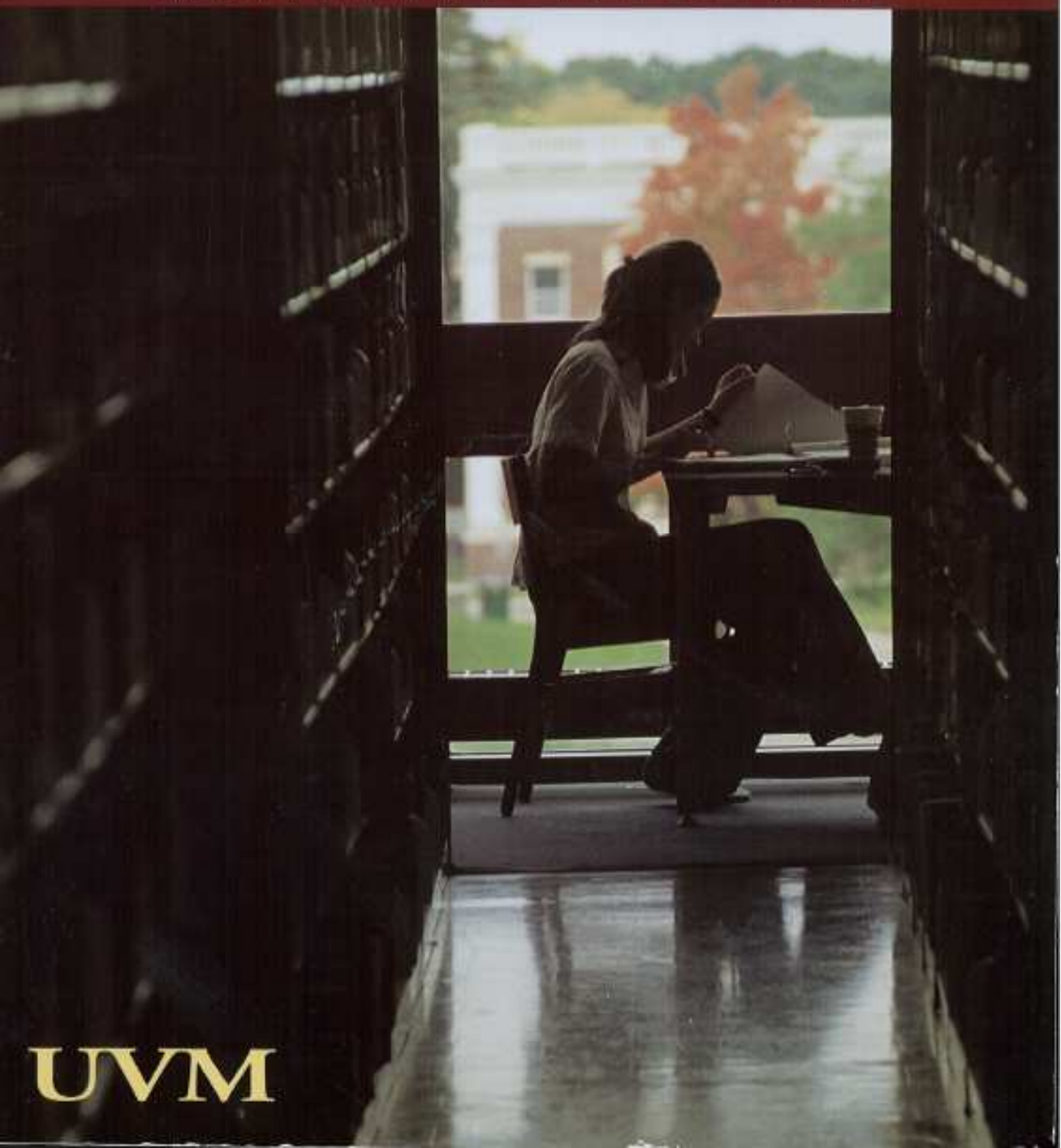


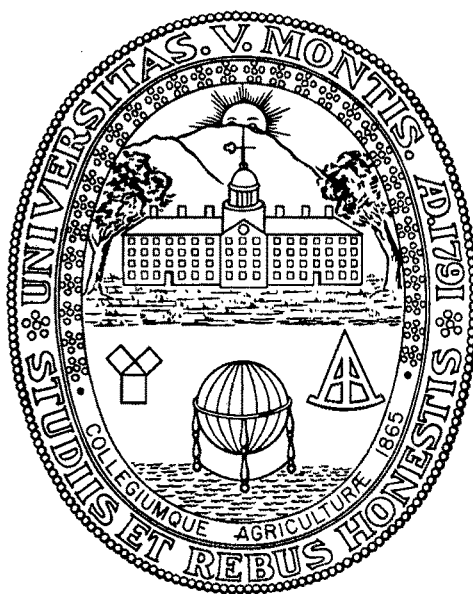


The UNIVERSITY *of* VERMONT

C A T A L O G U E 1 9 9 8 - 1 9 9 9



UVM



Catalogue 1998-99

The University of Vermont
Burlington, Vermont 05405

The University of Vermont Equal Opportunity in Educational Programs and Activities Policy

The University of Vermont and State Agricultural College is committed to a policy of equal educational opportunity. The University therefore prohibits discrimination on the basis of unlawful criteria, such as race, color, religion, national or ethnic origin, age, sex, sexual orientation, marital status, or disability, as those terms are defined under applicable law, in admitting students to its programs and facilities and in administering its admissions policies, educational policies, scholarships and loan programs, athletic and other institutionally administered programs or activities made available to students at the University. The University also prohibits unlawful harassment defined in 16 V.S.A. §11(a)(26) as verbal or physical conduct based on a student's race, creed, color, national origin, sex, sexual orientation, marital status, or disability and which has the purpose or effect of substantially interfering with a student's educational performance or creating an intimidating, hostile, or offensive environment.

Questions regarding this policy statement or compliance with its provisions may be directed to Dean Batt, Vice President for Student Affairs, University of Vermont, 41-43 South Prospect Street, Burlington, VT 05405 (802-656-3380) or Wanda Heading-Grant, Executive Director, Office of Affirmative Action and Equal Opportunity, University of Vermont, 428 Waterman Building, Burlington, VT 05405 (802-656-3368). Questions may also be directed to government agencies having oversight and enforcement authority with respect to the referenced laws. A complete listing of those agencies may be obtained from the Office of Affirmative Action and Equal Opportunity.

Sources: Title VI of the Civil Rights Act of 1964; Title IX of the Education Amendments of 1972; the Age Discrimination Act of 1975; Section 504 of the Rehabilitation Act of 1973; the Americans with Disabilities Act of 1990; the Vermont Public Accommodations Act; and such other federal, state and, local nondiscrimination laws as may apply.

Equal Employment Opportunity and Affirmative Action Policy

The University of Vermont and State Agricultural College is committed to a policy of equal employment opportunity and to a program of affirmative action in order to fulfill that policy. The University will accordingly recruit and hire into all positions the most qualified persons in light of job-related requirements, and applicants and employees shall be treated in employment matters without regard to unlawful criteria including race, color, religion, national origin, sex, sexual orientation, disability, age, or status as a disabled or Vietnam-Era Veteran, as these terms are defined under applicable law. In addition, The University of Vermont recognizes that sexual harassment is a form of unlawful sex discrimination, and it is therefore the policy of the University that sexual harassment will not be tolerated.

Questions regarding this policy statement or compliance with its provisions may be directed to Wanda Heading-Grant, Executive Director, Office of Affirmative Action and Equal Opportunity, University of Vermont, 428 Waterman Building, Burlington, VT 05405 (802) 656-3368. Questions may also be directed to government agencies having oversight and enforcement authority with respect to the referenced laws. A complete listing of such agencies may be obtained from the Office of Affirmative Action and Equal Opportunity.

Sources: Titles VI and VII of the Civil Rights Act of 1964; Title IX of the Education Amendments of 1972; the Equal Pay Act of 1963; the Age Discrimination Act of 1975; Sections 503 and 504 of the Rehabilitation Act of 1973; the Americans with Disabilities Act; Section 402 of the Vietnam-Era Veterans Readjustment Assistance Act of 1974; Executive Order 11246 as amended; the Vermont Fair Employment Practices Act; and such other federal, state, and local non-discrimination laws as may apply.

Note: These Policy Statements are official University of Vermont Equal Employment Opportunity/Affirmative Action and Equal Opportunity in Educational Programs and Activities Policy Statements and supersede all prior policy statements regarding their subject matter. They may be modified only by written statement issued by the President as Chief Executive Officer of the University or formal action by the University of Vermont and State Agricultural College Board of Trustees. These Policy Statements are designed to express the University's intent and commitment to comply with the requirements of federal, state, and local nondiscrimination laws. They shall be applied co-extensively with such laws, and shall not be interpreted as creating any rights, contractual or otherwise, greater or lesser than exist under such nondiscrimination laws. Persons seeking to participate in educational and employment opportunities offered by the University must consult position and program descriptions to determine criteria for eligibility. All such criteria shall be established in a manner consistent with the legal requirements herein referenced.

Students at The University of Vermont are responsible for knowing and complying with all requirements for their respective degrees as stated in the catalogue.

The University of Vermont reserves the right to make changes in the course offerings, degree requirements, charges, and regulations, and procedures contained herein as educational and financial considerations require, subject to and consistent with established procedures and authorizations for making such changes.

Although its legal title is The University of Vermont and State Agricultural College, the University is known to its students and alumni as UVM. This popular abbreviation is derived from the Latin *Universitas Viridis Montis*, University of the Green Mountain.

The colors of the University are green and gold.
The mascot is the catamount.

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Correspondence

Requests for a catalogue, an application form, or information concerning admissions policies and procedures, room and board, and tuition may be addressed to:

Director of Admissions
The University of Vermont
194 South Prospect Street
Burlington, Vermont 05401-3596

Other correspondence may be addressed as follows:

Dean, College of Agriculture and Life Sciences
Dean, School of Allied Health Sciences
Dean, College of Arts and Sciences
Dean, School of Business Administration
Dean, College of Education and Social Services
Dean, College of Engineering and Mathematics
Dean, Graduate College
Dean, College of Medicine
Dean, School of Natural Resources
Dean, School of Nursing
Director, Environmental Program
Director, Continuing Education (includes Summer University, Evening University,
Regional Centers in Montpelier, Rutland, and Brattleboro,
Distance Learning Network, Church Street Center, and Lane Series)

The University of Vermont
Burlington, Vermont 05405

Academic Calendar

FALL 1998

Classes begin	September 1	Tuesday
Labor Day holiday	September 7	Monday
Fall recess	October 9	Friday
Thanksgiving recess	November 25-27	Wednesday-Friday
Classes end	December 9	Wednesday
Reading and exam period	December 10-18	
Reading days	December 10, 12, 13, 16	
Exam days	December 11, 14, 15, 17, 18	

SPRING 1999

Martin Luther King holiday	January 18	Monday
Classes begin	January 20	Wednesday
President's Day holiday	February 15	Monday
Town Meeting recess	March 2	Tuesday
Spring recess	March 15-19	Monday-Friday
Honors Day	April 23	Friday
Classes end	May 5	Wednesday
Reading and exam period	May 6-14	
Reading days	May 6, 8, 9, 12	
Exam days	May 7, 10, 11, 13, 14	
Commencement	May 23	Sunday

Notes:

Refer to the policy on Class Attendance (page 33) for information regarding observance of religious holidays and participation in intercollegiate athletics.

The Schedule of classes offered through Continuing Education may differ from this Academic Calendar. Refer to Continuing Education publications.



Introduction

THE UNIVERSITY MISSION

The University of Vermont and State Agricultural College blends the academic heritage of a private university with service missions in the land-grant tradition. Vermont's only university-level institution of higher education directs its resources toward the provision of excellence in instruction, innovation in research and scholarship, and public service to the citizens of the state, nation, and world. As befits a small but comprehensive university, the curricula in UVM's undergraduate, graduate, and professional programs integrate the principles of liberal education to enhance the personal, professional, and intellectual growth of its students. Through a widespread spirit of inquiry and investigative rigor, UVM's faculty, staff, and students participate in extending humankind's knowledge of self and environment. In its special partnership with the citizens of Vermont, The University of Vermont contributes analysis and definition to the human, social, technological, managerial, cultural, environmental, and educational issues of the State.

THE UNIVERSITY AND THE BURLINGTON COMMUNITY

Chartered in 1791, the same year that Vermont became the fourteenth state in the union, The University of Vermont was established as the fifth college in New England. Much of the initial funding and planning for the University was undertaken by Ira Allen who is honored as UVM's founder.

The University of Vermont was the first college or university in the country to have it plainly declared in its charter that the "rules, regulations, and by-laws shall not tend to give preference to any religious sect or denomination whatsoever" — a clear assertion of Vermont's commitment to equality and enlightenment.

Nine more years passed before, in 1800, the University was finally set in motion with a president-professor and a handful of students.

UVM was founded in a day when U.S. colleges and universities existed primarily to educate men for the professions, especially for the ministry. Yet, in studying University history, Professor Emerita Betty Bandel discovered that "this small institution located in a frontier community of New England became a pioneer in the kind of practical education which later became the basis for the establishment of the land-grant universities — those institutions which made it possible for the sons and daughters of average citizens to aspire to a college education." For example, she noted that the University is believed to be the first nonmilitary institution to have offered engineering courses.

The University pioneered in yet another area of society, that of giving women equal status with men in higher education. In 1871, the University defied custom and admitted two women as students and four years later was the first institution in the country to admit women to full membership in the scholarly society, Phi Beta Kappa.

Tucked in the northwest corner of the Ira Allen Chapel grounds is a memorial to a late nineteenth century graduate of this University, Philosopher John Dewey, whose ideas about practical education are still debated with passionate vigor.

The first building was subscribed by citizens of Burlington and, when fire destroyed that edifice in 1824, its successor, for which General Lafayette laid the cornerstone, was again made possible by the citizens of Burlington. That building, the Old Mill, was only the first in a long line to be made possible by private philanthropy. The list includes all but one of the buildings on University Row: Ira Allen Chapel, Billings, Williams, Old Mill, and the Royall Tyler Theatre. Morrill Hall, the first UVM building to be provided by State funding, did not come until 1907.

Nearly all state universities function as departments of government, and the faculty and staff are state employees. In Vermont, the University is an "instrumentality" of the State and its Board of Trustees balances both the public and private sectors. The Board is composed of 25 members: nine self-perpetuating, nine elected by the State Legislature, three appointed by the Governor, and two members of the student body. The President of the University and the Governor of the State serve as *ex officio* members of the Board.

From the beginning, the University has relied on both public and private funding. Today, the University's appropriation from the State of Vermont is about 10 percent of the total operating budget of \$281 million. The largest single share (about 40 percent) is obtained from student tuition and fees. Government grants and contracts account for about 20 percent of the budget and the remainder comes from alumni and other private philanthropy, endowment, sales, services, and auxiliary enterprises.

During 1997-98, 7,514 students were enrolled in the eight undergraduate colleges and schools — the Colleges of Agriculture and Life Sciences, Arts and Sciences, Education and Social Services, and Engineering and Mathematics, and the Schools of Allied Health Sciences, Business Administration, Natural Resources, and Nursing — and 1,164 were enrolled in the Graduate College and 383 in the College of Medicine. In addition, 1,263 students enroll in courses offered by Continuing Education. The University employs over 3,000 full- and part-time faculty and staff.

The campus of The University of Vermont is located in Burlington, the State's largest city. Within a greater Burlington area of 132,000 people, the city with its population of 39,000 enjoys magnificent views of Lake Champlain and the Adirondack Mountains to the west and Vermont's Green Mountains to the east. Burlington is located approximately 200 miles northwest of Boston, 300 miles north of New York City, and 100 miles south of Montreal.

The Graduate College

The Graduate College serves the needs of college graduates who desire continued professional development and a broader and more thorough knowledge of scholarship and research in their chosen fields. The College offers master's degree programs in 57 fields of study and doctoral degree programs in 20 fields. In some departments, selected undergraduate students may participate in Accelerated Master's Degree Programs. For detailed information regarding graduate programs, degree requirements, and Graduate College regulations and procedures, refer to the Graduate College Catalogue available from the Graduate Admissions Office, 333 Waterman Building.

Persons applying to and enrolled in graduate programs are expected to be familiar with the general regulations of the Graduate College and with the specific degree requirements in their chosen fields of study. Questions pertaining to matters other than admission to graduate programs may be directed to the Graduate College Dean's Office, 333 Waterman.

Continuing Education

Continuing Education functions as a gateway between the University's rich resources in research, scholarship, and teaching and multiple audiences, including UVM students and alumni, Vermonters, and professional audiences nationwide. Continuing Education provides innovative credit and non-credit programs in a variety of settings, educational formats, technology options, and locations. During their years at UVM, many undergraduate and graduate students take Continuing Education courses for academic credit during the evening and the summer, both on campus and in locations around the state. Opportunities exist for completing a number of undergraduate degrees on campus in the evening. Noncredit offerings include community education "short courses" as well as a full range of seminars, workshops, conferences, satellite teleconferences, and video products on topics of current interest to college graduates and their peers. The Lane Series presents concerts and theatre productions for an audience of students, faculty, staff, and the community at large. The Distance Learning Network provides educational television programming and support, credit courses, and noncredit programs throughout Vermont and across the nation.

Continuing Education courses are offered by UVM faculty and approved adjunct faculty. Additional information is provided in the Academic Options section of this catalogue.

College of Medicine

The UVM College of Medicine is one of the oldest and most respected medical schools in the nation. Since its establishment in 1822, the College's mission has been the education of undergraduate and medical students. This has evolved to include the education of residents, graduate students, and postdoctoral fellows, as well as continuing medical education of health professionals in the state, region, and the nation. During the past 30 years the College's mission has embraced cutting-edge biomedical research, accessible high quality patient care, and community/public service. Physicians educated or trained at the UVM College of Medicine and its affiliated health care organization — Fletcher Allen Health Care — are a vital part of the region's health care work force, accounting for nearly half of Vermont's physicians.

University Extension System

UVM Extension is the door to The University of Vermont for Vermonters. Extension faculty and program staff, located on-campus and in all regions of the state, offer up-to-date information to help Vermonters make informed choices, answer questions, and solve problems.

Extension provides a two-way link between the University and the people of the state — using knowledge and research to meet their needs and bringing back to the University the real-life questions and concerns needing further research. Areas of priority are agriculture; community resources and economic development; natural resources and environmental management; nutrition, food safety, and health; and youth and family development.

Morgan Horse Farm

The Morgan Horse Farm in Weybridge, Vermont, 35 miles south of the main campus, has been a shrine for Morgan horse lovers for more than a century. The Morgan breed dates back to 1789 when the first small but powerful stallion was born to a mare owned by school teacher Justin Morgan.

The Morgan Farm was established in 1878 by Joseph Battell of Middlebury who compiled the first volume of the Morgan Horse Registry and constructed the farm landmark, an ornate Victorian barn with mansard roof. In 1907, Battell deeded the farm to the U.S. Government, which in 1951 turned the farm over to The University of Vermont.

The farm has become a laboratory for UVM students and the focal point for Morgan Horse lovers around the world. The farm continues to host thousands of visitors annually.

A versatile, highly intelligent horse, the Morgan is Vermont's State Animal. The Morgan Horse Farm is conducting crucial research on reproductive physiology and the breeding program at the Morgan Farm has produced numerous blue ribbon winners at the National Morgan Horse Show.

FACULTY AWARDS

The University recognizes excellence in faculty with several awards.

Kroepsch-Maurice Awards for Teaching Excellence

This award memorializes Robert H. and Ruth M. Kroepsch and Walter C. and Mary L. Maurice. Nominees must show excellence in classroom instruction, animate and engage students in the subject matter of the course, be innovative in teaching methods and curriculum development, show a demonstrated commitment to cultural diversity, have an ability to motivate and challenge students beyond the classroom, and show excellence in advising.

The 1997–98 recipients were Michael Strauss, Professor of Chemistry; Anthony Magistrale, Associate Professor of English; Jean Szilva, Lecturer in Anatomy and Neurobiology; and Jules Older, Continuing Education.

Kidder Faculty Award

The George V. Kidder Outstanding Faculty Award honors excellence in teaching, significant contributions to the broadening of student's academic experience, and the enrichment of campus life. This award stands for top-quality teaching and dedication to the enhancement of the academic experience for undergraduate students at UVM. The 1998 Kidder Award recipient is Kenneth I. Gross, Professor of Mathematics.

University Scholar Award

The purpose of this award is to recognize, reward, and honor faculty for sustained excellence in research and scholarly activities and encourage a general climate of scholarship at UVM. Four distinguished faculty member, two from the social sciences and humanities and two from the basic and applied sciences, are selected each year.

University scholars for 1997–98 were Charles J. Colbourn, Professor of Computer Science; Stephen T. Higgins, Professor of Psychiatry; Frank Manchel, Professor of English; and Susan S. Wallace, Professor of Microbiology and Molecular Genetics.

UNIVERSITY PROFESSORSHIPS

Since the establishment of the Williams Professorship in Mathematics in 1853, the University has been the recipient of a number of generous endowments intended to support teaching and research in various academic fields. Among them are:

The Williams Professorship of Mathematics, 1853, honors Azarias Williams of Concord, Vermont, merchant and judge, native of Sheffield, England, who in 1839 deeded to the University extensive holdings in land, at that time valued at \$25,000. In return, he received a small annuity during the remaining ten years of his life.

The Marsh Professorship of Intellectual and Moral Philosophy was established in 1867 to honor James Marsh, distinguished UVM president and philosopher of the 1830's. Many alumni contributed to the fund that established this chair. Robert W. Hall, Professor of Philosophy, is the Marsh Professor of Intellectual and Moral Philosophy.

The Pomeroy Professorship of Chemistry was established in 1878 by John N. Pomeroy, A.B., 1809, who lectured on chemistry and later, during his career as a lawyer in Burlington, served as trustee of the University. He was awarded the LL.D. in 1861. William E. Geiger is the Pomeroy Professor of Chemistry.

The Howard Professorship of Natural History and Zoology was established in 1881 by John Purple Howard, a Burlington resident who was a generous benefactor both of the University and of the City of Burlington. Ross T. Bell, Professor of Zoology, is the Howard Professor of Natural History and Zoology.

The Flint Professorship of Mathematics, Natural or Technic Science, frequently awarded in the field of civil engineering, was established in 1895 by a bequest from Edwin Flint, A.B., 1836, lawyer and judge in Wisconsin and Iowa until his death in 1891.

The Converse Professorship in Commerce and Economics was established in 1899 as a result of an endowment made by John H. Converse, A.B., 1861, LL.D., 1897, Philadelphia railroad financier, who as a trustee of the University proposed the teaching of Latin, modern languages, history, bookkeeping, penmanship, and other subjects necessary to men and women. Abbas Alnasrawi, Professor of Economics, is the Converse Professor of Commerce and Economics.

The Thayer Professorship of Anatomy was established in 1910 to honor Dr. Samuel White Thayer, Dean of the College of Medicine from 1854-71 and 1880-82, from contributions made by alumni of the College of Medicine. Professor of Anatomy Rodney L. Parsons is the Thayer Professor.

The McCullough Professorship of Political Science was established in 1926 through grants made by Gov. and Mrs. John G. McCullough of Bennington, Vermont. Gov. McCullough was a lawyer and attorney general in California during the mid-nineteenth century, later a railroad financier and benefactor of many educational and other enterprises during his long residence in Vermont. Alan P. Wertheimer, Professor of Political Science, is the McCullough Professor.

The Perkins Professorship of Zoology was established in 1931 to honor George H. Perkins, for 64 years a teacher of science and dean of the College of Arts and Sciences for many years. Grant for this professorship was made by John E. Lynch of Boston, Massachusetts. Judith L. Van Houten, Professor of Biology, is the Perkins Professor.

The Shipman Professorship of Ophthalmology was established in 1934 by a bequest from Dr. Elliot W. Shipman, M.D., 1885. After beginning this practice in Vergennes, Vermont, and studying ophthalmology in Berlin, Dr. Shipman practiced medicine in Richmond Hill, New York, for 35 years.

The Lyman-Roberts Professorship of Classical Languages and Literature was established in 1941 by Mrs. Robert Roberts and Mrs. Edward Lyman to honor Robert Roberts, a well-known lawyer who was mayor of Burlington in the 1890's and served as a University trustee from 1895-1939. Z. Philip Ambrose, Professor of Classics, is the Lyman-Roberts Professor.

The Corse Professorship of English Language and Literature was established in 1952 by Frederick M. and Fannie C.P. Corse. Mr. Corse, A.B. 1888, and registrar and teacher of mathematics and economics in the University during the 1890's, was general manager for Russia of the New York Life Insurance Company, with offices in Petrograd (now St. Petersburg) for 17 years before the Russian Revolution of 1917. T. Alan Broughton, Professor of English, is the Frederick M. and Fannie C.P. Corse Professor of English Language and Literature.

The Lawrence Forensic Professorship of Speech was established in 1965 by Edwin W. Lawrence, lawyer and financier of Rutland, Vermont, A.B., 1901, generous patron of forensic activities at the University.

The Sanders Professorship was established in 1968 as a chair endowed by the alumni, honoring the Rev. Daniel Clarke Sanders, first president of the University. Carl H. Reidel, Professor of Natural Resources, is the Daniel Clarke Sanders Professor of Environmental Studies.

The John L. Beckley Professorship in American Business was established in 1983 by John L. Beckley, 1934 graduate of UVM and member of the Board of Trustees from 1966 to 1970, to encourage economic education emphasizing private enterprise, the free market, and individual initiative. Ronald Savitt, Professor of Business Administration, is the Beckley Professor.

The Bishop Robert F. Joyce Distinguished University Professorship of Gerontology was established in 1983 by contributions from alumni and friends, honoring Robert F. Joyce, 1917 graduate of UVM, former member of the Board of Trustees from 1948 to 1954, and Bishop of the R. C. Diocese of Burlington for 15 years. Professor of Sociology Stephen J. Cutler is the Joyce Professor.

The Buttles Professorship in Pathology was established in 1984 to honor Ernest Hiram Buttles, Professor of Pathology and Bacteriology in the College of Medicine from 1921 to 1946. William W. Pendlebury, Professor of Pathology, is the Buttles Professor.

The McClure Professorship in Musculoskeletal Research was established in 1988 by J. Warren and Lois H. McClure. Robert J. Johnson, Professor of Orthopaedics and Rehabilitation, is the McClure Professor.

The E. L. Amidon Professorship in Medicine was established in early 1989 to honor Dr. E.L. Amidon, a revered teacher of medical students and residents and former chair of the Department of Medicine. Dr. Burton E. Sobel, Professor of Medicine, is the Amidon Professor.

Established in 1995 by Gordon and Llura Gund, the Gund Chair in Liberal Arts provides the College of Arts and Sciences with the opportunity to attract a leading teacher-scholar to one of the liberal arts disciplines. Philip J. Cooper, Professor of Political Science, is the first Gund professor.

The Wallace Professorship in the Department of Pediatrics was established in 1995 by the family of Harry W. Wallace to create a memorial that would represent Mr. Wallace's philanthropic interests. Dr. Jerold F. Lucey, Professor of Pediatrics, is the first Wallace Professor of Neonatology.

The Dorothean Professorship was established in 1996 by Dr. Stuart Martin in memory of his wife, Dorothy Webster Martin, to support an outstanding individual in the field of engineering or a related science whose work promises to be significant in advancing the field. Charles J. Colbourn is the first Dorothean Professor of Computer Science.

'ACCREDITATIONS

The University of Vermont is accredited by the New England Association of Schools and Colleges, Inc., a nongovernmental, nationally-recognized organization whose affiliated institutes include elementary schools through collegiate institutions offering postgraduate instruction.

Accreditation of an institution by the New England Association indicates that it meets or exceeds criteria for the assessment of institutional quality periodically applied through a peer group review process. An accredited school or college is one which has available the necessary resources to achieve its stated purposes through appropriate educational programs, is substantially doing so, and gives reasonable evidence that it will continue to do so in the foreseeable future. Institutional integrity is also addressed through accreditation.

Accreditation by the New England Association is not partial but applied to the institution as a whole. As such, it is not a guarantee of the quality of every course or program offered or the competence of individual graduates. Rather, it provides reasonable assurance about the quality of opportunities available to students who attend the institution.

Inquiries regarding the status of an institution's accreditation by the New England Association should be directed to the administrative staff of the University. Individuals may also contact the New England Association of Schools and Colleges, The Sanborn House, 15 High Street, Winchester, MA 01890, (617) 729-6762.

Specific academic program accreditations are listed below:

ALLIED HEALTH SCIENCES

Biomedical Technologies
Medical Laboratory Science—National Accrediting Agency for Clinical Laboratory Science
Nuclear Medicine Technology—Joint Review Committee on Educational Programs in Nuclear Medicine Technology
Radiation Therapy—Joint Review Committee on Education in Radiologic Technology
Dental Hygiene—American Dental Association
Physical Therapy—American Physical Therapy Association

ARTS AND SCIENCES

Chemistry—American Chemical Society
Speech-Language Pathology—American Speech-Language-Hearing Association
Clinical Psychology—American Psychological Association

BUSINESS ADMINISTRATION

American Assembly of Collegiate Schools of Business

EDUCATION

National Council for Accreditation of Teacher Education
Social Work—Council on Social Work Education
Teacher Education—Vermont Department of Education

ENGINEERING AND MATHEMATICS

Engineering Programs (Mechanical, Electrical, Civil)—Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.

MEDICINE

Liaison Committee on Medical Education, American Medical Association—Association of American Medical Colleges

NATURAL RESOURCES

Forestry—Society of American Foresters

NURSING

National League for Nursing

Admission to the University

APPLICATION DEADLINES AND FEES

If you are interested in applying for admission, contact the Office of Admissions well before the deadlines noted on page 8. The office is located at 194 South Prospect Street, Burlington, VT 05401-3596 (802) 656-3370. All applicants are required to pay a \$45 filing fee to cover the cost of reviewing the application. Fee waivers are accepted if submitted by a student's guidance counselor. Applicants not enrolled in formal schooling may request a fee waiver if the fee would present a financial hardship.

ADMISSIONS CRITERIA FOR FIRST-YEAR STUDENTS

It is the applicant's responsibility to provide a complete, accurate academic history. The Admissions Office must receive an official high school transcript, and, if applicable, official transcripts from each college or university attended. A transcript is official only when sent directly from the issuing institution to The University of Vermont.

The University defines a first-year candidate as one who is applying for degree status directly from high school and/or who has not taken any college-level courses for credit following high school graduation.

AREA	REQUIRED COURSES	RECOMMENDED COURSES
ALL AREAS	4 years of English 3 years of mathematics (Algebra I, Geometry, Algebra II) 3 years of social science 2 years of natural or physical science 2 years of the same foreign language	
Agriculture and Life Sciences	1 year of biology and 1 year of chemistry (for sciences majors only)	1 year of biology 1 year of chemistry 4 years of mathematics (including trigonometry) (for all majors) 1 year of physics, and mathematics through calculus (for science majors only)
Allied Health Sciences	For all majors: 1 year of biology 1 year of chemistry For biomedical technology, medical laboratory science, radiation therapy, and nuclear medicine technology majors: 4 years of mathematics, including trigonometry Transfer students must show proficiency in physics, mathematics through trigonometry, biology, and chemistry.	1 year of physics For transfers to physical therapy or candidates to the Master of Physical Therapy Program, course work in physics and chemistry is strongly recommended.
Arts and Sciences		4 years of mathematics (including trigonometry) Continue foreign language, junior and senior years
Business Administration	4 years of mathematics, including one year of college preparatory/advanced math beyond Algebra II	1 additional year of science
Education and Social Services		1 year of biology
Engineering and Mathematics	For all engineering and mathematics majors: 4 years of mathematics, including trigonometry For engineering and computer science majors: 1 year of physics 1 year of chemistry	For all nonengineering majors: 1 year of physics 1 year of chemistry
Natural Resources	1 year of biology 1 year of chemistry or physics	Additional science courses 4 years mathematics
Nursing	1 year of chemistry 1 year of biology	1 additional year of science in the senior year

The University of Vermont offers first-year admission to all qualified residents of Vermont. To be considered qualified, Vermont residents must present an academic record that demonstrates their ability to complete a degree program at UVM.

The University welcomes applications from out-of-state candidates and reviews them on a space-available, competitive basis.

To reach an admissions decision, the following information is considered: overall academic performance and grades, rank in class (if available), standardized testing scores, and essays. Leadership potential, extracurricular interests, and ability to contribute to diversity of the student body may also be considered. The University's Admissions Office implements the established academic policies and requirements that define the necessary qualifications for admission.

Minimum entrance requirements to the University include:

- 4 years of English
- 3 years of college preparatory mathematics (Algebra I, II, and geometry)
- 3 years of social science
- 2 years of same foreign language
- 2 years of science, including a laboratory science

Additional courses may be required depending on the major selected (see the chart on page 7). Successful applicants frequently present more than the minimum requirements. Exceptions to the entrance requirements are reviewed on a case-by-case basis. The University reserves the right to change entrance requirements without prior notice.

Matriculation Status. The Admissions Office requires secondary school graduation or completion of the General

Education Development Certificate (GED) prior to entry. GED recipients should have their official score report forwarded to the Admissions Office. An official copy of any high school work completed is also required. The Admissions Office reviews the results of the subject area examinations for the GED and evaluates the overall secondary school picture. Candidates presenting the GED are subject to the minimum entrance requirements noted on page 10 of this catalogue.

In some cases, the Admissions Office offers admission to candidates who complete their high school course work in three years. **Three-year graduates** are asked to meet all entrance requirements as outlined on this page, including the four-year English requirement. The Admissions Office requests that the three-year candidate produce support from his or her high school that the school district has approved early graduation and is prepared to issue a diploma.

Standardized Testing Scholastic Assessment Test (SAT I) and/or American College Testing Program (ACT) results are required for admission. Standardized test results are always viewed in conjunction with the high school record and are never the sole factor used to determine eligibility.

The College Board SAT II Tests in mathematics and the sciences are not required but may be useful in advising entering students about placement in courses.

For information about testing dates and locations, contact the College Board, Box CN 6200, Princeton, NJ 08541-6200, or Box 1025, Berkeley, CA 94701. The American College Testing Program (ACT) is located in Iowa City, IA. Contact the ACT Registration at P.O. Box 168, Iowa City, IA 52243.

Counselor/Teacher Letters of Recommendation Letters of recommendation provide additional information to the Admissions Office regarding the applicant's accomplishments.

Admission Deadlines

Fall Semester

	Deadline	Notification	Payment
Early Decision	November 1	Late December	January 15
Early Action	November 1	Late December	May 1
General Admission	January 15	Late March	May 1
International	January 15	Rolling	Refer to information included in letter of admission.
General Transfer Admission (all categories)	April 1	By May 15	Payment is due within 20 working days of the date of the admission letter.
Evening Degree Program	April 1	Rolling	Payment is due within 20 working days of the date of the admission letter.

Spring Semester

General Admission (all categories, including international, except Nursing and PT transfer)	November 1	Mid-December	Payment is due within 20 working days of the date of the admission letter.
Evening Degree Program	November 1	Mid-December	(Same as above)

Writing Sample Essays allow the Admissions Office to judge a student's ability to communicate clearly in writing. They may also describe an individual's interests or activities that add a personal dimension to the application.

Candidates for Music Majors (Music Education, Bachelor of Arts in Music, Bachelor of Music) must arrange for an audition with the secretary of the Department of Music, or send an audition tape to the department if unable to come to campus. For further information, contact the Department of Music (802) 656-3040. Any tapes sent become property of the Admissions Office and will not be returned.

REAPPLYING TO THE UNIVERSITY

Applicants denied admission for a given semester may re-apply for the following semester. Anyone reapplying must re-submit an application form, update any academic information, and send the appropriate application fee. Essays may be adjusted to reflect applicant's recent activities. These individuals should contact the Admissions Office to discuss academic work that would improve their chances for admission.

Under certain conditions, candidates offered admission who choose not to attend in a given semester can defer entry for up to two semesters with permission of the Admissions Office. After that period or if the admitted candidate failed to request deferred admission, another application and fee must be filed for review by the Admissions Office.

Former degree students at The University of Vermont who withdrew for any reason must see the dean of his/her former UVM college or school to request re-entry. The Admissions Officer does not readmit former degree students.

ADMISSION PROGRAMS

Early Decision is a program open to first-year candidates who have identified UVM as their first choice. Applications for the fall are due in the Admissions Office by November 1 and notification is in late December. Candidates admitted under Early Decision commit themselves to attending the University and are required to pay the Acceptance Fee and Advance Tuition Deposit by January 15. Withdrawal from the Early Decision contract is possible only if a proposed financial aid award is inadequate.

Candidates denied under Early Decision may not reapply for the fall semester.

Early Action

Students applying for first-year status who wish to learn of their admission decision by late December may apply by November 1 under the Early Action program. Candidates admitted under Early Action have until May 1 to pay an Acceptance Fee and Advance Tuition Deposit and are not making a commitment to attend the University.

Early Action applicants are offered admission if their academic records are very strong. Some Early Action candidates will be deferred until the Admissions Office has reviewed all first-year applicants for fall admission. A small number of candidates will learn in late December that they have been denied admission.

For new students, scholarship preference will be given to those students applying under Early Decision or Early Action programs.

New England Regional Student Program The University of Vermont participates with the other public two-and four-year institutions of higher education in the six New England states in the New England Regional Student Program, a option aimed at increasing educational opportunities for the region's students.

New England residents who enroll in UVM programs open to them under the New England Regional Student program are charged 150 percent of in-state tuition.

UVM programs offered for the 1998-99 academic year are:

Canadian Studies to residents of CT, MA, NH, RI
Community Development and Applied Economics to residents of CT

For a full listing of programs and policies, contact the New England Board of Higher Education, 45 Temple Place, Boston, MA 02111, (617) 357-9620.

Guaranteed Admission Program (GAP) The Guaranteed Admission Program provides an avenue of entry to The University of Vermont for students who are not yet ready to enter an undergraduate degree program. The Guaranteed Admission Program provides advising services and guarantees admission after successful completion of approved academic credit courses taken through Continuing Education. The program is administered cooperatively by Continuing Education, Undergraduate Admissions, and the deans' offices of the colleges and schools within UVM.

To qualify for the Guaranteed Admission Program students must have a high school diploma or G.E.D. Students will complete a minimum of 18 semester credits in approved courses as well as courses for the proposed major and general education requirements. Any admissions requirements lacking from high school must also be completed. A G.P.A. of 3.0 must be maintained. Students in the program have the option of applying for admission at any time as regular applicants. Admission is only guaranteed, however, to those students who have successfully completed their contract course work. Please refer to admission deadlines on page 10.

A few majors may have additional restrictions or may not be accessible through the Guaranteed Admission Program. Please contact the Office of Undergraduate Admissions or Continuing Education for a list of these programs.

Students should call the Continuing Education Office at (802) 656-2085 or (800) 639-3210 to schedule an appointment with an advisor. A high school transcript as well as a transcript for any previous college work should be provided at the appointment.

The advisor will discuss the program and begin the process of determining the courses needed to complete the contract. If a student has earned previous credits, a copy of his/her transcripts will be forwarded to the Office of Transfer Affairs to determine which courses will transfer to UVM upon admission.

Guaranteed Admission Checklist: (1) 3.0 cumulative G.P.A.; (2) high school diploma or G.E.D.; (3) completed contract; (4) official transcript for transfer credits.

UVM Evening University Students can enter a baccalaureate program in any of six majors by taking classes which start after 4:00 p.m.

Students may earn a degree in Art (Studio Concentration), Business Administration, English, Psychology, Mathematics, and Sociology. A minor in Women's Studies is also available. An Evening University student earns the same degree as any other baccalaureate candidate who attends UVM. All the courses are the same, but they are held at a time that is more convenient for students who hold full-time jobs.

The UVM Evening University is backed by evening support services for students, including advising, registration, financial aid, and other administrative services. Evening University students can access these services through the Continuing Education Student Services Office until 7:30 p.m. Monday through Friday.

The application deadline for the fall semester is April 1. For the spring semester the deadline is November 1.

