Dimond, John B. (1959). B. S., 1951, University of Rhode Island; M. S., 1953; Ph. D., 1957, Ohio State University; Professor of Entomology; Cooperating Professor of Forest Resources.


Doeing, Doris J. (1971). B. A., 1952, University of Missouri; Extension Agent, Cumberland County; Assistant Extension Educator.


Donovan, John W. (1969). B. S., 1964, Husson College; M. S., 1969, University of Rhode Island; Extension Agent, Cumberland County; Associate Extension Educator.


Doty, C. Stewart (1964). A. B., 1950, Washburn University of Topeka; M. A., 1955, University of Kansas; Ph. D., 1964, Ohio State University; Chair and Professor of History.


Drummond, Francis A. (1988) B. S., 1976, University of Rhode Island; M. S., 1982, Michigan State University; Ph. D., 1986, University of Rhode Island; Assistant Pro-

Dube, Olive C. (1957). B. A., 1962, Maine; M. A., 1964; Associate Director, CAPS; Associate Professor, Computer Science.

Dubord, Olve C. (1957). B. S., 1957, Maine; Extension Agent, Franklin County; Assistant Extension Educator.

Duchesneau, Thomas (1967). A. B., 1963, Saint Anselm’s College; Ph. D., 1969, Boston College; Chair and Professor, Department of Economics.

Dunham, Wallace C. (1966). B. S., 1952, University of Vermont; M. S., 1956, Ohio State University; Ph. D., 1971, Cornell University; Dean, College of Life Sciences and Agriculture; Assistant Vice President Maine Agricultural Experiment Station; Professor, Agricultural and Resource Economics.

Dunlap, Robert D. (1949). B. A., 1943, Colgate University; M. S., 1944, Pennsylvania State University; Ph. D., 1949; Professor of Chemistry.


Dwyer, Daniel J. (1988). B. S., 1972, State University of New York at Osewgo; M. S., 1974, Lehigh University; Ph. D., 1976; Associate Professor of Chemistry.


Dwyer, Thad S. (1983). B. S., 1979, Maine; M. S., 1981, University of Idaho; Assistant in Recreational Sports; Lecturer in Physical Education.


Edwards, Patricia (1988) B. A., 1970, Antioch College; M. Ed., 1974, Bowling Green State University; Ph. D., 1988, Kent State University; Assistant Professor of Education.

Ehlers, Manfred (1988) Dipl., 1975, University of Kiel, West Germany; Ph. D., 1983, University of Hannover, West Germany; Associate Professor of Surveying Engineering.


Elgaaly, Mohamed (1985). B. S., 1957, Cairo University, Egypt; M. S., 1961, University of Michigan; Sc. D., 1963; Professor of Civil Engineering.

Ellis, Merrill F. (1976). B. A., 1960, Allegheny College; M. S., 1961, Purdue University; Ph. D., 1963; Director of Clinical Training and Professor of Psychology.

Elliot, Catherine A. (1986). B. Sc. F., 1979, University of New Brunswick, Canada; M. S., 1982, Maine; Ph. D., 1987; Extension Wildlife and Fisheries Specialist; Assistant Extension Educator.

Elliot, George H. (1986). B. S., 1957, Mississippi State University; M. S., 1959, University of Southern California; M. Ed., 1971, Pennsylvania State University; Associate Professor of Electrical Engineering Technology.


Erich, Mary Susan (1987). B. S., 1976, Bethany College; M. S., 1980, Cornell University; Ph. D., 1984; Assistant Professor of Plant and Soil Chemistry.


Evans, Ronald W. (1986). B. A., 1974, Ok-
Ilahoma State University; M. S., 1980; Ed. D., 1986, Stanford University; Assistant Professor of Education.

**Evans, T. Jeff** (1975). B. A., 1968, University of California-Davis; M. A., 1970; Ph. D., 1974; Associate Professor of English.


**Farlow, Stanley J.** (1968). B. S., 1959, Iowa State University of Science and Technology; M. S., 1962; Ph. D., 1967, Oregon State University; Professor of Mathematics.

**Famham, Curvin G.** (1986). B. S. M., 1966, Northern Conservatory; M. M. Ed., 1982, VanderCook College of Music; Assistant Professor of Music and Cooperating Assistant Professor of Education.