Candidates for the Evening University are evaluated using general University of Vermont admission criteria discussed elsewhere in this catalogue. Necessary supplementary documents, which are due by the application deadline, include an official high school transcript (and/or official General Education Development Certificate), official transcripts of any college-level work, and official SAT/ACT scores for first-year students. Transfer candidates may have their standardized test results waived.

An Evening University application may be obtained at the Office of Continuing Education, 322 South Prospect Street, Burlington, VT 05401 (802) 656-2085, or from the Admissions Office, 194 South Prospect Street, Burlington, VT 05401-3596 (802) 656-3370. For more information about evening and summer programs, see the Continuing Education section of this catalogue.

UVM College of Agriculture and Life Sciences/Tufts University School of Veterinary Medicine B.S./D.V.M. Program

First-time, first-year candidates who meet rigorous eligibility criteria may enroll in a seven-year Bachelor of Science/Doctor of Veterinary Medicine program offered jointly by UVM's College of Agriculture and Life Sciences and the Tufts University School of Veterinary Medicine. Students accepted in the program pursue three years of study (approximately 90 credit hours) at UVM with a major in either Animal Sciences or Biological Sciences. A grade-point average of 3.25 must be maintained at UVM to guarantee entry to the Tufts University D.V.M. program. After successful completion of the first year in the Doctor of Veterinary Medicine program, candidates are awarded the Bachelor of Science degree from The University of Vermont.

If accepted into the joint program, students may elect not to attend Tufts, may continue for a fourth year at UVM and graduate before entering the Tufts University School of Veterinary Medicine, or they may elect to take a year off before entering Tufts.

Students must apply to both UVM and to the Tufts University School of Veterinary Medicine by February 1. Both applications should be sent to the Admissions Office at UVM. The fee for filing a University of Vermont application is \$45; there is a fee of \$60 for filing the Tufts University application.

Candidates are screened initially by the UVM Admissions Office. The documents of those applicants considered admissible to UVM are then forwarded to the Tufts University School of Veterinary Medicine for review. Tufts University shares its decisions with the Admissions Office at UVM. UVM notifies candidates of their status at both institutions. Due to the timing of these processes, candidates may learn of admissions decisions from UVM before learning of their status at Tufts. Candidates will learn of their status at both institutions by April 1.

Spaces in the Tufts University School of Veterinary Medicine are limited. Thus an excellent student may gain admission to UVM but be denied admission to the Tufts University School of Veterinary Medicine. A student in this situation may still complete a preveterinary program at The University of Vermont and apply for admission to veterinary schools, including the Tufts University School of Veterinary Medicine, upon graduation from UVM.

Transfer candidates to UVM are not eligible to apply directly to the joint program. Transfer candidates, however, who enter the College of Agriculture and Life Sciences as majors in either Animal Sciences or Biological Sciences may apply for early entry to the Tufts University School of

Veterinary Medicine upon the completion of three years or 90 credit hours. A minimum of 23 of the 39 credit hours associated with the following courses must have been completed in residence at UVM to qualify for admittance to the UVM/Tufts seven-year program: biology (eight credits); inorganic/organic chemistry (16 credits); physics (eight credits); biochemistry (four credits); and genetics (three credits).

For information regarding admission to UVM's College of Agriculture and Life Sciences, please consult information contained in that section of the UVM Catalogue and in the UVM Viewbook. Successful candidates to this program should present:

1. An excellent background in high school biology, chemistry, and mathematics. Course work in AP Biology, AP Chemistry, and AB Calculus is encouraged.
2. Standardized test scores at or above the 80th percentile nationally.
3. A high school class rank in the top ten percent where class rank is available. Candidates attending schools where rank is not computed must demonstrate a high level of academic achievement.
4. Some appropriate animal and/or veterinary experience.

To receive a UVM/Tufts University application packet, please contact the Admissions Office, University of Vermont, 194 South Prospect Street, Burlington, VT 05401-3596 (802) 656-3370.

For information about University of Vermont course work for the joint UVM/Tufts University Program, please consult the College of Agriculture and Life Sciences section of the catalogue.

St. Michael's College and UVM Articulation Agreement

St. Michael's College (SMC) and The University of Vermont in the fall of 1994 established an articulation agreement for a Dual Degree Program in Engineering ("the Program"). This agreement guarantees students who meet specified criteria admission to a prescribed program of study in engineering at UVM. Upon successful completion of the Program and degree requirements, students receive a Bachelor of Arts or Bachelor of Science degree from SMC and a Bachelor of Science degree in the appropriate engineering area from UVM. **Students will normally complete the Program in five years.**

The academic advising, admission, transfer of credits, enrollment, and monetary conditions in this agreement applicable to students will be carried out in accordance with the following policies and procedures.

1. Initial application to the Program will be made to SMC.
2. Students will enroll in the Program by declaring a pre-engineering major at the time of admission to SMC to permit them to complete all prerequisites in a reasonable time (see SMC catalogue for pre-engineering program).
3. Students may register for any of the options in the Civil, Electrical, or Mechanical Engineering programs.
4. Students enrolling under this Program will be considered SMC students throughout the duration of the Program. Once admitted to UVM according to the policies of this Agreement, they also become UVM students for the remainder of the Program.
5. For the first three years the host institution for students in the Program will be SMC, and for the last two years the host institution will be UVM. Tuition and fees will be paid to the host institution according to its normal policies (including residence status, financial aid, etc.) Tuition for courses taken at the other institution will be paid by the host institution transferring funds based on an agree upon amount per credit hour.
6. While students are enrolled at a host institution they will be independently responsible for appropriate fees at the other institution on a per use basis.

7. Students in the Program will make a formal application to UVM by April 1 in the spring semester of their third year at SMC. Interested students should contact the pre-engineering advisor or SMC by November of the third year for information about the application process.
8. Students will matriculate at UVM and will be accepted to the appropriate engineering program at UVM once they have met the following requirements: (a) completion of at least 60 credits at SMC with an overall minimum GPA of 3.0 (only grades of C or above will count towards the 60 credits); (b) completion of Part I of the required pre-engineering courses at SMC, as specified in the Agreement (see SMC catalogue); and (c) completion of 15–17 credits of UVM engineering courses, including the following table of courses, with an overall minimum GPA of 2.0 in these courses.

Civil and Environmental Engineering (17 hours): CE 1, 2, 10; CS 16; ME 12.

Mechanical Engineering (15 hours): ME 2, 12, 40; CS 21; CE 1.

Electrical Engineering (16 hours): ME 2; CS 21; EE 3/81, 4/82.

9. Students who have been admitted to UVM according to the above criteria will complete their requirements for either a Bachelor of Arts or Bachelor of Science degree at SMC once they have met the following additional requirements: (a) completion of Parts I and II of a pre-engineering Program at SMC; (b) completion of the Liberal Studies requirement at SMC; (c) completion of a combined total of 124 SMC and UVM credits in the Program; and (d) an overall minimum GPA of 2.0, and a minimum GPA of 2.0 in the pre-engineering courses (at SMC) and engineering courses (at UVM).
10. Students will complete their requirements for a Bachelor of Science in the appropriate engineering discipline once the prescribed requirements of that UVM program have been met (including completion of Parts I and II of a pre-engineering Program at SMC).
11. Students at SMC who are registered in the Program during the portion in which SMC is their host institution will be given enrollment status in UVM engineering courses equal to UVM engineering majors. Such students will also enjoy the status and privileges of a Continuing Education student at UVM.
12. Credits earned in the Program will be entered on the student's transcripts at both SMC and UVM, as determined by the issuing institution.
13. Students in the Program are subject to the policies and procedures of their host institution. The host institution will have jurisdiction to suspend or terminate a student based upon its own policies and procedures, subject to written notice to the student and the other institution.
14. Students will be independently responsible for transportation to and from the two campuses.
15. Students in the Program will be subject to the College of Engineering and Mathematics' computer requirement in the second semester of the first year.
16. All information and correspondence pertaining to student enrollment in this Program will be directed to the SMC Admissions Office and the Dean of the College of Engineering and Mathematics at UVM.
17. Students successfully completing the Program will be eligible to participate in the commencement exercises of each institution.

ADMISSION OF NONTRADITIONAL CANDIDATES

The Admissions Office recognizes that candidates who have been out of formal schooling for a period of five years or more have life experiences that are different from traditional-age students.

While nontraditional candidates are expected to present strong academic credentials for admission, they can write to the Admissions Office to request waiver of the standardized test score requirement, may adjust application essays to reflect their experiences, and may substitute a letter of recommendation from an employer or friend in lieu of the guidance counselor recommendation.

As with every applicant for admission, however, nontraditional candidates are required to present official documents of all academic work, including high school transcript and/or General Education Development certificate (GED). The Admissions Office looks for previous academic performance that would predict success at the University. Nontraditional applicants who are missing one or two requirements are reviewed on a case-by-case basis; if a record is otherwise acceptable, the Admissions Office may offer admission with a clause requiring completion of missing requirements prior to enrollment or concurrent with the UVM degree program. UVM does not grant college credit through portfolio assessment. Nontraditional candidates may explore credit options through the College Level Examination Program (CLEP) or through UVM's Credit by Examination.

Nontraditional learners considering a degree program at UVM may make an appointment with an admissions counselor to discuss the chances for admission. The Admissions Office is able to advise more accurately if individuals bring all academic records with them to the appointment. These documents are used for advising only and do not need to be official.

TRANSFER ADMISSION CRITERIA

The University welcomes applicants who have demonstrated success at other institutions of higher education and who have met all University-wide entrance requirements either in high school or in college. For the purpose of admission, a transfer candidate is one who has taken college-level courses for credit after completion of secondary school.

Residents of Vermont receive preference in transfer admission. All qualified in-state residents are admitted as long as space is available in the program requested. Out-of-state residents are admitted on a space-available, competitive basis.

In making transfer admission decisions, the Admissions Office reviews all academic information available: official transcripts of all college-level work and the high school record (or General Education Development Certificate). Submission of standardized test scores such as the SAT I or the ACT is optional for transfer candidates. If submitted, test scores may help in making an admission decision.

Transfer candidates are subject to the minimum entrance requirements outlined for first-year candidates. Any entrance requirement not fulfilled in high school can be met by an equivalent semester-long college course.

For transfer candidates who have earned under 30 college-level credits, the quality of the high school record remains an important evaluation tool. After 30 earned credit hours, the college grade-point average and course selection are the most important factors in a decision. The Admissions Office still needs to see the high school record to determine if all University-wide entrance requirements (as outlined on page 8) have been met.

Although The University of Vermont does not have a minimum grade-point average required for admission, most successful transfer applicants present at least a 2.5 (C+) aver-

age on a four-point scale. Vermont residents presenting cumulative grade-point averages between a 2.25 and a 2.5 will be reviewed on a case-by-case basis. Because nonresidents compete for admission, few are admitted with averages below 2.5. Applicants with concerns about their transfer status should contact the Admissions Office to discuss their individual situation.

TRANSFER CREDIT POLICY

The Office of Transfer Affairs reviews each college-level course taken by transfer candidates accepted for admission and notifies them, in writing, of the status of each course reviewed for credit. To receive credit, a course must have been taken at an accredited college or university for credit, it must be comparable in content, nature, and intensity to a course offered at UVM, and the grade earned must be "C" or better or an acceptable equivalent. The dean of the college or school decides how courses accepted for credit pertain to the student's major requirements at the University.

All transfer credit remains provisional until the transfer student successfully completes one semester of course work as a degree student at UVM. The UVM grade-point average reflects only course work taken at the University. Grades from other institutions do not appear on the UVM transcript.

Entering **first-year students** may be eligible for transfer credit either through the Advanced Placement Program of the College Board or, under certain conditions, through college courses taken while in high school.

Credit through the **Advanced Placement Program (AP) of the College Board** is granted as a specific university course or courses with scores of 4 or 5. Scores of 3 are acceptable in many areas. AP course equivalencies are determined by the department governing the subject area and are awarded by the Office of Transfer Affairs. Since AP credit is assigned as a regular university course, it can be used to fulfill major, distribution, general education, or elective requirements.

Courses taken while a student is still in high school may be eligible for University credit under the following conditions: courses must have been taken on a college campus with students enrolled in that institution, courses must meet general UVM transfer credit guidelines, and they must be recorded on the college's official transcript.

College-level courses taken through high school cooperative programs will not transfer to the University. Students who have completed cooperative courses, however, may want to explore the possibility of sitting for the Advanced Placement exam in the appropriate area(s).

Further questions regarding transfer of credit should be addressed to the Office of Transfer Affairs, 360 Waterman Building, University of Vermont, Burlington, VT 05405.

ADMISSION OF INTERNATIONAL STUDENTS

The University welcomes the applications of international students.

Academic Documents International applicants must submit official transcripts of all secondary and postsecondary education, including final examination results. If documents are not in English, certified translations are required. Information regarding certified translation services can be obtained at the applicant's embassy or through NAFSA: the Association of International Educators, 1875 Connecticut Ave., NW, Suite 100, Washington, DC 20009-5728, (202) 462-4811.

Transfer Credit for International Students International students who have attended postsecondary institutions in their home country may be eligible for University of Vermont credit under the general guidelines listed this page of this catalogue. Once notified of admission, international students should submit comprehensive course descriptions, which include content material, to the Office of Transfer Affairs, 360 Waterman Building, University of Vermont, Burlington, VT 05405 USA. Submission of this material as soon as possible after the letter of admission arrives helps the Office of Transfer Affairs prepare a full credit evaluation prior to enrollment at UVM. If this information is not in English, the student should translate it (or have it translated) and enclose it with the original copy.

Standardized Tests International students applying as first-year candidates must present scores from either the Scholastic Assessment Test (SAT I) or the American College Testing Program (ACT). If English is not the first language, the Test of English as a Foreign Language (TOEFL) is also required. Because The University of Vermont does not offer an intensive English as a Second Language (ESL) program, the Admissions Office requires a minimum TOEFL test score of 550. For information about test dates and sites for the SAT and the TOEFL exams, contact the Educational Testing Service in Princeton, NJ (609) 771-7100.

English as a Second Language (ESL) Programs The University of Vermont offers a few English-as-a-Second-Language courses intended to ease the transition to studying and living in an English-speaking environment. Interested students with TOEFL scores below 550 may want to consider transferring to The University of Vermont after studying at a U.S. college or university that offers intensive ESL preparation.

The ESL intensive program located the closest to The University of Vermont is at Saint Michael's College, an accredited institution of higher learning in nearby Winooski, Vermont. For full information about Saint Michael's College, write to the School for International Studies, Saint Michael's College, Winooski, VT 05404 (USA Telephone: 802 654-2000, extension 2300; Telex 5102990013, VT, SMC WINO).

For further information concerning available programs, contact: NAFSA: Association of International Educators, 1875 Connecticut Ave. NW, Suite 100, Washington, DC 20009-5728.

Financial Support for International Students The University of Vermont offers a few partial tuition scholarships to international students each year. Therefore, most international students pay the full cost of attending UVM. International students attending the University on nonimmigrant student visas are charged out-of-state tuition rates. For an application for partial scholarship aid, write to the Admissions Office, 194 So. Prospect St., University of Vermont, Burlington, VT 05401-3596.

A **Form I-20** is prepared for accepted international students by the Advisor to International Students in the Office of International Educational Services (OIES). The I-20 can only be issued when bank certification of finances has been filed with the OIES by the student's family or sponsoring institution.

For more information, contact Gisele Pansze, Advisor to International Students, L/L, B-161, Faculty Box 8, Burlington, VT 05405. Phone: (802) 656-4296. Fax: (802) 656-8553. E-mail: gpansze@zoo.uvm.edu.

Graduate Study at The University of Vermont International students interested in pursuing a graduate degree at The University of Vermont should contact: Graduate College Admissions Office, Waterman Building, University of Vermont, Burlington, VT 05405, (802) 656-3160.

APPLYING FOR FINANCIAL AID

The University of Vermont reviews candidates for admission on a need-blind basis. The University also recognizes that many students accepted for admission cannot meet the full cost of attendance.

To be considered for financial assistance, applicants for admission must complete the Application for Financial Aid found in the UVM Application for Admission. Additionally, each applicant must complete the Free Application for Federal Student Aid (FAFSA) which is available from a local high school guidance office, the Vermont Student Assistance Corporation, or the Office of Financial Aid at 330 Waterman Building, University of Vermont, Burlington, VT 05401. Preference in awarding aid is given to those who complete the FAFSA on or before **February 10** of the spring prior to entry.

For further information regarding policies on UVM financial aid, please refer to the section on Student Expenses and Financial Aid.

SCHOLARSHIP OPPORTUNITIES

The Vermont Scholars Program

Each year, UVM names a select group of outstanding Vermont high school students as Vermont Scholars, an academic honor which carries a four-year partial scholarship. To qualify, candidates generally rank in the top ten percent of their graduating class at the end of their junior year in high school and present superior scores on the Scholastic Assessment Test (SAT I). Comparable ACT scores are acceptable. Additionally, class valedictorians or salutatorians are eligible to compete in the Vermont Scholars Program regardless of their SAT I scores.

A committee comprised of members of the university community reviews all qualified applicants and bases final selection on such factors as secondary school record, recommendations, admissions essays, extracurricular participation, and academic potential. Scholarship recipients are notified by mid-March.

Scholarship recipients who demonstrate financial need (as determined by federal and University guidelines) will receive a scholarship that ensures their need is met with grant aid and a 15-hour weekly work experience. Students without financial need will receive a \$500 annual scholarship to assist in covering the costs of books. Other privileges afforded Vermont Scholars include first choice in course enrollment and preference in residence hall selection. Awards are renewable up to four full years provided a 3.0 grade point average is maintained.

Scholarships for New Students

Thanks to the generosity of UVM alumni, parents, and friends, a limited number of scholarships are available to entering Vermont and out-of-state students whose experiences and backgrounds promise to enrich the larger university community. While most of these scholarships are based on a combination of need and merit, several scholarships are offered exclusively on the basis of academic achievements and potential for success at UVM. With some of these scholarships, preference will be given to those applying under Early Decision and Early Action.

Scholarships for Returning Students

There are also a variety of scholarships available to returning students, made possible through the generosity of alumni, parents, and friends. To qualify, a student must be

in good academic standing and have demonstrated financial need.

Other Scholarship Resources

- The Financial Aid Office at The University of Vermont maintains records of a small number of scholarship opportunities forwarded to UVM by outside sources. These materials may be seen in the Financial Aid Office, 330 Waterman Building.
- Searching the internet offers another opportunity to find scholarship funds. One current scholarship information site is **fastWEB** which can be reached from the UVM Financial Aid Office home page. It offers a searchable database of more than 180,000 private sector scholarships, fellowships, grants, and loans. Search **fastWEB** at: <http://www.student-services.com/fastweb>.
- VSAC (The Vermont Student Assistance Corporation) offers a guide to scholarships for Vermont students available in UVM's Financial Aid Office or contact VSAC toll-free at 1-800-642-3177.

Many organizations within home communities offer a wide range of scholarships to needy and deserving students. Check with school and communities for these opportunities.

How to Apply

Although no formal application is required for scholarships at UVM, new students must complete two steps in order to be considered. First, an admission application to the University must be submitted by February 1, the regular admission deadline. Additionally, to determine eligibility for a scholarship, you must file the Free Application for Federal Student Aid (FAFSA) must be filed by February 7. You will be notified if additional information is needed to apply for a specific scholarship.

For returning students, more information about scholarship opportunities for returning students is available in the Financial Aid Office, 330 Waterman Building.

Internet Access

Questions may be sent by e-mail to finaid@zoo.uvm.edu. Extensive information about the financial aid process at UVM and other useful links can be found on our web site: <http://www.uvm.edu/~finaid/homepage.html>.

For questions or additional information, contact David Hull, UVM Scholarship Coordinator, at (802) 656-8574.

ADMITTED STUDENT INFORMATION

Acceptance Fee and Advance Tuition Deposits To reserve a space in the class or semester admitted, students should send the Admissions Office an acceptance fee and advance tuition deposit for \$260 made payable to The University of Vermont.

First-year students entering in the fall have a May 1 deadline for paying the acceptance fee and advance tuition deposit, with the exception of Early Decision candidates. Students admitted under Early Decision commit to attending UVM and must pay the tuition deposit by January 15. Transfer candidates and all candidates admitted for the spring semester will have a payment deadline printed with their acceptance materials.

A full refund of the acceptance fee and advance tuition deposit can be requested up to the payment deadline. After the payment deadline and up until the first day of classes, \$100 of the payment is refundable.

Orientation All entering first-year students are required to attend a two-day orientation session in June. At Orientation, new UVM students meet with a faculty advisor, select first semester classes, and learn about living options in the residence halls. Information packets are mailed to incoming students' home addresses once they pay the acceptance fee and advance tuition deposit. Transfer students may attend June Orientation, or they may attend a session just prior to the beginning of the fall semester.

Transfer or first-year students entering in the spring semester receive information about a special spring orientation session once they pay the deposit.

Housing First-year and second-year students are required to live in on-campus housing. Entering students explore living options at orientation and are allowed to list residence hall preferences. The Department of Residential Life mails room assignments prior to the beginning of each semester.

Class Registration The academic advisor at Orientation helps prepare the first semester class schedule. First-year students entering fall semester register for classes at June Orientation. First-year students entering in the spring and transfer students entering either semester meet with an academic advisor at an Orientation session and may need to formally register for classes at that time.

Immunization and health history forms are sent directly to newly-admitted students and are due in the Center for Health and Wellbeing – Student Health/Medical Clinic by June 30 of the year of entry. Vermont state law requires proof of two doses of live measles vaccine after the student's first birthday.

RESIDENCY REGULATIONS

In-State Status Regulation

The Vermont Legislature has established a lower rate of tuition for students who are Vermont residents. These regulations define eligibility requirements for in-state status classification. All students at The University of Vermont and State Agricultural College (UVM) shall be assigned an in-state or out-of-state status classification consistent with these regulations. Vermont domicile must be established for a student to be eligible for in-state status.

In-State Status Classification Rules

- Domicile shall mean a person's true, fixed, and permanent home. It is the place at which one intends to remain indefinitely and to which one intends to return when absent.
- As one element of domicile, a student must reside in Vermont continuously for one year prior to the semester for which in-state status is sought.
- A residence established for the purpose of attending UVM shall not by itself constitute domicile.
- An applicant becoming a student within one year of first moving to the state shall have created a rebuttable presumption that residency in Vermont is for the purpose of attending UVM and/or acquiring in-state status for tuition purposes.
- A domicile or residency classification assigned by a public or private authority neither qualifies nor disqualifies a student for UVM in-state status. Such classification may be taken into consideration, however, in determining the student's status at UVM.
- It shall be presumed that a student who has not reached the age of majority (18) holds the domicile of his/her parents or legal guardian(s).
- Receipt of financial support by a student from his/her family shall create a rebuttable presumption that the student's domicile is with his/her family, regardless of whether the student has reached the age of 18.
- A student who has not reached the age of 18 whose parents are legally separated or divorced shall be rebuttably presumed to hold the domicile of the parent with legal custody.
- A student of parents legally separated or divorced may be granted in-state status if a noncustodial or joint custodial parent is domiciled in Vermont and has contributed more than 50 percent of financial support for at least one year prior to the semester for which in-state status is sought.
- The burden of proof as to eligibility for in-state status rests with the student. Eligibility must be established by clear and convincing evidence.

In-State Status Classification Documentation

- The student must submit with the application form all relevant information.
- The classification decision shall be based upon information furnished by the student, information requested of the student, and other relevant information available consistent with University policies and procedures and legal guidelines.
- Testimony, written documents, affidavits, verifications, and/or other evidence may be requested.
- The student's failure to produce information requested may adversely affect the decision for in-state status.
- A student or others furnishing information may request the deletion from documents of irrelevant private data.

In-State Status Classification Appeals

- The decision of the Residency Officer must be appealed in writing to the Residency Appellate Officer within thirty (30) calendar days of the date of the Residency Officer's written decision. Appeal to the Residency Appellate Officer is the final appeal at UVM.

In-State Status Reclassification

- A student who does not qualify for in-state status classification may reapply for such classification each subsequent semester.
- In-state status classification becomes effective the first semester following the date of successful application.

Re-Examination of Classification Status

- Classification status may be re-examined upon the initiative of the Residency Officer in the exercise of sound discretion. Circumstances such as periodic enrollment may be cause for re-examination.

For information on residency, contact: Residency Officer, Office of Admissions, 194 South Prospect Street, Burlington, VT 05401; (802) 656-3367.

Recommended Timelines for Applying for In-State Status

(New residents of Vermont applying to UVM or applicants for admission asked by the Residence Office to complete an Application for In-State Status are asked to review this timetable. Please refer to page 8 of this catalogue for admission application deadlines for undergraduate admission, and consult the graduate and medical catalogues for those admission application deadlines.)

Undergraduate, graduate, or medical school applicants should submit the Application for In-State Status no later than **August 1** if applying for fall semester and no later than **December 1** if applying for spring semester.

Nondegree students in Continuing Education may be asked to complete an Application for In-State Status when they register for classes. The Application for In-State Status is due in the Residency Office at the end of the add-drop period for the semester enrolled.

Currently enrolled students asked by the Residency Officer to fill out an Application for In-State Status should complete the application no later than **December 1** for the spring semester or no later than **August 1** for the fall semester.

Student Expenses and Financial Aid

The student expenses outlined in the following paragraphs are anticipated charges for the academic year 1998-99. Changing costs may require adjustment of these charges before the beginning of the fall semester.

UNDERGRADUATE TUITION AND FEES

APPLICATION FEE

A nonrefundable application fee of \$45 is charged each applicant for admission to a University degree program.

ACCEPTANCE FEE AND ADVANCED TUITION PAYMENT

All new undergraduate applicants who have been accepted by the University are required to pay \$260 in order to reserve a place in the next enrolling class. Regular first-year students accepted for the fall semester must pay the deposit by May 1. Most transfer students admitted for the fall must pay the deposit within two weeks of the offer of admission. Students admitted in January for the spring semester may have less than two weeks in which to pay the deposit. A portion of the fee is for initial advising, selection of courses, and personal orientation to the campus, a requirement for all incoming undergraduate degree students. The remainder will be applied to the initial semester's tuition bill.

If a newly admitted student who has paid the required deposit subsequently chooses not to attend the University, the student will receive a \$100 refund if the University is notified in writing prior to the beginning of the semester for which the student was admitted. If the University is notified after the beginning of the semester, the entire deposit is forfeited.

ESTIMATED YEARLY EXPENSES

Listed below are estimated expenses (excluding transportation, laundry, and spending money) based on the regular tuition for undergraduate students followed by an explanation of these charges.

	<i>Resident</i>	<i>Nonresident</i>
<i>Tuition</i>	\$7,248	\$18,120
<i>Housing (Double Room)</i>	3,560	3,560
<i>Meal Plan (Average)</i>	1,880	1,880
<i>Inter-Residence Association Fee</i>	20	20
<i>Library and Athletic Fees</i>	92	92
<i>Student Health Fee</i>	268	268
<i>Student Accident & Sickness Insurance (Optional)</i>	555	555
<i>Student Government Ass'n Fee</i>	86	86
<i>Books and Supplies (Estimated)</i>	604	604
<i>Student Center Fee</i>	22	22
<i>Transportation Fee</i>	52	52
<i>Total, excluding personal and miscellaneous costs</i>	\$14,387	\$25,259

TUITION

Vermont Residents: \$302 per credit hour through 11.5 hours. From 12-18 credit hours — \$3,624 per semester plus \$302 per credit hour for each hour in excess of 18 hours.

Nonresidents: \$755 per credit hour through 11.5 hours. From 12-18 credit hours — \$9,060 per semester plus \$755 per credit hour for each hour in excess of 18 hours.

Note: Courses taken for audit are also included in determining the number of credit hours for which a student is billed.

HOUSING CHARGES

Room and Board: All housing agreements include both room and board and are legally binding for the nine-month academic year. Each occupant is liable for the yearly rent, one half to be paid each semester. The room charge per person is \$2,890 for triple occupancy, \$3,560 for double occupancy, and \$4,060 for a single room.

The minimum University meal plan is \$1,480 yearly, one half to be paid each semester. The minimum meal plan is not designed to meet all the needs of most students. Rather, the plan allows individual students to purchase whatever additional amount of food service beyond the minimum level they feel is necessary to meet their own nutritional needs. The University's food service system includes not only dining halls but also the various campus snack bars, restaurants, and grocery stores. Questions regarding food services should be directed to the University Dining Services/Marriott, Robinson Hall, Redstone Campus.

A written request is required of any student wishing to cancel a housing agreement. Any student cancelling a housing agreement before June 15 will be assessed a \$50 penalty and from June 15 but before August 31, 1998, a \$100 penalty. Unless specifically authorized by the Office of Residential Life, no room cancellations will be honored after the beginning of the fall semester.

INTER-RESIDENCE ASSOCIATION (IRA) FEE

A \$20 per year (\$10 per semester) fee is charged to each resident to be used for activities within the residence hall system.

LIBRARY FEE

A library bond fee of \$44 per year (\$22 per semester) is charged to all students enrolled for 12 or more hours. This fee is used to fund planning for future library expansion and a reserve for capital improvements.

ATHLETIC BOND FEE

An athletic bond fee of \$48 per year (\$24 per semester) is charged to all students enrolled for 12 or more hours. This fee is assessed in accordance with the requirement of the indenture covering the construction of additions and improvements to athletic facilities.

HEALTH FEE

The health fee of \$268 per year (\$134 per semester) is mandatory for students enrolled in 12 or more credit hours and optional for other students. Payment of the health fee entitles the student to most of the services available at the Student Health Center without additional cost. An optional Summer Health Fee is available to students remaining in the area during the summer months.

Students also have the option of purchasing a Student Accident and Sickness Insurance Policy through the University. This policy provides coverage for many services not included in the health fee as well as hospitalization benefits. To participate in this program, the student must pay a modest annual premium plus the health fee for the two semesters of the academic year. Students not covered by the health insurance policy of a parent, guardian, or spouse must purchase the Student Accident and Sickness Insurance Policy.

STUDENT CENTER FEE

A student center fee of \$22 per year (\$11 per semester) is charged to all students enrolled for 12 or more credit hours. This fee funds capital costs of developing and improving student center facilities.

TRANSPORTATION FEE

A \$52 per year (\$26 per semester) fee is charged to all students enrolled for 12 or more hours. This fee is assessed to fund the capital and operating costs for the all-campus shuttle.

STUDENT GOVERNMENT ASSOCIATION FEE

Undergraduate degree students enrolled in four or more credit hours are charged a fee of \$86 per year (\$43 per semester). This fee is allocated by the Student Government Association toward the support of student organizations and student activities.

FEES FOR PART-TIME STUDENTS

A comprehensive fee is charged to all part-time students enrolled in four but less than 12 credit hours in a semester, as follows:

Hours Enrolled Per Semester	Fee
4	\$46
5	52
6	58
7	64
8	70
9 to 11.5	76

All undergraduate degree students enrolled in four or more credit hours in a semester pay the full Student Government Association fee.

BOOKS AND SUPPLIES

The estimated yearly cost of books and supplies at \$586 is a low average. Some particular curricula may require one-time purchases which will change this amount.

Students in the College of Engineering and Mathematics and School of Business Administration should add about \$100 for computer software to their estimated yearly costs for books and supplies.

Dental Hygiene students should add approximately \$1,500 for an instrument kit and clinical attire in the first year that will be collected during the first week of the fall semester.

Physical Therapy students will be responsible for the cost of medically-required vaccinations, transportation, and living expenses (including room and board) during clinical affiliation periods. All Physical Therapy students are required to carry professional liability insurance prior to enrolling in the clinical experience.

Nuclear Medicine Technology and Radiation Therapy students should add about \$85 for lab coats and other related expenses.

Professional Nursing students should add about \$250 for clinical attire, professional liability insurance, health screening, vaccinations, and other related expenses in the second semester of the sophomore year and about \$300 in the beginning of the junior year.

Students enrolled in art courses should expect to incur a lab or materials cost roughly equivalent to the cost of books in other courses. In certain courses, instructional materials are purchased in bulk by the department and costs are prorated among students at a far lower rate than if they were purchased individually.

OPTIONAL FEES

Locker-Towel Fee

All students enrolled in physical education activity courses and others who wish to have an assigned locker must pay a locker-towel fee each year or any portion thereof. This fee provides a locker and a clean towel after each use of the gymnasium facility.

UNIQUE FEES

College of Engineering and Mathematics and School of Business Administration

All new first-year and transfer students entering programs in the College of Engineering and Mathematics and the School of Business Administration are required to purchase a microcomputer. Details on the costs and the machine specifications are provided to the student at the time of admission. Students eligible for financial aid can have the cost of the microcomputer acquisition and maintenance built into their financial aid package.

Credit by Examination

A fee of \$35 per credit hour will be charged for administration of special tests in areas for which academic credit may be received. This fee must be paid in advance.

Fees for Courses in Music Performance Study

Private instrumental and voice lessons, group voice classes, and group beginning piano classes are available each semester. Private lessons are one-half hour or one hour (for one or two credits) over a 15-week period. Group lessons consist of two 50-minute classes per week over a 15-week period (one credit).

\$170 per credit will be charged each student (for one or two credits). This is in addition to the tuition charged and will be part of normal billing.

Any student enrolled in excess of 18 credit hours will be charged only the \$170 per credit hour for private lessons and not for additional tuition charges for the Music Performance Study course. Any other University courses(s) that result in more than 18 credit hours of enrollment will be subject to the additional applicable per credit hour tuition charges.

School of Natural Resources Summer Field Courses

The tuition for the School of Natural Resources Summer Field Courses will be at the Summer Session credit hour rate. In addition, there may be charges for field expenses.

Additional Fees for Special Courses

Occasionally, a special fee will be charged in addition to the fee for tuition to cover long distance travel expenses, special equipment, arrangements, or skilled consultants. Students will be notified of this fee through the registration process.

Study Abroad

An administrative fee will be assessed for those students participating in Study Abroad programs/activities with the exception of the Buckham Overseas Studies Program.

Diagnostic Evaluation

In certain instances, students may be assessed a fee for diagnostic testing. Additional information can be obtained from the Office of Specialized Student Services.

PAYMENT OF OBLIGATIONS

The Touchtone registration system will generate charges based on enrolled credit hours. All tuition, fees, and room and board charges are payable in full upon notification. Degree students who enroll in advance for courses will receive itemized statements of applicable semester charges at their permanent addresses about a month prior to the commencement of classes, with instructions to settle in full by a specific date (generally three weeks before classes begin). Advanced payments are accepted; checks should be made payable to The University of Vermont. Any checks or payments received by the University may be applied to any outstanding balances.

Students who cannot meet their financial obligations because of unusual circumstances should contact the Student Accounting Office as soon as possible before the payment due date. Students who are allowed a Monthly Payment Plan or a postponement of all or a portion of their financial obligation will be charged a \$50 Monthly Payment Plan service charge per semester.

Students who have not satisfactorily completed financial arrangements by the announced due date may have their enrollment cancelled. Disenrollment will automatically place a registration hold on a student's account that will prevent re-enrollment until the student has contacted Student Accounting to discuss the account. A \$50 fee must be paid to allow reregistration.

The University reserves the right to withhold registration material, the diploma, degree, and all information regarding the record, including transcript, of any student who is in arrears in the payment of tuition, fees, or other charges, including, but not limited to, student loans, dining and housing charges, telephone toll charges, and parking fines.

If a student leaves the University for any reason with an outstanding balance and this balance is not settled in a timely manner, the University may turn the account over for collection. If this is done, any additional collection fees, legal fees, and other costs and charges necessary for the collection of this debt will be added to the outstanding balance.

LATE PAYMENT SERVICE CHARGE

Students who do not settle their accounts by the due date, and students who are allowed a payment postponement of all or a portion of their financial obligations, will be charged a late payment service charge. Please refer to the Payment Information and Financial Policies information on the following web page: http://www.uvm.edu/~stuacctg/student_acct.html.

BUDGETED PAYMENT

The University offers a Monthly Payment Plan to parents who desire to budget annual costs in monthly installments. Specific information is mailed to parents of incoming and returning students in the spring by the Student Accounting Office.

BILL ADJUSTMENT AND REFUND POLICIES

ACCEPTANCE FEE AND ADVANCE TUITION PAYMENT FOR NEW STUDENTS

A newly admitted undergraduate student who decides not to attend, and who notifies the University in writing prior to the first day of classes, will receive a refund of \$100 of the \$260 payment (acceptance fee of \$150 and advance tuition payment of \$110) that was required to reserve a place in the class.

CANCELLATION, WITHDRAWAL, MEDICAL WITHDRAWAL, SUSPENSION, DISMISSAL

A student who cancels, withdraws for personal or medical reasons, is suspended, or is dismissed will receive an adjustment of charges in accordance with the following schedule. Medical withdrawals require approval of the University Student Health Center.

- 100% tuition and fees credit adjustment prior to the end of the first two weeks of classes.
- 50% tuition and fees credit adjustment prior to the end of the fourth week of classes.
- 25% tuition and fees credit adjustment prior to the end of the eighth week of classes.
- No adjustment after the eighth week of classes.

Due to federal requirements, first-time, first-year financial aid recipients who withdraw during the semester will receive their refund based on current federal guidelines.

Note: The effective date of any cancellation or withdrawal is the date the student's dean receives such notification in writing. The dean may recommend to the Registrar that an exception be made to this policy only in extenuating circumstances. In no case will an adjustment be made after the first day of classes of the following semester.

CHANGES IN CREDIT HOUR LOAD

A student who adds courses during the semester will be billed additional tuition and fees applicable to the adjusted credit hour load. A student who drops courses during the semester will receive a tuition credit based upon the effective date as described above. A student who withdraws from a course during the semester will receive a tuition credit based upon the effective date as described above. However, the course will remain on the student's record.

REFUND OF OTHER CHARGES

Room and meal plan payments will be refunded on a pro-rated basis.

DEATH

In the case of a student's death, tuition, room, and fees will be fully refunded for the semester during which the death occurs. Unused meal points will be refunded.

FINANCIAL AID

The University has many programs to help finance a UVM undergraduate education. In order to ensure that the financial aid application process is understandable and accessible, each applicant is assigned to a "service-team" within the Financial Aid Office. Whenever a student has a question about his or her financial aid status, he or she may call upon the members of the service team who will be familiar with the the applicant's particular circumstances.

ELIGIBILITY FOR FINANCIAL AID

Students who wish to be considered for assistance in meeting their University expenses with student loans, grants, or employment should consider applying for federal, state, and University financial aid. To be eligible to apply for financial aid, a student must be a U.S. citizen or a permanent resident. (Limited financial aid funding is available for international students; inquiries should be made to the Office of International Educational Services.) To be considered for aid, a student must also be enrolled at least half-time (six credits) in a degree program. Audited credits or Credits by Examination should not be considered as part of the credits in determining financial aid eligibility.

FINANCIAL AID APPLICATION PROCEDURES

Incoming first-year and transfer students who wish to apply for aid may do so by (1) completing the 1999-2000 Application for Financial Aid which is included in the University of Vermont Application for Undergraduate Admission; (2) completing and mailing the Free Application for Federal Student Aid (FAFSA) after January 1, 1999; and (3) providing any verification documentation requested by the UVM Office of Financial Aid. Preference is given to those students who submit their applications by March 1. Applications submitted after that date will be processed in chronological order, subject to the availability of funds. In addition to following the procedures listed above, all students should apply to their state financial aid grant agency for assistance. Vermont students should apply to the Vermont Student Assistance Corporation (VSAC), P.O. Box 2000, Champlain Mill, Winooski, VT 05404.

FACTORS FOR DETERMINING FINANCIAL NEED

Financial aid funds are limited. Accordingly, most assistance offered by the Office of Financial Aid is based on a calculated determination of financial need which considers the following factors:

1. **STUDENT BUDGET.** Total cost of attending UVM is considered including tuition, mandatory fees, room, board, books, supplies, and moderate personal expenses.
2. **EXPECTED PARENTAL CONTRIBUTION.** An estimate of parent ability to pay for college expenses is determined using a system of "need analysis" utilized by many other postsecondary institutions nationally. A contribution is expected from the noncustodial parent in those cases in which the student's natural parents are divorced or separated and the custodial parent has not remarried.
3. **STUDENT RESOURCES.** A student's own financial resources are factored into our aid decision (these include savings, summer earnings, and other scholarship assistance the student receives).

THE FINANCIAL AID PACKAGE

The University of Vermont participates in all federal and state financial aid programs and must adhere to their requirements. Additionally, the University makes available a variety of grant and loan opportunities from its own operating and endowment funds. While federal and state aid is based exclusively on student need, eligibility for University funds is based on student need and on the strength of the applicant's academic record. Applicants will be considered for all aid programs for which they are eligible. Aid is most often awarded in combinations or "packages" of the various types of aid. Almost all awards will include some student loan.

Student loans are available to all students regardless of need in the form of Unsubsidized Federal Direct Stafford Loans. To be considered, however, a student must APPLY for aid. After a determination of eligibility has been made by the Financial Aid Office, students will be notified if they qualify for "need-based" aid or for an Unsubsidized Federal Direct Stafford Loan.

In the awarding of UVM institutional financial aid funds, a student's academic record may be taken into consideration in some instances. Federal and state financial aid funds are allocated solely on the basis of student and parent financial need.

SATISFACTORY ACADEMIC PROGRESS STANDARD FOR FINANCIAL AID RECIPIENTS

In order to maintain eligibility for federal Title IV financial aid, matriculated undergraduate and graduate students must progress at a rate that ensures completion of their degree programs within a reasonable time frame. Beginning with the first semester of study in a degree program at The University of Vermont, a federal financial aid recipient is required to accumulate earned hours totaling at least 75 percent of the number of hours attempted. Each student's progress will be measured at the end of each year of attendance to ensure adherence to this standard.

Beginning with the third academic year (after the achievement of 60 credit hours), all students must have attained at least a 2.0 overall cumulative grade-point average in order to continue to qualify for assistance.

Any student not meeting the standard described above will be placed on Financial Aid Probationary Status for a one-year period (during which aid eligibility will be maintained). Should the student not meet the required credit standard or cumulative grade-point average standard by the end of that probationary year, the student's eligibility for additional federal financial aid will be withdrawn until the required standard has been met. Institutional aid will continue to be awarded but not for any amount that would replace the student's federal aid award.

Students whose aid is withdrawn for not maintaining academic progress according to the standard outlined above may appeal their loss of aid by writing to the Director of Financial Aid. The decision to withhold aid eligibility may be overridden by the Director in conjunction with the Financial Aid Appeals Committee in circumstances which warrant special consideration. Such circumstances may include medical emergencies or family crises which resulted in the student's not meeting the stated requirements.

1998-99 IN-STATE AND OUT-OF-STATE EDUCATIONAL COSTS

Standard student budgets used for calculating financial aid eligibility for the 1998-99 academic year are shown below. Expenses for subsequent years may be higher if any of the cost components increase. PLEASE NOTE THAT THESE FIGURES INCLUDE COSTS NOT LISTED IN THE ACTUAL CHARGES SHOWN ON PAGE 16 (personal expenses, additional food costs, transportation, etc.). Sample costs are for a dependent single student living in campus housing and utilizing one of the University's meal options.

	SINGLE	
	In-State	Out-Of-State
Tuition	\$7,248	\$18,120
Fees	540	540
Books/Supplies	604	604
Room	3,560	3,560
Board	1,880	1,880
Personal/Miscellaneous	949	1,035
Loan Fees	433	433
Total	\$15,214	\$26,172

The awarding of financial aid is administered in accordance with the policies on nondiscrimination described on page ii.

Academic Support and Resources

Students experience rapid personal growth while on the college campus. In addition to developing new academic skills, they are challenged to pursue new ideas, evaluate their value systems, change existing attitudes, investigate new life styles, explore future career options, and learn social and interpersonal skills.

The University provides support and resources to encourage students' personal growth and intellectual achievement. Some of the most important resources are described in this section. More detailed information is available in the UVM student handbook, *The Cat's Tale*, which can be accessed on the internet (<http://www.uvm.edu:80/~dosa/handbook/>).

THE UNIVERSITY LIBRARIES AND MEDIA SERVICES

The main unit of the University libraries, Bailey/Howe Library, provides services, print, and electronic resources relating to the humanities, social sciences, and many of the sciences. This library houses the largest book and map collection in Vermont, and maintains a representative collection of major periodicals, scholarly journals, indexes, and abstracting services. It is a depository for U.S. and Canadian government publications, and provides a full service Patent and Trademark Depository Library. The Special Collections Department includes a comprehensive collection of Vermont materials, the Wilbur Collection, rare books, literary and historical manuscripts, and the papers of many individuals associated with the state and federal governments. A separate Chemistry and Physics library is located in Cook Physical Sciences Building. Collections relating to medicine and the health sciences are housed in the Dana Medical Library. Most of the holdings are accessible through the online catalog LUIS and the gateway to information sources, SAGE. Many additional resources and information about the Libraries can be accessed through the Libraries webpage <http://sageunix.uvm.edu/>. Sage provides access, in a fully integrated way, to LUIS, full text magazines and reference works, and the World Wide Web. Sage may be reached from workstations in the libraries, from residence rooms, and from locations off campus. Audiovisual materials are located in the Media Resources Department of Bailey/Howe Library and in the Dana Medical Library. The Library Research Annex (LRA), located just beyond Police Services (directly east of the corner of East Avenue and Carrigan Drive), contains many older and less used books, periodicals, and government documents from the Libraries. It also houses the UVM archives, many large modern manuscript collections such as the Sen. George D. Aiken Papers, and other older and rare printed materials from the Special Collections Department. The LRA has public hours and a delivery service.

COMPUTING AND INFORMATION TECHNOLOGY

Computing and information technology plays a vital role in supporting the instructional, research, and service needs of the University. In addition to the discipline-specific computing facilities available in UVM colleges and schools, the Division of Computing and Information Technology (CIT) supports essential information technology infrastructure for

all UVM students, faculty, and staff. CIT support includes the following:

- Full Internet access, including electronic mail (e-mail) and access to the World Wide Web (WWW). The UVM network is available throughout the campus, including on-campus residence hall rooms. E-mail and the Web are increasingly being incorporated into instruction and research. Students can register for courses by telephone and via the World Wide Web. UVM is also a member of the Internet 2 Consortium.

- Microcomputing areas equipped with Macintosh, Windows, and X-Windows (Unix) workstations. These areas are staffed by helpful consultants and include software for word processing, spreadsheets, statistics, scientific visualization, design, and a powerful geographic information system. All areas are networked, allowing access to UVM's host systems as well as to national and international resources available through the Internet.

- A variety of host systems, centered on a cluster of systems running the IBM AIX (UNIX) operating system. This cluster serves academic and research computing needs. Other systems, including IBM AIX (UNIX), DEC VAX/VMS, and IBM VM/CMS hosts, primarily support administrative functions.

- A modern digital telephone system providing low-cost long distance and including voice mail for all on-campus students, faculty, and staff.

- An Academic Resource Facility (the ARF) with high-end Macintosh, Intel, and Unix workstations, flatbed and slide scanners, CD-ROMs, CD recorders, digital video editing suite, and other specialized hardware for exploring, testing, and developing computing, visualization, and multimedia applications.

- Sales and service for Macintosh and Windows personal computers from major vendors. The UVM Microcomputer Depot preconfigures systems for the UVM network and sells them at competitive educational prices.

- Free publications, workshops, tutorials, consulting support, and a help line. CIT maintains an active role promoting and supporting information technology on campus.

Many other parts of the University provide specialized computing resources designed to meet the needs of specific programs. These include facilities provided by the Colleges of Engineering and Mathematics, Education and Social Services, Medicine, Arts and Sciences, and Agriculture and Life Sciences, the Schools of Business Administration, Natural Resources, and Nursing, the Language Laboratory, and Libraries and Media Services. In addition, Continuing Education provides teleclassrooms and a Digital Media Development Laboratory. Residential Life provides networking and computer labs in the residence halls.

See CIT's World Wide Web page at cit.uvm.edu or contact CIT by sending e-mail to cit@uvm.edu.

THE ROBERT HULL FLEMING MUSEUM

The Fleming Museum is an important art center and multicultural resource for the UVM community. It houses a collection of more than 18,000 works, including American and European paintings and works on paper, American decorative arts and costumes, and outstanding collections of art and artifacts from African, ancient Egyptian, Pacific, and Native American cultures. In addition to the permanent galleries, changing exhibitions are shown throughout the year. This year's special exhibitions include: *Political Pictures: Works of Protest and Commemoration*,

George Smith: Sculpture, and *Thomas Eakins: Drawings*. Lectures, workshops, films, performances, and exhibition openings are held in conjunction with exhibitions and are free to UVM students, faculty, and staff.

The Fleming Museum provides access to the collections and exhibitions for study and research. Undergraduate and graduate students from the departments of art, history, English, education, and anthropology have assisted with the production of exhibitions, art classes for children, and community family day. Interns receive academic credit for their work. Over 40 work study students each semester work in the Museum in the areas of education, public relations and marketing, security, and exhibition design and construction.

Stocked with books, posters, and items related to the exhibitions, the Museum Store is an inviting resource at gift-giving time. The Fleming has more than 700 members, with a student membership category available.

SERVICES FOR STUDENTS WITH DISABILITIES

Services and accommodations for students with disabilities are coordinated by three offices: Specialized Student Services of The Learning Coop certifies and coordinates services for students with physical disabilities (visual, hearing, mobility, and/or manual dexterity impairments), learning disabilities, and attention deficit disorders; the Counseling Center of the Center for Health and Wellbeing certifies and coordinates services for students with psychological disabilities; the Student Health Center of the Center for Health and Wellbeing certifies and coordinates services for students with ongoing medical conditions. Services to equalize opportunities in the classroom and course accommodations are arranged through these offices. Students are encouraged to inform the staff of the appropriate certifying office of any needed services or accommodations in advance of each semester. Current and comprehensive documentation of disability will be required.

The Office of Specialized Student Services, A170 Living/Learning Center, 656-7753, TTY 656-3865.

Counseling Center, 146 South Williams Street, 656-3340.

Student Health Center, 425 Pearl Street, 656-3350.

THE LEARNING COOPERATIVE

The Learning Cooperative provides academic support to students in all disciplines by offering individual tutoring in writing, reading, study skills, and many introductory courses.

Supplemental Instruction (SI) assists students in large introductory-level courses. In SI sessions, small groups of students meet after class to review course material and learn how to apply study skills to specific subjects.

Any student currently enrolled in classes at UVM is eligible to use the Co-op services. The office is centrally located at 244 Commons, Living/Learning Center. For more information, stop by or call the office at (802) 656-4075. The extended office hours are Monday to Thursday 8 a.m. to 9 p.m.; Friday 8 a.m. to 5 p.m.; Sunday 6 p.m. to 9 p.m.

TRIO Program TRIO is a federal program providing support for those students who may be the first in their family to go on to college or who may have limited financial resources. It is also for students with physical or learning disabilities.

TRIO Program participants receive personalized attention from the professional staff of the Learning Co-op to work on the skills necessary to get the grades and satisfaction from college that they expect. All the services available through the Co-op are available to participants at no cost. Special emphasis is placed on teaching students to become better learners.

Eligible students are contacted by the Co-op at the beginning of their first year. Students interested in learning more about the TRIO Program can call the Learning Cooperative at (802) 656-4075.

CAREER SERVICES

The Center for Career Development provides UVM students with comprehensive assistance in exploring and implementing their career goals. There are four major components in this effort: understanding one's own strengths and career needs, discovering related work and educational options, validating those options through related experience, and pursuing specific postgraduation goals. More information is available on our Web page (<http://career.uvm.edu>) or in the Career Development Office in E Building, Living/Learning.

Career Assessment Students often want assistance in identifying their strengths and career needs, and in discovering the best major for them or the kind of employers and openings that might be good options. *Career counselors* administer assessment tools, lead workshops and meet individually with students to help them set goals related to career, graduate school, or even undergraduate major interests. Career counselors are available during *Drop-ins* (M-F 1:30-4:30 p.m. and Wednesdays 5-7 p.m. during fall and spring semesters) or by calling 656-3450 for an appointment.

Discovering Options Surveys of UVM graduates, publications on careers related to certain majors, and books on careers in specific interest areas (such as environment, media, sports, human services, health) are available in the Career Library in Living/Learning. Every year, students can attend *workshops and panels*, presented by UVM grads, discussing options for students in any number of majors. Career Development also has available the contact names of over 2,000 participants in the *Alumni Career Network* who have volunteered to provide information to students interested in working in their fields or geographic locations.

Getting Experience We want all students to test their interests in particular fields by getting experience before graduation. Employers are expressing interest in hiring college graduates who have relevant work skills, even more reason to get experience before finishing a baccalaureate degree. To support students' needs in this area, many campus leadership and research opportunities are available. Career Development has also developed a number of useful programs and services. Call 656-3450 for times and locations of our daily *Get Experience* information sessions.

Federal Work Study job openings are managed through Career Development. Students who have received a Work-Study award through the Office of Financial Aid can use their employment to gain valuable skills and test their career interests. Openings ranging from medical photographer to editorial assistant to technology consultant to dance instructor to environmental field worker exist in UVM offices as well as nonprofit, off-campus sites.

Career Internships are local, regional, national, and international openings catalogued at Career Development. Available to students in any major, at any time in their academic careers, the internship listings cover a wide range of fields.

Most of these openings are unpaid; students who are interested in earning academic credits must make arrangements with their academic departments.

The **Cooperative Education** program is nationally sanctioned and allows students to alternate full- or part-time paid employment with periods of classroom education. Coop provides in-depth experiences (6–18 months) as close to campus as Burlington and as far away as Boston, Minnesota, and Florida. Participating students usually major in computer science, engineering, math, or business.

Natural Resources Internships are paid or unpaid experiences designed in collaboration with the faculty in the School of Natural Resources and environmentally-related employers in business and non-profits. The length of stay in the internship and number of hours worked can vary with student and employer needs. Academic credit is available for SNR students. Call 656-3003 for more information.

The **Service Learning Internship Program** provides opportunities for academic credit-bearing internships. While students serve real needs in the community, they link their experiences with structured academic learning. Typical options include openings in health and human services, law and justice, government and legislative, arts, environmental, and educational settings. These experiences can be part- or full-time, one semester or longer in duration, and may be in Vermont, the U.S., or anywhere in the world. Staff provide coordination and support throughout the students' experiences.

The **Student Employment Services** posts summer and part-time job openings of interest to UVM students. There are many employment opportunities around the country which can help students develop good work habits, check out interesting fields or organizations, and build transferable skills, as well as finance their educations. Look for listings on our Web site.

Pursuing Goals Career development staff are available in workshops and individually (through appointments and drop-ins) to assist students with implementing goals.

Employment workshops are held each semester to teach students job search skills such as resume writing, interviewing, developing networks and contacts, and building a comprehensive job search strategy. **Alumni Career Network** advisors often act as contact and referral sources for job seekers. To provide students with 24-hour access to job openings and information about employers, the Center has a Web site at <http://career.uvm.edu>.

Our **On-Campus Interviewing** program, which posts hundreds of jobs annually, brings organizational representatives from small, medium, and large, local, regional, and multinational employers to UVM to conduct job interviews with UVM students.

Because employers do not always have time to post a job and wait for applicants, UVM offers students the opportunity to register for our **Résumé Referral Service**. To sign up, students fill out a brief form indicating their interests and skills, provide us with résumés, and give us permission to mail them out. Participants are then entered into our database which can be queried when quick requests for résumés are received.

Thanks to a gift from the *Class of '96*, Career Development also offers students and employers the opportunity to conduct interviews using our **Video Conferencing** system.

Searching for a job in government, human services, advocacy organizations, and other nonprofit groups can be daunting. The **Non-Profit Employment** advisor provides assistance to undergraduates and alumni on careers, job search skills, and networking strategies in the public interest sector. Information on local, regional, national, and international nonprofit employers and fellowships are available in our resource room, and hundreds of post-graduation public interest employment opportunities are posted annually.

Preprofessional/Graduate School advising supports students who are considering applying to preprofessional programs such as law, medicine, dentistry, optometry, podiatry, and osteopathy, as well as other graduate programs. Intended to supplement faculty advising, the career center provides registration materials for the required graduate and pre-professional examinations and application services, as well as reference materials which index funding sources, evaluate schools, and explain application procedures. Career counselors assist students in honing their interests and setting goals relative to graduate education and beyond. The **Premedical/Prelaw Advisor** and faculty members of the Premed and Prelaw committees assist students in planning their undergraduate curricula and gaining admission to programs.

THE ALANA STUDENT CENTER

The mission of the ALANA Student Center is (1) to help meet the needs of African, Latino/a, Asian, and Native American (ALANA) undergraduate students by nurturing their academic, cultural, emotional, and social development at The University of Vermont, and (2) to promote awareness and help facilitate a just multiracial campus climate.

Quality-of-life issues for ALANA students are concerns of the ALANA Student Center staff because of the profound effects such matters have on the academic success of ALANA students at a predominately white institution of higher education.

Prior to beginning full-time study in the fall, some ALANA students may have had the opportunity to enroll in the Summer Enrichment Scholarship Program (SESP). The University provides SESP during the summer at no cost for students to earn six academic credits. Students live on campus and are provided with room, board, and books.

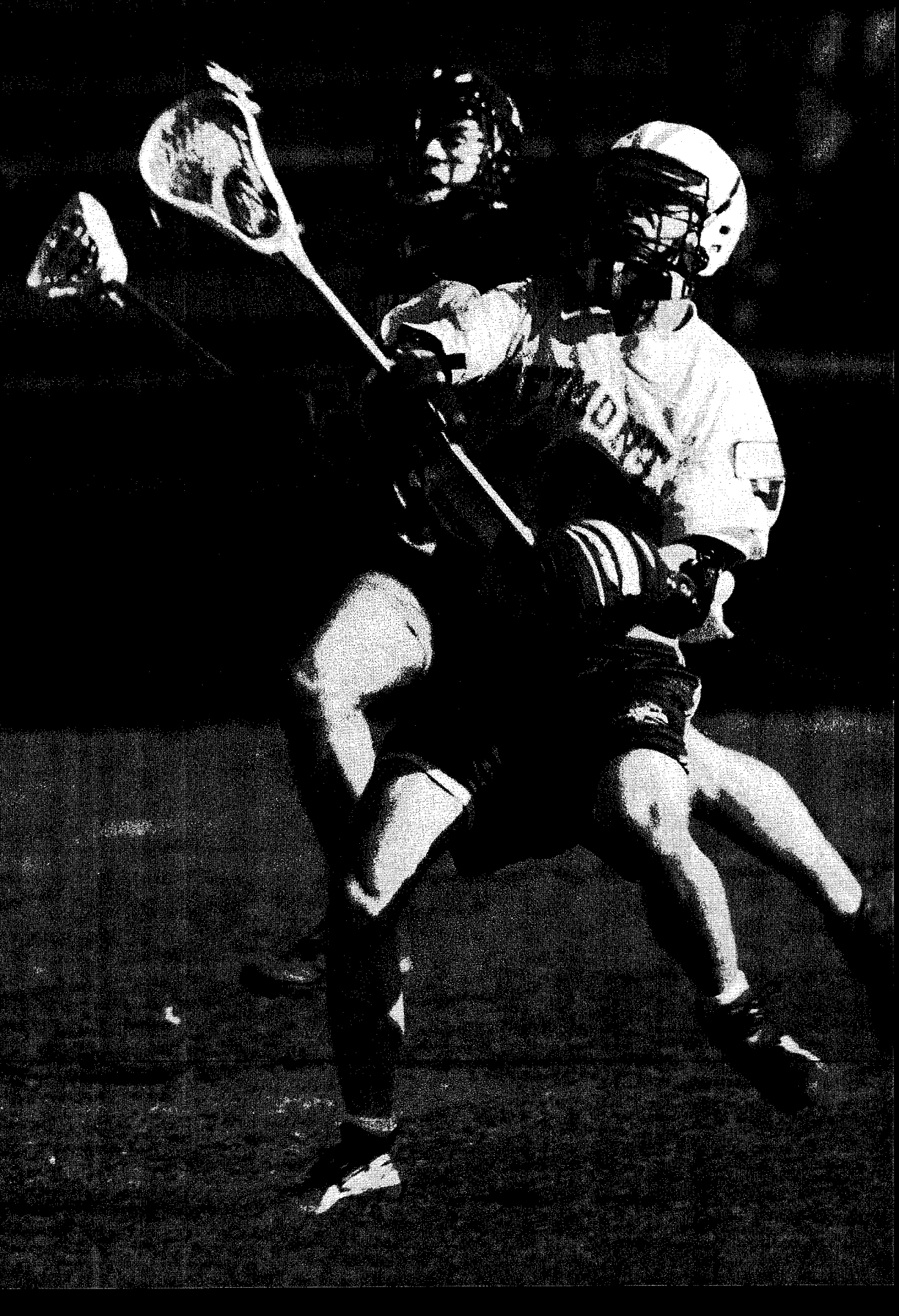
The retention of ALANA students is sustained through the Center's providing academic support, continuous communication, and improvement of the larger campus climate.

The ALANA Student Center is located in the Blundell House on the University's Redstone Campus. The facilities include a computer lab, conference/study room, community room, kitchen, and television lounge and are available to ALANA students 24 hours per day. Office hours are 8:00 a.m. to 4:30 p.m., Monday through Friday, (802) 656-3819.

SPEECH AND HEARING CENTER

The E.M. Luse Center for Communication Disorders of the Department of Communication Sciences offers diagnostic and treatment services at a nominal cost to all UVM students for communication disorders such as: hearing loss; selection and use of hearing aids; stuttering; voice, language, and articulation disorders, and foreign language reduction, etc.

The Luse Center is located in Allen House, (802) 656-3861.



Campus Community Life

A student's commitment to strong academic performance coupled with healthy out-of-class pursuits forms the basis for a successful college experience. The units listed and described in this section are meant to acquaint students with some of the offices, services, and programs that offer additional support for student endeavors, needs, and interests outside of the classroom. More detailed information is available in the UVM student handbook, *The Cat's Tale*, which can be accessed on the internet (<http://www.uvm.edu:80/~dosa/handbook/>).

STUDENT LIFE

The Department of Student Life meets the experiential education needs of UVM students while also striving to build a strong campus community. The work of Student Life begins with new students' Orientation to the University, continues by assisting a large number of students in planning their co-curricular experiences, and extends to numerous recognition programs for graduating seniors. The staff challenges students to learn about communication, leadership and management, problem solving and decision making, self awareness, personal and social responsibility, and the application of theory to practice. More information is available on our Web page at <http://www.uvm.edu/~dosa/studact/>, or in Student Life in Billings Student Center.

Orientation and Parent Relations Orientation provides the official welcome to parents and students to the University through summer orientation programs and Homecoming and Parents' Weekend in the fall. Orientation continues to develop programs that enrich the entire first year of student life at UVM, challenging students to explore numerous dimensions of campus life and to get significantly involved in the University and local community.

Leadership Programs The mission of Leadership Programs is to engage students in experiential leadership education and empower them to develop, understand, and utilize their leadership capabilities. Central programs include leadership classes (EDHI 213 and 214), the Emerging Leaders Program, Women as Leaders Workshops Series, **Leadership Recognition, KUDOS!**, and campus-wide leadership retreats. The broad-based approach to leadership education is a reflection of the quantity and diversity of leadership opportunity on campus.

Greek Life Fraternity and sorority life is an important option for many UVM students. This area of endeavor supports the activities of the Interfraternity Council, the Panhellenic Council, Order of Omega (the Greek academic honor society), GAMMA, the Greek Judicial Board, individual chapters, the Greek Alumni Advisory Council, and the Fraternity Manager's Association. Currently there are 12 fraternities and five sororities.

Community Service and Volunteer Programs The spirit of community service is thriving at UVM and is an **integral** part of campus life for many students, faculty, and staff. This important area includes Community Service TREK (for new students), the broad-ranging efforts of Volunteers in Action (VIA – a consortium of 13 individual community service programs), Hearts and Hands, Alternative Spring Break, Make a Difference Day, and other emerging links with the local community.

Outdoor Programs Vermont provides a wonderful classroom for those students interested in enhancing their outdoor leadership skills, in understanding a more definitive relationship with adventure-based education and learning, and in simply getting out and enjoying the mountains, rivers, and lakes. The major aspects of Outdoor Programs at UVM include the Wilderness, TREK program (for new students), the Outing Club, the Outing Club Cabin, the climbing walls located in the gym, a well-defined weekend trips program, and a comprehensive outdoor leadership development program.

Campus Programs and Billings Center Many of the campus-wide programs find valuable assistance by working with the staff of Student Life. Homecoming, Earth Week, the Campus Weekend Update, the monthly Campus Connections Calendar, Hunger Awareness Month, and the annual Twister Tournament are but a few of the programs that originate or are strongly supported by Student Life. Billings Center is also managed by Student Life and is a hub of incredible activity each day throughout the entire school year. Billings houses a number of student organizations and provides a space for meetings, lectures, films, and other campus programs.

The Department of Student Life, the Student Government Association, *The Cynic*, WRUV-FM, Student Legal Service, VIA, and many other organizations are located in Billings Center. Cook Commons and the Round Room provide almost constant access to campus dining services in Billings.

New Organizations All of the Student Life staff are ready to assist students interested in forming a new student organization. The initial steps in forming a new group can be critical in quick and long-term success. The staff knows the campus and the numerous ways to jump-start a club. Access to meeting space, posting policies, initial funding options, and finding an advisor are but a few of the areas important to a group's success. The Student Government Association (SGA) is the official university body that recognizes all non-Greek student organizations.

Job Opportunities Student Life provides work-study and wage students a variety of employment opportunities. In each of these positions we strive to design challenging positions that help students learn new skills or refine current skills while also assisting us in meeting a diversity of campus and community needs. Be it a Night Manager, a clerk at the Information Desk, or an Office Assistant, students will be challenged to help us help others!

STUDENT GOVERNMENT ASSOCIATION (SGA)

The Student Government Association, the primary student governing organization, assumes responsibility for voicing student concerns and interests in the governance activities of the University community. It recognizes and funds approximately 100 student organizations, including the student newspaper, *The Vermont Cynic*; the yearbook, *The Ariel*; WRUV, the student-operated radio station; UVM Rescue Squad; and the Student Legal Service; in addition to a host of political, religious, service, program, honorary, and recreational groups.

INTER-RESIDENCE ASSOCIATION (IRA)

The Inter-Residence Association represents the students living in UVM residence halls. The council, with its executive board and representation from each residence complex and ongoing committees, offers programs and services and provides leadership for residence hall students. The Inter-Residence Association represents residential student interests to other constituencies with the University community and the greater Burlington area. IRA is involved in all aspects of residence hall life and constantly seeks new ideas and student input to ensure that the residence halls meet the needs of the residents.

HONORARY AND RECOGNITION SOCIETIES

Honorary and recognition societies at The University of Vermont recognize student contributions to the UVM community and their leadership in campus life.

University honorary societies include Boulder Society, which acknowledges outstanding senior men; and TOWERR, which acknowledges outstanding senior women.

National honorary societies represented on campus are as follows:

The Phi Beta Kappa Society established the Vermont Alpha Chapter at the University in 1848 and the local chapter was the first in Phi Beta Kappa to initiate women into membership. Initiates are chosen on the basis of high scholastic standing with emphasis on a broad distribution of liberal studies. This is interpreted to mean course work in all seven College of Arts and Sciences distribution categories including intermediate-level foreign language study (see page 62). Membership criteria are published on the Web; interested students and advisors should consult the chapter president.

Mortar Board is a national society for senior women and men. Although membership in Mortar Board comes as a high honor for a UVM student in recognition of outstanding service, scholarship, and leadership, it is also a challenge for continued unselfish service in the best interests of the college campus.

The Society of the Sigma Xi, established in 1945, initiates those who have proven their ability to do research in one of the sciences, including students who have a high scholastic standing.

The alpha chapter of Nu Delta Epsilon was established at UVM in 1993. It is the first national honor society to recognize nondegree students who excel academically and exhibit a strong commitment to higher education and personal achievement. In addition, Nu Delta Epsilon provides universities and colleges an opportunity to promote a higher standard of learning and encourage high scholastic achievement among the nondegree student population.

Other national honorary societies include: Alpha Omega Alpha, medicine; Alpha Zeta, agriculture; Beta Gamma Sigma, business administration; Kappa Delta Pi, education; Sigma Theta Tau, professional nursing; Tau Beta Pi, engineering; Omicron Nu, home economics; Delta Sigma Rho-Tau Kappa Alpha, debating; Phi Alpha Theta, history; Psi Chi, psychology; Eta Sigma Phi (Iota Chapter), classical studies; Alpha Kappa Delta, sociology; Sigma Phi Alpha, dental hygiene; Lambda Alpha, anthropology; Chi Epsilon, civil engineering; Xi Sigma Pi, forest resources; Ethan Allen Rifles, outstanding students in the Reserve Officers' Training Corps; Champlain Sabres, a military fraternity; and Phi Eta Sigma, outstanding first-year students.

ATHLETICS AND RECREATIONAL SPORTS

The University encourages and supports a variety of sports at various participatory levels. All full-time undergraduate students are eligible to try out for varsity sports and are encouraged to participate in all levels of sports activities. High student interest in athletic activities has placed a great demand on facilities. To help meet this demand, a dance studio, a gymnastics/combatative sports arena, a multi-purpose facility, and the ice rink were added or renovated in recent years.

Athletic eligibility is determined through the Director of Athletics Office. All varsity athletes must comply with all appropriate rules and regulations of The University of Vermont, NCAA, and those of the playing conferences with which UVM is affiliated. Each prospective student-athlete and current student-athlete must receive an individual eligibility clearance from the Athletic Director's Office which may include the need for a physical exam. He/she must also receive appropriate clearance from the UVM Student Health Center prior to participating in team activities including practice, preseason conditioning, and contests.

The athletic policies of the University are developed by the Director of Athletics in conjunction with the Athletic Council, an advisory board to the President composed of faculty, students, and alumni. Athletic affiliations are maintained with the NCAA, AMERICA EAST, and ECAC.

Opportunities exist in the traditional seasonal sports for all students who are eligible to compete. In the fall, the programs offered to men include soccer, cross-country running, golf, and tennis. The programs offered in the fall to women include field hockey, soccer, cross-country running, tennis, and volleyball. Winter programs include ice hockey for men and basketball, skiing, swimming, gymnastics, and indoor track for both men and women. The spring programs for men include baseball, lacrosse, tennis, and outdoor track. Women's spring programs include softball, lacrosse, tennis, and outdoor track.

Programs range in strength from the national level to the regional and New England level. All prospective students interested in obtaining information concerning a particular sport should contact the coach of that sport.

Competitive sports are a desirable part of a student's education. The Recreational Sports Program offers over 19 intramural sports and special events throughout the academic year. All undergraduate students, graduate students, and faculty/staff are eligible to participate in as many activities as they choose. Teams may be organized from any residence hall, fraternity, sorority, or independent source.

Recreational facilities are available every day to provide students the opportunity to drop in and participate informally in activities which interest them. Racquetball, volleyball, tennis, and squash courts are available on a reservation basis. Students are free to use the pool, basketball courts, ice rink, weight room, and track whenever these areas are open for recreational hours.

Each semester the Recreational Sports Program offers a full schedule of aerobic classes. Registration begins during the first week of classes and continues throughout the semester. For specific program information, contact the Recreational Sports Office, (802) 656-4483.

THEATRE

The Royall Tyler Theatre is the home for the season of plays presented by the Department of Theatre. Our season is made up of three main stage productions, a holiday play

for children, and an evening of one-act plays directed, performed, and designed entirely by students.

The Department of Theatre, in collaboration with the Vermont Stage Company, UVM's resident professional theatre company, brings professional guest artists — performers, directors, designers — to work side-by-side with students on our main stage productions. VSC also offers its own annual season of events: a summer and winter series, as well as the annual Vermont Young Playwrights Festival.

The arts are vital to individuals as well as civilizations, and the Department presents the fruits of the artistic work of students and faculty alike. Within the context of a liberal arts college, the theatre program in the classroom and on the stage and public platform attempts to expose its audience to its theatrical heritage. A rich curriculum is enhanced by an adventurous production schedule. The Department also offers courses and activities in public speaking and debate, the excellence of which are nationally recognized. All members of the UVM community are encouraged to participate in these programs and to share the Department's commitment to vital living theatre.

DEBATE

The Lawrence Debate Union provides an opportunity for interested students to participate in intercollegiate forensics. Members of the LDU attend debate tournaments throughout the nation, each year engaging in over 250 debates at more than a dozen tournaments. Competition of this caliber teaches skills of efficient research, rigorous thought, and effective communication. The program is designed to develop the abilities of both the experienced debater and the beginner. Outstanding performers receive recognition in the form of annual awards and by election to Delta Sigma Rho-Tau Kappa Alpha, the national forensic honor society.

MUSIC

Opportunities for participation and appreciation are available for students with strong musical interests. The University Choir, Choral Union, and Catamount Singers are open by audition to students seeking participation in choral ensembles. The University Band, Jazz Band, Vermont Winds, Brass, Tuba, and Percussion ensembles, Trombone Choir, and University Orchestra provide performance opportunities for instrumentalists. All perform in various public presentations during the year. On occasion, the Choir and Choral Union have been invited to perform with the Vermont Symphony Orchestra; the University Pep Band performs at athletic events, and the Band mounts a spring tour. The University Orchestra presents several varied concerts of standard orchestral literature plus concertos featuring outstanding music students or combines forces with the vocal ensembles for presentation of major choral works.

In addition to the larger ensembles, faculty and senior recitals, special departmental concerts, and guest artists are scheduled throughout the school year. Individual instruction on all orchestral instruments, piano, organ, harpsichord, guitar, and voice may be arranged (contact the Music Department office for specific information).

The offices of the Music Department are located in the Music Building on Redstone Campus. An important feature of this facility is its beautiful recital hall which houses the C.B. Fisk organ, one of the finest instruments in the Northeast. The Music Department serves as a showcase for the musical talents of the music majors and the faculty, as well as for those students seeking musical activity as a part of their extracurricular life on campus.

THE GEORGE BISHOP LANE ARTISTS' SERIES

Established in 1955 with a generous gift from the Lane family, the Lane Series features a diverse season of performing arts events including classical music, early music, opera, theatre, jazz, and folk music. Each year brings a variety of artists — from established international favorites to promising new talent.

Serving as a link among many constituencies, the Lane Series finds its audience, volunteers, and advisors from the students, faculty, and staff of UVM as well as the community at large. In addition to the presentation of performances, the Lane Series ensures students and public direct interaction with performers through master classes, workshops, residencies, lectures, and receptions. The Friends of the Lane Series serve as advisors and volunteer many hours of service; corporate and private sponsors throughout the state provide financial support.

The Lane Series is a part of Continuing Education. The offices are located at 30 South Park Drive in Colchester, VT (802) 656-4455. Tickets are available by calling the Campus Ticket Store (802) 656-3085. The Lane Series offers \$5 student rush tickets at the venue on the night of events.

CENTER FOR CULTURAL PLURALISM

The Center coordinates efforts to create a campus culture based on equality, respect for all members of our community, and appreciation of diversity. The Center is a highly visible, tangible symbol of commitment to inclusiveness and multicultural education. It provides a central meeting place for individuals and groups working on diversity issues and facilitates interaction and cooperation among students, faculty, and staff, and with members of the larger Burlington community as well.

Under the direction of the Executive Office for Cultural Pluralism and Racial Equality, the Center develops policy and strategies for increasing diversity at UVM, including efforts to improve recruitment and retention of students, faculty, and staff of color, transformation of the curriculum to include more multicultural perspectives, and creation of a campus climate in which each individual feels safe and valued in the classroom, residence halls, offices, and co-curricular activities. The Center oversees programming of social, cultural, and educational events throughout the year, works with standing committees devoted to various diversity efforts, conducts research, and develops grant proposals for additional funding for diversity initiatives from foundations.

In addition to the Executive Officer and staff, the Center houses the Race and Culture Course, meeting spaces, a classroom, art gallery, resource library, multicultural and religious student organizations, several handicapped-accessible offices available for campus-wide use, and offices for graduate assistants and visiting scholars.

The Center for Cultural Pluralism is located in Allen House on the University Green at the corner of Main Street and South Prospect, (802) 656-8833. Visitors are welcome.

CENTER FOR HEALTH AND WELLBEING

The Center for Health and Wellbeing offers a unique and integrated set of services to meet the health needs of college students. These services include counseling, medical and women's clinics, nutritional counseling, physical therapy and sports therapy, a wellness promotion program,

a drug and alcohol education program, laboratory services, and 24-hour emergency telephone advice (802) 656-3350. Visit our website for more complete information — <http://www.uvm.edu/~dosa/chw/>.

Counseling Over a thousand students use the services of the Counseling Center each year for improving academic success, for mental health counseling, and personal growth work. A “focused counseling model” helps the student and counselor agree on goals and the number of sessions needed. Students are often referred to additional services on campus or in the community, and longer term therapy must be referred out. All records in the Counseling Center are confidential, and even the names of clients are not available without the student’s permission. The staff consists of women and men of varying backgrounds, ethnicity, ages, and physical abilities, and all the students taking six credits or more are eligible for services.

Individual counseling is most often requested, but some limited couples and family work is provided. Experience shows that group counseling is the most helpful and effective in many situations. Topics differ each semester but include: self-esteem and confidence building, eating disorders, negative sexual events, stress reduction, alcohol/ACOA, and support groups for ALANA students, nontraditional women, GLBTA, ADD or LD, and many other groups. Counseling also provides educational outreach programs to the campus, and staff are called upon to consult/mediate when needed. National testing programs such as the Graduate Record Examination are administered through Counseling, and career and personality tests are available in conjunction with counseling.

The Counseling Center is accredited by the International Association of Counseling Services and adheres to the code of ethics of the American Psychological Association. Counseling is located in an historic brick house on the corner of Main Street and South Williams and is convenient for students (802) 656-3340.

Student Health/Medical and Women’s Health Clinics

The Clinics are available to all students (except those in the College of Medicine) for primary and preventive health care. Most of these services are covered by the health fee (see page 20). Students entering the University are required to furnish the Health Center with a complete immunization record, to include two valid measles (Rubeola) vaccinations, and a medical history. A physical exam is not required.

Health Insurance The University also makes available to students an optional health insurance plan that provides hospitalization and some outpatient benefits. Full-time students who do not provide proof of adequate health insurance at the time of registration will be required to purchase the University-sponsored plan.

Because the College of Medicine is located on campus, the Burlington area has a large and sophisticated medical community of which the Center for Health and Wellbeing is a part. Students requiring consultations are referred to specialists in the area. When necessary, hospitalization is usually arranged at Fletcher Allen Health Care, a teaching hospital located on the edge of the main campus. *Note:* The University Health Center (UHC) is not the UVM Student Health Center.

RESIDENTIAL LIFE

The mission of the Department of Residential Life is to actively support the academic success of our students; to provide a safe and secure environment where students are able to live with and learn from one another; and to create an atmosphere which facilitates students’ personal and social development.

The residence hall system is divided into seven complexes. Each complex has undergraduate, graduate, and full-time staff to plan and implement activities intended to develop characteristics desirable in a UVM educated person. These characteristics include: developing a sense of belonging, acquiring knowledge and skills, developing critical thinking, making ethical choices, and assuming self-responsibility. In addition, each complex fosters an environment in which students are provided opportunities to understand and celebrate diversity. Community councils complement the department’s mission, represent student opinions, and provide educational and social programs for their constituents.

Student Rooms Student rooms are equipped for comfortable residence hall living. Each double room has two beds, two desks and chairs, bureau space for each student, two closets, and blinds or shades on the windows. Bookshelves are provided in some rooms. Students provide their own bed linen, towels, pillows, wastebaskets, and lamps. Laundry facilities are provided in the complexes.

Networking All residence hall rooms have at least one network connection (many have two). The connection fee is \$70 for the academic year which includes on-site work to install and configure UVM’s standard network access software and UVM purchased network adapter. This fee does not include the cost of the network adapter (\$40-170 depending on computer). Not all computers or adapters will work on the campus network. Any questions should be directed to Student Networking at 656-3808, or e-mail: stunet@zoo.uvm.edu. For more information please visit our Web page at <http://www.uvm.edu/~stunet>.