**Fastook, James L.** (1977). B. S., 1971, Rensselaer Polytechnic Institute; M. S., 1974, Maine; Ph. D., 1977; Assistant Professor of Computer Science.

**Faulkner, Alaric** (1978). A. B., 1967, Harvard College; Ph. D., 1972, Washington State University; Associate Professor of Anthropology.

**Feichtinger, Oskar** (1970). B. S., 1961, University of Wisconsin-Superior; M. S., 1964, University of Nebraska-Lincoln; Ph. D., 1969, Montana State University; Professor of Mathematics.


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**Pettit, John M.** (1969). B. S., 1958, University of Illinois; M. A., 1966; Ohio State University; Ph. D., 1969, Purdue University; Professor of Speech Communication; Coordinator of Clinical Services and Training.

**Phillips, William J.** (1971). B. A., 1961, Queens College; M. A., 1966, Hunter College; Associate Professor of English; Director of Special and External Programs.

**Philp, James F.** (1983). B. S., 1967, Pennsylvania State University; M. S., 1970; Forestry Specialist; Assistant Extension Educator; Cooperating Assistant Professor, Forest Resources.

**Pickering, Marisue C.** (1973). B. A., 1959, Ohio University; M. Ed., 1962, Boston University; Ed. D., 1979; Executive Assistant to the President; Associate Professor, Speech Communication.


**Pinto, Jeffrey** (1988) B. A., 1981, University of Maryland; M. B. A., 1982, University of Pittsburgh; Ph. D., 1986; Assistant Professor of Management.

**Pinto, Mary Beth** (1988) B. A., 1980, University of Notre Dame; M. B. A., 1982, University of Pittsburgh; Ph. D., 1988; Assistant Professor of Marketing.

**Pliskoff, Stanley S.** (1969). A. B., 1951, New York University; M. A., 1953; Ph. D., 1956; Professor of Psychology.


**Poland, Justin H.** (1978). B. S., 1968, Maine; M. S., 1970, Northeastern University; Ph. D., 1979, University of Colorado; Associate Professor of Mechanical Engineering.


**Pooler, Anne** (1976). B. A., 1964, College of New Rochelle; M. Ed., 1972, Maine; Ed. D., 1975; Assistant Dean for Academic Services; Associate Professor of Education.

**Porter, Gregory A.** (1985). B. S., 1980, Maine; M. S., 1982; M. S., 1985, Pennsylvania State University; Assistant Professor of Agronomy.


**Poulin, Lawrence E.** (1967). B. S., 1950, Maine; M. Ed., 1968; Extension Agent, Hancock County; Associate Extension Educator.


**Pyles, L. Rex** (1964). B. A., 1959, University of Miami; M. A., 1963, University of Michigan; Assistant Professor of Russian.

sumption College; M. A., 1981, Boston College; M. Ed., 1986, Columbia University; Ph. D., 1987; Assistant Professor of Education.

Rabineau, Mona (1988) B. S., Simmons College; M. A., Radcliffe College; Ed. D., Harvard University; Associate Professor of Education.


Ranson, Rolland (1988) B. A., Western Ontario University; Canada; M. S., 1973, Ohio University; Assistant Coach for Men’s and Women’s Cross Country and Track, Lecturer in Physical Education.

Rasaiah, Jayendran C. (1969). B. Sc., 1957, University of Ceylon; Ph. D., 1965, University Pittsburgh; Professor of Chemistry.


Reeves, Alvin F. (1975). B. S., 1963, Indiana University; M. A., 1964; Ph. D., 1968, University of California-Davis; Plant Breeder; Associate Professor of Plant and Soil Sciences.


Reno, Paul W. (1976). B. S., 1966, Fairleigh Dickinson University; M. S., 1971, University of Florida; Ph. D., 1976, University of Guelph, Canada; Associate Professor of Microbiology.


Revelante, Noelia (1980). B. S., 1966, University of Zagreb, Yugoslavia; M. Sc., 1970; Ph. D., 1974; Research Associate Professor of Zoology.

Rhoads, Robert B. (1952). B. S., 1950, Maine; M. S., 1951; Associate Dean of Life Sciences and Agriculture; Professor, Agricultural Engineering; Cooperating Professor, Engineering and Science.