Housing All students are encouraged to reside in one of a variety of housing options offered to undergraduate, graduate, and nontraditional students on the University campus. Research indicates that students living in college residence halls: realize greater academic achievement; participate in a greater number of social, extracurricular, and cultural events; more frequently interact with faculty and peers; are more satisfied with their college experience; and are more likely to graduate from college.

It is for these reasons that UVM requires all first-year and second-year students to live on campus. Over 200 staff members in Residential Life are committed to making on-campus living experiences as productive and rewarding as possible.

Exceptions to live off campus will be heard prior to June 1 for students residing at home with parents or legal guardians in Chittenden County, or for first-year or second-year students who claim independent financial status in accordance with the guidelines provided by the UVM Financial Aid Office, or married, or with dependent children. Housing for returning students is determined by a lottery held each spring. Second-year students who are members of a sorority or fraternity and want to live in their sorority or fraternity house must submit their request through their President and Chapter Advisor to the Department of Residential Life by May 1. In addition, a limited number of second-year students wishing to live in the Green Mountain Cooperative must submit their written request to Residential Life by May 1.

Transfer students to UVM are required to complete four matriculated semesters living in residence halls. Exceptions will be heard prior to June 1 if one of the circumstances listed above is met, or the student has attempted 30 college-level credits or has completed three semesters of on-campus living elsewhere. All exception requests must be made in writing prior to June 1.

Students living in the residence halls must have room and meal plan contracts. Contracts are binding for the full academic year unless cancelled for due cause with the approval of the Department of Residential Life. In August, new students will receive notification of their housing assignments. Rooms may not be occupied until the date specified. Students are expected to leave the residence halls not later than 24 hours after their last examination or by 8:00 p.m. on the last day of final examinations.

Also see page 43 for a description of the Living/Learning Center option.

The Department of Residential Life is located in Robinson Hall, Redstone Campus, (802) 656-3434.

Jeanne Mance Center Jeanne Mance Center is a housing option for graduate and older students and is designed to respond to the various and special needs of this student population. Although Jeanne Mance is part of the main campus, it is set apart from other residence halls and classroom buildings. There are 75 single rooms, each furnished with a bed, dresser, desk, closet, and full-sized refrigerator. The contract is for a nine-month period, with separate options for the summer. Please contact the Ethan Allen Housing Office for further information, (802) 655-0661.

Student Family Housing There are 115 University-owned apartments designated for student families located just outside Winooski at Fort Ethan Allen. About five miles from campus on Route 15, the apartments are close to shopping centers, hospital, and educational institutions. These apartments are divided into two complexes.

County Apartments Complex consists of 89 unfurnished units: 42 two-bedroom apartments on either the first or second floor, 14 one-bedroom apartments on the first

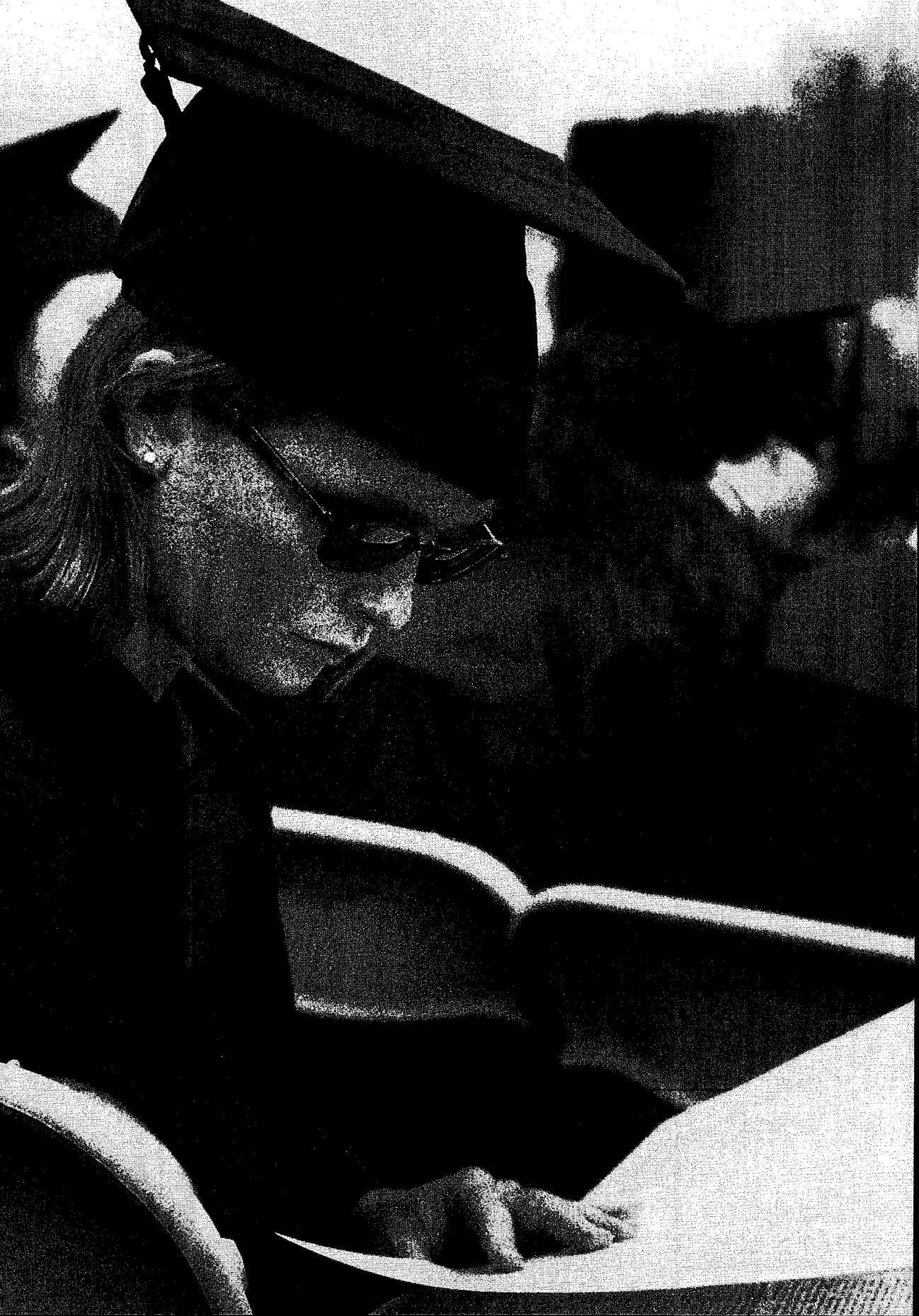
floor, and 33 two-bedroom townhouse apartments in 11 two-story buildings. Located in the center of these buildings is a Community Center containing the housing office, laundry facilities and a large multipurpose room. There are three parking areas within this complex. Each apartment is furnished with an electric stove, refrigerator, and wall-to-wall carpeting.

The other complex, called Ethan Allen Apartments, is former military officers' quarters built between 1895 and 1933. There are 11 buildings with one to five apartments in each. Twenty-one apartments in this complex have two bedrooms, and five have three bedrooms. These apartments have washer and dryer hook-ups and basement storage areas. Some apartments are carpeted. The cost of the fuel oil heating is included in the rent of about half the apartments. In the others, the tenants are billed directly by the University.

Detailed rental information may be obtained from the Ethan Allen Housing Office, 1007 Ethan Allen Avenue, Fort Ethan Allen, Colchester, Vermont 05446, (802) 655-0661.

Off-Campus Housing A variety of services exist in the Burlington community to help students find appropriate off-campus housing. Other than word of mouth, those most frequently used by students include Project HOME and Green Mountain Student Cooperative. Project HOME (863-5625) is a home-sharing matching system for elderly or recently disabled home owners with compatible lodgers who provide companionship or services in exchange for low or no rent. Green Mountain Student Cooperative (863-4211) offers communal cooperative living to a variety of traditional and nontraditional aged students.

There are several listing services which require a fee: Apartment Finders (860-5058); Renters Agency (872-2858); The Apartment Store (658-1835).



Academic and General Information

This section offers a summary of regulations and procedures. In addition to the information presented here, the rights and responsibilities of students and University policy on these and other matters are explained in detail in the *The Cat's Tale*, a student's guide to The University of Vermont. Students are responsible for meeting all requirements for their respective degrees as stated in the catalogue and to comply with the following regulations and procedures.

REGISTRATION

Students in attendance must early register for the next semester at the designated time. Unless excused in advance by the dean of the college/school concerned, students who do not early register will be considered as dropped and may apply for readmission after one semester. Specific directions are published for each semester.

Written approval of the student's dean is required to early register for more than 18 credit hours.

Any credits earned at The University of Vermont are transferable to another institution only at the discretion of the receiving school.

ACADEMIC ADVISING

Effective academic advising involves an established rapport between student and teacher. Accordingly, each new student is assigned a faculty advisor upon admission to the University. The student remains under the guidance of this advisor until a major has been selected, usually during the sophomore year at which time a departmental advisor will be assigned. Students with questions about academic planning should consult their advisor throughout the year and especially during the early registration period. To change academic advisors, students should contact the dean of their college/school. Each academic unit within the University maintains its own system for advising students.

ADVISING RESOURCES

In addition to an assigned faculty advisor, there are a variety of other advising resources available to undergraduates.

The Learning Cooperative: represents a collaborative effort on the part of academic and student affairs offices to improve the ability of students to benefit fully from their academic experiences. The Learning Coop supplements the academic environment by providing developmental instruction in writing, reading, and study skills, works with students to develop good learning strategies for challenging courses, and maintains a campus-wide tutoring program.

Prehealth Advisor: assists undergraduate students with the admissions requirements for dental and medical school. A library of resource materials is maintained which includes literature on alternative health careers, school catalogues, and premedical education journals.

Prelaw Advising: The UVM Prelaw Committee assists students by providing meetings and panel discussions regarding career options in law. Advising also includes specific information on applying to law schools. A current collection of law school catalogues is maintained for interested students.

Preveterinary Advising: is available to discuss plans for graduate school and employment in animal science career areas. A selection of catalogues, pamphlets, and other related literature is maintained.

International Students and Scholars Advising: An advisor to International Students is available to provide counseling and assistance to international students on personal and academic problems, and on matters relating to immigration and social and cultural adjustment. In a special pre-orientation program prior to the beginning of the fall semester, the Office of International Educational Services provides new international students with an introduction to the University and the Burlington community. An active campus International Club provides an opportunity for international students to contribute to campus life and to make friends outside the classroom. Other clubs with an international focus, such as the Overseas Development Network, are also available. American students planning to study abroad should also make their plans through the Office of International Educational Services which is located at B161, Living/Learning Center.

Multicultural Student Advising: assists students entering the University who demonstrate that additional support services are needed. Incoming first-year multicultural students may elect to take part in a "Summer Enrichment Program" held on campus for a month (three credits).

Center for Career Development: assists students who are exploring a variety of potential career options early in their academic careers. A library of career information and school catalogues is maintained.

Veterans Advising: advises students of their G.I. Bill benefits in education. Counseling and referral on academic matters are available to veterans.

Continuing Education: Advisors guide nondegree students, nontraditional students, and evening degree applicants on course selection, how to apply for a degree program, general information about UVM academic resources, and career and life planning. The advisors work with those who are returning to school after raising a family or working outside the home, who are considering a career change, or who have recently graduated from high school. A series of free workshops on topics of interest to adult learners are also offered. Teaming up with the Learning Co-op, UVM Continuing Education helps students "learn how to learn" with free tutoring integrated into several evening introductory-level courses each semester.

ADD/DROP/WITHDRAWAL

1. Courses may be added or dropped only during the first ten days of instruction of the University semester. After the first five class days of this period, the instructor may refuse to allow the add if certain material may not be made up (e.g. laboratories) and the loss of this work would seriously affect the quality of educational experience gained by the student in the course. In any case, faculty are not required to give make-up exams, papers, or quizzes.
2. No drops will be allowed after the tenth day of classes except in cases where the student is enrolled by administrative error and has not attended the course. The disposition of such cases is handled entirely by the Registrar's Office.
3. From the end of the tenth day to the end of the ninth week of classes, students may withdraw from courses. Students who wish to withdraw fill out the course withdrawal form, consult with their advisor, and submit the form to the instructor for signature. The student is then

responsible for delivering the form to the Registrar's Office no later than 4 p.m. on Friday of the ninth week of classes. Students give a copy to their dean for information purposes. The instructor also records the withdrawal grade (W) on the final grade sheet which is sent to the Registrar.

4. Between the end of the ninth week and the last day of classes, students may withdraw from one or more courses only by demonstrating to their college or school studies committee, through a written petitionary process, that they are unable to continue in the course(s) due to circumstances beyond their control. Such petition must contain conclusive evidence, properly documented, of the illness or other situation which prevents completion of the course(s). Acceptable reasons do not include dissatisfaction with performance or expected grade, with the course or instructor, or desire to change major or program. If the petition is approved, a grade of W will be assigned by the instructor(s) and recorded on the student's permanent record. If the petition is denied, the instructor(s) will assign a final grade (A-F) in accordance with the same criteria applied to all other students in the course(s).

Students wishing to withdraw for medical reasons must contact their dean.

5. No withdrawals are permitted after the last day of classes.
6. The grade of W will not enter into the grade-point average.

PASS/NO PASS

PASS/NO PASS course enrollments were approved by the University Senate for implementation in September 1968 to encourage students to take elective courses they might otherwise avoid for fear of a low grade, to encourage work for internal rather than external goals, and to stimulate intellectual exploration. The action was taken in two parts:

FIRST, that any degree program students, not on academic trial, be permitted to take as many as six courses (three courses for two-year students; or as many courses as they have semesters remaining for future transfer students) during their undergraduate career on a pass/no pass basis, beginning in the sophomore year (second semester of the first year for two-year students). These courses may not include any required by the student's major department, either for the major or for the degree. Only free electives (without condition) may be taken as pass/no pass. This option may not be used for electives within the distribution requirements of a college or department. Students who enrolled in ineligible distribution elective courses on a pass/no pass basis prior to September 1, 1974, shall not be penalized. Students must complete all work normally required in these courses to receive full credit toward graduation for passing them. The instructor will not be informed of the student's status and the Registrar will record grades of D or higher as PASS and grades of F as NO PASS. Neither P nor NP grades will affect the student's grade-point average. The grade submitted by the instructor will not become available to the student nor to any third party.

SECOND, that the following addition was approved by the Faculty Senate in January 1974: Physical education (activity) courses, whether taken to fulfill a requirement or as electives, will be available to students on a pass/no pass basis and shall not be counted as a part of the six standard courses described above.

Procedure:

1. A PASS/NO PASS Request Form is obtained from the Registrar's Office and the academic advisor is consulted.

2. The advisor's endorsement that the request conforms to the policy established by the University Senate is obtained. Any question about a course or courses being appropriately elected as pass/no pass for a student will be resolved by the student's college/school dean.
3. The request to be placed on pass/no pass status is submitted to the Registrar's Office during the first two weeks of the semester. Requests to be removed from that status must be filed during the same period.

Note: Nondegree students may not take courses on pass/no pass basis.

AUDITING COURSES

With the approval of the dean and the instructor concerned, a regularly enrolled student carrying a normal program may audit a course. Others who do not wish to receive credit, or who have not met admission requirements, may also register as auditors. Auditors have no claim on the time or service of the instructor. A student wishing to audit a credit course must meet minimum levels of performance set by the instructor at the time of registration in order to receive an audit grade on a transcript. No grade credit is given for the work. Tuition is charged at the applicable rate. Under no circumstances will a change be made after the enrollment period to allow credit for courses audited.

The approval of the Director of Continuing Education is necessary for courses audited in the Evening Division or Summer Session.

GUIDELINES FOR INDEPENDENT STUDIES

1. Independent study is an educational experience (taken for credit) which occurs outside the traditional "classroom/laboratory" setting. The project is faculty supervised and tailored to fit the interests of a specific student.
2. Independent study will be under the direct supervision of a faculty member having expertise in the area of investigation and consequently the project will be done in the department which is primarily responsible for the field of study in question.
3. Prior to enrollment in independent study, students must obtain the approval of their advisor, faculty sponsor, and the faculty sponsor's department chairperson.
4. Independent study may be taken for variable credit. The amount of credit to be granted should be mutually agreed upon by the student and the faculty sponsor at the time of enrollment.
5. When a project is to cover more than one term, the XC (extended course), rather than incomplete, should be used for the first term of work.
6. All departments in which a student may obtain "service learning" or "field experience" credit should list this option in their description of courses. If a department offers the opportunity for both "Readings and Research" and "Field Experience" (service learning, internships, etc.), these offerings should have different course numbers, titles, and catalogue descriptions. In the rare instance where one cannot differentiate between these two offerings, they may be listed under the same name.
7. All academic units offering independent study courses will be responsible for administering such work. Specific guidelines which define the responsibilities of both faculty and student in terms of administering the independent study project are given in Part 8. Alternative guidelines which incorporate the basic points in Part 8 are acceptable.
8. Procedure:

- a. The success of an independent study project is often related to the amount of advanced planning expended on the project. Consequently, planning for the project should, whenever possible, be initiated in the semester before the course is taken.
- b. By the end of the add/drop period, students will be required to submit to their faculty sponsor a specific plan which must include, but not be limited to, the following:
 - i. The project title.
 - ii. A statement of justification, indicating why independent study is being selected and the reason for undertaking the project, its importance, and how it relates to other work done by the student.
 - iii. A clear and complete statement of project objectives.
 - iv. A concise statement of the plans and methods to be used in order to accomplish each objective.
- c. During the first full week of classes the student and the faculty sponsor will meet and prepare a document which includes the following:
 - i. A schedule of dates when the student and faculty member will meet and discuss progress, including a time plan indicating when various parts of the work are projected for completion.
 - ii. A list of those ways in which documentation of work can be shown.
 - iii. A plan for evaluation, which will include the specific work to be submitted for evaluation on the project, and a statement of criteria to be used for evaluation, will also be included.
- d. It is the responsibility of the faculty supervisor to ensure that all the provisions in numbers 7 and 8 above have been satisfactorily accomplished. Copies of all documents and schedules mentioned in 8.b and 8.c must be filed with the department chairperson by the end of the add/drop period. Completed projects, along with faculty evaluations, should be retained in the faculty member's files, to be available for review, if necessary, by appropriate school and college committees.

REPEATED COURSES

Students who repeat a course only receive credit once for the course. The grades for all occurrences of the course remain on the permanent academic record and all are included in computing the cumulative grade-point average.

ATTENDANCE POLICY

Students are expected to attend all regularly scheduled classes. The instructor has the final authority to excuse absences.

It is the responsibility of the instructor to inform students of his or her policy for handling absences and tardiness, and the penalties that may be imposed. Notification should be done both verbally and in writing at the beginning of each semester.

It is the responsibility of the student to inform the instructor regarding the reason for absence or tardiness from class, and to discuss these with the instructor in advance whenever possible. The instructor has the right to require documentation* in support of the student's request for an excuse from class. If an out-of-class exam is scheduled which conflicts with a regularly scheduled class, the regularly scheduled class has priority (see Hour Tests below).

The instructor has the right to disenroll any student who fails to attend a scheduled course by the third instructional day of a semester or the second scheduled class session of a course, whichever comes later, unless the student has notified the instructor and has been excused. To disenroll students the instructor must notify the Registrar, who will remove the student's name from the class list and the course from the student's schedule. The student is responsible to determine whether or not she or he is enrolled in a class.

Two situations, described below, arise where instructors are asked to give special consideration to students' request for permission to miss class. As in all class absences, it is the student's responsibility to notify faculty of the absence and the instructor has final authority to excuse students from class.

*When a student is unable to attend class for a health reason, the student may give permission for the instructor to discuss the situation with a representative from the Center for Health and Wellbeing. As with all absences, the faculty member has final authority to excuse students from classes.

Athletic-Academic Conflicts

Students participating in intercollegiate athletics should plan their schedules with special care, recognizing the primary importance of all of their University academic responsibilities. Each semester, members of UVM varsity and junior varsity teams are responsible for documenting in writing any conflicts between their planned athletic schedule and the class schedule to their instructors by the end of the second full week of classes. Students and instructors should then discuss potential conflicts between course requirements and intercollegiate competitions. When an unavoidable conflict exists, the student and instructor should seek a resolution which permits the student to address the course requirement and participate in the athletic competition. The instructor has final authority on this matter.

Religious Holidays

Students have the right to practice the religion of their choice. Each semester students should submit in writing to their instructors by the end of the second full week of classes their documented religious holiday schedule for the semester. Faculty must permit students who miss work for the purpose of religious observance to make up this work.

Right of Appeal

A student who believes that an instructor has treated him/her unfairly, regarding any policy or procedure, may appeal to the academic dean of the instructor's academic unit.

HOURLY TESTS

1. One or more hour tests are usually given during a semester in each course. These are scheduled by the faculty member within the class periods assigned for the class.
2. In a course which has several sections meeting at different hours, a common test for all sections may be given only by arrangement with the Registrar. A schedule of such tests is made up at the beginning of the semester. Requests should be filed as early as possible.
3. Attendance at hour tests scheduled outside the normal meeting time of the class shall not have precedence over attendance at other scheduled activities or other important commitments of the students concerned. Faculty members must be prepared to give a make-up test for those unable to be present at the time set.

- University academic responsibilities have priority over other campus events. Attendance at (1) regularly scheduled classes have priority over specially scheduled common hour examinations, (2) common hour examinations have priority over attendance at other activities.

FINAL EXAMINATIONS

- The examination period at the end of each semester is set by the official University calendar.
- Semester examinations shall be given only during the regular examination period except by permission of the dean of the college/school on request of the chairperson of the department. No examination shall be given during the last week (the last five instructional days) of the semester except lab exams given in courses with specific lab sections.
- The time and place of each final examination are determined by the Registrar and a schedule is circulated and posted. Any change in the scheduled time or place may be requested by the chairperson of the department concerned when conditions seem to warrant such special arrangement. Decision on such requests rests with the Registrar.
- In every course in which a final examination is given, every student shall take the examination unless excused by the instructor.
- Students having a conflict in their final examination schedule must notify the faculty concerned of such conflict not later than the close of business one week prior to the last day of classes for the semester in which the conflict arises.
- Students who are absent from a final examination for any reason must report that fact and the reason, in person or in writing, to their instructor within 24 hours. If the absence is due to any situation beyond the reasonable control of the student (e.g. illness or family tragedy), the instructor must provide the student with the opportunity to complete the course requirements. At the instructor's discretion, this may be an examination or some other suitable project. The instructor may require evidence in support of the student's reason for absence.
- If the absence is not reported as provided above, or is not excused by the instructor, the examination is regarded as failed.
- No student shall be required to take three or more final examinations in one 24-hour period.
- Unless a mutually agreeable alternative time can be reached by the student and the instructor, the scheduled make-up will occur the next day after the regularly scheduled examination. These considerations are subject to the following constraints: all exams will be given in the final exam period and all conflicts must be resolved before the start of the final exam period.
- Students will select which of the three examinations they wish to take at an alternative time. In cases where the instructors in all three sections feel it is impossible to give the examination at an alternative time, and all conflicts are in the same college or academic unit, the appropriate dean's office, in consultation with the faculty involved will establish which of the three examinations will be taken as a make-up. If the unresolved conflict involves more than one college, the deans of the units in question will resolve the matter. If agreement cannot be reached by the deans involved, then a person from the Office of the Provost will establish which of the three examinations will be taken as a make-up.
- All final examination materials should be retained for at least one month after the final examination session in

case any questions arise concerning grades and to afford students the opportunity to review their graded final examination papers if they wish to do so.

GRADES

Grades are reported and recorded as letter grades. Averages are calculated from quality point equivalents.

	Points per Semester Hour
A+ Excellent	4.00
A Excellent	4.00
A- Excellent	3.67
B+ Good	3.33
B Good	3.00
B- Good	2.67
C+ Fair	2.33
C Fair	2.00
C- Fair	1.67
D+ Poor	1.33
D Poor	1.00
D- Poor	0.67
F Failure	0.00

This system began with grades received for courses initiated in the fall semester 1983. Grades received prior to the fall 1983 semester with "+" or "-" receive only those quality points shown on page 42 of the 1982-83 catalogue.

Other grades are:

S/U Satisfactory/Unsatisfactory. This grade may be used to evaluate a student's performance in courses where the A-F grade is inappropriate, such as in seminars, internships, practica, etc. The grade will appear on the transcript, but will not be used in grade-point computation. The student will receive the appropriate credit hours toward graduation for the S grade, but not for the U grade. Courses which use this grading system are so indicated in the catalogue description. The S/U is available on a whole course basis (and only on a whole course basis) and is available for courses that count towards degree requirements.

AU Audit. See page 32 for details.

Inc. Incomplete. This grade applies to course work which is not completed due to circumstances beyond the student's control, e.g. illness, as documented by the Student Health Center; personal tragedy; academic, such as breakdown of computer or laboratory equipment, or unanticipated delay in receiving information from sources inside or outside the University. Incompletes can be awarded only with the permission of the student's college/school dean. The incomplete course requirement will be satisfied at the earliest possible date. In no case shall this time be set longer than the beginning of the corresponding semester of the next academic year. In cases of laboratory assignments, the student must complete all work the first time that the laboratory experience is offered again. It will be the responsibility of each dean's office to determine through the Registrar whether any incompletes have been awarded without prior approval. It is the student's responsibility to learn from the dean's office whether the request has been approved, the date of completion, and, from the instructor, the nature of all outstanding requirements.

Procedure:

- Medical. Students contact the appropriate dean's office to determine type of academic relief needed (i.e. incomplete, withdrawal). Students complete a

Medical Action Request and submit it to the Student Health Center. Students and faculty will receive confirmation of eligibility for medical action from the dean's office.

2. Personal tragedy. Students contact the appropriate dean's office to discuss these matters. Confirmation of eligibility for incompletes will be provided to faculty by the dean.
3. Academic. Students contact the course instructor to request an incomplete grade. It is the instructor's responsibility to confirm to the dean eligibility for incompletes on academic grounds.

In all cases, the instructor will fill out and forward to the student's academic dean an incomplete card which will describe the reason for the incomplete and will note the completion date to which the student and instructor have agreed.

- XC Extended Course. This grade is awarded at the end of the semester to a student who is enrolled in an identified course, the nature of which makes it unreasonable or impossible for the student to complete the required work within the regular semester.
- NP Not Passed, not used in grade-point average computation.
- P Passed, not used in grade-point average computation.
- W Withdrawn.
- M Missing. Grade not turned in by the instructor.

In cases in which a student requests reconsideration of a grade for a course already taken, the grade change, if any, must be made by the instructor and approved by the student's dean by the end of the first month of the following semester unless an extension is granted by the student's dean.

GRADE APPEALS

Students who feel that they have received an unfair grade should first contact the Registrar's Office to verify that the grade submitted by the instructor is the same as that printed on the grade report. If the grade has been reported correctly, a student should next contact the instructor, department chair, and dean of the college/school in which the course is offered (in that order) for a discussion of the matter. Grading is the prerogative of the instructor and a decision to change a grade can be made only by the instructor. Additional information on the grade change process may be found in the Rights and Responsibilities section of *The Cat's Tale*.

RETROACTIVE ACADEMIC ADJUSTMENT POLICY

The University will consider requests for medical withdrawal and retroactive academic adjustments when those requests are accompanied by appropriate medical information. To receive consideration, a student or his/her authorized representative must complete and submit to the student's college/school dean's office a *Consultation Form for Medical Withdrawal and Incompletes*.

The completed form must contain two important dates. The first, the effective date of condition, is provided by the Office of Student Health, Counseling, or Disability Services. The dean's office will use this date when deciding whether to approve a request for academic adjustment. The second date, on which a completed form was submitted to the dean's office, will be entered by the dean's office. This latter date will govern the determination of refunds.

Approved academic adjustment decisions will be forwarded by the college/school dean's office to the Registrar's Office

for academic record keeping. Students may appeal the academic adjustment decision of their school or college to the Office of the Provost. If the appeal is based upon a certified disability and recommended as an appropriate accommodation, students may appeal the academic adjustment decision of their school or college as outlined in *Policies and Procedures for Students with Disabilities* under the section entitled "Protocol for Dispute Resolution." All appeals must be submitted in writing.

Decisions regarding adjustments to academic records are distinct and separate from refunds. Any refund, including tuition, financial aid awards, fees, room, and board, will follow federal and institutional guidelines. The effective date for any refund will be the date that the completed form was received by the academic dean's office. Questions regarding refunds should be directed to the Controller's Office.

TRANSFER OF CREDIT

Students seeking to transfer academic credit may do so only for courses which are taken at accredited institutions and are comparable in content, nature, and intensity to courses taught at The University of Vermont. Credit is not given for grades lower than C. To insure transferability of courses to be taken elsewhere, degree students must secure prior approval for each course in writing from Transfer Affairs. Questions regarding credit transfer should be directed to the Office of Transfer Affairs, 327 Waterman.

ACADEMIC REPRIEVE POLICY

An Academic Reprieve Policy for former students returning to complete their education at the undergraduate level became effective at The University of Vermont in the fall semester of 1986. This policy is designed to make it possible for former UVM students, whose academic performance when first enrolled was below standard, to resume their studies without the encumbrance of the grades previously earned.

The Academic Reprieve Policy is available to returning students who have not been enrolled at UVM or any other accredited institution of higher education for a period of at least three calendar years.

Former students returning to the University may request the application of the Academic Reprieve Policy only once in their career at UVM.

The established procedures and criteria for admission or re-admission apply to all students, including those who may be eligible for the application of the Academic Reprieve Policy.

The dean of the college/school in which the student is enrolled at the time of initial eligibility for the application of the Academic Reprieve Policy shall determine all questions as to eligibility for, and application of, the "policy."

A person meeting the criteria for eligibility must file a petition with the appropriate dean requesting reprieve of all prior course work at the University, either at time of admission or readmission or before the close of the first semester of re-enrollment. The Reprieve Policy includes all previous UVM work and does not allow the students to pick and choose individual courses for reprieve. All courses with grades below passing are ignored, credit hours for courses passed are carried forward, but the grade is not figured in the new grade-point average which begins again at zero.

Any person electing the reprieve option is required to complete a minimum of 30 additional regularly graded credits

at the University before a degree may be awarded (15 regularly graded credits for the associate degree); these credits are not open to the pass/fail option. Those electing the reprieve option may qualify for honors at graduation only on the same basis as any transfer student, i.e. completion of 60 or more regularly graded credits at UVM (30 or more regularly graded credits for the associate degree programs).

Persons electing the reprieve option will be required to meet degree requirements of the catalogue in effect on the date of the student's application for readmission.

The Reprieve Policy applies solely to regular undergraduate degree programs. Graduate programs are specifically excluded.

CLASS STANDING

The designation of a student's class shall be determined by the number of credits completed. The divisions are as follows:

	Credit Hours
Bachelor's degree:	
First-year	0-26.9
Sophomore	27.0-56.9
Junior	57.0-86.9
Senior	87.0 and over
Associate degree:	
First-year	0-26.9
Senior	27.0 and over

TRANSCRIPTS

An official transcript is the reproduction of a complete, unabridged permanent academic record validated with the University seal, facsimile signature of the Registrar, and date of issue. A Key to Transcript is included which contains a full statement of pertinent definitions. A rank-in-class entry is made upon completion of degree requirements.

Currently enrolled as well as former undergraduate and graduate students may obtain an official transcript of their permanent academic record by writing the Office of the Registrar, 360 Waterman Building. Please allow a minimum of one week for normal processing and three weeks following the end of a semester.

Transcripts are not released when there is an indebtedness to the University.

ACCESS TO RECORDS

Students have the right to review any of their educational records maintained by the University. Students also have the right to have all educational records maintained in a confidential manner. In appropriate situations, students may choose to waive some or all of these protections, but such waivers must be clearly stated in writing. If a student feels an educational record is misleading, or contains information which is inaccurate, a hearing may be scheduled to seek appropriate modification. Requests for review of records should be made to the Registrar.

ADDRESS CORRECTION

It is a student's responsibility to promptly report any address changes to the Registrar. Semester pre-bills are mailed to a student's permanent address as are bills mailed during the summer months. All other bills and notifications are mailed to a student's local address.

NAME AND ADDRESS EXCLUSION

The Family Educational Rights and Privacy Act of 1974 grants to all students the right not to have personal information contained in the records of the University released to any individual, agency, or organization. UVM feels that the following constitutes such personal information.

Name
Address
Telephone number
Dates of attendance
Class
Previous institution(s) attended
Major field of study
Enrollment status
Awards
Honors (including Dean's list)
Degree(s) conferred (including dates)
Past and present participation in officially-recognized sports and activities
Physical factors (height, weight of athletes)
Date and place of birth

Students who do not wish to have the above information released should fill out an information exclusion card at the Registrar's Office.

UNIVERSITY HONORS

The bachelor's and associate's degrees may be conferred with honors, by vote of the Senate, in recognition of general high standing in scholarship. Three grades are distinguished and indicated by inscribing on the diploma the words *cum laude*, *magna cum laude*, or *summa cum laude*.

Honors are determined in the following manner: Within the graduating class of each college or school, students in the top one percent will receive *summa cum laude*; the following three percent will receive *magna cum laude*; the next six percent will receive *cum laude*. The total number of honors awarded will not exceed ten percent of the graduating class of each school or college.

Honors will be calculated on all grades received at this University. In order to be eligible for consideration, a student must have taken at least 60 hours (30 hours for two-year programs) at this University in which a letter grade of A, B, C, D, or F has been awarded.

DEAN'S LIST

The deans of the undergraduate colleges/schools publish at the beginning of each semester the names of those full-time students with a grade-point average of not less than 3.0 who stood in the top 20 percent of each class of their college/school during the preceding semester. Full-time enrollment in this case shall be a minimum of 12 credit hours in courses in which grades of A, B, C, D, or F have been given.

In addition, each semester a Continuing Education Honors List recognizes the top 20 percent of nondegree students who have had a long association with UVM and achieved a high cumulative grade-point average. Continuing Education is currently forming Nu Delta Epsilon, a new national honor society to encourage high scholastic attainment among nondegree students.

STUDENT LEAVE OF ABSENCE POLICY

A leave of absence means that a student who is eligible for continued enrollment ceases to be enrolled while in good standing and is guaranteed readmission. This policy benefits both the student and the University in that it enables a student to plan for readmission and allows the University, by having records on the expected date of return of its students, to refine further the planning of the size of the student body. The following statements further define a leave of absence:

1. Upon written application to the academic dean, a student may be granted a leave of absence by that dean when that application merits the commitment of the University to insure the student's readmission.
2. A leave must be granted for a finite period of time.
3. A leave normally may not exceed four semesters.
4. A leave normally may not be granted for the current semester after the day on which courses can be dropped without penalty.
5. A leave may not be granted to students currently on academic trial or disciplinary probation.
6. A leave is distinct from withdrawing for medical reasons and is not granted for medical reasons.
7. A leave does not guarantee housing upon the student's return.
8. A leave guarantees readmission to the student's college/school in the University if the student confirms intent to return by the closing date for a normal readmission application (October 31 and March 31 preceding the appropriate semester).
9. While on a leave, an individual's student status is temporarily terminated. A leave of absence guarantees an individual's readmission only if the appropriate action is taken.
10. Financial aid awarded but not used prior to a leave will not be carried over. Reapplication for aid for the readmission period must be made according to normal Office of Financial Aid policies and procedures applicable to that period.
11. A leave should be confirmed by the appropriate form signed by both the student and the dean of the college/school involved.

WITHDRAWAL

Students who wish to withdraw from the University must first notify their academic dean in person or writing.

READMISSION

Any degree students who have left the University for one semester or more must write to their dean's office to request readmission. Students must apply for readmission by October 31 or March 31 preceding the appropriate semester of return.

LOW SCHOLARSHIP

The information below describes the general University regulations for low scholarship standing. The Studies Committee of each college/school may determine more stringent requirements. Students with questions regarding their academic standing should consult with their college/school dean.

1. "On Trial":
 - a. "On trial" is an intermediate status between good

standing and dismissal. Students remain enrolled according to stated academic conditions of their college/school.

- b. A student is placed "on trial" by the dean or the designated committee of the college/school concerned. Special academic conditions may be set in each case. Normally the period of "trial" status is one semester.
- c. The circumstances under which a student is placed "on trial" are as follows:
 - (1) Students who are readmitted after having been dismissed for low scholarship re-enter "on trial."
 - (2) Generally students are placed "on trial" if in any semester they have failed half or more of the hours of their enrollment but have been permitted to continue in college/school.
 - (3) Students whose records have been consistently below the graduating average or generally unsatisfactory in any semester may be placed "on trial" or continued "on trial" even though they do not come within the provisions of Section (2).
2. Separation:
 - a. Students are dismissed from the University if they receive grades below passing in one-half or more of the semester hours of their enrollment in any semester unless they are allowed to continue by action of the designated committee.
 - b. Students who fail to meet the condition of their trial or whose record has been unsatisfactory and consistently below the graduation average may be dismissed for low scholarship even though they do not come within the provision above.
 - c. Students dismissed for low scholarship must address their application for readmission to the college/school taking the action.
 - d. Any students dismissed for academic or disciplinary reasons must receive written approval from their previous academic dean (or the Vice President for Student Affairs for disciplinary cases) before enrolling in any University course.

INTERCOLLEGE TRANSFERS

Students who are or have been members of any college/school of this University may transfer to another college/school within the University only with the consent of the deans of the two units involved. Students wishing to transfer must have a cumulative grade-point average of 2.0. A cumulative grade-point average of 2.5 is required for transfer admission into teacher licensure programs in the College of Education and Social Services. Transfers can be made only if space is available and may be conditional upon students satisfactorily completing requirements set out by the new college/school. Students are advised to discuss a potential transfer with the deans of both colleges/schools before applying and are encouraged to remain in their original college/school for at least one semester and preferably one year before transferring. In the case of veterans receiving educational benefits through the Veterans Administration, the change must be brought to the attention of the advisor to veterans in the Center of Career Development where a Change of Program or Place of Training Form #22-1955 must be completed and submitted for approval to the Veterans Administration.

MEDICAL DISABILITIES

Students with disabilities may be approved to enroll for a course load of less than 12 credit hours (FTE) because of their functional or processing limitations as a result of a disability. Those students with receipt of appropriate

medical certification from the Director of the Student Health Center will be approved to carry a reduced load. Such students, because of their disability, will be afforded full-time status in accordance with Section 504 of the Rehabilitation Act of 1973.

UNDERGRADUATE DEGREE REQUIREMENTS

Degrees are conferred on the recommendation of the colleges/schools and specific requirements will be found in the sections devoted to the respective colleges/schools.

In addition to the course requirements of the curricula, students must also fulfill the general requirements in physical education.

To be eligible for graduation, a student must have attained a cumulative average sufficient to meet the minimum requirements for the college/school in which the student is officially enrolled. Beginning with the class of 1984, the minimum grade-point average for graduation is 2.00. Grades in courses accepted for transfer credit are excluded in computing this average.

Every candidate for a degree is required to have taken 30 of the last 45 semester hours of credit (15 of the last 30 for two-year students) in residence at the University except that those who have completed three years of premedical study in the University are awarded their degrees after successful completion of one year of study in any approved college of medicine. Other exceptions to this rule may be made only upon decision of the dean or the appropriate faculty committee of the college or school in which the student is enrolled. To qualify for a second bachelor's degree, the candidate must have fulfilled all the requirements for the degree and must have taken a full year of work, usually 30 hours, in addition to that taken to qualify for the first degree.

PHYSICAL EDUCATION

One year of physical education, normally completed during the first or sophomore year, is required of all undergraduate students in four-year programs. The two credits earned in activities classes will be included in the total number of hours required for graduation. Students may opt to take activities classes on a pass/no pass basis. (For further details, see the pass/no pass heading in this section.) Medical examinations are required of all new students. Those with serious defects may be given restricted work or may be excused by the Director of the Student Health Center. The physical education requirement for students pursuing two-year degree programs shall be one credit of course work earned in activities instruction.

Students 25 years of age or older at time of admission or readmission are exempt from physical education requirements.

UNIVERSITY RESPONSIBILITY

Many courses involve instruction in and the use of various types of power equipment, laboratory apparatus, and specialized facilities. The University takes every precaution to provide competent instruction and supervision of such courses. It is expected that students will cooperate by following instructions and exercising precaution. In case an accident resulting in personal injury does occur, the University can assume no responsibility.