Riley, John G. (1975). B. Sc., 1966, University of Newcastle, England; M. S., 1968; Ph. D., 1971, Cornell University; Chair, Agricultural Engineering; Professor of Agricultural and Forest Engineering.


Risk, Paul H. (1984). A. A., 1962, Pasadena City College; B. A., 1966, California State University; M. S., 1969, University of California-Davis; Ph. D., 1976, Michigan State University; Associate Professor of Forest Resources.


Robbins, Wallace C. (1965). B. S., 1954, Maine; M. S., 1956, University of New Brunswick, Canada; Associate Professor of Forest Technology.


Roberts, Patricia (1988) B. S., 1979, University of Tennessee; Head Coach of Womens Basketball, Lecturer in Physical Education.
Rock, Chester A. (1979). B. S., 1968, Washington State University; M. S., 1971, Stanford University; Ph. D., 1974, University of Washington; Associate Professor of Civil Engineering.

Rog, James A. (1979). B. S., 1964, Kent State University; M. Ed., 1968; Ed. D., 1979, University of Massachusetts, Amherst; Associate Professor, Education, Physical Education.

Rogers, Deborah D. (1982). B. A., 1975, Rutgers The State University; M. A., 1976, University of California-Berkeley; M. Ph., 1979, Columbia University; Ph. D., 1982; Assistant Professor of English.

Roggenbauer, Josef (1961). D. K. M., 1950, University of Vienna, Austria; M. A., 1965, Middlebury College; Ph. D., 1953, University of Innsbruck, Austria; Professor of German.


Rosenwasser, Alan M. (1986). B. A., 1974, City College of New York; M. A., 1976, Northeastern University; Ph. D., 1980; Assistant Professor of Psychology.

Rowe, Richard J. (1959). B. S., 1952, Cornell University; M. S., 1959, Iowa State University; Ph. D., 1969, Cornell University; Professor of Agricultural Engineering.


Rushing, W. Jackson (1987). B. A., 1982, University of Texas; M. A., 1984; Assistant Professor of Art.

Russ, Charles R. (1965). B. S., 1959, Marquette University; M. S., 1961; Ph. D., 1965, University of Pennsylvania; Associate Professor of Chemistry.


Sader, Steven A. (1987). B. S., 1973, Northern Arizona University; M. S., 1976, Mississippi State University; Ph. D., 1981, University of Idaho; Associate Professor of Forest Resources.


Sandford, Thomas C. (1981). B. S., 1965, Massachusetts Institute of Technology; M. S., 1967; Ph. D., 1976, University of Illinois; Associate Professor of Civil Engineering.


Schoenberger, Walter S. (1956). A. B., 1950,
University of Pittsburgh; M. A., 1953; M. A., 1954, Fletcher School of Law and Diplomacy; Ph. D., 1963; Professor of Political Science.

Schomaker, Peggy K. (1966). B. S., 1949, Pennsylvania State University; M. S., 1957; Ph.D., 1963; Professor of Political Science.


Schoeder, Craig J. (1988) B. S., 1980, Iowa State University; M. S., 1982; Ph. D., 1985, University of Minnesota; Assistant Professor of Food Science, Cooperating Assistant Professor of Microbiology.

Schupp, James R. (1988). B. S., 1978, Bowling Green University; M. S., 1984, Ohio State University; Ph. D., 1984; Assistant Professor of Pomology; Extension Fruit Specialist.


S contrace, Charles A. (1961). B.S., 1952, University of New Hampshire; M. Ed., 1957, Maine; M. A., 1965; Ph. D., 1968; Professor of Modern Society; Faculty Associate in History; Research Associate.


Segal, Howard P. (1986). B. A., 1970, Franklin and Marshall College; M. A., 1972, Princeton University; Ph. D., 1975; Associate Professor of History; Director, Technology and Society Project; Cooperating Associate Professor of Engineering and Science.


Servello, Frederick A. (1989) B. S., 1979, State University of New York, College of Environmental Science and Forestry; M. S., 1981, Virginia Polytechnic Institute and State University; Ph. D., 1985; Assistant Professor of Wildlife.

Setter, Frank T. (1978). Ph. B., 1967, University of North Dakota; M. S. W., 1970, University of Michigan; Associate Professor of Human Services; Faculty Associate in Social Work.