USE OF ENGLISH

Correct English usage is demanded by all departments. Written work of any kind which is unsatisfactory in manuscript form, grammar, punctuation, spelling, or effectiveness of expression may be penalized, regardless of content. Students whose written work falls below the standard of correct usage may be referred to the English Department for additional instruction, even though the first-year course in English has been passed.

Before admission to the University, foreign students must offer evidence that they are capable of reading and writing English at the college level.

ACADEMIC DISCIPLINE

The University expects each student to maintain high standards of personal conduct and social responsibility at all times both on and off campus. As responsible citizens, all students are required to observe and to share in the support of University regulations. Any student who fails to uphold these standards is subject to disciplinary action.

The disciplinary authority of the University is vested in the President. In such cases as the President considers proper, this authority may be delegated to the several deans and to appropriate judicial bodies. The continuance of each student, the receipt of academic credits, graduation, and the conferring of any degree or the granting of any certificate are strictly subject to the disciplinary powers of the University. The University is free to cancel a student's registration at any time on any grounds if it considers such action to be for the welfare of the institution.

Policy on the above matters is explained in detail in *The Cat's Tale*. Each student is held responsible for knowledge and observance of these rules and regulations, including those concerned with academic honesty.

ACADEMIC HONESTY

The principal objective of the policy on academic honesty is to promote an intellectual climate and support the academic integrity of The University of Vermont. Academic dishonesty or an offense against academic honesty includes acts which may subvert or compromise the integrity of the educational process. Such acts are serious offenses which insult the integrity of the entire academic community.

Offenses against academic honesty are any acts which would have the effect of unfairly promoting or enhancing one's academic standing within the entire community of learners which includes, but is not limited to, the faculty and students of The University of Vermont. Academic dishonesty includes knowingly permitting or assisting any person in the commission of an offense of academic dishonesty.

The policy distinguishes between minor and major offenses. Offenses purely technical in nature or in which the instructor does not perceive intent to achieve advantage are deemed minor and are handled by the instructor. Major offenses are those in which intent to achieve academic advantages is perceived.

The following is a summary of the steps involved in adjudicating an alleged major offense against academic honesty:

1. A faculty member, student, or other University-related person reports in writing the specifics of an instance of alleged academic dishonesty to the Coordinator in the Office of the Provost.
2. The Coordinator will inform, in writing, the student(s) cited in the letter of initiation that charges will be pre-

sented to the University Hearing Panel. The student will meet with the Coordinator to be advised on the nature of the process, and the student's rights and responsibilities.

3. A student who has been accused of an act of academic dishonesty has the right to a formal hearing. The student may waive that right, in writing, and thus admit to the charge(s); in this event, the Coordinator will assign the appropriate sanction(s).
4. In the event a hearing is convened, the Presenter will describe the particulars of the charge to the five-member Hearing Panel consisting of three faculty members and two students. It is the responsibility of the Panel to determine whether there is sufficient and suitable evidence to determine guilt; the decision of the Panel with respect to guilt or innocence is determined by majority vote.
5. If a student is found innocent of the charge(s), he or she may drop the course in question without penalty if he or she wishes to; no record of that course will appear on the student's transcript.
6. If a student is found guilty of the charge(s), the Coordinator will assign the sanction(s) in accordance with the standards contained in Section G of the academic honesty policy. Although the sanction(s) will not appear on the student's transcript, a record will be maintained in the Provost's Office.
7. A student found guilty of committing an act of academic dishonesty may appeal, in writing, within five University business days, to the Provost, but solely on the grounds of procedure or abuse of discretion.

A full statement of the policy is in *The Cat's Tale*. Each student is responsible for knowing and observing this policy.

FREEDOM OF EXPRESSION AND DISSENT

The University of Vermont is a place to learn and to teach. It is not a cloister—it does not live in a vacuum. It is both in the world and of the world. Its mission is to educate people for leadership in society. (Board of Trustees, May 1969)

As the above quotation suggests, the University functions within the rules governing a larger society. It was created by that society for a special purpose: the facilitation of learning and teaching. It follows that the University's regulations must conform with the law as well as take into account the particular role of educational institutions.

Fundamental to our entire philosophy is our firm belief that rights guaranteed by the First and Fourteenth Amendments to the Constitution of the United States must be protected on the campus as elsewhere and that local, state, and federal laws must prevail on campus. Becoming a member of the University community in no way abrogates or compromises the rights which the Constitution of the United States guarantees to all persons.

Within the University setting as within society at large, the exercise of one's rights must be tempered by recognition of the rights of others. For example, the exercise of free speech may unreasonably infringe upon the right to learn.

The laws of society and the mission of the University establish the framework within which disagreement, dissent, demonstration, and advocacy may, indeed must, occur. For humankind to progress, the educational process must be dynamic even if fraught with controversy, for change cannot take place until the first question is raised. The discovery of new propositions or new solutions also may be followed by passionate advocacy. Such advocacy must never replace the continued pursuit of the University's essential purpose of learning and teaching.

It is within this context that the University rejects the use of, or the threat of force as a means of resolving differences. Violence is both unnecessary and inappropriate for those who have access to reasoned discourse and is unacceptable within an institution dedicated to reason. The University officer responsible for implementing the Policy Statement on Freedom of Expression and Dissent, when students are involved, is the Chief Student Affairs Officer. In all cases, the designated officer shall attempt to resolve the situation through efforts of persuasion. The University must, if efforts at persuasion have failed, resort to the use of any legal remedy deemed necessary. Those engaged in unlawful disruption, consequently, may expect appropriate responses from either University or other law enforcement authorities or both.

A full statement of the policy is in *The Cat's Tale*. Each student is responsible for knowing and observing this policy.

UNDERGRADUATE ENROLLMENT FOR GRADUATE CREDIT

UVM senior undergraduates may enroll for graduate credit at UVM under the following circumstances: the course must be available for graduate credit; total enrollment including the graduate course must not exceed 12 credit hours in the semester in which the course is taken; the course must not be computed as part of the bachelor's degree; permission to seek such graduate credit must be requested of the Graduate Dean in writing by the dean of the undergraduate college or school prior to enrollment. Such graduate credit is limited to six hours and is not available for transfer to another institution as graduate credit. It can be used only at UVM if the course is judged appropriate by the student's advisor for the particular graduate program.

Accelerated Master's Degree Programs

A number of departments and programs provide opportunities for selected undergraduates to participate in Accelerated Master's Programs (AMPs). This option is available for admission to graduate programs in Animal and Food Sciences, Biology, Biomedical Technology, Biostatistics, Computer Science, Education (Curriculum and Instruction and Professional Education), History, Materials Science, Mathematics, Mechanical Engineering, Microbiology and Molecular Genetics, Nursing, Public Administration, and Statistics. The AMP allows early admission to graduate studies with up to six concurrent credits double-counted toward the bachelor's and master's degrees. Consult the Graduate College catalogue for further information.

CREDIT BY EXAMINATION

A degree student may, under the following conditions, receive credit for a course by taking a special examination and paying the special examination fee charge of \$35 per credit hour. The examination fee must be paid prior to taking the examination.

A request for such an examination must be made in writing at least one month before the date of the examination, and it must be approved by the student's advisor, the chairperson of the department in which the course is given, and the academic dean, in that sequence. The student must neither have audited, previously received a grade or mark, nor have attempted a prior special examination in this course at UVM or at any other institution of higher education. Only specific University courses may be challenged using special examination. Readings and Research, Honors Research,

etc., are specifically excluded. Special Topics may be challenged only if that course is offered during the semester in which the special examination is being requested. The student may not take a special examination in a course whose content is presupposed by other courses the student is currently enrolled in or has already taken. In cases of uncertainty, the department chairperson shall decide whether it is appropriate for the student to take a special examination for credit in a particular course. Upon passing the special examination, as determined by the examiner and the chairperson of the department in which the course is given, the student receives credit, but not a grade, for the course. Credit by examination forms are available in the Office of the Registrar, 360 Waterman Building.

COLLEGE-LEVEL EXAMINATION PROGRAM (CLEP)

The University considers credit for most of the 30 specific subject CLEP exams providing the student has not previously attempted a similar course of study at a college level. Scores acceptable for credit are comparable to attaining a level of accomplishment equal to a B in a graded course situation. Individual exams may earn a student three, six, or eight semester hours of credit depending on the nature and scope of the material covered. Credit is not granted for the general exams.

Credit granted for CLEP Examinations may be applied toward distribution requirements and to the total semester hours specified for a particular degree program when approved by the dean of the college/school in which the student is subsequently a candidate for a degree. Information about CLEP and application forms are available at the Counseling and Testing Center, 146 South Williams Street, and the Office of Transfer Affairs, 327 Waterman Building.

CREDIT FOR CALCULUS

Credit will be given for Math. 21, or Math. 22 and Math. 121, according to the following guidelines.

May receive credit for Math. 21 provided the student:

1. Has not taken the advanced placement test in mathematics; and
2. Has not attempted Math. 21 for credit at UVM; and
3. The average of the grades received in Math. 22 and Math. 121 is B or better; and
4. Received a B or better in Math. 121.

May receive credit for Math. 22 provided the student:

1. Has not taken the advanced placement test in mathematics; and
2. Has not attempted Math. 22 for credit at UVM; and
3. Received a B or better in Math. 121.

CREDIT FOR MILITARY SERVICE

University of Vermont degree students may have their military service record reviewed for possible transfer credit. Veterans should present form DD 214 to the Office of Transfer Affairs; active duty personnel should have form DD 295 sent directly from the educational officer on the base. Army personnel seeking credit other than Physical Education should have an AARTS transcript sent directly from: AARTS transcript, Manager, AARTS Operations Center, 415 McPherson Ave., Ft. Leavenworth, KS 66027-1373.

Transcripts of examinations sponsored by the Defense Activity for Non-Traditional Educational Support (DANTES) are available at a nominal charge from: DANTES Contractor Representative, Educational Testing Service, P.O. Box 2819, Princeton, NJ 08540. All documents except form DD 214 should be sent directly to the Office of Transfer Affairs, University of Vermont, 360 Waterman Building, Burlington, VT 05405.

Students should contact the Office of Transfer Affairs for more information.

VETERANS

The University provides support and advising to any veteran or dependent eligible for benefits under Federal Law, Chapters 30, 31, 32, 34, 35, or 106. Students eligible for these benefits should contact the Career Development Office at least one month prior to registration each semester. Students wishing to register for benefits should be prepared to present their certificates of eligibility.

It is important that all veterans and dependents keep in contact with the University for the latest information regarding benefits and requirements. Also, those students involved in the Veterans Program should contact the University in the event of any change in credit load, dependency status, address, or major. The phone number is (802) 656-3450.

TYPES OF ENROLLMENT

DEGREE STUDENTS — Students who have presented appropriate credentials for admission and have been accepted as students in a degree program.

NONDEGREE STUDENTS — Students who have presented minimum credentials and are permitted to undertake limited course work (up to six credit hours per semester) for a purpose other than the earning of a degree through Continuing Education.

Credits earned by nondegree students who later apply and gain admission to a degree program will be evaluated and, if appropriate, will be accepted toward completion of their degree. Nondegree students may enroll for a maximum of six credits (or two courses) per semester in the day program. Special permission is necessary for a student to exceed the six-credit maximum. Before completing 30 credits of course work through Continuing Education, degree-bound students should consult with an advisor at Continuing Education, submit an application for formal admission to UVM, and then should consult with the appropriate dean to structure further courses into a degree program.

Selection of courses for those having long-range plans of earning a degree should be made on the basis of information given in this catalogue. Students interested in making a formal application for admission to the University should contact the Admissions Office.

Students presently enrolled and in good standing at another institution may take courses at UVM to transfer to their institutions. Visiting students are considered nondegree students and should contact Continuing Education for information and registration material.

All nondegree students who would like assistance in planning educational programs and selecting courses should contact Continuing Education, (802) 656-2085.

Academic Options

In addition to the areas of study detailed in the following sections of the catalogue, a number of curricular options are available which provide unique opportunities for UVM students. Students interested in a curriculum focusing on the environment and environmental problems will be interested in the options described in the following section "Studying the Environment."

Family and Consumer Sciences Education Program

The Family and Consumer Sciences Education Program is an interdisciplinary program offered by the College of Agriculture and Life Sciences. It provides a sequence of courses in family, personal, and consumer issues: food and nutrition, consumer management, human development, and housing. The variety of courses taken for the major expands career possibilities.

Because of the interdisciplinary and comprehensive scope of Family and Consumer Sciences Education, graduates with this major have a variety of career alternatives in business, social agencies, and different types of educational programs for youth and adults. Graduates are licensed to teach in public schools in Family and Consumer Sciences fields such as family studies, child development, consumer education, food and nutrition, housing and interiors, and resource management found in middle, junior, and high school programs. Also, an additional endorsement to teach health can easily be obtained with this major. Family and Consumer Sciences Education graduates can be licensed to teach in occupational programs, including human services and culinary arts. Experience in business or industry is needed to teach in an occupational program.

Typical Curriculum

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
Agri. 91, Beginnings	1	—
Agri. 95, Race & Culture	1	—
NFS 43, Fund. Nutrition	3	—
Eng. 1, Written Expression	3	—
ECHD 5, Human Develop.	3	—
Biol. 4, Human Body	4	—
NFS 53/54, Basic Foods	—	4
Soc. 1, Introduction Soc.	—	3
EDSS 1, School & Learning	—	3
ECHD 65, Hum. Rel. & Sexuality	—	3
Physical Educ. Act.	1	—
Humanities elective	—	3
	16	16
	1st SEMESTER	2nd SEMESTER
SECOND YEAR		
CDAE 158, Pers. & Fam. Fin.	3	—
Chem. 23, Outline Chem.	3	—
CHEM 26, Outline Organic & Bioch.	—	3
ECHD 62, Adolescent Dev.	—	3
CDAE 85, Computer Applic.	3	—
CDAE 15, Design	—	3
Psyc. 1, General Psych.	3	—
Math. 9, College Algebra	—	3
NFS 123, Educ. Methods	3	—
Physical Educ. Act.	1	—
	16	15

Additional family and consumer science-related courses and electives to meet college and concentration requirements including specific state requirements for licensure, to be selected with the approval of the student's advisor.

Urban Forestry and Landscape Horticulture

Urban Forestry and Landscape Horticulture provides a professional education in the use and care of trees, shrubs, lawn grasses, and other plants in the human environment.

The interdisciplinary program is jointly coordinated by the Forestry Program in the School of Natural Resources and the Department of Plant and Soil Science within the College of Agriculture and Life Sciences. Student majors in this program are enrolled in Plant and Soil Science.

Reserve Officers' Training Corps

ARMY

The Army ROTC program offers men and women the opportunity to earn a commission as a Lieutenant in the United States Army, Army Reserve, or Army National Guard. Graduates choose from among 27 different branches or specialties. The objective of the program is to develop leadership and management skills. These include sound situational assessment, decision making, personal integrity, self-discipline, responsibility, and the ability to know, understand, and lead people.

Additionally, the Department offers special courses in related fields through Physical Education, including orienteering and backpacking.

The offices of the Department of Military Studies are located at 128 University Heights, (802) 656-2966. E-mail: uvmrotc@zoo.uvm.edu.

PROGRAMS Military Studies at UVM consists of several programs: (1) A four-year program comprised of a Basic Course which is open to all first-year students and sophomores. This course is designed to provide students with information on what it would be like to be an Army officer. Other than for scholarship students, the basic course has no military commitment. Students survey Army opportunities and decide whether to continue in the program. (2) An Advanced Course is available for qualifying juniors and seniors including veterans. Both courses require one military studies class per term during the four years of undergraduate study. Attendance at the 35-day summer camp at Fort Lewis, Washington, is required between the junior and senior year. (3) The Simultaneous Membership Program allows eligible students to be concurrently enrolled in the advanced course and as an active member of a National Guard or Army Reserve unit, drawing up to \$325 per month in wages and allowances for participation in both programs.

SCHOLARSHIPS Two-, three-, and four-year government scholarships are available paying up to \$16,000 per year. Application for the four-year scholarship is made during the senior year of high school. All other scholarship applications are made through the Department.

Note: Private Alumni Scholarships and loans are also available for ROTC students.

SUBSISTENCE ALLOWANCE All contracted cadets receive \$150 a month tax free. Students receive travel allowances to and from all required military schooling away from

the University. Those who attend advanced summer camp will receive approximately \$750.

POSTGRADUATE Upon graduation, ROTC students are normally commissioned as officers in the U.S. Army, National Guard, or Army Reserves. The active duty obligation will vary from three months to four years dependent on the needs of the Army and personal desire. Active duty may be deferred up to four years for those desiring to pursue an advanced degree as a full-time graduate student. Opportunities also exist for fully-funded graduate schooling upon branch qualification.

Typical Curriculum

	1st	2nd
	SEMESTER	
FIRST YEAR	MSTD 6	MSTD 7
	MSTD 2*	
SOPHOMORE YEAR	MSTD 8	MSTD 9
JUNIOR YEAR	MSTD 201**	MSTD 202**
SENIOR YEAR	MSTD 203	MSTD 204

*Optional

**Students enrolling in MSTD 200-level courses must meet The Department of the Army ROTC medical/physical fitness standards and become contracted as cadets in the advance courses.

Study Abroad

The Office of International Educational Services, located in Room B161 of the Living/Learning Center, is both an advising and a resource center for students interested in a year, semester, or summer overseas study experience. UVM Study Abroad Advisors maintain extensive information about overseas programs, institutions, and volunteer opportunities. They are available to help students in identifying programs appropriate to their needs and arranging credit approval from UVM. All students intending to study overseas on a non-UVM program and receive transfer credit from UVM are required to visit the Office of International Educational Services and to complete the Study Abroad Approval Form prior to departure. This official approval is required for students to be guaranteed that their programs of study are eligible for transfer credit upon their return and that they will be able to take their financial aid overseas. There is an assessed study abroad fee of \$100 during the academic year and semester, and \$50 for the summer.

To be approved to study abroad, students must:

1. Meet the admissions criteria of a University approved study abroad program. University approved programs include those programs on the UVM Recommended List.
2. Have a minimum cumulative GPA of 2.5, or between 2.0 and 2.5 with a minimum semester average of 2.5 for each of the last two semesters prior to studying abroad.

Students with a GPA above 2.0 who do not qualify under point two above may petition their academic dean for permission to study abroad. Students seeking such permission should request an Academic Eligibility Form from the Office of International Educational Services to be signed by their academic dean.

Students who have been dismissed or are on academic trial are generally not eligible to participate in study abroad programs. Such individuals are encouraged to consult with their individual deans' offices regarding their interpretation of this policy. Under no circumstances will a student on disciplinary suspension the semester before studying abroad receive official UVM approval for overseas study.

SPONSORED PROGRAMS

The Buckham Overseas Studies Program in England is a scholarship program at the University of Kent, Canterbury, administered by the College of Arts and Sciences at UVM and funded through a generous endowment from the Buckham family. The program runs for the full academic year and is designed to provide an opportunity for up to 20 exceptional English majors to spend their junior year studying English and other subjects at a modern university in an ancient British city. Living and studying in a fully integrated way with English students, the UVM students will earn up to 32 credits. The cost of participation, including tuition, transportation, room and partial board, will not normally exceed the costs incurred during a year on the UVM campus.

To apply for a Buckham Overseas Studies Scholarship, a student must be an English major with a cumulative and an English GPA of 3.0 and have earned at least 60 credit hours (including English 81 and 82) by the time the scholarship begins. For further information, contact Prof. Lee Thompson, Department of English, 219 Old Mill (656-8546). (This program is currently being re-evaluated by the English Department and will be postponed for the 1997-98 academic year. It is expected to continue beginning fall 1998.)

In addition to this full-year Buckham program, UVM's Continuing Education also sponsors several short-term UVM faculty-led programs. Most are three-credit summer courses, and previous locations have included Mexico, England, South Africa, Finland, Honduras, and the West Indies. Contact Continuing Education for updated information on these annual short-term program offerings.

UVM EXCHANGE PROGRAMS

UVM participates in a number of exchange programs with institutions around the world. In an exchange program, all UVM participants pay UVM tuition, fees, room, and board and exchange places with a student from a foreign institution. Exchange programs are a good financial value. These programs provide a direct immersion into the academics and culture of the country. Although most exchange programs require a good command of the host language, many offer programs entirely in English.

The UVM/Sussex Exchange Program: This exchange is located at the University of Sussex in Brighton, England. Sussex is well recognized for both its humanities and social science offerings as well as its science and engineering programs. Twenty percent of the Sussex student body is international. For more information, contact Professor George Moyser, Department of Political Science, or the Office of International Educational Services.

The UVM/Augsburg Exchange Program: This exchange is with the Universität Augsburg, Bavaria, Germany. The UVM student needs to have a solid command of the German language and be pursuing German or European Studies. For more information, contact Professor Dennis Mahoney, Department of German and Russian, or the Office of International Educational Services.

International Student Exchange Program (ISEP): This program enables UVM students to study in 46 different countries in Europe, Asia, Australia, Canada, Africa, and Latin America. Many sites offer instruction in English, as well as in the language of the host country. For more information, contact the Office of International Educational Services.

Kansai Gaidai Exchange Program: Students interested in Japanese language and culture may spend a semester or year studying at this university near Osaka, Japan. For more information, contact Professor Tomiko Hayashi, Area and International Studies, or the Office of International Educational Services.

UVM/Vienna Exchange Program: Students interested in international business may spend a semester or year studying at the Wirtschafts Universität Wien. All courses are taught in English. For more information, contact Professor Len Tashman, School of Business Administration, or the Office of International Educational Services.

UVM-AFFILIATED STUDY ABROAD PROGRAMS

Institute for French Studies in Paris: This option provides full-year and semester programs in Paris in a high-quality, all-French immersion program. Course offerings in French, history, political science, European studies, economics, and art history at IFSP and L'Institut d'Etudes Sociales, la Sorbonne-Paris IV, and l'Institut Nationale des Langues et Civilisations Orientales. Credit-bearing internships in French businesses, international organizations, fashion, art galleries, museums, and schools are possible. The program offers a wide variety of living arrangements and French student peer-advisors. UVM financial aid (but not tuition remission) may be applied to tuition. UVM has an affiliation agreement with IFSP and its parent institution, the American University of Paris. For information and applications, contact the Department of Romance Languages, UVM.

Semester Program in Grenoble, France, in International Marketing: Sponsored by the six New England land-grant universities, this program provides an opportunity for students interested in international business, economics, and trade to participate in an English-speaking program while gaining exposure to France's history, language, and culture. For more information, contact Professor Leonard Tashman, School of Business Administration, 209 Kalkin Hall, UVM.

Junior-Year-in-Salzburg Program: Administered by the University of Maine, this academic-year program at the University of Salzburg, Austria, is open to qualified UVM undergraduates in all major fields. Basic requirements are: completion of sophomore year; two years of college-level German with an average of B; and good academic standing (a cumulative average of 2.5). For information, contact Prof. Helga Schreckenberger, Department of German and Russian, UVM.

The Swedish Program: Sponsored by the University of Stockholm and a consortium of participating American colleges and universities (of which UVM is a member), this non-profit program focuses upon organizations and public policy in every social science discipline. Its curriculum is thematically specific, interdisciplinary, and relevant to the host country (Sweden). For more information, contact Professor Anthony Magistrale, English Department, 72 University Heights, or the Office of International Educational Services, UVM.

OTHER POPULAR STUDY ABROAD PROGRAMS

The following programs are just a few of those on the UVM Recommended List. These particular programs have been especially popular among faculty, staff, and students. For a complete Recommended List, contact the Office of International Educational Services, UVM.

American Institute for Foreign Study (AIFS): A publicly owned company, AIFS Inc. is a nationwide organization that provides comprehensive overseas study and travel programs in Argentina, Australia, Austria, the Czech Republic, England, France, Italy, Japan, Mexico, Russia, South Africa, and Spain.

Boston University: Boston University offers academic-year, semester, and summer study abroad opportunities in 12 countries on six continents. Several of the program sites provide students with an integrated internship component for a portion of their academic experience and credit. Other program sites feature direct enrollment options in local universities for advanced language students.

Butler University – Institute for Study Abroad: This program offers direct enrollment opportunities at over three dozen universities in England, Scotland, Ireland, Australia, New Zealand, and Costa Rica. Their student services include an overseas orientation, academic advising, excursions, and assistance in locating housing.

Institute for the International Education of Students: This non-profit organization sponsors programs in Argentina, Australia, Austria, China, England, France, Germany, Italy, Japan, and Spain. Semester, year, and summer options are available.

School for International Training (SIT): SIT is an accredited college of World Learning Inc., which was founded in 1932 as The U.S. Experiment in International Living. Fifty-one experientially-focused programs are offered in over 30 countries, including the continents of Africa, Asia, and South America. All programs include a Life and Culture Seminar, a Methods and Techniques of Field Study Seminar, an Independent Study Project, a home-stay opportunity, and, if appropriate, an intensive language study.

The Living/Learning Center

The Living/Learning Center is an academic resource whose mission is to create an environment for students to integrate their academic studies and their residential experiences. To expand the intellectual horizons of students, the Center encourages faculty, staff, and student programs that foster innovative and interdisciplinary academic experiences that bring the intellectual life of the University in close alliance with the students' lives outside the classroom. Every program sponsors educational activities to which the entire UVM community is invited, making the Living/Learning Center a focus of campus cultural and intellectual activity. An evening's activities might include a sign language workshop, conversational Russian, artistic performances, gallery exhibits, faculty lectures, or a presentation by one of the Center's programs. In addition to being an academic and student support unit, the Living/Learning Center is also a residence, housing 588 students, as well as faculty and administrative offices, including the Center for Career Development and the Learning Cooperative.

The foci of the Living/Learning Center are the 30 to 35 academic programs, each of which is a year-long plan of course work, independent study, seminars, field trips, and other special activities which support a specific program theme. Recent programs include: Africa House, Geology and Ecology of the Lake Champlain Basin, La Maison Francaise, Creative Writing, The Art of Photography, and The Computer Cooperative. Programs are designed and directed by students or faculty members and reflect educational interests of the program leaders and participants. The Center provides a unique environment for each of the University schools and colleges to offer particular curricular elements in an atmosphere which fosters broad opportunities for intellectual discourse.

The first-year, sophomore, junior, senior, and graduate students who reside in the Center live with fellow program members in five-, six-, or seven-person suites adjoining a living room and private bathroom facilities. This fosters close friendships and communication among the program members. Suites are located in each of the five interconnected buildings, as are classrooms, laundry rooms, common living rooms and kitchens, as well as apartments for resident faculty and their families. The Center has a reading room/reference library, microcomputer laboratory, music practice rooms, a grocery store, dining hall, preschool, an audiovisual room, U.S. Post Office, a central lounge with fireplace, and an art gallery. Through the efforts and expertise of accomplished staff artists, the Center has pottery and photography studios that provide direct program support for the Living/Learning Center community, as well as providing all members of the University community with the opportunity for informal instruction and access to the facilities and equipment.

The Living/Learning Center contributes to the University's mission in the quality of the programs it offers, in its ability to support exciting new curricular developments, and in its emphasis on the integration of the personal, professional, and intellectual growth of the student. Moreover, the Center encourages programs with interdisciplinary, international, and multicultural themes and continues to encourage and abet creative excellence. The Living/Learning Center offers the opportunity to be part of a community of people; students, faculty, and administrative staff, who share the goal, work and excitement of improving the breadth and quality of their University experience.

Continuing Education

The main offices of Continuing Education are located at 322 South Prospect Street, (802) 656-2085/(800) 639-3210. E-mail: EveningUniversity@uvm.edu.

EVENING UNIVERSITY

Hundreds of credit courses are offered at nontraditional hours (evening, weekends, lunch hour, etc.) on- and off-campus during the fall and spring semesters. Opportunities exist for completing undergraduate degrees in English, Sociology, Mathematics, Business Administration, Psychology, and Studio Art in the evening. A minor in Women's Studies is also available. Registration occurs before the beginning of each semester. Courses are announced in the Continuing Education periodical, FOCUS, which is available at sites all over campus and by calling the CE office. Also view course listings online (<http://uvmce.uvm.edu:4431>).

SUMMER UNIVERSITY

Beginning in May and continuing to mid-August, hundreds of credit courses are offered in Burlington and across the state. As an integral part of UVM, Summer University courses provide students with opportunities to get ahead, catch up, focus on pre-med requirements, participate in an internship, study abroad, and explore new topics. In addition, Summer University meets the professional education needs of teachers and school administrators, engineers, business managers, and human services professionals.

Special attention is given to providing undergraduate courses that are in high demand during the academic year. In addition, there are field courses, special seminars, and intensive workshops. Summer University also provides students with a financial advantage through lower tuition rates. A

complete FOCUS catalog of courses is available in March in print as well as online at <http://uvmce.uvm.edu:4431>.

The Summer Writing Program brings serious writers and writing students from around the country together with outstanding faculty and visiting writers for workshops, readings, and seminars. Application is required. Call 802-656-5796 or 800-639-3210.

The International Business Institute offers students the opportunity to experience an integration of business issues from around the world. The institute includes both credit and noncredit experiences intended to highlight current international business issues and developments.

The Champlain Summer Institute is a two-, four-, or six-week program that explores the aquatic environments of the Lake Champlain Basin. All involve extensive field experience intended for advanced undergraduate or beginning graduate students interested in aquatic ecology.

The Summer Discovery Program provides high school students with an introduction to the college experience. Students participating in the Summer Discovery Program experience college living and learning by living on campus and taking credit courses and noncredit enrichment seminars. For more information call (800) 645-6611.

For more information about evening and summer courses: (802) 656-2085 or toll free (800) 639-3210.

Note: Undergraduate students should verify with their advisor and dean that any CE course would be applicable to their degree program. Students not officially admitted to the Graduate College who wish to enroll for more than six graduate credits in one semester must receive permission from the Graduate Dean.

DISTANCE LEARNING NETWORK

The University of Vermont Distance Learning Network (DLN) offers credit courses and certificate programs at locations across the state via satellite, interactive television, and other technologies. Students in these courses have access to faculty, UVM libraries, student advisors, and other students via computer. The Distance Learning Network provides Vermonters access to UVM's faculty and other outstanding university resources in or near their own communities.

CONTINUING EDUCATION REGIONAL OFFICES

In response to the changing needs of Vermonters, Continuing Education maintains numerous off-campus satellite locations and three regional offices located in Montpelier, Rutland, and Brattleboro. In addition, courses are offered each semester in communities around the state.

In the UVM Central Vermont Regional Center in Montpelier, UVM Southwest Vermont Regional Center in Rutland, and the UVM Southeast Vermont Regional Center in Brattleboro, Continuing Education coordinators work with companies, organizations, and individuals to match specific needs with UVM resources through both credit courses and noncredit programs. Additionally, all Regional Centers provide access to advising professors, departments, and libraries located at the Burlington campus via Campus Link, a computer-based teleconferencing system. For more information: Central Vermont (802) 223-0388 or (800) 870-0388; Brattleboro (802) 257-3004; Rutland (802) 747-0060.

PROFESSIONAL PROGRAMS

Throughout the year, Continuing Education offers a variety of noncredit learning opportunities for UVM students,

alumni, and their peers in business and the professions. Local and national conferences, symposia, teleconferences, and workshops provide the formats to access new information developed through research at the University, to discuss contemporary issues, and to learn career skills. Detailed information on programs is available through Continuing Education, 30 South Park Drive, Colchester, VT 05446, (802) 656-2088; or visit the webpage at <http://uvmce.uvm.edu/profprog.htm>.

ADVISING

The advising services offered by Continuing Education are often used as an introduction to UVM, and to help students set and achieve academic and career goals. Advising is available to anyone enrolled in Continuing Education or who may be interested in enrolling in the future. Advisors are available to answer questions about educational opportunities at the University and can refer potential students to the appropriate offices when necessary. In addition to discussing admission and academic requirements, advisors also help resolve administrative problems and answer questions about University policy. Call (802) 656-2085 for an appointment.

The Study Assisted Program The Learning Cooperative and UVM Continuing Education offer courses each semester which include free tutoring services and assistance with study skills. This collaborative service gives new and returning students academic support as they reenter the academic environment.

Guaranteed Admission Program This program provides an avenue of entry to The University of Vermont for students who are not prepared to enter under standard admission criteria. Under the Guaranteed Admission Program, academic counselors work with students to design sequences of courses which will prepare them for matriculation. Admission to UVM is guaranteed upon successful completion of a contract of approved academic credit courses taken through Continuing Education. The program is administered cooperatively by Continuing Education, Undergraduate Admissions, and the deans' offices of the colleges and schools within UVM.

The Certificate Program in Gerontology

The UVM Center for the Study of Aging and Continuing Education jointly offer a Certificate Program in Gerontology for professionals currently working in fields related to aging and others interested in such fields. The 18-credit certificate focuses on the sociological, psychological, and biological changes in the aging population and presents courses from a number of academic disciplines.

The Certificate in Computer Software

The Department of Computer Science and Continuing Education jointly offer a software certificate that requires five courses (15 credits) in approved computer courses at UVM and offers several course tracks from which to choose. The curriculum includes an introduction to commonly used application software packages and programming courses involving both high- and low-level computer languages. The certificate enables students to receive acknowledgment of college credit in computer software and to determine their aptitude in computer science.

The Postbaccalaureate Pre-Medical Preparation Program

A sequence of courses gives people with a bachelor's degree in a nonscience area the preparation they need for admission to medical and dental schools. Those interested in applying should pay careful attention to the specific requirements of the schools of medicine, dentistry, veterinary, or other health science programs to which they intend to apply. The required courses in laboratory sciences and mathematics are accessible through a combination of day and evening courses. Prospective medical school applicants who enroll as nondegree students receive individual advisement through Continuing Education and the support needed while preparing for admission to a medical program and all phases of the application process.

Student Exchange: New England State Universities

The six New England land-grant universities (Universities of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut) participate in an exchange program to enable students at the subdegree level to take advantage of a course or combination of courses not available at the home institution. In order to participate in the program, state university students must:

1. Identify a course or combination of courses related to their area of academic interest and not available on the home campus.
2. Receive permission from the appropriate university exchange authorities at both the sending and receiving institutions.
3. Meet minimum eligibility requirements which include the following: In general, students must be in good standing and have at least a 2.50 grade-point average; must be degree candidates; and must be at least first semester sophomores (application may be made as early as the second semester of the first year). There is no upper limit in terms of class standing on participation.

Exchanges may not exceed a total period of two academic semesters, but these need not be taken consecutively. Summer sessions are not considered part of the exchange program. Course work approved by the student's host institution and completed satisfactorily is fully transferable to the home institution. Transferability of grades and inclusion in grade-point averages are subject to home institutional policy.

The student will pay normal tuition and required fees to the home institution and room and board (where applicable) to the host institution. Students on financial aid must contact their home institution's financial aid office to determine eligibility for continued scholarship assistance.

Participation in the exchange program will not affect a student's residence status either at the home or host institution, nor does participation improve or prejudice possibilities for transfer.

For information, contact the Office of the Provost, 349 Waterman Building, University of Vermont.

Studying the Environment

One of the distinctive features of UVM is the focus on studying the environment and environmental problems. Students interested in these issues have a rich array of choices. Many of these are focused within specific disciplines, but others offer the opportunity for multidisciplinary study. UVM offers several multidisciplinary degree programs.

Environmental Studies is a curriculum offered to students from four different colleges and schools (Agriculture and Life Sciences, Arts and Sciences, Education and Social Services, and Natural Resources) and is coordinated within the Environmental Program.

Two distinct degree programs are offered in **Environmental Sciences**. The program in the College of Arts and Sciences provides a *basic* Environmental Sciences major with emphasis in biology, chemistry, or geology. The School of Natural Resources and the College of Agriculture and Life Sciences jointly offer an Environmental Sciences major with *applied* emphases in pollution ecology, environmental analysis and assessment, conservation biology and biodiversity, microbiology, environmental resources, and agriculture.

The College of Engineering and Mathematics offers students the opportunity to pursue a degree in **Environmental Engineering**.

Environmental Studies

Environmental Studies is a University-wide undergraduate curricular option offering students several challenging academic programs. Directed by the Environmental Program in cooperation with several colleges and professional schools, this option is one of UVM's most distinctive and popular academic programs — unique nationally in its breadth and interdisciplinary nature.

Students entering UVM may apply for admission to Environmental Studies through several of the undergraduate divisions. Choice of the appropriate college or school will depend on the individual's interests, career and educational objectives, and selection of one of the program options outlined below.

The Environmental Program involves students and faculty from throughout the University, as well as community professionals, recognizing that study of the environment must draw upon all academic disciplines and professional fields. The activities of the Program include undergraduate education, research, and community service programs dedicated to the study and improvement of the cultural and natural environments essential to the quality of life on earth.

The Program serves a wide range of environmental interests, with its primary mission being undergraduate education, and its primary focus the individual student. Working closely with the faculty, each student plans an individualized program that combines a broad, comprehensive understanding of the environment with depth in a specific discipline or profession. Major concentrations can be in the natural or technical sciences, the humanities or arts, the social sciences or professions, or broadly interdisciplinary.

Many graduates continue their education in graduate or professional schools; others work in public and private sectors in highly diverse fields throughout Vermont, the nation, and in countries around the globe.

Program offices and a Student Services Center are located in The Bittersweet, where students are encouraged to visit with the staff and faculty regarding their academic plans, to gain assistance with research or action projects, and to seek information about academic programs, internships, international study opportunities, graduate studies, and future careers.

DEGREE PROGRAMS

The Bachelor of Science degree in Environmental Studies is awarded through the College of Agriculture and Life Sciences, the College of Education and Social Services, and the School of Natural Resources.

The Bachelor of Arts degree in Environmental Studies is awarded through the College of Arts and Sciences.

DEGREE REQUIREMENTS

Students must complete the distribution and credit-hour requirements of their college or school and one of the following programs. Incoming students will be assigned an advisor in the Environmental Program who will assist in selecting a major or minor program.

CURRICULUM

The curriculum in Environmental Studies offers students several alternatives leading to an individualized program of studies. The Major in Environmental Studies provides a unique academic program for the student seeking an interdisciplinary major leading to the B.S. or B.A. degree, with opportunity for Honors Studies. The Minor in Environmental Studies fulfills the minor requirement for students in the College of Arts and Sciences and is available as an elective minor in other schools and colleges. For selected students, a double major offers the opportunity for combining interdisciplinary studies with a traditional major.

MAJOR IN ENVIRONMENTAL STUDIES This interdisciplinary major offers students the opportunity to combine studies in several disciplines and professional fields. In addition to a core of interdisciplinary courses, each student's program includes an individually-designed plan of study directed toward newly-developing careers and graduate study programs. It is equally suited to the student seeking a broad liberal education with an environmental emphasis and to the student focusing on a particular science, humanities, social studies, or technical discipline.

The Major in Environmental Studies is a highly-selective program for qualified students with well-conceived academic goals. Admission to the major (regardless of declared major at the time of admission to UVM) requires submission of an application to the Environmental Program during the sophomore year, approval of the Director, and successful completion of Environmental Studies 151. In addition to course requirements, this major includes a required senior research thesis or project that may qualify for program, college, or school honors recognition. Requirements for Secondary Education majors differ. Consult the appropriate sections of this catalogue for the exact requirements of each college or school.

Environmental Studies Major Core

Required Courses:	Credit Hours
Intro. to Environmental Studies (ENVS 1)	4
International Environmental Studies (ENVS 2)	4
Intermediate Environmental Studies (ENVS 151)	3
Research Methods (ENVS 201)	3
Senior Project and Thesis (ENVS 202/203)	6 - 12

(Planned and designed in ENVS 201; credit arranged in consultation with senior thesis advisors)

Individually-Designed Program

Individually-designed program of studies	18 - 30
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(Intermediate and advanced courses, including courses in natural sciences, humanities, social sciences, and international studies)

Students are strongly encouraged to undertake internships, independent projects, study abroad, and cross-cultural experiences.

MINOR IN ENVIRONMENTAL STUDIES For students in several colleges and schools, this program combines the basic interdisciplinary skills and perspectives necessary for the understanding of environmental issues with the curriculum of a traditional disciplinary major.

In addition to two introductory Environmental Studies courses and at least three intermediate or advanced ENVS courses, students complete a major in a related discipline or professional field.