Seymour, Robert S. (1979). B. S., 1974, Ohio State University; M. F., 1976, Yale University; Ph. D., 1980; Curtis Hutchins Associate Professor of Forest Resources.


Shepard, Robert K. (1975). B. S., 1963, University of Michigan; M. F., 1964, Duke University; Ph. D., 1970, University of Michigan; Associate Professor of Forest Resources.

Sheppard, Edmund M. (1962). B. S., 1956, University of Miami; M. S., 1958, Massachusetts Institute of Technology; Ph. D., 1962, Purdue University; Professor of Electrical Engineering.

Sherblom, Anne P. (1980). B. S., 1971, Bates College; Ph. D., 1975, Dartmouth College; Associate Professor of Biochemistry.


Shipps, Therese (1989) B. S. N., 1966, St Anselm's College; M. S., 1974, Boston University; D. N. Sc., 1988; Assistant Professor of Nursing.

Shottafer, James E. (1964). B. S., 1954, State University of New York College of Environmental Science and Forestry; M. S., 1956, Syracuse University; Ph. D., 1964, Michigan State University; Professor of Wood Technology.

Sidell, Bruce D. (1977). A. B., 1970, Boston University; M. S., 1972, University of Illinois; Ph. D., 1975; Professor of Zoology; Cooperating Associate Professor of Biochemistry.
Singer, John T. (1985). B. A., 1975, Denison University; Ph. D., 1983, University of Georgia; Assistant Professor of Microbiology.

Skaggs, Dennis M. (1985). B. S., 1969, Western Illinois University; M. S., 1973; Assistant Professor of Military Science.


Slabyj, Bohdan M. (1972). B. S., 1958, University of Alberta, Canada; M. S., 1960; Ph. D., 1968, University of Washington; Professor of Food Science; Cooperating Professor of Microbiology.


Slovak, John M. (1973). B. S., 1965, Rutgers The State University; M. S., 1967, University of Massachusetts at Boston; Ph. D., 1973, University of Massachusetts, Amherst; Professor of Horticulture.

Smith, Andrew L. (1988) B. S., 1978, Whitworth College; M. S., 1980, Purdue University; Ph. D., 1984, University of Washington; Assistant Professor of Chemistry.

Smith, Charles W. (1968). B. S., 1962, Allegheny College; Ph. D., 1968, Ohio University; Chair and Professor of Physics; Cooperating Professor of Engineering and Science.

Smith, David C. (1965). B. S., 1955, Farmington State College; M. Ed., 1956, Maine; M. A., 1958; Ph. D., 1965, Cornell University; Bird and Bird Professor of American History; Professor, Agricultural History; Cooperating Professor, Quaternary Studies.


Smith, Norman (1962). B. Sc., 1952, Leeds University, England; M. Sc., 1954, Durham University, England; M. S., 1959, Maine; Ph. D., 1970, University of Newcastle, England; Dean, Engineering and Science; Professor, Agricultural and Forest Engineering; Cooperating Professor, Life Sciences and Agriculture.


Smith, William (1972). A. B., 1968, Northern Illinois University; Ed. D., 1971, Maine; Chair and Professor of Developmental Studies.


Soule, Hayden M. (1960). B. S. A. E., 1960, Maine; M. S., 1968; Associate Professor of Agricultural and Forest Engineering.


Spector, Janet (1986). B. A., 1972, Trinity College; M. A., 1974, University of Connecticut; Ph. D., 1983, Stanford University; Assistant Professor of Education.


of Minnesota; Ph. D., 1988, West Virginia University; Assistant Professor of Civil Engineering.


Stack, Lois B. (1986). B.S., 1973, University of Wisconsin-Madison; M.S., 1980; Ph.D., 1984; Assistant Extension Educator; Extension Specialist, Ornamental Horticulture; Assistant Professor of Landscape; Greenhouse Supervisor.

Standbrook, Grant (1988). B.S., 1961, University of Minnesota-Duluth; Assistant Ice Hockey Coach; Lecturer in Physical Education.


Stimpson, Don D. (1965). B.A., 1955, Maine; D.V. M., 1960, Ontario Veterinary College, Canada; Chair and Associate Professor, Department of Animal and Veterinary Sciences.


Storch, Kay S. (1974). B.S., 1960, Otterbein College; M.S., 1962, University of Illinois; Ph.D., 1966; Chair, General and Liberal Studies; Associate Professor, Biological Sciences.