Students in the College of Arts and Sciences may elect this minor to fulfill the minor requirements in that college. Minor programs are available on an elective basis in most other schools and colleges.

Consult appropriate sections of this catalogue for the exact requirements of each college or school.

TEACHING MAJOR IN EDUCATION Secondary Education majors in the College of Education and Social Services may elect a major in Environmental Studies to fulfill the teaching major requirement (see appropriate section of this catalogue). The minor in Environmental Studies is also available.

Environmental Sciences

Students with an aptitude for science and an interest in the quality of the environment can choose alternate pathways in pursuing a major in Environmental Sciences at UVM. The College of Arts and Sciences offers a science education with an emphasis on basic science approaches to understanding the environment. The School of Natural Resources and the College of Agriculture and Life Sciences jointly offer a science-based education emphasizing the application of scientific skills and knowledge in addressing complex environmental problems.

Environmental Sciences: School of Natural Resources or College of Agriculture and Life Sciences

The School of Natural Resources (see page 110) and the College of Agriculture and Life Sciences (see page 49) jointly administer an Environmental Sciences major intended to provide students with the fundamental knowledge and hands-on experience needed to identify, analyze, and solve "real

world" environmental problems arising from human activities. This major is specifically tailored for students interested in working in the growing private sector job market for knowledgeable and skilled environmental scientists. As such, students have a unique opportunity to "earn while they learn" through credit-bearing internships with government agencies or private companies (for details, consult the Internship Coordinator, Room 335, Aiken Center for Natural Resources). Students interested in research can participate with our faculty in nationally- and internationally-recognized environmental research programs. Excellent academic advising is a demonstrated strength of both the School and the College. All graduates will have the solid foundation necessary to pursue graduate study in the environmental sciences or any natural science or related discipline.

Five specially created Environmental Sciences courses, designed to augment basic biology, chemistry, and mathematics courses, serve as the foundation of the SNR/CALS Environmental Sciences major:

ENSC 1	Introduction to Environmental Sciences
ENSC 101	Pollutant Movement Through Air, Land and Water
ENSC 130	Global Environmental Assessment
ENSC 201	Recovery and Restoration of Altered Ecosystems
ENSC 202	Ecological Risk Assessment

In order to provide flexibility yet assure some depth of knowledge, students explore a particular aspect of Environmental Sciences through advanced study in one of six concentrations. Students can select:

Pollution Ecology — effects of pollutants on the structure and function of ecosystems.

Environmental Analysis and Assessment — techniques for measuring environmental impacts and managing environmental data.

Environmental Microbiology — the role of microorganisms in causing and remediating environmental pollution.

Agriculture and the Environment — impacts of agriculture on the environment and strategies for minimizing environmental degradation.

Conservation Biology and Biodiversity — endangered species and ecosystems, and strategies for conserving the diversity of the earth's life forms.

Environmental Resources — environmental processes in air, soil, and water.

DEGREE REQUIREMENTS

Students must complete the distribution and other requirements of either the College of Agriculture and Life Sciences (CALS) or the School of Natural Resources (SNR) in addition to the following specific requirements of the Environmental Sciences curriculum.

A. Environmental Sciences basic science/quantitative courses:*

Biology 1,2, Principles of Biology
 Chemistry 31,32, Introductory Chemistry
 Chemistry 42, Intro. Organic Chemistry
 Geology 55, Environmental Geology or Plant and Soil Sciences 161, Intro. to Soil Science
 Math. 19,20, Calculus
 Natural Resources 140, Nat. Res. Biostatistics or Statistics 141, Basic Statistics

*Four of these courses simultaneously fulfill School of Natural Resources distribution requirements.

- B. Special foundation courses: Environmental Sciences 1, 130, 101, 201, 202.
- C. Concentration requirements (14 credits) in any one of: Pollution Ecology, Environmental Analysis and Assessment, Environmental Microbiology, Agriculture and the Environment, Conservation Biology and Biodiversity, or Environmental Resources. Detailed lists of courses for each concentration are available in the Dean's Offices in both the College of Agriculture and Life Sciences and the School of Natural Resources.

Internships and Undergraduate Research. Experiential learning is strongly recommended. Students enroll in Environmental Sciences 195 (Internship) or Environmental Sciences 196 (Independent Research) for up to six hours each. Three credit hours from either of these experiences may be used to meet a portion of the 14 credit-hour requirement for an Environmental Sciences concentration. Both courses require a formal proposal and the approval of the Program Director.

Consult the sections of the catalogue on the College of Agriculture and Life Sciences and the School of Natural Resources for a description of the specific requirements of the programs.

Environmental Sciences: College of Arts and Sciences

The basic Environmental Sciences major in the College of Arts and Sciences provides students with a modern environmental science degree in the context of a liberal arts college. It is tailored for students who want an interdisciplinary science degree that is centered around environmental issues. It emphasizes basic approaches to understanding the environment and environmental problems. Students completing this major will have the scientific background necessary to compete in the job market for environmental science, or to continue with advanced studies in a graduate degree program. This major emphasizes flexible course choices at the upper level, guided by co-advisors from different departments who work with each student individually.

During the first two years, the major draws on a core curriculum of basic science courses in biology, chemistry, and mathematics. This core is designed so that students can easily flow between other science majors, such as Biology, Geology, and Chemistry. At the upper division level, students work closely with faculty advisors to develop a set of science courses that will meet their particular needs and career goals.

Learning through experience and advising are integral parts of this major. To experience environmental research first hand, an independent research project or honor thesis is completed in the senior year. Co-advisors help with research and also with choices of courses and career plans.

At the upper division level, students can be general in their choice of courses or three areas of concentration allow students to specialize their training.

Environmental Biology – ecological and molecular analysis of endangered populations, conservation biology, conservation genetics, and ecology.

Environmental Geology – earth science, geomorphology, and the analysis of ground water.

Environmental Chemistry – analytical methods for measuring and monitoring air, ground, and water pollutants.

Consult the College of Arts and Sciences section of the catalogue (page 61) for specific requirements for the major.

DEGREE REQUIREMENTS

The Environmental Sciences major within the College of Arts and Sciences is jointly administered by the Biology and Geology Departments. Students must complete the distribution and other requirements of the College of Arts and Sciences, in addition to the following Environmental Sciences curriculum.

A. Core courses:

Biology 1,2, Principles of Biology, or Biology 11, 12
Chemistry 31,32 (or 35-38), Intro. Chemistry
Chemistry 42, 141, or 143, Intro.Organic Chemistry
Math. 19,20 (or 21), Calculus

B. Environmental Studies 1 or 2, Introduction to Environmental Studies.

C. Technology course (one of the following in second year):

Statistics 141 or 211, Statistics
Chemistry 121, Quantitative Analysis
Chemistry 221, Instrumental Analysis
Biology 205, Advanced Genetics Lab.
Biology 267, Molecular Endocrinology
Geology 255, Geohydrology
Civil Engineering 150, Environmental Engineering

D. Concentration requirements: With co-advisors students choose three advanced courses (one with advanced lab if not taken above and one at the 200 level) for a generalist approach or concentration.

Undergraduate Research. An independent research project is an important requirement of the major. Students enroll in Biology 198 (Undergraduate Research) or Honors 208, 209 (Honors in Biology). Both courses require a formal proposal and final report.

Refer to degree requirements (page 68) and course descriptions (page 115).

ENVIRONMENTAL ENGINEERING

Refer to the engineering curricula on page 91 for a description of the requirements for the Environmental Engineering option offered by the College of Engineering and Mathematics.

The College of Agriculture and Life Sciences

The College of Agriculture and Life Sciences (CALS) seeks to advance knowledge in the life sciences and about rural communities to improve the quality for life of Vermonters and others. Emphasis in teaching, research, extension, and public service activities is placed on making discoveries and developing new applications for the benefit of agriculture, food production, the environment, and rural communities. The College is committed to providing educated professionals, knowledge to help solve important societal problems, and to insure a sustainable, vital healthy Vermont and globe.

The College performs the four public functions which include teaching, conducting research, disseminating information to the public, and performing related services. These four areas of work are performed by CALS in cooperation with the Agricultural Experiment Station, and the University of Vermont Extension.

The College faculty strive for excellence in undergraduate education as evidenced by a sustained and enviable record of University teaching award winners. The College emphasizes the importance of each individual student and promotes significant student-faculty interaction. Students are provided with a firm foundation in the social and life sciences in order to excel and meet the challenges in future professional careers. Faculty and peer advisors provide a broad range of support, to help students develop high-quality academic programs that meet individual needs.

Opportunities abound for off-campus experiences such as internships, independent study, and study abroad. Graduates of the College are successfully meeting the requirements to pursue advanced education. Career choices are broad, but focus primarily in agribusiness, dietetics, international and rural development, agriculture, veterinary and human medicine, biotechnology, nutrition, research and teaching, horticulture, and botany.

Academic majors are enhanced by the on-campus facilities, labs, and research for which the College is renowned. Many CALS faculty working through the Experiment Station conduct mission-oriented, applied agricultural research, and faculty encourage undergraduate research.

The College of Agriculture and Life Sciences welcomes applications from international students. The specific procedures and requirements are listed on page 12.

The Office of the Dean of the College is located at 601 Main Street. The Student Services Division of the Dean's Office is located in Morrill Hall.

ORGANIZATION

The College's instructional units include six departments: Animal Sciences; Botany and Agricultural Biochemistry; Community Development and Applied Economics; Nutrition and Food Sciences; Microbiology and Molecular Genetics (a department shared with the College of Medicine); Plant and Soil Sciences; and interdepartmental programs in Biological Sciences, Environmental Sciences, Environmental Studies, and Family and Consumer Sciences Education.

DEGREE PROGRAMS

The Bachelor of Science degree is awarded for the programs listed below:

- Animal Sciences – concentration in:
 - Dairy Production
 - Equine Science
 - General Animal Science
 - Preveterinary/Preprofessional Science
- Biochemical Science
- Biological Sciences
- Botany
- Community Development and Applied Economics – concentration in:
 - Consumer Economics
 - International Development and Agricultural Economics
 - Small Business
- Dietetics
- Environmental Sciences
- Environmental Studies
- Family and Consumer Sciences Education
- Microbiology
- Molecular Genetics
- Nutrition and Food Sciences – concentration in:
 - Nutrition Education
 - Nutrition and Food Sciences
 - Sports Nutrition
- Plant and Soil Science – concentration in:
 - Agroecology/Sustainable Agriculture
 - Landscape Design
 - Horticulture
 - Environmental Soil Science
- Self-Designed Major
- Urban Forestry and Landscape Horticulture
- Undecided

DEGREE REQUIREMENTS

All programs in the College of Agriculture and Life Sciences lead to the Bachelor of Science degree and require:

- A. The successful completion of a minimum of 120 credit hours of course work plus two credit hours in physical education.
- B. A minimum cumulative grade-point average of 2.00.
- C. Completion of the following:

	Hours
1. Communication skills	6
a. One course in writing	
b. One course in oral communication	
2. Analytical skills	6
a. One course in mathematics or statistics (Math. 9 or equivalent)	
b. One course in computers (Community Development and Applied Economics 85 or equivalent) or demonstrated equivalent computer skills	
3. Biological and physical sciences	6-8
Two courses	
4. Social sciences	6
Two courses	
5. Humanities and Fine Arts	6
Two courses	

- D. College of Agriculture and Life Sciences "Beginnings" course. Required of all first semester first-year students.
- E. "Race and Culture" course required of all first-year students.
- F. Courses as specified in individual programs.

The applicability of courses to specific areas is based on content and not departmental label. Courses taught in the College of Agriculture and Life Sciences can be used to fulfill requirements under "C" above; however, they must be taken outside the department in which the student's program of study is located. Applicability of courses to fulfill requirements rests with the student's advisor and, if necessary, concurrence of the Dean of the College.

Students in the College of Agriculture and Life Sciences may not take more than 25 percent of their course credits in the School of Business Administration.

REGULATIONS GOVERNING ACADEMIC STANDARDS

The College of Agriculture and Life Sciences (CALS) Studies Committee reviews the semester grades of all students in the college whose semester or cumulative grade-point average falls below the 2.00 minimum, as well as the academic progress of all students placed on academic probation the previous semester. Detailed information may be obtained from the CALS Student Services Office, 108 Morrill Hall.

Guidelines A student whose semester grade-point average falls below a 2.00 will be placed “on trial” and will be given a target semester average to achieve by the end of the following semester. A student whose semester grade-point average is below a 1.00, or who fails to achieve the stated target average while “on trial,” may be placed on “intermediate trial.” Any student with a prolonged history of poor grades including students who consistently fail to achieve the target semester average may be placed on “final trial.” A student who does not achieve the target semester grade-point average while on “final trial” is a candidate for dismissal from the University.

Appeal A student may appeal a dismissal by submitting a written appeal to the CALS Studies Committee within two working days of the receipt of the dismissal letter. The student will be asked to appear in person before the Studies Committee to appeal the case.

Continuing Education and Readmission A student who has been dismissed from the College may take up to six credits of course work through UVM Continuing Education in an attempt to improve his/her grades. To gain readmission to the College, the student must achieve no less than a 2.67 semester average on the six credits. Dismissed students may enroll in six credits at another institution, and should work with the Office of Transfer Affairs to insure transferability.

COLLEGE HONORS PROGRAM

The College Honors Committee promotes and encourages independent study by recognizing those students who especially excel in their creative, innovative, responsible, and independent pursuit of study.

Independent study can be an important aspect of a student's education. Undergraduate research, independent projects, and internships or field practicums are examples of independent study which benefit students as they pursue graduate study or seek employment. Over the years a number of

undergraduate research projects have been published in well-known scientific journals; and manuals, videotapes, and other products of special projects have been incorporated into classes to enhance the learning environment in the College.

The completed study, in a form appropriate to the area of study, is evaluated first by a departmental review committee. Independent studies of the highest quality will be chosen for College Honors by the Honors Committee. Students are recognized at College Honors Day.

PREPROFESSIONAL PREPARATION

Students striving for admission to professional colleges, such as dentistry, medicine including naturopathic, chiropractic, osteopathic, and veterinary medicine, can meet the undergraduate requirements for these programs through enrollment in the College of Agriculture and Life Sciences. Upon admission, each student will be assigned a faculty advisor knowledgeable in preprofessional preparation. Competition for admission to professional schools is very keen, and a superior academic record throughout an undergraduate program is necessary to receive consideration for admission. Due to the intense competition, only a small percentage of those first-year students declaring an interest in professional schools are admitted after completion of the baccalaureate. Consequently, students must select a major, in an area of their choice, to prepare them for a career other than medical sciences. The preprofessional requirements will be met concurrently with the major requirements for the B.S. degree. Students interested in human medical sciences often enroll in either biochemical science, biological science, nutritional sciences, or microbiology. Those interested in veterinary medicine usually enroll in animal sciences or biological sciences.

Each student prepares a four-year program of courses, with the guidance of a faculty advisor, to meet requirements for a B.S. degree in their major. It is recommended that students complete the following courses to meet minimum requirements of most professional schools. It is the responsibility of each student to contact the professional schools of choice to determine the exact entrance requirements.

Human Medical and Dental Schools:

Biology with laboratory	Biology 1, 2
Chemistry with laboratory:	
inorganic	Chemistry 31, 32
organic	Chemistry 141, 142

Physics with laboratory:	
with math	Physics 11/21, 12/31
with calculus	Physics 31/21, 42/31

Mathematics (requirement varies)	Math. 19, 20
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Humanities, Social Sciences, Languages

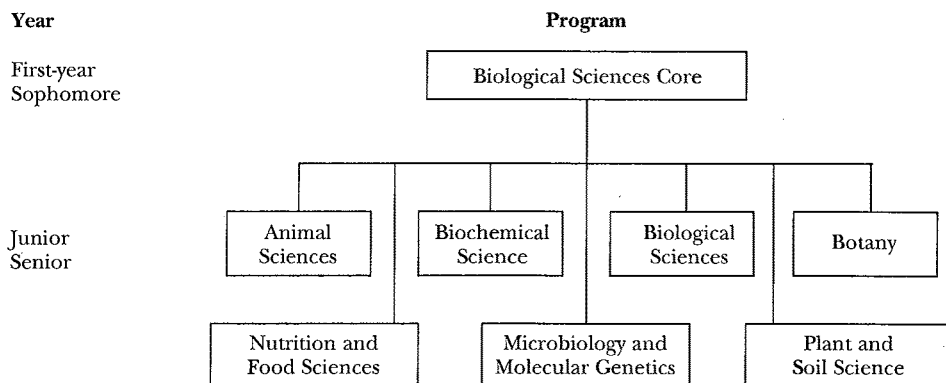
Students must complete the minimum College requirements in this area that includes English composition and speech. Advanced composition and additional courses in this area are encouraged as time allows.

Veterinary Medical Schools: All of the courses listed above under Human Medical Schools plus:

Biochemistry	Ag. Biochemistry 201/202
Written English	English 50 or 53
Genetics	Botany 132 or Biology 101
Microbiology	Micro. and Mol. Genetics 101
Nutrition	Animal Sciences 43

Several schools require a course in introductory animal sciences, vertebrate embryology, or statistics.

Finally, both human and animal medical schools want to see a history of interest in medicine. It is important for students to work with physicians or veterinarians and gain first-



hand knowledge of their chosen profession. Volunteer or paid work in hospitals, nursing homes, or emergency centers is important. Commercial farm experience is also valuable for preveterinary students.

Students applying to the College of Agriculture and Life Sciences who express an interest in medicine or preveterinary medicine should present evidence of high performance in high school level science and mathematics courses, plus additional supporting documentation such as high SAT scores, strong letters of recommendation, and a motivational summary statement.

PREVETERINARY HONORS PROGRAM

The College of Agriculture and Life Sciences and Tufts School of Veterinary Medicine offer a seven-year B.S./D.V.M. program to selected honors students. Students who meet rigorous eligibility criteria may enroll for three years of study at UVM majoring either in Animal Sciences or Biological Sciences. After completion of about 90 credits with a minimum GPA of 3.25 each year, the student enters Tufts School of Veterinary Medicine. The student will be awarded a B.S. degree from The University of Vermont following the successful completion of the first year of the D.V.M. program at Tufts. The successful student will earn a D.V.M. degree from Tufts School of Veterinary Medicine after the fourth year at Tufts.

Prospective students must apply to both UVM and Tufts University. Both applications may be obtained from the UVM Admissions Office. Candidates' files are first reviewed at Vermont, and admissible student applications are then forwarded to Tufts for their evaluation. Students will be notified of the results of these reviews through the UVM admissions process. Absolute standards may vary from year to year, but this is an intensive program with limited places. We expect that successful candidates will have:

1. Excellent grades in high school biology, chemistry, physics, and mathematics. It will be advantageous to have completed or be enrolled in AP (advanced placement) biology, AP calculus, and AP chemistry.
2. Standardized test scores at or above the 80th percentile nationally.
3. A class rank in the top ten percent of their high school class.
4. Some appropriate animal and/or veterinary experience.

It is important to recognize that some excellent students may not be admitted to the joint B.S./D.V.M. because of space limitation. These students may be admitted to UVM

as preveterinary students and may reapply for the joint program after successful completion of their first year. Or they may complete four years at UVM, graduate with a B.S. degree, and make application to any of the veterinary schools in the nation. There are many options to meet individual educational goals.

For information regarding admissions and applications to this exciting new program, see the Admissions section of this catalogue and contact the Admissions Office, 194 S. Prospect Street, Burlington, VT 05401-3596. For specific program information contact either: Dr. John Bramley, Department of Animal Sciences, Terrill Hall, UVM, Burlington, VT 05405. Email: abramley@zoo.uvm.edu; phone (802) 656-2070; or Dr. Donald Foss, Dean's Office, Adams House, 601 Main Street, Burlington, VT 05401. Email: dfoss@zoo.uvm.edu; phone (802) 656-0293.

BIOLOGICAL SCIENCES CORE

Students who have strong academic ability in the sciences and are excited about the future, concerned with contemporary issues, and want a challenging, dynamic career should consider the Biological Sciences major. This program is designed to provide flexibility in developing a strong background in the biosciences. Students can take advantage of the entire array of University course offerings by selecting basic and applied biology courses from departments within the College (Agricultural Biochemistry, Animal Sciences, Botany, Nutrition and Food Sciences, Microbiology and Molecular Genetics, and Plant and Soil Science) and across the campus (Anatomy and Neurobiology, Forestry, Natural Resources, Pathology, Pharmacology, Molecular Physiology and Biophysics, Wildlife and Fisheries Biology, and Biology). Selection of courses is not limited to CALS.

The Biological Sciences program is interdisciplinary and draws on the expertise of faculty from many different departments within the College. Each student is assigned a faculty advisor from the committee who helps the student select courses. The core program is rigorous and designed to provide a broad exposure to different aspects of biology in the first and second years. Then students have the opportunity to focus in the area of their choice. This may mean changing majors to one of the traditional departments or continuing in Biological Sciences to graduation.

In addition to the general College requirements listed previously, the Biological Sciences core requires satisfactory completion of: Biology 1, 2; Math. 19, 20 or Math. 21; Chemistry 23, 42 or Chemistry 31, 32 and 141, 142; Botany 132 or Biology 101 (genetics); Animal Sciences/Nutritional Sciences 43 (nutrition); and Microbiology and Molecular

Genetics 101. Course descriptions are presented under the appropriate departments.

Programs in the College, available upon completion of the core curriculum, are shown above. Students should select courses from these programs during the first two years to gain exposure to different aspects of biology.

MAJORS: DEPARTMENTAL REQUIREMENTS

Animal Sciences*

Domestic animals play a major role in our lives through agriculture, recreation, biomedical science, and companionship. The mission of the Department of Animal Sciences is to provide a broad-based education emphasizing domestic animals and their products.

Our graduates enter the veterinary or other professions, biomedical science, the agrifood industry, companion animal care and breeding, zoos and aquaria, or education. Additionally, many students use a B.S. in Animal Sciences as a stepping stone to careers in business and commerce. To provide the necessary flexibility to achieve this diversity students work closely with faculty advisors to individualize their programs.

To facilitate and reduce the costs of veterinary education of excellent students, the Department of Animal Sciences and the Tufts University School of Veterinary Medicine have established a highly competitive seven-year B.S./D.V.M. program. For further information on this exciting option contact the Department of Animal Sciences directly at (802) 656-2070.

An option for the outstanding student with an interest in a graduate degree is to enter the Accelerated Master's Program of the Department. In this program students commence study for their master's degree in their senior year and have the potential to obtain a B.S./M.S. in a five-year period.

The Department of Animal Sciences actively encourages participation in undergraduate research, internships, and study abroad. By combining classroom, laboratories, and practical experience students maximize their performance in a friendly environment and develop responsibility for and control over their education.

**Department name change pending final approval of Board of Trustees.*

ANIMAL SCIENCES The program deals with a range of options from basic sciences through companion and zoo animal care to farm management. Although programs are highly individualized by students working with the advisors, there are four basic options:

Preveterinary/Preprofessional Science: This is the option for students most interested in the basic sciences who probably intend to enter veterinary, professional, or graduate school. It provides the necessary background in science as well as the opportunity for advanced study related to production and companion animals.

Equine Science: Specialized courses are offered on the care, management, breeding, training, and health of horses. The world-famous Morgan Horse Farm at Middlebury, about 45 minutes from campus, is also part of the Department and offers opportunities for study and research. Students may also enroll in equine courses at the Miner Agricultural Research Institute in Chazy, New York.

Dairy Production: This option concentrates on courses relating to the feeding, breeding, health, and management of dairy cattle. Increasing emphasis is given to sustainable agriculture and environmental impact of agricultural policies. These will be supported by appropriate courses in financial management and basic science. An important aspect of the option is the CREAM program, which will provide a two-semester, hands-on experience unique in the Northeast. This option is appropriate for students seeking a career in dairy farming as well as those who seek employment in allied industries.

General Animal Science: Under this option, students can tailor a program to suit their needs, or keep a broader-based program to meet a particular career goal. For example, this option is often used by students who have an interest in human/animal interactions, animal welfare, and zoo animals. Core requirements are minimized and the student selects a combination of basic science, production, or companion animal courses that best suit them and balance these with courses available elsewhere in the College or University.

Core Courses for All Animal Sciences Majors

Animal Sciences 1, 43, 110, 122, 141, 212, 281, plus two additional Animal Sciences courses.

Biology 1

Chemistry 23 or 31

Chemistry 26 or 42 or 141

Community Development and Applied Economics 86 or

Computer Science 2

Math. 9 or 10 or 19

Statistics 111 or 141 or 211

Additional courses are selected with the help of the advisor.

In addition, each student must complete all College and University requirements for graduation.

A Possible Curriculum in Preprofessional Science

First Year	Hours
Agricultural Orientation	1
Cultural Diversity	1
Inorganic Chemistry	8
Math. through Calculus	6
Intro. Animal Sciences	4
Microcomputer Applications	3
Written English	3
Biology	4
Electives*	0-6
Sophomore Year	Hours
Organic Chemistry	8
Biology	4
Statistics	3
Animal Biology	4
Fundamentals of Nutrition	3
Electives*	4-10
Junior Year	Hours
Animal Welfare	3
Animal Feeding	4
Biochemistry	4
Microbiology	4
Physics	8
Speech	3
Career Seminar	1
Electives*	3-9

Senior Year	Hours
Clinical Veterinary Med.	3
Animal Health	4
Physiology of Reproduction or Endocrinology	4
Biochemistry	4
Career Seminar	1
Animal Genetics and Breeding	4
Electives*	12-18

*Include courses to meet college requirements and advanced courses for specific options. Many of the electives are normally taken in advanced science options.

A Possible Curriculum in Dairy Production

First Year	Hours
Agricultural Orientation	1
Cultural Diversity	1
Intro. Animal Sciences	4
Organic Chemistry	4
Inorganic Chemistry	4
Mathematics	3
Principles of Agr. and Res. Econ.	3
Microcomputer Applications	3
Written English	3
Electives**	4-10

Sophomore Year	Hours
Animal Biology	4
Principles of Animal Feeding	4
Fundamentals of Nutrition	3
CREAM	4
Biology	4-8
Small Business Management	3
Statistics	3
Electives**	2-4

Junior Year	Hours
Dairy Cattle Judging	2
Fundamentals of Soil Science	4
Principles of Plant Science	3
Forage Crops	3
Animal Welfare	3
Animal Health	4
Genetics and Breeding	4
CREAM	4
Electives**	3-5

Senior Year	Hours
Career Seminar	1
Physiology of Reproduction	3
Dairy Herd Management	4
Farm Business Management	3
Pasture Management	3
Small Business Finance	3
Electives**	13-19

A Possible Curriculum in Equine Science

First Year	Hours
Agricultural Orientation	1
Cultural Diversity	1
Intro. Animal Sciences	4
Inorganic Chemistry	4
Written English	3
Biology I	4
Organic Chemistry	4
Mathematics	3
Microcomputer Applications	3
Electives**	3-6

Sophomore Year	Hours
Animal Biology	4
Fundamentals of Nutrition	3
Intro. Equine Studies	4
Emergency First Aid	2
Principles of Animal Feeding	4
Princ. Economics	3
Small Business Management	3
Electives**	3-6

Junior Year	Hours
Physiology of Reproduction	4
Microbiology	4
Intro. Plant Sci.	3
Advanced Equine Production and Management	4
Speech	3
Animal Welfare	3
Statistics	3
Equine Training Techniques	3
Electives**	3-5
(Summer Internship Recommended)	

Senior Year	Hours
Therapeutic Riding	3
Practical Equine Management	3
Forage Crops	3
Horse in Health and Disease	3
Career Seminar	1
Animal Genetics and Breeding	4
Electives**	13-17

**Include courses to meet college requirements and advanced courses for specific options.

Biochemical Science

The Department of Botany and Agricultural Biochemistry is the only department at UVM that offers a program of undergraduate study leading to the Bachelor of Science degree in Biochemical Science. The program provides a coordinated sequence of study in biochemistry, biology, and chemistry.

The faculty believes that excellence in teaching and student advising are a priority and all department courses are taught by faculty regardless of professional rank. Undergraduate majors in biochemical science are encouraged to enroll in undergraduate research (AGBI 197,198) and to join the department faculty as part of an active, productive research team.

Depending on interest and future plans, students elect one of three possible options or custom design their own option in consultation with their faculty advisor.

Cellular Biochemistry emphasizes the biochemical, physiological, and metabolic reactions of organisms.

Molecular Biology focuses on the structure and function of chromosomes and proteins, the control of gene expression, and the methods of analysis of recombination of DNA.

Mammalian Biochemistry emphasizes the hormonal and nutritional control of biochemical pathways in mammals and the related metabolic and endocrine adaptations.

Required Courses in Biochemical Science

- I. General Education Requirements for All Majors:
 - A. Communication Skills: English I, Speech 11
 - B. Analytical skills (See below section II, D):

- C. Humanities and Fine Arts: Two unspecified courses (six credits)
- D. Social Science: Two unspecified courses (six credits)
- E. College of Agriculture and Life Sciences Orientation: Agriculture 99
- F. Cultural Diversity
- G. Physical Education: Two credits

II. Biochemical Science Core Requirements for All Majors:

- A. Biochemical Science: Ag. Biochem. 10, 201, 202, 220, 221, 230, 231, and one additional elective from 191 or 250.
- B. Chemical Science: Chemistry 31, 32, 141, 142.
- C. Biological Science: Biology 1, 2; Micro. & Mol. Gen. 101; and genetics course, Botany 132 (Biology 101 may be presented for this requirement).
- D. Physics and Mathematical Science: Physics 31, 42 (recommended for premedical programs) or 11, 12 (advisor's permission required), 21, 22; Math. 19, 20 or 21, 22; Comm. Dev. & Appl. Econ. or Computer Sci. 2 or equivalent.

III. Biochemical Science Option Requirements:

Successful completion of three courses numbered at or above the 100 level are required in one of the following options:

- A. Cellular Biochemistry. Suggested courses: Ag. Biochemistry 191, Botany 257, Biology 103, Zoology 223.
- B. Molecular Biology. Suggested courses: Ag. Biochemistry 191, Botany 252, Microbiology and Molecular Genetics 211.
- C. Mammalian Biochemistry. Suggested courses: Ag. Biochemistry 191, 212; Biology 223; Animal Sciences 141, 142, 216; Microbiology and Molecular Genetics 203; Pharmacology 272; Nutritional Sciences 242, 245.
- D. Student Designed Biochemistry Option (in consultation with faculty advisor): Three 100-level science courses.

Biological Sciences

Some of the most exciting and controversial developments in our society are in the biological sciences. Biotechnology is providing the opportunity for *in vitro* fertilization, embryo transfer, embryo sexing, synthesis of hormones to regulate body processes, and gene transfer to increase growth.

The Biological Sciences major starts with the Core Program discussed previously (page 51). In conjunction with a personal faculty advisor, each student plans a curriculum appropriate for individual career goals. Students are urged to participate in undergraduate research and to work directly with a faculty scientist on the cutting edge of research. While each program of study is personalized, all graduates must complete the College requirements and the following major requirements: Biological Sciences Core, one semester each of anatomy, biochemistry, ecology, physiology, statistics, and two semesters of physics. In addition, each student must satisfactorily complete an undergraduate research project or two advanced biological science courses at the 200 level or above. These courses may be selected from the diverse offerings from departments throughout the University. This program requires the successful completion of 122 credit hours of courses to earn the Bachelor of Science degree.

Possible Four-Year Curriculum

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
Beginnings 99	1	—
Race and Culture 95	1	—
Biology 1, 2	4	4
Chemistry 31, 32	4	4
English 1	3	or 3
Nutrition 43	—	3
Computer Appl. 85	3	or 3
Physical Educ. Activities	1	or 1

	1st SEMESTER	2nd SEMESTER
SECOND YEAR		
Organic Chem. 141, 142	4	4
Anatomy/Physiology 141, 142	4	4
Calculus 19, 20	3	3
Statistics 141	3	—
Physical Educ. Activities	1	—
Electives*	0	3

	1st SEMESTER	2nd SEMESTER
THIRD YEAR		
Physics 11/12	4	4
Physics 21/22	1	1
Microbiology 101	4	—
Genetics, Botany 132	3	—
Speech, Comm. Dev. and Appl. Ec. 183	—	3
Electives*	3-6	6-9

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
Biochem. 201	3	—
Biochem. Lab 202	1	—
Undergrad. Res. 197, 198	3	3
Ecology, Botany 160	—	4
Electives*	8-11	8-11

*Electives include selection of courses to meet the College requirement for social sciences and the humanities and fine arts. Electives may be used for a double major, minor, advanced biology, or simply general interest courses. Sequence of courses may be modified with advisor guidance.

Excellent students with a strong preveterinary medicine interest may apply to the new seven-year B.S./D.V.M. program between the College of Agriculture and Life Sciences and Tufts University School of Veterinary Medicine (description on page 10).

The specific courses to be taken for this option start with the Core Program of the College (page 49) as discussed previously. In addition, each student will be required to successfully complete the following courses and credit hours within the three-year period:

Biology	8
Calculus	4 or 6
Inorganic Chemistry	8
Organic Chemistry	8
Biochemistry	4
Physics	8
Microbiology	4
Nutrition	3
Genetics	3
Ecology	3
Undergrad. Research	6
English 50 (recommended)	3

For specific program information contact the Biological Sciences Program Director, at (802) 656-2070.

Botany

Each undergraduate major plans a program in consultation with a personal departmental advisor. Emphasis on flexibility permits a choice of electives. Cross-disciplinary study is encouraged as botany, a fundamental science, is the base upon which education, research, and careers in both applied and basic plant science are built. Students are also encouraged in their senior year to enrich their botanical experience through individualized, original research and study with faculty members. Areas of interest include: ecology, evolution, cell and molecular biology, growth and development, and physiology.

General Botany Major

Required courses: Math. 19, 20 or equivalent, Statistics 141 or 211; one year of physics with laboratory; Chemistry 42 or preferably 141, 142; Biology 1, 2; Botany 104, 132, 160, one course in plant diversity and evolution (Botany 108 or 109), and three additional courses in Botany, one of which must be at the 200 level. Students may petition to substitute similar courses for 104, 132, and 160.

Six hours of modern foreign language are strongly recommended.

Two concentrations are available to students majoring in botany who seek intensive career preparation in areas of specialization within the department. These concentrations include one in plant ecology and evolution and the other in plant molecular biology. Where conflicts arise, the requirements for the concentration have precedence.

Ecology and Evolutionary Biology of Plants: This concentration offers broad training in organismal biology, with emphasis on population and physiological ecology, community structure and function, and plant evolution and diversity. Students choose from a menu of options in fulfilling most requirements; this flexible curriculum enables students to select from a wide range of courses while achieving proficiency in the ecology and evolution of plants.

Core Requirements (49–58 hours):

Biology 1, 2
Chemistry 23 or 31, 32; 42 or 141, 142
Math. 19, 20
Bot. 104, 108, 109, 132, 160
Physics 11, 21 (one semester with lab)
Statistics 211 or Nat. Res. 140

Core Electives (15–24 hours). At least six courses from the following at least two of which must be 200-level Botany courses.

Biology 102, 203, 270
Ag. Biochem. 201, 202
Bot. 117, 261, 205, 209, 213, 223, 232, 234, 241
Forestry 21, 120, 121, 122, 225, 229
Geology 1, 101, 121
Micro. and Mol. Gen. 220
Nat. Res. 220
Plant and Soil Sci. 161, 215

Plant Molecular Biology: This concentration may serve undergraduates in either of two ways. First, Plant Molecular Biology may be used as a general undergraduate science curriculum. Students enroll in a diversity of natural science courses that provide a general, broad education (with a flavor toward plants). This is a liberal education with some background in natural science. Alternatively, Plant Molecular Biology may be used intensively as the University offering to undergraduate education in development, genetics, physiology, and biochemistry of plants.

In addition to college and core program requirements the curriculum asks the student (in consultation with a faculty advisor) to choose two additional plant-oriented courses, two technically-based courses, and then a selection of elective courses that permit the student to identify and expand interest and expertise.

Core Requirements (62–64 hours):

Biology 1, 2
Chemistry 31, 32, or 35, 36; 141, 142
Physics 31, 42 or 11, 12
Math. 19, 20; or 21 or 22
Microbiology 101
Bot. 104, 109, 132 or 101, 261
Agric. Biochem. 201, 202, 220, 221

Core Electives (10–16 hours)

Two courses from plant electives:

Plant and Soil Sci. 138
Bot. 117, 257, 255, 152, 205
Ag. Biochem. 250

Two courses from technology electives:

Bot. 252, 254
Ag. Biochem. 191, 230
Biology 103
Statistics 211

Alternatives in consultation with academic advisor

Free electives: varies between 15–36 credit hours depending on options chosen.

Community Development and Applied Economics

The Department of Community Development and Applied Economics (CDAE) promotes sustainable community development through its commitment to interdisciplinary teaching, applied research, and outreach. CDAE courses and field experiences provide students with a foundation in applied economics, skills in communication, critical thinking and problem solving, and an awareness of social, civic, and environmental responsibility. CDAE research expands knowledge of the social, economic, and environmental factors that affect our communities, small businesses, the agricultural sector, and consumers. CDAE outreach works to improve the quality of life and economic opportunities in Vermont and around the world.

The Department major is Community Development and Applied Economics, with three areas of concentration:

Consumer Economics: The Consumer Economics concentration focuses on the role of the consumer in the economy. Students gain an understanding of consumer demand for goods and services and its interaction with law, public policy, and business. This background prepares students to address a variety of consumer issues such as advertising, credit, the environment, health care, and housing.

International Development and Agricultural Economics: Agricultural Economics provides students with the skills necessary to deal with economic aspects of agricultural and rural development problems. Particular attention is given to the productive sectors of the rural economy. The International Development component educates students to be social scientists with a theoretical and practical foundation to work effectively on rural development issues locally and globally.

Small Business: Students in the Small Business concentration are prepared to establish and operate a small business or to work with organizations serving small business. Particular attention is paid to application of economic principles and

management, issues of business ethics and responsibility, and the building and sustaining of small businesses in rural environments.

The department also offers five minors: **Applied Design, Consumer and Advertising, Consumer Economics, International Development, and Small Business.**

General Requirements – All concentrations (40–42 credits)

Communication Skills	Hours
English 1	3
CDAE 183, or other approved course	3
One additional communications course (either oral or written)	3
Quantitative Skills	
Math. 19	3
Statistics 141	3
CDAE 85	3
Science	
Two courses in physical or natural science	6–8
Arts and Humanities (two courses)	6
Social Science	
Political Science 21	3
One additional social science course	3
Physical Education	2
College Requirements	
Beginnings	1
Race and Culture	1
Core Courses	
Economics 11	3
CDAE 61	3
CDAE 254	3
Minor or Advisor Approved Focus	12–18
Restricted Electives	15
The purpose of restricted electives is to provide students with an additional opportunity to specialize within an area of study or, alternatively, to provide breadth of exposure across the major.	
a. Students may take any course offered in CDAE.	
b. Students must take nine credits in CDAE outside their area of concentration.	
c. Students may take courses in other departments with advisor approval.	
Free Electives	13–21

Required courses in International Development and Agricultural Economics

Twenty-seven credit hours selected from the following courses: CDAE 2, 171, 205, 207, 208, 237, 253, 272, 273.

Required courses in Consumer Economics

Twenty-five credit hours: CDAE 58, 127, 157, 158, 159, 250, 255, 258.

Required courses in Small Business

Twenty-eight credit hours: CDAE 127, 157, 166, 167, 168, 253, 264, 266, 267.

Environmental Sciences

Students may major in Environmental Sciences through the College of Agriculture and Life Sciences, the College of Arts and Sciences, or the School of Natural Resources. For general information about the Environmental Sciences curriculum, see page 46.

Environmental Sciences majors through the College of Agriculture and Life Sciences must fulfill the following requirements for graduation:

- A. General CALS distribution requirements (see page 51).
- B. Core distribution requirements for major (also fill distribution requirements): Animal Sci. 1, 230; Comm. Dev. and Appl. Ec. 2; Plant and Soil Sci. 11; Botany 160; Micro. and Molec. Genetics 101.
- C. Environmental Sciences minimal basic science/quantitative courses (also fill distribution requirements): Biology 1,2; Chemistry 31, 32; Chemistry 42*; Geology 55 or Plant and Soil Sci. 161**; Math. 19, 20; Nat. Res. 140 or Statistics 141.