Strong, Robert A. (1983). B.S., 1972, United States Military Academy; M.S. B.A., 1975, Boston University; Ph.D., 1983, Pennsylvania State University; Associate Professor of Finance.


Sullivan, Brian (1987). B.A., 1979, University of California; Ph.D., 1983, Arizona State University; Assistant Professor of Zoology.

Sullivan, Daniel J. (1986). B.A., 1951, Maine; M.S., 1964, University of Colorado; M.Ed., 1959, Maine; Assistant Professor of Mathematics.


Sun, Bruce D. (1988) M.A., 1981, Shanghas Institute of Finance and Economics, China; M.A., 1983, Ohio State University; Ph.D., 1988, University of Texas at Austin; Assistant Professor of Business Administration.


Symanski, Mary E. (1985). B.S.N., 1979, University of Delaware; M.S., 1983, University of Maryland; Assistant Professor of Nursing.

Symonds, Jean M. (1984). R.N., 1954, Lawrence Memorial Hospital; B.S., 1958, Boston University; M.S.N., 1967; Assistant Professor of Nursing and Coordinator of the Registered Nursing Studies Program.

Syvinski, Elizabeth A. (1955). B.S., 1955, Uni-
faculty

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iversity of Massachusetts; Extension Agent, York County; Extension Educator.

Tarr, Charles E. (1968). B. S., 1961, University of North Carolina; Ph. D., 1966; Dean of the Graduate School; Professor of Physics.

Tavantzis, Stylianos (1980). B. S., 1971, Agricultural School of Athens, Greece; M. S., 1977, Pennsylvania State University; Ph. D., 1980; Associate Professor of Plant Pathology; Cooperating Associate Professor of Biochemistry and Microbiology.


Thompson, Edward V. (1966). A. B., 1956, Cornell University; Ph. D., 1962, Brooklyn Polytechnic Institute; Professor of Chemical Engineering and Pulp and Paper Foundation Professor.


Thompson, Walter A. (1956). B. S., 1951, Maine; Extension Agent, Hancock County; Associate Extension Educator.


Torkanowsky, Teresa (1980). Lecturer in Dance.


Tyler, Seth (1976). B. A., 1970, Swarthmore College; Ph. D., 1975, University of North Carolina; Associate Professor of Zoology.


Urbanski, Marie O. (1971). B. A., 1944, University of Texas; M. A., 1965, Western Illinois University; Ph. D., 1973, University of Kentucky; Professor of English; Cooperating Professor, Engineering and Science.

Vadas, Robert L. (1967). B. S., 1962, Utah State University; Ph. D., 1968, University of Washington; Chair, Botany and Plant Pathology; Professor of Botany, Oceanography and Zoology.

Valleau, William G. (1962). B. S., 1955, University of Kentucky; M. S., 1962, Rutgers The State University; Ph. D., 1963; Professor of Zoology.


Assistant Professor of Social Work. Assistant Professor of Electrical Engineering. Assistant Professor of General Engineering. Assistant Professor of General Engineering Technology. Assistant Professor of Electrical Engineering Technology. Assistant Extension Educator. Assistant Extension Educator; Dairy Extension Specialist. Instructor in Dental Health. Distinguished Visiting Professor. Visiting Professor of English. Visiting Professor of Animal and Veterinary Sciences. Visiting Professor of Community Development. Visiting Professor of Social Work. Visiting Assistant Professor of Zoology and Marine Studies, Acting Director of the Darling Center. Special Assistant Professor of Institutional Management. Professor of Mechanical Engineering Technology. Assistant Professor of History. Assistant Professor of Social Work. Assistant Professor of General Engineering. Associate Head Baseball Coach, Lecturer in Physical Education. Assistant Professor of Journalism and Broadcasting. Assistant Professor of Human Nutrition and Foods. Associate Professor in Forest Resources; Henry W. Saunders Professor in Hardwood Silviculture. Director, Environmental Studies.
Center; Associate Professor, Agricultural and Resource Economics.


White, Robert C. (1978). B.S., 1963, Springfield College; M.Ed., 1964; Ed.D., 1976, Baylor College of Medicine, University of Houston; Director of Planning and Resource Development; Associate Professor; Interim Director, Continuing Education Division.