*Students should consider taking Chemistry 141/142.

**Plant and Soil Sci. 161 is required for many advanced PSS courses in several curricular concentrations; most students should take this course.

- D. Environmental Sciences foundation courses: ENSC 1, 101, 130, 201, 202.
- E. Concentration requirement, 14 credit hours in one of following: *Pollution Ecology, Environmental Analysis and Assessment, Environmental Microbiology, Agriculture and the Environment, Conservation Biology and Biodiversity, Environmental Resources*. Detailed lists of courses for each concentration are available from the Program Director and the Office of the Dean.

Environmental Studies

The Major in Environmental Studies is an interdisciplinary program available to qualified students upon approval of the Director of the Environmental Program. For information about the Environmental Program, see page 46.

Environmental Studies students majoring through the College of Agriculture and Life Sciences must complete a minimum of 122 credit hours, including two hours of physical education, with a minimum GPA of 2.0, and fulfill the following requirements: (1) the general CALS distribution requirements (see page 50); (2) the Environmental Studies Major Core and the Individually-Designed Program: 30 credit hours of approved environmentally-related courses at the 100 level or above, including three hours at the 200 level, with at least one course in each of the following areas — natural sciences, humanities, social sciences, and international studies (may be fulfilled by study abroad experience).

Microbiology and Molecular Genetics

Undergraduates who undertake studies in the Department of Microbiology and Molecular Genetics receive instruction in the classroom and in state-of-the-art teaching and research laboratories. The Department offers either a Microbiology or a Molecular Genetics major or minor as well as courses in the areas of molecular genetics, general, clinical, and environmental microbiology, virology, and immunology which are available to students in other programs. Numerous research opportunities provide undergraduates with close interactions with faculty at the cutting edge of microbiology using molecular genetics technology.

The Microbiology and Molecular Genetics core courses total 59 credits. The courses comprising the core are: biology, biochemistry, cell structure and function, genetics, inorganic and organic chemistry, mathematics, general microbiology, molecular genetics, and physics. In addition to the core requirements departmental majors take a minimum of 15 credit hours from an array of approved elective courses including undergraduate research. As their core requirements, minors take microbiology, molecular genetics, and genetics plus additional credit hours of courses as required.

See Minors in this section.

Nutrition and Food Sciences*

The Department of Nutrition and Food Sciences (NFS) prepares students to enter the rapidly expanding field of diet, food science, nutrition, health, and fitness and is the only academic unit in Vermont that is approved by the American Dietetics Association. Nutrition and Food Science, unique fields of study, are rooted in the physiological, chemical, and biochemical sciences but are comprehensive in scope since they integrate knowledge learned in the social and psychological sciences. The faculty in the department believe that excellence in teaching, research, and undergraduate student advisement are critical components of their responsibility to undergraduate education. Through formal course work, field experience, and independent research, students prepare themselves in the biochemical, psychological, and socioeconomic aspects of diet, nutrition, and foods.

The course credits earned in NFS provide background in preventive and therapeutic nutrition as well as nutrient requirements for human growth, development, health, and fitness throughout the life cycle. Other courses focus on the physical, chemical, and nutritional properties of food, food safety, and consumer aspects of food related to socioeconomic status, life style, cultural beliefs, and health. Although a series of courses providing knowledge in these areas is required of all majors, each student has a generous amount of free elective credits to pursue personal interests.

It is possible for students to meet the requirements for more than one program option (for example, dietetics majors are also double majors in Nutrition and Food Sciences) or combine a major in this department with another area of study.

**Department name change pending final approval of Board of Trustees.*

Depending on current interests and future plans, majors may select one of four department options:

Dietetics: Dietetics is the study of the science of nutrition as it relates to the attitudes, beliefs, and behaviors that people have toward food and their diet. Our Dietetics Major is approved as a Didactic Program in Dietetics by the American Dietetics Association and prepares students for careers as Registered Dietitians by providing the undergraduate requirements needed to apply to postbaccalaureate, supervised, training programs (dietetic internships).

To become a Registered Dietitian, students must complete our undergraduate didactic program, have 900 hours of experience in a training/internship program, and pass a national registration examination. This double major in Dietetics plus Nutrition and Food Sciences prepares graduates to counsel people about the preventive and therapeutic role of nutrition in the maintenance of health and fitness.

Nutrition Education: Nutrition Education is designed to provide a strong background in preventive and therapeutic nutrition plus allow students accelerated entry into our postbaccalaureate, Master of Arts in Teaching (MAT) program to obtain teacher licensure. Department majors who complete the UVM-MAT program can expect to receive their master's degree plus their license to teach Family and Consumer Studies, Science, and Health. The Vermont teaching license is reciprocal with 32 other states.

Sports Nutrition: Sports Nutrition is designed to combine a strong background in the basic and nutritional sciences with the physiology of exercise and movement science. Students may also elect to full the academic and practical application requirements needed to become an athletic trainer. Upon graduation, students selected for the athletic

training option will be prepared to take the National Athletic Trainers Association certification examination (see description of athletic Training concentration on page 81).

Nutrition and Food Sciences: This customized major is designed to provide a strong background in preventive nutrition, food science, and basic science, with an opportunity to elect further course work in medical, biochemical, biological, physiological, psychological, and sociological sciences or business. Graduates may continue their education in medical or graduate school or find career opportunities in related industries.

Course requirements for Nutrition and Food Sciences Majors

I. General Education Studies for all Majors	Hours
A. Communication Skills English 1 (or equivalent) Speech: NFS 124 or Speech 11	6
B. Fine Arts and Humanities Two unspecified courses	6
B. Social Science Core Psychology 1 Economics: CDAE 61 or Econ 11 Sociology 1 or 109, or Social Work 47	9
C. Basic Science Core* Chemistry 23 (or 31); 42 (or 141) Anatomy and Physiology 19-20 Biochemistry 201 and 202	20
D. Analytic Sciences* Statistics 111 (or equivalent) Computer Science: CDAE 85, or CS 2 or 3 (or equivalent)	6
E. Agriculture and Life Sciences Orientation: AGRI 95 and 99	2
F. Physical Activity Two unspecified courses	2

*Students planning to attend medical or graduate school should have biology (one year), chemistry (two years), and physics (one year); plus calculus (one year) is recommended.

II. Department Core Requirements for all Majors Nutrition and Food Sciences (NFS) 43, 44, 53, 54, 143, 203, 243, 253	21
III. Department Major Requirements	
A. Dietetics NFS 123, 150, 250, 260, 261, 262, 263; Business Administration 120. Electives	25-47
B. Nutrition and Food Sciences	
1. Nutrition and Food Sciences In consultation with the student's academic advisor, select four additional didactic courses, at least two of which must be at the 200 level from the following: NFSS 63, 123, 150, 163, 165, 195, 201, 204, 206, 208, 222, 224, 250, 260, 261, 262, 263, 295. Electives	12 38-60
2. Nutrition Education NFS 123, 222, 224, 262; Two additional NFS courses. Electives	18 32-54

3. *Sports Nutrition* 24
 NFS 63, 163, two didactic NFS courses
 at the 200 level; EDPE 166, 167, 220, 240.
 Electives 26-48
 For athletic training add EDPE 23, 46, 157, 185, 186.

Plant and Soil Science

The Plant and Soil Science program allows students to expand their knowledge of science and apply it to plant production, landscape design, and to environmental issues related to plants and soils. The faculty represent the disciplines of agronomy, horticulture, entomology, plant pathology, and soil science. Our program provides a unique, interdisciplinary opportunity for studying plant/soil ecosystems that are managed for food, feed, or fiber production, for landscape purposes, or for recycling/waste utilization.

The program integrates classroom and field experiences and incorporates relevant environmental, social, and economic issues into the curriculum. Faculty help students develop individualized courses of study to match their interests and career goals. The following are areas of concentration within the program:

Agroecology/Sustainable Agriculture: A goal of this concentration is to develop a knowledge base and skills to critically analyze and address issues related to sustainable agriculture.

Landscape Design: This concentration emphasizes the theory and techniques of landscape design and their application to private, commercial, or public design problems.

Horticulture: This concentration provides students with the knowledge and skills needed for challenging careers in the "green" industry and in the production of fruits and vegetables.

Environmental Soil Science: Students learn how the soil affects the transport and remediation of environmental contaminants in both natural and agricultural ecosystems.

The Plant and Soil Science faculty are actively involved not only in teaching but in research that is targeted at solving agricultural and environmental problems. Students are encouraged to become involved in on-going research projects or to develop independent learning experiences with the guidance of a faculty member. In addition, opportunities exist for off-campus internships that provide valuable work experience and insights into professional careers.

Required Core Courses (18-20 hours):

Plant and Soil Science 11, 106, 161, 162; Botany 104, 117; Chemistry 23, 42 or 26; six additional Plant and Soil Science courses at or above the 100 level.

For more complete information see our home page at <http://pss.uvm.edu>.

Urban Forestry and Landscape Horticulture

Urban Forestry and Landscape Horticulture provides a professional education in the use and care of trees, shrubs, lawn grasses, and other plants in the human environment.

The program integrates professional training in landscape design and the plant sciences with courses in business and the liberal arts. The emphasis is on the preparation of students for the changing future and a variety of careers in the expanding field of Urban Forestry and Landscape Horticulture.

Students are encouraged to participate in internships related to their studies.

Urban Forestry and Landscape Horticulture

Required Core Courses:

Plant and Soil Science 11, 107, 123, 125, 131, 132, 145, 161, 162; Forestry 3, 134, 176; Comm. Dev. and Appl. Econ. 61, 166, or 120; Botany 104, 160; Natural Resources 25; Chemistry 23; Math. 10. (Students not having trigonometry in high school should also take Math. 2.)

The Self-Designed Major

Undergraduate students have the opportunity to define a personalized program of study when their personal educational objectives fall outside a curricula defined by departments and programs of the College. The requirements for a Self-Designed Major are specified in a "Guide for Proposal Development and Submission," available through the Student Services Dean's Office in 108 Morrill Hall. Each student is asked to formulate their own program of study by working in association with a faculty advisor and the committee of faculty which oversees the major. Designing a major requires examination of personal goals and acquiring information about formal courses and other possible learning experiences (e.g. internships, independent studies, special topics studies, and independent research). The information is then formulated into a package of proposed course work and other learning experiences.

The objective is to design a coherent and unique plan of study to meet the specific learning needs of the student and by which the student will achieve an advanced state of skills, knowledge, and values in their chosen field. The student must justify the designed package in two ways: (1) value to the student; (2) uniqueness and deviation from curricula already available. The Self-Designed Major usually comprises about 60+ credits of study in the junior and senior years (after the College core requirements have been fulfilled).

The design of the Major is itself an intensive learning experience; therefore, students should plan to spend some time each week over the course of one semester while self-designing the Major.

Family and Consumer Sciences Education

Because of the comprehensive scope of Family and Consumer Sciences Education, graduates with this major have a variety of career alternatives in business, social agencies, and different types of educational programs for youth and adults. Graduates are licensed to teach in public schools in family and consumer sciences fields such as family relationships, child development, consumer education, food and nutrition, housing and interiors, and resource management found in middle, junior, and high school programs. An additional endorsement to teach health is easily obtained with this major. Graduates can also be licensed to teach in occupational programs, including human services and culinary arts. Experience in business or industry is needed to teach in an occupational program.

Students are enrolled in the interdisciplinary Family and Consumer Sciences Program (see page 41).

MINORS

SPECIFIC MINOR REQUIREMENTS

Any student in the College interested in enrolling in one of the following minors should contact the department administering the program. If accepted, the student will be assigned a "minor advisor" from that department who must approve all program plans and course selections.

Students in the College may enroll, on a space available basis, in minors listed under the School of Natural Resources and in minors offered campus wide.

Animal Sciences: Five courses with a minimum of 15 credit hours including Animal Sciences 1; two courses selected from 43, 110, 116, 122, 141, 212, 215 or 216; two courses selected from 6, 71, 113, 115, 117, 118, 161, 163, 213, 214, 220 or 230. At least three credits must be at 200 level or above.

Applied Design: Nine credits in required courses: CDAE 15; 101 or 16; 101 or 231 plus two additional elective courses approved by the student's advisor to define an applied design focus for a total of 15 credits.

Biochemical Science: Agricultural Biochemistry 201 (see prerequisite), 202, 220, 221, 230, 231.

Biological Science: Biology 1 and 2 plus a sequence of three semester courses (nine to 12 credits) in the biological sciences selected with advice of the faculty advisor and approved by the program chair. The courses are selected to provide a relevant extension of the student's major program into the biological sciences.

Botany: At least 15 hours of course work to include Botany 4 or Biology 1 or 2; plus three additional courses in Botany, at least one at the 200 level.

Consumer and Advertising: Fifteen credits including CDAE 15, 127, 128, 183, and an advisor-approved elective.

Consumer Economics: Fifteen credit hours including 12 credits in required courses CDAE 58, 127, 157, 255; three credits from the following restricted electives: CDAE 128, 158, 159, 250, 258.

Environmental Studies: Seventeen hours of Environmental Studies including 1, 2; nine hours at the 100 level or above, with at least three hours at the 200 level and may include one non-ENVS course with the approval of a student's advisor and Program Director.

International Development: A total of 15 credit hours with nine from required courses CDAE 2, 61, and 171; and six hours from a list of restricted electives as follows: CDAE 128, 158, 166, 167, 168, 196, 205, 210, 218, 233, 237, 253, 254, 255, 258, 264, 266, 267, 273, or 296. Each student will be assigned a minor advisor who will approve all program plans and course selection.

Microbiology: Core requirements are MMG 101 and 102, Botany 132, plus an additional six credit hours of MMG courses chosen from MMG 195, 201, 203, 211, 220, 222, 223, 225, depending on student needs.

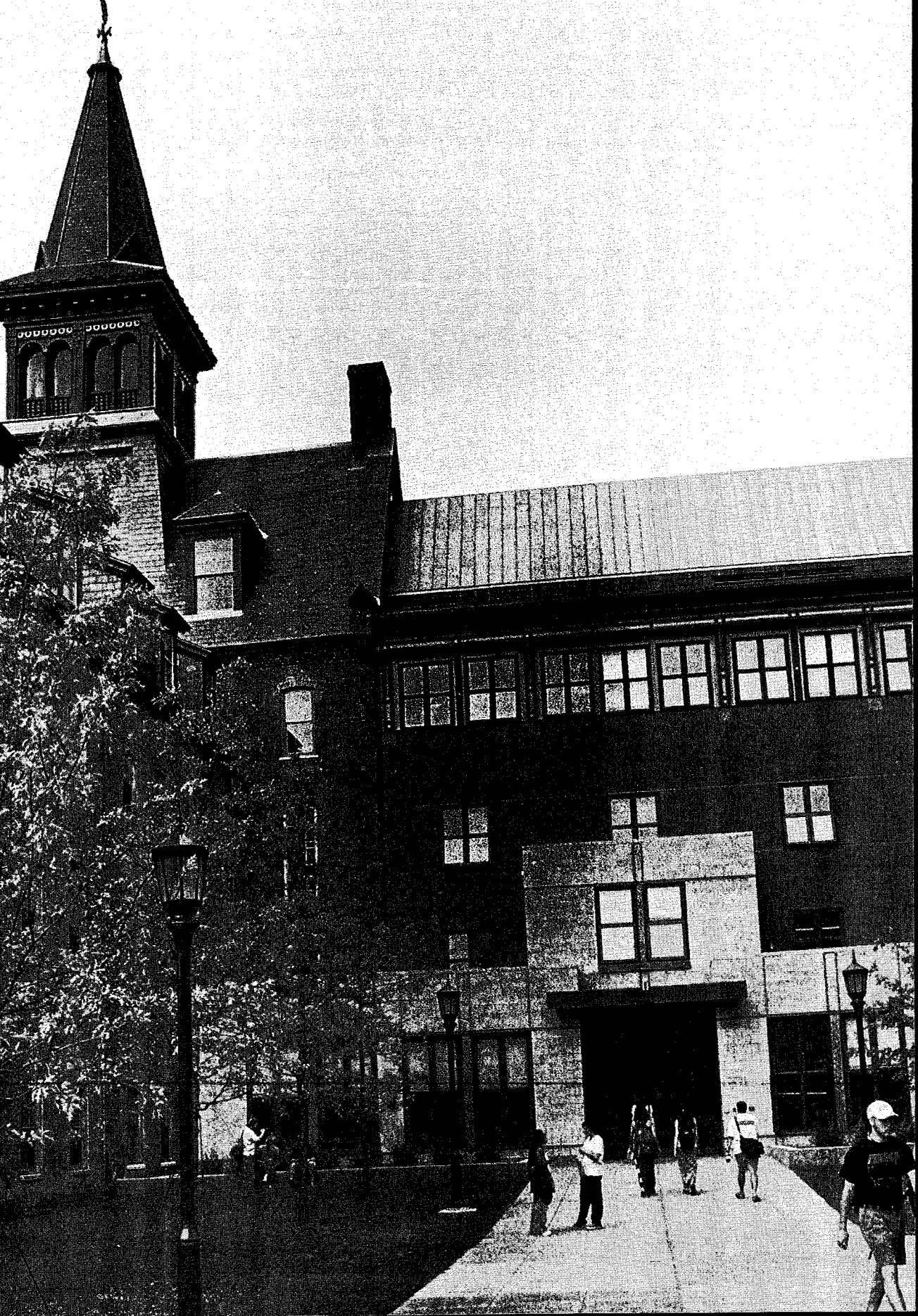
Molecular Genetics: Core requirements are MMG 101, 102, 211, and Botany 132, plus an additional three credit hours of MMG courses chosen from MMG 195, 201, 203, 223, 225 depending on student needs.

Nutrition and Food Sciences: Fifteen credit hours in Nutritional Sciences consisting of 43, 53, 63, 143, plus a three-credit NUSC course at or above the 195 level. Independent study or field experience cannot be counted in this total.

Plant and Soil Science: Sixteen credits including Plant and Soil Science 10 or 11, 161, plus any three additional Plant and Soil Science courses at the 100 level or above.

Small Business: Fifteen-16 credits including 12 credits in required courses CDAE 166, 167, 168, 266; one course three-four credits from the following restricted electives: CDAE 157, 169, 264, 267.

Sustainable Agriculture: Fifteen hours including nine in required courses ASCI 230 or CDAE 230, CDAE 61 and PSS 152; three or four credits from the following restricted electives: ASCI 110, 113, 115, 118, 213, 214, 215 or CDAE 170, 171, 205, 218, 272, 273 or PSS 106, 161, 122, 123, 124, 125, 138, 141, 145, 215, 217, 221, 232; and a three- to six-credit hour internship: AGRI 195, ASCI 197 or 297, CDAE 196, or PSS 197 or 297.



The College of Arts and Sciences

Throughout its history, the College of Arts and Sciences has held that its central purpose is to provide students with a sound liberal education. Congruent with this central purpose, the College seeks to instill in students a spirit of reasoned inquiry and those habits of intellectual discipline that are required for the critical thinking expected of free men and women. The College further seeks to acquaint students with their intellectual, cultural, and aesthetic heritage, and to provide them the skills necessary to cope with the complex human, societal, and technological problems of modern society. Finally, the College seeks to prepare students for entry into rewarding careers in a variety of fields and for advanced study that may be prerequisite to other opportunities. These objectives of a liberal education are achieved through the courses of instruction which form the undergraduate curricula of the College. Through satisfaction of the general and distributive requirements, students acquaint themselves with the diversity of approaches whereby people have come to understand themselves and their environment. As well, through satisfaction of the major and minor requirements, students can attain baccalaureate level mastery of a particular discipline or interdisciplinary area and significant depth of study in a second discipline or interdisciplinary area.

The offices of the Dean of the College are located in Waterman Building.

ORGANIZATION AND DEGREE PROGRAMS

The Bachelor of Arts degree program may be completed with an approved major in one of the following fields:

Anthropology	History
Area and International Studies	Latin
Art History	Mathematics
Art - Studio	Music
Biology	Philosophy
Botany	Physics
Chemistry	Political Science
Classical Civilization	Psychology
Communication Sciences	Religion
Economics	Russian
English	Sociology
Environmental Studies	Spanish
French	Theatre
Geography	Women's Studies
Geology	Zoology
German	Individually Designed
Greek	Major

The following majors are available through the Evening University: English, Mathematics, Psychology, Sociology, Studio Art (see page 9).

The Bachelor of Science degree program may be completed with an approved major in one of the following fields.

Biology	Physics
Chemistry	Psychology
Environmental Sciences	Zoology
Geology	

The Bachelor of Music degree program may be completed with an approved major in one of the following fields.

Music Performance

Music Theory

FIRST-YEAR PROGRAMS

The College also offers a program of first-year seminar courses combined with advising, the Teacher-Advisor Program. This program includes one-semester departmental courses, two-semester interdisciplinary courses, and the Integrated Humanities and the Integrated Social Sciences programs. For further information, see the Teacher-Advisor Program Guide to Course Selection, available in 304 Waterman.

The Integrated Humanities Program is a coordinated first-year program that presents the development of the Western cultural tradition through the perspectives of literature, history, religion, and philosophy. Most students in the program are housed in the Living/Learning Center. English 27, 28, History 13, 14, and Religion 27, 28 are the program's core courses.

In the Integrated Social Science Program, first-year students undertake an intensive, interactive study of significant contemporary social problems. In five coordinated courses and an optional thesis, students apply various social science methods to understand these problems and efforts to solve them. Students are advised by an ISSP professor and most are housed together.

DEGREE REQUIREMENTS

Students must comply with the degree requirements as stated in one edition of the Catalogue in place during the time they are enrolled. However, since the curriculum is viewed as a coherent whole, selected parts from different catalogues may not be counted. Students who do not complete the degree within seven years must comply with the requirements in the catalogue current at the date of readmission. Disputed rulings may be appealed to the Committee on Academic Standing.

REQUIREMENTS FOR THE BACHELOR OF ARTS DEGREE

A. A student must earn a cumulative grade-point average of 2.0 in a program comprised of a minimum of 122 semester hours to include **two** hours of physical education activities. Students 25 years of age or older at the time of admission to the University or students with a documented medical condition which precludes participation in such activities are exempt from the physical education requirement and must present a total of 120 hours of academic credit.

Of the 122 hours of credit required, students electing a minor offered by the College must complete 96 hours in courses offered by departments and programs in the College of Arts and Sciences. The remaining 24 hours may be taken in courses offered by any academic unit at The University of Vermont. Students electing an approved minor offered by another school or college of the University (a cross-college minor), must complete

84 hours in courses offered by the departments and programs in the College of Arts and Sciences. The remaining 36 hours of credit, to include courses required for the minor, may be taken in courses offered by any academic unit of The University of Vermont.

No more than eight hours of Military Studies credit may apply toward the degree. Courses taken on a pass/no pass basis may not be used toward completion of any requirement listed below under sections C and D and E.

- B. A student must be matriculated in the College of Arts and Sciences and in residence at The University of Vermont during the period in which he or she earns 30 of the last 45 hours of academic credit applied toward the degree.
- C. A student must complete the following courses which comprise the general and distributive requirements for the Bachelor of Arts degree. All courses used to satisfy these requirements must carry at least three hours of credit and may not be taken on a pass/no pass basis.

General Requirements

1. **Non-European Cultures:** One course, other than a foreign language, which deals with non-European cultural traditions.¹ The course selected to satisfy this requirement may also be used to fulfill the distributive requirement, but one course cannot be used to satisfy both General Requirements 1 and 2.
2. **Race Relations and Ethnic Diversity in the United States:** One course which addresses centrally the question of race relations and ethnic diversity in the U.S.² The course selected to satisfy this requirement may also be used to fulfill the distributive requirement, but one course cannot be used to satisfy both General Requirements 1 and 2.

¹The following courses have been approved for this category for the 1998–99 academic year: Anthropology 21, 24, 128, 160, 161, 162, 163, 164, 165, 166, 170, 172, 175, 177, 179, 180, 185; Art 8, 146, 185, 187, 188, 285; English 61, 172; French 289; Geography 1, 51, 56, 58; History 9, 10, 40, 45, 50, 51, 61, 140, 145, 146, 149, 150, 151, 152, 161, 162, 245, 246, 250, 252; Music 15; Philosophy 3, 121, 122, 221; Political Science 157, 168, 170, 174, 175, 177, 179; Religion 20, 21, 131, 132, 134, 141, 145; Sociology 171, 213, 272.

²The following courses have been approved for this category for the 1998–99 academic year: All ALANA Studies courses; Anthropology 160, 164, 169, 187; Communication Sciences 160; Economics 153; English 57, 166, 167, 168, 170, 171; General Literature 143; Geography 60; History 60, 68, 168, 169, 187, 188, 189; Political Science 29, 129; Religion 80, 128; Sociology 19, 31, 118, 119, 219; Art 295 “Working With Culturally Diverse Sources” and Art 295 “Cultural Transformations” will meet this requirement. Anthropology 187 is cross-listed with Sociology 119.

³See page 12 for information concerning academic credit for Advanced Placement Testing.

⁴Music Performance courses (one and two credit hours each) may be used to satisfy the Fine Arts requirement if their cumulative credit hour total is equal to or greater than three.

⁵Speech courses will not satisfy the Fine Arts requirement.

⁶The following courses have been approved for this category for the 1998–99 academic year: Classics 24, 37, 42, 153, 155, 156; all English courses except 1, 4, 30, 50, 53, 101, 102, 103, 104, 111, 112, 117, 118, 119, 120; all French courses numbered 111 or above except 191, 201, 209, 211, 215, 216, 292, 293; all General Literature courses; all German courses numbered above 100 except 103, 104, 121, 122, 201, 202, 213; all Greek courses numbered above 200; Italian 157, 158; all Latin courses numbered above 100 except 111, 112, 255; all Russian courses numbered above 100 except 101, 121, 122, 141, 142, 161, 221, 222, 251, 271; all Spanish courses numbered 155 or above except 201, 202, 210, 211, 291, 292, 293.

Distribution Requirements

Six of the seven categories must be completed. No more than two courses from the same department may be used to satisfy the distributive requirement. Courses which satisfy major and minor requirements may also be used to satisfy this requirement.

1. **Foreign Language:** One course numbered 52, or in Latin, 51 and 52, or one course numbered 100 or above (except Spanish 105). A student who has achieved a score of 4 or better on an appropriate Advanced Placement Test will be exempt from this requirement.³ Exemption will also be granted to those students who achieve a score of 650 or better on the appropriate CEEB Achievement Test and who pass oral and written tests administered by the appropriate foreign language department.
2. **Mathematics:** One course numbered 13, 14, 17 or above or Statistics 51 or above. A student who has achieved a score of 3 or better on the Calculus AB or a score of 2 or better on the Calculus BC Advanced Placement Tests will be exempt from this requirement.³
3. **Fine Arts:** One course in Studio Art or Art History, Music,⁴ Theatre,⁵ or Film.
4. **Literature:** One course selected from a list of approved offerings in Classics, English, French, German, General Literature, Greek, Italian, Latin, Russian, and Spanish.⁶
5. **Humanities:** Two courses selected from a list of approved offerings in ALANA Studies, Art History, Classics, Greek, History, Latin, Philosophy, Political Science, and Religion.⁷
6. **Social Sciences:** Two courses selected from a list of approved offerings in Anthropology, Communication Sciences, Economics, Geography, Area and International Studies, Political Science, Psychology, Sociology, Vermont Studies, and Women's Studies.⁸
7. **Natural Sciences:** Two courses, one of which must include laboratory experience, from among the offerings in Biology, Botany, Chemistry, Geology, Physics.

- D. A student must complete an approved Major in the College of Arts and Sciences by satisfying the requirements specified by the department or program supervising the major (see page 65), and by maintaining a cumulative grade-point average of 2.0 in the major field. No more than 45 hours of credit in the major field may be used toward completion of the 122 hours of credit required for graduation. At least one-half of the credit hours used toward the major requirements must be taken at The University of Vermont. Of these, at least 12 credits must be at or above the 100 level. Application of credits earned elsewhere to completion of the major is subject to approval by the appropriate department chairperson or program director. No courses applied toward satisfaction of major requirements may be taken on a pass/no pass basis.

- E. A student must complete a minor approved by the College of Arts and Sciences in a field other than the major by satisfying the requirements specified by the department.

⁷The following courses have been approved for this category for the 1998–99 academic year: all Art History, History, Philosophy, Religion courses; ALANA Studies 55, 159; Classics 21, 23, 24, 33, 35, 121, 122, 149, 154, 157, 158, 159, 221, 222; Greek 203, 205; Latin 255; Political Science 41, 141, 142, 143, 144, 146, 241, 242, 243, 249.

⁸The following courses have been approved for this category for the 1998–99 academic year: all Anthropology, Economics, Geography, Psychology, and Sociology courses; Communication Sciences 20, 80, 94; Area and International Studies 91A, 91B; all Political Science courses except 41, 141, 142, 143, 144, 146, 241, 242, 243, 249; Vermont Studies 52, Women's Studies 73.

ment or program supervising the minor (see page 71).⁹ Also, a student must maintain a cumulative grade-point average of 2.0 in the minor field.¹⁰ Completion of a second major will satisfy the minor requirement. As with the major, at least one-half of the credit hours used toward completion of the minor requirements must be taken at The University of Vermont, and application of credits earned elsewhere toward completion of the minor is subject to approval by the appropriate department chairperson or program director. No courses applied toward satisfaction of the minor requirements may be taken on a pass/no pass basis.

REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE

- A. A student must earn a cumulative grade-point average of 2.0 in a program comprised of a minimum of 122 semester hours to include **two** hours of physical education activities. Students 25 years of age or older at the time of admission or students with a documented medical condition which precludes participation in such activities are exempt from the physical education requirement and must present a total of 120 hours of academic credit. Of the 122 hours of credit required, 96 hours must be taken in courses offered by departments and programs in the College of Arts and Sciences. The remaining 24 hours of credit may be taken in courses offered by any academic unit of The University of Vermont, although no more than eight credits of Military Studies may apply toward the degree. Courses taken on a pass/no pass basis may **not** be used toward the completion of any requirement listed below under sections C and D and E.
- B. A student must be matriculated in the College of Arts and Sciences and in residence at UVM during the period in which he or she earns 30 of the last 45 hours of academic credit applied toward the degree.
- C. A student must complete the General Requirement Race Relations and Ethnicity in the United States listed on page 64. A student must complete the **Distributive Requirement** for the Bachelor of Science degree by completing six courses selected from at least two of the following areas: Foreign Language, Fine Arts, Literature, Humanities, and Social Sciences (see page 62 for a detailed description of the courses included in these areas). Students opting for a Bachelor of Science degree in Psychology must also complete the College of Arts and Sciences distribution requirements for a Bachelor of Science degree and they may not use Psychology courses to fulfill the social sciences category. No courses applied toward satisfaction of the distributive requirements may be taken on a pass/no pass basis.
- D. A student must complete an approved **Major** in the College of Arts and Sciences by satisfying the requirements specified by the department or program supervising the major (see page 65), and by maintaining a cumulative grade-point average of 2.0 in the major field. No more than 50 hours of credit in the major field may be used

toward completion of the 122 hours of credit required for graduation. At least one-half of the credit hours used toward the major requirements must be taken at UVM. Of these at least 12 credits must be at or above the 100 level. Application of credits earned elsewhere toward completion of the major is subject to approval by the appropriate department chairperson or program director. No courses applied toward satisfaction of major requirements may be taken on a pass/no pass basis.

Bachelor of Science (with minor) degree. A student electing this degree program must satisfy all of the requirements specified in sections A, B, C, and D (above), as well as:

- E. A student must complete an approved minor in a field other than the major by satisfying the requirements specified by the department or program supervising the minor (see page 71) and by maintaining a cumulative grade-point average of 2.0 in the minor field. Students electing a minor offered by the College must complete 96 hours in courses offered by departments and programs in the College of Arts and Sciences. The remaining 24 hours may be taken in courses offered by any academic unit at The University of Vermont. Students electing an approved minor offered by another school or college of the University (a cross-college minor) must complete 84 hours in courses offered by the departments and programs in the College of Arts and Sciences. The remaining 36 hours of credit, to include courses required for the minor, may be taken in courses offered by any academic unit of The University of Vermont. At least one-half of the credit hours used toward completion of the minor requirements must be taken at The University of Vermont, and application of credits earned elsewhere toward completion of the minor is subject to approval by the appropriate department chairperson or program director. No courses applied toward satisfaction of the minor requirements may be taken on a pass/no pass basis. No more than two of the courses from section C distribution requirements may be applied toward the completion of the minor requirements.

REQUIREMENTS FOR THE BACHELOR OF MUSIC DEGREE

- A. A student must earn a cumulative grade-point average of 2.0 in a program consisting of a minimum of 122 semester hours of academic credit for a Music Theory Concentration, or 125 semester hours of academic credit for Music Performance Concentration. Of these hours of required credit, **two** hours must be associated with physical education activities. Students 25 years of age or older at the time of admission or students with a documented medical condition which precludes participation in such activities are exempt from the physical education requirement and must present a total of 120 hours of academic credit. Courses taken on a pass/no pass basis may not be used toward the completion of any requirement listed below under sections C, D, and E.
- B. A student must be matriculated in the College of Arts and Sciences and in residence at UVM during the period in which he or she earns 30 of the last 45 hours of academic credit applied toward the degree.
- C. A student must complete the **Distributive** and **General Requirements** identical to that required for the Bachelor of Arts degree (see page 62 for a detailed description of the Distributive and General Requirements).
- D. A student must complete a **Major** with a concentration in either theory or performance by satisfying the re-

⁹Only one course may be applied toward completion of both a major and a minor requirement.

¹⁰The minor grade-point average will be calculated from the first set of courses which satisfy the minor requirements. However, if a student's grade-point average in these courses falls below 2.0, and there are additional courses which are approved for inclusion in the minor, a student may elect to drop for purposes of the grade-point average calculation, one course graded below C and to replace this course with an approved alternate.

quirements specified by the department (see page 65), and by maintaining a cumulative grade-point average of 2.0 in the major field. An admission audition, junior standing jury examination, and senior recital are also required for the performance concentration. At least one-half of the credit hours used toward the major requirements must be taken at The University of Vermont. Of these, at least 12 credits must be at or above the 100 level. Application of credits earned elsewhere to completion of the major is subject to approval by the appropriate department chairperson or program director. No courses applied toward satisfaction of major requirements may be taken on a pass/no pass basis.

Bachelor of Music (with minor) degree. A student electing this degree program must satisfy all of the requirements specified in sections A, B, C, and D (above) as well as:

- E. A student must complete an approved minor in a field other than the major by satisfying the requirements specified by the department or program supervising the minor (see page 71) and by maintaining a cumulative grade-point average of 2.0 in the minor field. Students electing a minor offered by the College must complete 96 hours in courses offered by departments and programs in the College of Arts and Sciences. The remaining 24 hours may be taken in courses offered by any academic unit at The University of Vermont. Students electing an approved minor offered by another school or college of the University (a cross-college minor) must complete 84 hours in courses offered by the departments and programs in the College of Arts and Sciences. The remaining 36 hours of credit, to include courses required for the minor, may be taken in courses offered by any academic unit of The University of Vermont. At least one-half of the credit hours used toward completion of the minor requirements must be taken at The University of Vermont, and application of credits earned elsewhere toward completion of the minor is subject to approval by the appropriate department chairperson or program director. No courses applied toward satisfaction of the minor requirements may be taken on a pass/no pass basis.

INTERNSHIPS

Arts and Sciences students are encouraged to do internships and may count up to 12 hours of internship credit toward their B.A. or B.S. Full information on internships and the regulations governing them is found in the Arts and Sciences Internship brochure, available in 304 Waterman.

REGULATIONS GOVERNING INDEPENDENT STUDY

A student may receive credit for a project or program of independent study which is supervised by an academic department or program within the University. Such independent study projects may be carried out under registration in courses entitled Readings and Research or Internship. All such projects must conform to University guidelines for independent study (see page 34). There is no limit on the number of independent study credits which may be earned, but prior approval by the Committee on Honors and Individual Studies is required if a student wishes to elect nine or more such credits in a single semester.

REGULATIONS GOVERNING COLLEGE HONORS

- A. The **College Honors** program, designed for the superior student with unusual initiative and intellectual curiosity, provides an opportunity for the pursuit of a two-semester, six-credit (3-3) independent research, scholarly, or creative project under the direction of a faculty sponsor. A student in the College of Arts and Sciences may apply for College Honors in a particular subject if, at the end of the junior year, he or she has a grade-point average of at least 3.20 and has been on the Dean's List for three semesters. The program must have been approved by the sponsoring department and by the Committee on Honors and Individual Studies. All application materials must be turned in to the Committee by September 30 of the candidate's senior year. Students must present a satisfactory written report and pass an oral examination upon completion of the honors project. Students who wish to consider undertaking a College Honors project during the junior year should contact the Office of the Dean for information concerning the circumstances in which such an exceptional arrangement is possible. College Honors credit will be counted toward the 45-hour limit (50-hour limit for B.S. candidates) in the major.
- B. Some departments in the College, including Economics, English, History, Mathematics, Political Science, Religion, and Sociology, sponsor **Departmental Honors** programs. Participation in these programs is limited to those students who are specifically recommended by their department. Each department will define what is required to earn Departmental Honors. A student who successfully completes this program is granted a degree with **Departmental Honors**. These programs are administered directly by the sponsoring department and information concerning them may be obtained from faculty advisors.
- C. Students may also earn College honors through the **John Dewey Honors Program**, a three-year course of study. Ground work for the senior honors thesis is laid with John Dewey Honors courses in the sophomore year and appropriate course work in the major in the junior year. Application is restricted to students with a G.P.A. of 3.2 or higher, and must be made at the end of the first year. For further information, contact the College.

REGULATIONS GOVERNING STUDY ABROAD

Students should refer to page 42 for the general University regulations and procedures pertaining to Study Abroad. For Arts and Sciences students the following additional policies pertain to the application of credit earned in a Study Abroad program:

- A. Regardless of the number of credits accepted in transfer by the University, a maximum of 16 credits earned in a one-semester Study Abroad program will be applied toward satisfaction of degree requirements. For year-long programs, a maximum of 32 credits will be applied toward the degree.
- B. Students must complete 30 of the last 45 hours of degree credit in residence at UVM. One-half of the hours applied toward the satisfaction of major requirements, including 12 hours at the 100 level or above, must be completed at The University of Vermont. One-half of the hours applied toward the satisfaction of

minor requirements must be completed at The University of Vermont.

- C. Under no circumstances will a student in the College of Arts and Sciences be permitted to enroll in a University-sanctioned Study Abroad program while on trial.

REGULATIONS GOVERNING TRANSFER INTO THE COLLEGE

A student who wishes to transfer into the College of Arts and Sciences from another college or school at the University must comply with the Intercollege Transfer policy in the section on Academic and General Information (page 37). Applications for internal transfer may be submitted to the Office of the Dean at any time, but they will be reviewed only at the end of each semester.

REGULATIONS GOVERNING ACADEMIC STANDARDS

The following criteria for academic trial and dismissal, while making allowances for the student in the first semester, are designed to encourage academic work of quality at least equal to the minimum which is required for graduation.

Trial

- A. A student who earns a semester grade-point average higher than that which merits dismissal but below 2.00 is placed *on trial*. In order to avoid dismissal from the University, a student who has been placed on trial must in the following semester earn a 2.00 semester average, enroll in all courses for a letter grade, and maintain a program of 12 or more credit hours. No student will be removed from trial until both the semester and cumulative averages are at least 2.00. A student who is on trial may not enroll in a University-sanctioned study abroad program.
- B. First-Year Students. Following the first semester of enrollment, a student who earns a semester grade-point average higher than that which merits dismissal, but below 1.67, is placed on trial and must in the following semester satisfy the same probationary requirements as described above. All first-year students who have a cumulative grade-point average which is below 2.00 after completion of the second semester will be placed on trial.

Dismissal

- C. A student who does not satisfy the conditions of trial, or who earns a semester grade-point average of 1.00 or lower, or who earns failing grades in one-half of the semester credit hours attempted (excluding courses in physical education and military studies) will be *dismissed for low scholarship*. The period of dismissal is one year. Dismissed students must receive written approval from the Arts and Sciences Dean's Office before enrolling in any University course.