Wiedenhoeft, Mary H. (1986). B.S., 1980, Iowa State University; M.S., 1982, Washington State University; Ph.D., 1986; Assistant Professor of Agronomy.

Wihry, David F. (1969). A.B., 1964, Merrimack College; Ph.D., 1972, Maxwell School of Citizenship and Public Affairs; Associate Professor of Economics; Coordinator, Task Force on Social Science Research.


Williams, Matthew S. (1985). B.S., 1972, University of Connecticut; B.S., 1975; M.S., 1978; Extension Agent, Aroostook County; Assistant Extension Educator.


Woerner, Douglas L. (1984). B.S., 1976, University of Rhode Island; Ph.D., 1983, University of Washington; Assistant Professor of Chemical Engineering.


Wren, Jeffrey (1975). B.S., 1971, College of William and Mary; M.Ed., 1974, Maine; Lecturer in Physical Education; Swimming Pool Assistant; Women's Swim Coach.


Wyman, O. Lewis (1965). B.S., 1949, Maine; M.S., 1963, University of Massachusetts; Program Leader, Agriculture and Business Management, Cooperative Extension Service; Extension Educator.


Ed.D., 1983, Vanderbilt University; Assistant Professor of Education.

Zibilske, Larry M. (1981). B.S., 1973, Texas A&M University; M.S., 1975; Ph.D., 1979, University of Missouri; Associate Professor of Soil Microbiology, Cooperating Associate Professor of Microbiology.


### Named Professorships, 1989–1990

- American Congress of Surveying and Mapping Professorship in Land Information Studies, Dr. Andrew U. Frank.
- Adelaide C. Bird and Alan L. Bird Professor of American History, Dr. David C. Smith.
- Louis Calder Professor of Pulp and Paper Technology, Dr. Joseph M. Genco.
- Roger Clapp and Virginia Averill Castle Professorship in Electrical Engineering.
- Agatha B. Darling Professorship in Oceanography.
- Claire S. Darling Professorship in Oceanography.
- Dwight B. DeMerritt Professor of Forest Resources, Dr. Fred B. Knight.
- Lloyd H. Elliott Professor of English.
- Edwin Giddings Professor of Forest Management, Dr. David B. Field.
- D.S. Gottesman Research Professor of Pulp and Paper Technology, Dr. Erdogan Kiran.

Curtis Hutchins Professorship inForest Resources, Dr. Robert S. Seymour.

Ruth Hutchins Professor of Forest Tree Physiology, Dr. Michael S. Greenwood.

Nicolas M. Salgo Professor of Business Administration, Dr. Guvenc G. Alpander.

Henry W. Saunders Professor in Hardwood Silviculture, Dr. Alan S. White.

Mark R. Shibles Distinguished Visiting Professorship.

Edmund Styma Coachship of Track, James O. Ballinger.

University of Maine Pulp and Paper Foundation Professorship in Chemical Engineering, Dr. Edward V. Thompson.

Arthur O. Willey Professor of Mechanical Engineering, Dr. William C. Rivard.

### Distinguished Professor Award Recipients

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<td>1987</td>
<td>Brian Green</td>
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<td>1986</td>
<td>Anne P. Sherblom</td>
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<td>1985</td>
<td>John Alwxander</td>
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<td>1984</td>
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<td>1983</td>
<td>Martin Stokes</td>
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<td>1981</td>
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<td>1979</td>
<td>Michael Lewis</td>
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<td>Charles Smith</td>
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<td>Melvin Gershom</td>
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<td>Donald Grant</td>
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<td>Joseph Scimecca</td>
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<td>David Trafford</td>
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<td>Richard Emerick</td>
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<td>Vincent Hartgen</td>
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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. 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, Rosseau, 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 Chateauneuf, 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 attention to concepts of history and structural method. Cr 3.

FRE 420 French Phonetics
A formal study of the French sound system with considerable practice in phonetic transcription. Practical and remedial work in pronunciation. Prerequisite: FRE 204 or the equivalent. Cr 3.

FRE 440 Franco-American Civilization

FRE 442 French Language of North America
A historical, linguistic and socio-linguistic approach to the study of the Franco-Quebecois and the Franco-American languages. Emphasis on the morphology, syntax, vocabulary and phonetic system in order to understand the