Readmission Following Dismissal

- D. A dismissed student who presents evidence of his/her ability to perform satisfactorily may be considered for readmission on trial. A student who has been dismissed for a second time will not be considered for readmission on trial until at least three years have elapsed. Further information regarding readmission may be obtained from the Office of the Dean.

MAJORS: DEPARTMENT REQUIREMENTS

Bachelor of Arts, Bachelor of Science, and Bachelor of Music requirements are found under the appropriate department headings.

INDIVIDUAL DESIGN MAJOR The IDM is a nondepartmental, interdisciplinary major for those Bachelor of Arts candidates whose academic interests are not met by the major programs currently offered by the College. An IDM may not be a program of narrow professional training. Rather, it must lead to an intensive investigation of some broad area of human knowledge which is not covered by a single departmental discipline. During the senior year, IDM majors engage in a three-credit tutorial for which they complete a paper or an equivalent project which demonstrates the essential coherence of the major. A College Honors project (six credits) may be substituted for the tutorial requirement. Application to pursue an IDM should be approved by the Committee on Honors and Individual Studies before the end of the candidate's junior year. No more than 18 hours of the proposed major may be completed at the time of application. Additional information about the IDM program is available in the Office of the Dean.

ANTHROPOLOGY Thirty hours in Anthropology including 21, 24, 26, and 128; 225 or 228 (recommended for the junior year) and five additional advanced (100- or 200-level) courses of which only one may be an independent study and at least one must be at the 200 level.

AREA AND INTERNATIONAL STUDIES PROGRAM Entering students are invited to consider the option of concentrating in Area and International Studies. Courses in several academic disciplines can be combined so as to focus on a particular area of the world, thus providing an opportunity to test generalizations against the particular reality of a geographical area and its people.

Undergraduates who major in Area and International Studies usually accumulate sufficient credit to enable them also to fulfill department requirements in one of the social sciences, humanities, or foreign languages.

Major programs are available in the following five areas: Asia, Canada, Latin America, Russia/East Europe, Europe (Western, Northern, Mediterranean). Minor programs are also available in these areas, as well as in Africa and the Middle East. For specific requirements, see page 71.

The approach to undergraduate education combines exposure to the traditional disciplines with integrative knowledge and appreciation of a foreign culture and thus combines the broad liberal arts education with a more specific area competence.

During their first and sophomore years, students who plan to major in Area and International Studies should take the required foreign language courses as well as beginning courses in the humanities and social sciences which are prerequisites for subsequent required courses and also meet the general distribution requirements.

Students interested in concentrating in Area and International Studies are urged to contact the Director.

Specific requirements of the individual programs follow:

Asian Studies

In selecting courses from the Asian Studies listing, students must consult with an appropriate Asian Studies advisor and demonstrate in their choices thematic and/or geographic coherence.

The Asian Studies major consists of at least 33 credit hours in courses from the Asian Studies listing (see Courses of Instruction; Asian Studies) to include the following:

- A. Completion of two years' (normally 16 hours) study of a language of the geographic subarea of concentration. No more than 16 hours of language study may be counted toward the major. For students who have demonstrated fluency in the language of the subarea of concentration (for instance, native speakers of the language), the language requirement will be waived. Such students will still be required to complete the 33-credit hour requirement.
- B. The remaining credit hours must include at least nine hours at the 100 level and three hours at the 200 level. These hours must be selected from at least three academic disciplines. Language courses may not be used to fulfill this requirement.

Note: Courses significantly but not entirely on Asia may be counted toward a student's major requirements only if papers or projects relevant to their Asian subarea or their Asian thematic focus have been completed. The Dean's Office must receive written approval from the advisor in order for these courses to be counted toward the major.

Students who major in Asian Studies and minor in an Asian language may overlap only one course as is stipulated on page 62 of this catalogue (section E, footnote 9).

Canadian Studies

The Canadian Studies major requires at least 30 credit hours to consist of the following:

- A. Three required courses: Area and International Studies 91, Introduction to Canada; History 66, Canadian History: 1867 to the Present; Area and International Studies 296, Seminar on Modern Canada.
- B. Seven additional courses, of which at least six must be at the 100 level or above, and of which at least five must be chosen from the following 100 percent Canadian content list: AIS 195, 196, 295; Anthropology 167; Art 180, 282 (when topic is Canadian); Bus. Admin. 234; English 157, 158; French 293, 285; Geography 52, 210; Geology 272, 273 (when this field course goes to Canada); History 65, 265, 165; Pol. Sci. 173.
- C. Majors will study French language through the intermediate level (French 52) or higher.

Majors are strongly encouraged to acquire an intermediate/advanced proficiency by completing at least French 201. Majors pursuing intermediate/advanced proficiency should consult with the Canadian Studies faculty of the Romance Languages Department to determine an appropriate plan of study.

Latin American Studies

- A. Twelve hours as follows: Anthropology 161; History 61; Geography 56; Political Science 174.
Two additional semester courses selected from Area and International Studies, 193, 194, 195, 196, 197, 198; History 161, 162; or from courses recommended by the Program of Latin American Studies.
- B. Plus six hours of advanced Spanish (Spanish 185, 186, 281, 285, 286, 293).
- C. An additional 12 hours from related courses chosen in consultation with advisor.

Russian/East European Studies

- A. Required courses (43 hours): Russian 52, and two courses at the advanced level; two courses from History 27, 137, 138; Economics 11, 12; and 116; Political Science, three

hours and 172; plus three additional courses from the following: Economics 185, 277, 281; Political Science 146; General Literature 181, 182, 183; Philosophy 133; History 237, 238.

- B. Recommended courses: Area and Int'l Studies 91.

The program also offers an interdisciplinary individual design major in Russian/East European Studies and Economics. The program of study must be planned with a member of the Russian/East European Studies faculty.

Required courses (38 hours):

Two courses in Russian or another Slavic language at the intermediate level (example: Russian 51, 52); four courses in Economics including 116; two Russian/East European Area Studies courses other than those in Economics; two courses in Business Administration; two approved electives at the 100 level or above.

European Studies (Northern, Western, Mediterranean)

A total of 33 hours in approved European Studies courses to include nine hours at the 200 level. No more than 12 hours may be taken from any one discipline. Only 15 hours of transfer credit may be applied toward the major. Students must consult closely with their European Studies advisor in the development of a coherent program of courses.

- A. *European Studies seminar:* All seniors must take the European Studies seminar, IS 291. Students should expect to use their competency in a European language (other than English) for research purposes in this seminar. The European Studies subcommittee may approve substitute seminars upon request.
- B. *European culture and thought:* Twelve hours from the approved list to include six hours at the 100 level or above.

Art: 5, 6, 148, 149, 155, 158, 161, 164, 165, 170, 172, 174, 177, and 179 or 282 (when the content is European); **Classics:** 24, 33, 35, 37, 42, 153–159; **English:** 21, 22, 25–28, 85, 86, 102, 103, 121, 122, 124, 125, 127, 128, 129, 130, 133, 134, 141, 142, 146, 152, 153, 154, 221, 222, 241, 242; **Film:** 5, 6, 107, 161; **French:** 111, 112, 225, 226, 235, 245, 246, 247, 255, 256, 265, 266, 275, 276, 290, 291, 292; **General Literature:** 24, 35, 37, 72, 131, 141, 153–156, 161, 162, 173, 181; **German:** 104, 121, 122, 155, 156, 201, 213, 214, 225, 226, 237, 238, 247, 248, 251, 252, 263, 264, 271, 273, 275, 276, 278, 279, 281, 282; **Greek:** all courses above 100 level; **Italian:** 121, 122, 157, 158; **Latin:** all courses above 100 level; **Music:** 11, 12, 111–114; **Philosophy:** 101, 102, 105, 107, 133, 140, 151, 160, 260; **Political Science:** 141, 142, 146; **Religion:** 22, 111, 116, 122, 124, 155, 173, 224, 226, 228, 280; **Spanish:** 155, 156, 235, 236, 245, 246, 265, 276, 277, 291, 292; **Theatre:** 136, 137, 138.

- C. *European history and society:* Twelve hours from the approved list to include six hours at the 100 level or above.
BSAD: 236; **Economics:** 113; **Geography:** 55, 155, 158; **History:** 13, 14, 19, 21–27, 85, 86, 120–136, 139, 185, 186, 190, 191, 221, 222, 224–228, 285; **Political Science:** 171, 257, 276, 287.
- D. *European language:* Six hours of a European language other than English at or above the 100 level. Students who fulfill nine or more hours of their "Culture and Thought" requirement through the study of any one such language must fulfill this requirement in a second European language other than English.

Note: Other equivalent courses within each area may be accepted with permission of the Director of European Studies.

ART Students may major in one of the following:

Studio Art: Thirty hours in Studio Art, including nine hours in foundation courses (to include Art 3 and two from 1, 2, 4) with three different instructors; 15 hours at the 100 level (only three of which may be 197; six of which may be 195) with two different instructors, including courses in the areas of two-dimensional study (drawing, painting, printmaking, photography, film, and video) and of three-dimensional study (sculpture, ceramics, fine metals); and six hours at the 200 level, three of them in the senior year; nine hours of Art History, including two of the following: 5, 6, or 8; and one of the following: 140, 170, 172, 174, 177, 179, 180, and 194 when approved for this requirement (permission depends upon topic; check with Art Department).

Note: A Studio Art major may not take more than one Evening Division course per semester in Studio Art.

Art History: Thirty hours in Art History, including 5, 6; 12 hours to include three hours from each of four different categories (196 courses in these categories also qualify): Ancient and Medieval (146, 148, 149, 155), Early Modern European (158, 161, 164, 165), Modern, American, and Canadian (170, 172, 174, 177, 180), Asian (185, 187, 188, 192), Other Non-Western Traditions, New Approaches to Art History, and Contemporary Art (140, 179, 193, 194); 12 additional Art History hours, to include at least one course (three hours) numbered 282 or above to be taken during the junior or senior year, preferably during the senior year. Six hours of Studio Art; the study of a foreign language through 51–52. French or German is strongly recommended for students considering eventual graduate work in Art History.

For Art Education, see College of Education and Social Services.

BIOLOGY Students may select either of two degree programs:

Bachelor of Arts: Chemistry 31, 32 or 35, 36, 37, 38 to be taken the first year if possible; 141, 142; Physics 21, 22 in combination with 11, 12 or 31, 42; Math. 19, 20; or 21, 22. Thirty-two hours of biology including introductory biology (Biology 11, 12 or 1B, 2B is preferred, but 1A, 2A is accepted), 101, 102, 103, 104 and three additional courses (including at least one course with laboratory) in one of four concentrations. One course may be taken from outside the Department from approved offerings of the biologically-oriented departments. A list of courses in each concentration is provided below. For a list of approved offerings in other departments, consult the Biology Department Office. College honors will not count toward the major.

Bachelor of Science: Chemistry 31, 32 or 35, 36, 37, 38 to be taken the first year if possible; Chemistry 141, 142; Physics 21, 22 in combination with 11, 12, or preferably 31, 42; Math. 19, 20 or 21, 22. Statistics 141 or 211. Forty-six hours of biology including introductory biology (Biology 11, 12 or 1B, 2B is preferred, but 1A, 2A is accepted), 101, 102, 103, and 104. Of the remaining 23 hours no more than 11 hours may be taken outside the Department. A list of the courses in the four concentrations is provided below. For a list of approved offerings in other biologically-oriented departments, consult the Biology Department Office.

Environmental Biology: This concentration is appropriate for students with interests in Ecology, Evolution, Conservation Biology, or Animal Behavior. Biology 102 is required of all Biology majors. Other recommended courses in this concentration include, but are not restricted to: Biology 203, 206, 208, 217, 238, 246, 254, 255, 264, 270, 295.

Professional Biology: Students with interest in the medical, veterinary, dental, and allied health fields may choose from the following courses: Biology 205, 212, 217, 219, 223, 246, 254, 265, 295, and Honors 208, 209. In addition, students may take approved courses offered by other biologically-oriented departments.

Cell and Molecular Biology: This concentration serves students with interests in Cell, Molecular, and Developmental Biology. Students may choose from: Biology 205, 212, 223, 231, 263, 265, 267, and Honors 208, 209. In addition, students may take approved courses offered by other biologically-oriented departments.

General Biology: This concentration serves students who wish a very broad training in life science, including zoology. After consultation with their Biology Department faculty advisor, students take a variety of courses drawn from the approximately three dozen offered by the Biology Department or from other approved courses in life science. See the Biology Department for a listing.

BOTANY Math. 21, 22; or Math. 21 and Statistics 141 or 211; or Math. 19, 20 and Statistics 141 or 211; Physics 21, 22; and 11, 12 or preferably 31, 42; Chemistry 42 or preferably 141, 142; Biology 1, 2; Biology 101 or 132, 104, 107, 108, and 109 or 160; two additional semester courses in Botany, at least one at the 200 level. Six credits of modern foreign language are strongly recommended. Students may petition the department to substitute other courses for certain requirements in the planning of individual programs.

CHEMISTRY Students may select either of two degree programs:

Bachelor of Arts: Chemistry 35, 36, 37, 38, 123 (or 31, 32, 121; or 31, 36, 38, 123), 141 or 143, 144, 145, 146, 161, 162, 201, 202, 221, and 231; Math. 21, 22, 121 (or equivalent); Physics 21, 31 and 22, 42 (or 125).

Bachelor of Science: Chemistry 35, 36, 37, 38, 123 (or 31, 32, 121; or 31, 36, 38, 123), 141 or 143, 144, 145, 146, 161, 162, 201, 202, 221, 231, 232, 282; nine hours of advanced chemistry or biochemistry electives, which may include Chemistry 291; Physics 21, 31 and 22, 42 (or 125); Math. 21, 22, 121, 271 (or equivalent); proficiency in German equivalent to the completion of German 1, 2.

CLASSICS Student may major in:

Latin: Thirty hours in courses above 100, among which 111, 112, and Classics 122 are required and one course in literature in translation above 100 and one course in Greek above 100 are applicable; a second foreign language, at least through the intermediate level, is recommended.

Greek: Thirty hours in courses above 50, among which 111, 112, and Classics 121 are required and one course in literature in translation above 100 and one course in Latin above 100 are applicable; a second foreign language, at least through the intermediate level, is recommended.

Classical Civilization: Thirty-six hours consisting of 30 in the major discipline and six hours at the 100 level or above in related courses. **Major Discipline:** Courses in Latin, Greek, classics, ancient history, and ancient art are applicable, among which three hours in ancient history (21, 23, 121, 122, 149) and the following language study are required: three hours of Latin or Greek at the 200 level OR six hours of Latin and six hours of Greek above 50; OR three hours of Latin or Greek at the 100 level and three hours of a modern foreign language at the level of 50 or above. (The three hours of the modern foreign language are not to be counted as part of the major discipline but as a related course if numbered above 100.) Strongly recommended as part of the major discipline are Classics 21, 23, 24, 33, 35, 37, 42 (Mythology), 121, 122, Art 146 (Ancient Near East), 148 (Greek Art), Art 149 (Roman Art), Classics 149, 153, 154, 155, 156, 157, 158, 159 (Greek and Latin Literature in Translation). Classics 22 (Etymology) is applicable, but not together with another Classics course below the level of 100. **Related Courses:** Students should consult with the Classics Department in choosing related courses. Courses at the 100 level or above in one or more of the following are applicable: anthropology, art, English, economics, geography,

history, modern foreign languages, music, philosophy, political science, religion, sociology, and theatre. Strongly recommended are courses in literature, medieval history, ancient philosophy, medieval, renaissance, and baroque art.

COMMUNICATION SCIENCES 80, 90, 94, 101, 105, 160 or 162, 208 or 215, 262; Biology 4; Psychology 161; Statistics 111 or 141, and nine hours from the following: Anthropology 128, 178; English 104; Philosophy 110; Sociology 120, 141, 229; Psychology 207.

ECONOMICS Thirty-three hours in Economics and three hours in Mathematics as follows: Economics 11, 12; Math. 19; three courses numbered Economics 60-196, two of which must be numbered 110-196; the methods and theory courses in Economics numbered 170, 171, 172; and three Economics courses numbered 210 or higher. No more than three credits from Economics 297, 298 (Readings and Research) may be applied towards the major. Students are urged to take Math. 19 early in the program.

ENGLISH Thirty-three hours (11 three-credit courses) at the level of 11 or above, including 85, 86; at least six courses at or above the 100 level; and one numbered 201-272 or Film 271-272. (A total of nine hours of Film at any level may be counted toward the major). Of the seven total courses above 100: (a) at least one must be in writing or in critical theory or in study of the English language (101-120; 201-212); (b) at least two must be in literature before 1800 (121-134; 221-222); and (c) at least one must be in 19th century literature (141-147; 241-242). Internship credit (191, 192) does not satisfy a, b, or c above. One General Literature course or one Humanities course approved by the English department may count toward the major. No more than nine hours of English 117, 118, 119, and/or 120 will count toward fulfillment of major requirements.

ENVIRONMENTAL SCIENCES Introductory biology (Biology 11, 12 or 1B, 2B is preferred, but 1A, 2A is accepted); Chemistry 31, 32 (or 35-38); Math. 19, 20 (or 21); Chemistry 42*, 141 or 143; Environmental Studies 1 or 2; one course among the list of technology-based courses (Statistics 141 or 211; Chemistry 121 or 221; Biology 205 or 267; Geology 255; Civil and Environmental Engineering 150); 12-15 credits in a broad selection or in a concentration chosen with co-advisors to include at least one semester of research or honors. Concentrations include *Environmental Biology*, *Environmental Geology*, *Environmental Chemistry*.

*Chemistry 42 is not allowed for either the Chemistry or Biology concentration.

ENVIRONMENTAL STUDIES Thirty-eight hours including Environmental Studies 1, 2, 151, 201, and six hours of 202 and/or 203; plus an Individually-Designed Program containing 18 hours of approved environmentally-related courses at 100 or higher level, including three hours at the 200 level, six hours of Environmental Studies courses, with at least one course in each of these areas* — natural sciences, humanities, social sciences, and international studies (may be fulfilled by study abroad experience). The courses of the Individually-Designed Program combine, along with the senior project and thesis, to provide a coherent major for the student.

*Students are cautioned that courses approved in these areas by Environmental Studies might not fulfill the distribution requirements in the College of Arts and Sciences.

GEOGRAPHY Thirty hours in Geography including 81, six hours in courses numbered 51 to 61, nine hours at the 100 level, and six hours at the 200 level.

GEOLOGY Students may select either of two degree programs: the Bachelor of Arts and the Bachelor of Science. Within each degree program, students may select the Solid Earth or Environmental Geology concentration. Up-

per level elective courses within the Geology Department are divided into three categories: Solid Earth, Surface Processes, and Geochemistry/Earth systems. Students must fulfill distribution requirements within these categories as indicated below.

Solid Earth: 112, 131, 230, 240, 241, 245, 273, 195, 196

Surface Processes: 151, 153, 155, 255, 195, 196

Geochemistry/Earth Systems: 210, 233, 234, 235, 195, 196

Bachelor of Arts

Solid Earth Concentration: One Geology course below 100 level, 101, 102, 260. At least three credits of field experience are highly advisable (Geology 197, 198, 201, field camp or field-based thesis). Three Solid Earth courses, one Surface Process course, one Geochemistry/Earth Systems course. Two courses in Geology or approved science, mathematics, engineering, or statistics courses at the 100 level or above selected in consultation with Geology advisor, Math. 19, 20 or 21, 22; Chemistry 31 and 32 (or 35, 37 and 36, 38); Physics 11, 21 (12, 22 also strongly recommended).

Environmental Geology Concentration: One Geology course below 100 level, 101, 102, 260. At least three credits of field experience are highly advisable (Geology 197, 198, 201, field camp or field-based thesis). Three Surface Process courses, one Solid Earth course, one Geochemistry/Earth Systems course. Two courses in Geology or approved science, mathematics, engineering, or statistics courses at the 100 level or above selected in consultation with Geology advisor, Math. 19, 20 or 21, 22; Chemistry 31 and 32 (or 35, 37 and 36, 38); Physics 11, 21 (12, 22 also strongly recommended).

Bachelor of Science

Solid Earth Concentration: One Geology course below 100 level, 101, 102, 260. At least three credits of field experience are required (Geology 197, 198, 201, field camp or field-based thesis). Four Solid Earth courses, two Surface Process courses, one Geochemistry/Earth Systems course. Two additional courses in Geology or approved science, mathematics, engineering, or statistics courses at the 100 level or above selected in consultation with Geology advisor, Math. 21, 22 or 19, 20, 22; Chemistry 31 and 32 (or 35, 37 and 36, 38); Physics 21, 31 and 22, 42 or 21, 31 and 125; Statistics 141.

Environmental Geology Concentration: One Geology course below 100 level, 101, 102, 260. At least three credits of field experience are required (Geology 197, 198, 201, field camp or field-based thesis). Four Surface Process courses, two Solid Earth courses, one Geochemistry/Earth Systems course. Two additional courses in Geology or approved science, mathematics, engineering, or statistics courses at the 100 level or above selected in consultation with Geology advisor, Math. 21, 22 or 19, 20, 22; Chemistry 31 and 32 (or 35, 37 and 36, 38); Physics 21, 31 and 22, 42 or 21, 31 and 125; Statistics 141.

GERMAN Thirty hours of German courses at the 100 level or above, including 155, 156; 281 or 282; two courses of general literature or English; and two courses of European or German history.

HISTORY Thirty-three hour including six hours of any approved sequence of courses at the introductory level (00), nine hours at the intermediate level (100), and three hours at the advanced level (200). They must also include 15 hours of concentration in one of the Department's three areas of study (Western Hemisphere; Europe; Africa/Asia/Latin America) and six hours in each of the others. The 15-hour concentration must include one course at the intermediate level and one seminar at the advanced level. (The Western Hemisphere concentration must include three hours in Canadian or Latin American history.)

MATHEMATICS Mathematics majors may choose from three concentrations. Students interested in any of these three concentrations should consult an advisor in the Mathematics and Statistics Department. A Handbook for Majors is available from the department office.

Mathematics: Thirty-six hours of Math./Statistics courses numbered 21 or higher, including 51, 52, 121, 124, and one of: 231, 241, 250, or 251. At least 15 of the 36 hours must be in mathematics/statistics courses numbered 200 or higher. (For transfer students, an appropriate computer programming experience may suffice for Math. 51, and Math. 104 may be substituted for Math. 52.)

Statistics: Thirty-six hours of Math./Statistics courses numbered 21 or higher, including Math. 51, 52, 121, 124, and Statistics 141 or 211, 151 or 251, 201, 221 or 227, 241 or 261, and 281 or 293. At least 12 hours must be 200 level or higher.

Applied and Interdisciplinary Mathematics: This concentration combines a major in applied mathematics with an approved minor that emphasizes the application of mathematics. Such minors include various disciplines in the physical, life, and earth sciences, the social sciences, and business. A student may expand the approved minor to form a double major with mathematics. The requirements for this option are: (a) Math. 21, 22, 121, Math. 51 or CS 21, Math. 124, 230, and 237; (b) at least nine additional hours in mathematics, statistics, or computer science courses number 100 or above, at least six of which must be numbered 200 or above; (c) an approved minor. Parts (b) and (c) must form a coherent program that has the written approval of the student's faculty advisor in the Mathematics and Statistics Department.

MUSIC Students may apply to either the Bachelor of Arts or Bachelor of Music programs. Arrangements for auditions should be made with the Music Department. Those admitted as first-year students or sophomores to either degree program are considered *Candidates* in the program. Admission as *Majors* is made at the beginning of the junior year following formal review procedures during the second semester of the sophomore year.

All students in programs which require a senior recital, including students transferring into these programs, must pass a junior standing examination at the end of the sophomore year, or before junior standing can be achieved in the case of transfer students. All students approaching a senior recital must pass a faculty audition covering all of the music to be included on the recital six weeks prior to the date of the recital.

Bachelor of Arts: Forty hours in Music. Majors will take the following core courses: 11, 12 (history); 31, 32, 131, 132 (theory); and 133, 134 (theory lab); plus eight hours of performance study and ensemble in any combination (excluding Music 5-8).

All students will elect nine additional hours — at least three at the 200 level — in one of the following three categories, plus three hours in a category different from that of the chief concentration.

- (a) Theory 231-235
- (b) History: 111-114, 211-214
- (c) Performance: 251-253, 256

A mixture of categories may be possible in consultation with a departmental advisor.

Music majors with a concentration in categories (a) or (b) must attain intermediate level on a single instrument chosen from the department's offerings.

Concentration in category (c) requires an appearance each semester in departmental recitals, passing a junior standing examination at the end of the sophomore year, and a solo recital in the senior year.

Majors must have, or acquire, piano skills sufficient to pass the piano proficiency examination, in addition to the eight hours of performance and ensemble study.

One foreign language through the intermediate level is required of all students.

Bachelor of Music: This degree, with a concentration in performance or theory, is the initial preprofessional collegiate music degree, designed for highly talented students who wish to pursue a career in music as performers, scholars, or private teachers. To earn the degree, they must demonstrate not only technical competence but also a broad knowledge of music and musical literature, sensitivity to musical style, and an insight into the role of music in society. Candidates with a strong sense of commitment ordinarily continue their studies through postgraduate work before they are fully qualified as professionals. Admission as a Candidate in the Performance major program requires an audition with the Music Department. Acceptance as a Major requires passing the junior standing examination. The final graduation requirement is a senior recital. Admission to the Theory major requires successful completion of a comprehensive theory examination at the end of the sophomore year. Transfer students with advanced standing must also pass this examination before they can be accepted as Theory majors. The curriculum consists of the following courses:

Performance Major	Hours
(a) Major instrument, 151, 152, 153, 154, 251, 252, 253, 256	28
(b) Theory, 31, 32, 131, 132, 133, 134, 231, 232, 233	26
(c) History, 11, 12	6
(d) Ensemble	14
(e) Keyboard, 5, 6, 7, 8 (if necessary)	4
(f) Music electives	9
(g) Nonmusic electives	36
(h) Physical education	2
	125

Theory Major	Hours
(a) Major instrument, 151, 152, 153, 154, 251, 252, 253	12
(b) Theory, 31, 32, 131, 132, 133, 134, 231, 232, 233, 234, 235, 237, 238, 240, 241	43
(c) History, 11, 12	6
(d) Ensemble	6
(e) Keyboard 5, 6, 7, 8 (if necessary)	4
(f) Instrumental choirs	4
(g) Music genre electives	9
(h) Nonmusic electives	36
(i) Physical education	2
	122

For Music Education see College of Education and Social Services.

PHILOSOPHY Thirty hours including: (a) 101 and 102; (b) a total of at least four 200-level courses in Philosophy. Students considering graduate work are urged to take Philosophy 13 and to study a foreign language.

PHYSICS Students may select either of two degree program:

Bachelor of Arts: Thirty-two hours in Physics, including 31 with 21, 42 with 22, 128 with 130, 201 or 202, 211, 213, 273; mathematics through 121 and three hours of approved mathematics electives; Computer Science 21. An additional laboratory science is strongly recommended.

Bachelor of Science: Physics 31 with 21, 42 with 22, 128 with 130, 201, 202, 211, 213, 214, 265, 273, 12 hours of approved Physics electives; Math. 21, 22, 121, and six hours of approved mathematics electives; eight hours of Chemistry, exclusive of Chemistry 20, 23 or 26; Computer Science 21.

POLITICAL SCIENCE

A. Thirty hours in Political Science.

B. Four (12 hours) core courses (21, 41, 51, 71).

C. Eighteen hours at the advanced (100 or 200) level, three hours of which must be at the 200 level, subject to the following restrictions:

1. Students must complete at least one advanced (100 or 200) course in three different subfields.
2. Of these 18 hours at the advanced (100 or 200) level, students must complete at least 12 of those hours, including three hours at the 200 level, in regular UVM political science courses (e.g., excluding study abroad, transfer credit, readings and research).

Note: Internships will not count toward the 30 hours required for the major.

PSYCHOLOGY Students may select either of two degree programs: the Bachelor of Arts or the Bachelor of Science. Within the Bachelor of Science degree program, students may select either the traditional Psychology concentration or the Biobehavioral concentration.

Bachelor of Arts: Thirty-five hours including: (1) 1, 109, 110, 119; (2) three of the following: 121, 130, 152, 161; (3) one course from each of the following categories A, B, and C: (A) 205, 206, 207, 208, 215, 220, 221, 222, 223; (B) 230, 231, 233, 234, 236, 237, 239, 240, 241, 254*, 257*, 261, 262, 263*, 265, 266, 268; (C) 250, 251, 252, 253, 254*, 255, 257*, 259, 263*; (4) one additional course at/above 100 level.

*Category B or C, but not both.

Bachelor of Science: Forty-four hours of psychology including 1, 109, 110, 119, 121, 130, 152, 161, and upper division psychology courses as described below; Math. 13, 14, or 19, 20 or 21, 22; biology courses as indicated below; and at least three additional hours in an approved science or statistics. For a list of approved offerings in science and statistics, consult the Psychology Department Office. Students opting for a Bachelor of Science degree in Psychology must also complete the College of Arts and Sciences distribution requirements for a B.S. degree and they may not use psychology courses to fulfill the social sciences category.

Traditional Concentration: This concentration is most appropriate for students wishing a broader training in psychology, often in preparation for graduate school. Required courses include: Biology 1, 2; one course from each of the following categories A, B, and C: (A) 205, 206, 207, 208, 215, 220, 221, 222, 223; (B) 230, 231, 233, 234, 236, 237, 239, 240, 241, 254*, 257*, 261, 262, 263, 265, 266, 268; (C) 250, 251, 252, 253, 254*, 255, 257*, 259, 263*. The remaining hours must be psychology courses at or above the 100 level. Independent research is encouraged and these hours may be counted towards the total 44 hours required. A minor in mathematics, statistics, or biology is strongly recommended.

*Category B or C, but not both.

Biobehavioral Concentration: Students who are interested in behavioral neuroscience and related medical fields, including premedicine preparation, should select this concentration. Required courses include: Biology 1B, 2B; three category A courses, one from each of the following subcategories (i) 221 or 222, (ii) 205 or 220, (iii) 206 or 223; and one course from 207, 208, 215, 230, 231, 233, 234, 236, 237, 239, 240, 241, 250, 251, 252, 253, 254, 255, 257, 259, 261, 262, 263, 265, 266, 268. The remaining hours must be psychology courses at or above the 100 level. Independent research is encouraged and these hours may be counted towards the total 44 hours required. A science minor is strongly recommended.

RELIGION Thirty-six hours in Religion, including 100 and 201; one course chosen from the 20-27 range; one course from the 101-109 range (comparative); one course from the 110-129 range (Judeo-Christian traditions); one course from the 130-149 range (Asian traditions); an additional course at the 200 level.

ROMANCE LANGUAGES Students may major in French or Spanish.

French: Thirty-three credits in French numbered 100 or above. Required courses: French 103, 104, 111, 112, 191, 292. Literature requirement: In addition to 111 and 112, students must take an additional six hours of literature (total of 12 hours of literature). French 111 or 112 may be taken concurrently or in either order. 200 level requirement: In addition to 292, students must take an additional 12 hours at the 200 level (total of 15 hours at 200 level).*

Note: History 135 or 136 may be substituted for French 191. However, History 135 or 136 will not be counted in the 33 hours of French courses required for graduation.

Spanish: A minimum of 33 hours of courses numbered above 100, of which at least 12 must be in literature and at least 18 in courses numbered above 200. Required courses: 155, either 185 or 186, and one from among History 61, Spanish 291, 292, 293. (History 61 will not count in the 33 required hours.)*

*Only three credits of Readings and Research (197, 198) and Advanced Readings and Research (297, 298) may be counted toward the major.

RUSSIAN Thirty hours of courses in Russian at the 100 level or above among which at least one course must be Russian literature in translation (GLIT 181, 182, 183); one additional course in English literature or general literature; one Russian history course; and two additional courses chosen from among the listings of the Russian and East European Area Studies Program. All course work to be chosen in consultation with the student's major advisor.

SOCIOLOGY Thirty-one hours in Sociology to include 1, 100, 178; nine hours in an approved concentration, three hours of which must be at the 200 level; and at least nine additional hours at the 200 level to include three hours from 274, 275, or 279. Approved sociology concentrations include: * *Communication and Culture*: 43, 109, 141, 150, 151, 209, 243, 250; *Crime, Law, and Justice*: 14, 19, 57, 115, 118, 132, 214, 216, 217, 258; *Gender Roles and Society*: 29, 109, 122, 213, 223, 229, 239; *Health and Society*: 11, 20, 57, 102, 120, 154, 222, 223, 254, 255; *International/Comparative Sociology*: 11, 31, 32, 102, 171, 202, 207, 213, 272; *Self-Design; Social Gerontology*: 20, 120, 154, 220, 221, 222, 254, 255; *Social Inequality*: 19, 31, 32, 118, 119, 132, 205, 206, 211, 219, 232, 240; *Social Structures and Forces*: 103, 105, 151, 203, 207, 209, 211, 225, 237, 240; *Urban and Rural Studies*: 19, 102, 103, 105, 119, 132, 202, 203, 205, 206, 207, 219, 232; *Work and Leisure*: 43, 150, 151, 243. With the approval of both her/his advisor and the Committee on Undergraduate Policy, a student may design a special concentration. Self-designed concentrations must be approved at least two semesters in advance of graduation.

No more than six hours in 288-289 may be counted toward the major. It is recommended that 100 be completed by the beginning of the junior year.

*Courses numbered 195, 196, 281, 282, 295, or 296 may qualify to fulfill concentration requirements with approval of the student's advisor.

THEATRE A total of 48 hours to include 10, 15, 20, 40, 110, 115 or 140, 135, 136, 137, 138, 250, 251; three hours in 190: Theatre Practicum; nine hours in selected area of emphasis: Design/Tech; or Performance; or History, Theory, and Criticism. Design/Tech: Nine hours from 41, 42, 115,

116, 120, 140, 141, 142, 143, 144, 160, 215; Performance: 111, 112, 210; History, Theory, and Criticism: Nine hours from English 127, English 152, Classics 153, or other courses by departmental permission.

Note: Students entering the College of Arts and Sciences should be advised that Theatre 1 is not recommended for students intending to major or minor in Theatre. Those students should enroll in required courses immediately. If Theatre 1 is taken, it will not be counted toward the required 48 hours for the major but will be counted toward the total number of hours required for graduation (122).

WOMEN'S STUDIES A total of 36 hours (12 courses) are required for the major. (a) Core (12 hours): Women's Studies 73, 101, 273, and 191 or 192; (b) Electives (nine hours): One additional race/ethnicity class beyond the A&S requirement, one additional non-European culture class beyond the A&S requirement and any one course in fine arts or humanities cross-listed with Women's Studies. (c) Concentration (15 hours): An individually-designed concentration consisting of five approved Women's Studies electives, at least four of which are at or above the 100 level.

ZOOLOGY Students may select either of two degree programs:

Bachelor of Arts: Chemistry 31, 32 or 35, 36, 37, 38 to be taken the first year if possible; 141, 142; Math. 19, 20 or 21; Physics 21, 22 in combination with 11, 12 or preferably 31, 42. Thirty-three hours of Biology including Biology 1, 2, 101, 102, 103, 104, and three advanced courses (including one with lab).

Bachelor of Science: Chemistry 31, 32 or 35, 36, 37, 38 to be taken the first year if possible; Chemistry 141, 142; Physics 21, 22 in combination with 11, 12 or preferably 31, 42; Math. 19, 20 or 21, 22; Statistics 141 or 211. Forty-three hours of Biology and Zoology courses including Biology 1, 2, 101, 102, 103, and 104. The remaining credits may be chosen from Biology 203, 205, and 200-level Biology courses. Three hours of Biology undergraduate research or honors may be counted toward the total of the 43 required credits.

MINOR REQUIREMENTS

Please note that a "+" indicates that the minor is NOT available to students pursuing degree programs not offered by the College of Arts and Sciences.

ALANA STUDIES

In selecting courses from the ALANA (African, Latino, Asian, Native American) Studies listing for a minor, students should consult with an appropriate ALANA Studies advisor and demonstrate that their course of study will have a U.S. multicultural dimension.

A total of 18 credit hours to include ALANA Studies 277, at least 12 hours of which must be at the 100 level or above, selected from the following: ALANA Studies 51, 55, 95, 96, 158, 159, 191, 192, 195, 196, 277, 295, 296, 297, 298; Anthropology 160, 164, 169, 187; Economics 153; English 57, 66, 167, 170; General Literature 143; Geography 60; History 60, 68, 168, 169, 187, 188, 189; Music 42, 44; Natural Resources 6; Political Science 129; Religion 80; Social Work 167; Sociology 19, 31, 119, 219; or appropriate Special Topics or seminar courses chosen in consultation with an ALANA Studies advisor.

ANTHROPOLOGY

+Social Anthropology: 21; two 100-level topical courses plus one 100-level "peoples" course, or one topical and two "peoples" courses; and any 200-level course except 200, 210, 297, 298.

+Archaeology: 24; 210; three from the following: 160, 161, 188, 200, 250.

Sociolinguistics: 128; 178; two "peoples" courses from 160, 161, 162, 163, 165, 166, or 168; 284 or Psychology 237.

AREA AND INTERNATIONAL STUDIES

African Studies: A total of 18 credit hours (six courses), at least nine of which must be at the 100 level or above, and which must include the following:

- A. Anthropology 162
Geography 51
History 40
- B. Two courses chosen from among the following:
Community Development and Applied Economics 2, 272
*Anthropology 170, 177, 179, 283
BSAD 237
*Education (EDFS) 206
French 289
*Geography 177
History 140

or appropriate Special Topics or seminar courses, chosen in consultation with the African Studies Program advisor.

*Students may count these courses towards fulfillment of the minor requirements only if individual projects, relevant to the African area, have been arranged in consultation with the African Studies advisor.

- C. International Studies 197 (Readings and Research on an African Topic under the direction of participating faculty members — to be arranged in consultation with the African Studies advisor) or International Studies 195 (Special Topics Seminars, taught by participating faculty members).

Asian Studies: In selecting courses from the Asian Studies listing, students must consult with an appropriate Asian Studies advisor and demonstrate in their choices thematic and/or geographic coherence. Such courses must also accord with the following requirements:

Eighteen hours in courses from the Asian Studies listing (see Courses of Instruction; Asian Studies) including at least two courses in an Asian language, and at least one course in each of two other academic disciplines. At least six credit hours must be at the 100 level or above. For students who have demonstrated fluency in an Asian language relevant to the other courses they have chosen for their minor concentration (for instance, native speakers of the language) the language requirement will be waived, and courses from a third academic discipline will be substituted.

Canadian Studies: Eighteen hours to include International Studies 91 or History 66 (History 65 upon approval of advisor), and 15 hours to be chosen from the Canadian content list (see major listing for approved courses) of which at least 12 hours must be at the 100 level or above. Students will fulfill the language requirement with French.

Latin American Studies:

- A. Students who are not Spanish majors: 18 hours (six courses)
 - 1. Completion of Spanish 52 or above (three hours).
 - 2. Completion of five of the following courses: Anthropology 161, History 61, History 161 or 162, Geography 56, Political Science 174, Spanish 185, 186, International Studies 195 or 196.
- B. Students who are Spanish majors: 18 hours (six courses)
 - 1. Completion of one of the following three courses: Spanish 285, 286, 293.
 - 2. Completion of five of the following courses: Anthropology 161, History 61, History 161 or 162, Geography 56, Political Science 174, International Studies 195 or 196.

Middle East Studies: Eighteen hours (six courses) to include: Completion of the College language distribution option or

the transfer of equivalent credits. Familiarity with an appropriate Middle East language, e.g. Hebrew, Arabic, Turkish, Farsi, etc., is strongly recommended; History 45; four courses taken from the following groupings, but no more than one course from Group B and no more than one course below the 100 level:

Group A: Anthropology 166, 170; Art 146, 188; Economics 180; Geography 158; History 123, 145, 146, 149; Religion 114, 116; Political Science 157, 259, 279 (when the topic is Middle East).

Group B: English 172; Geography 51; History 40, 140; Math. 161.

Russian/East European Studies: Twenty hours to include Russian 51, 52 or its equivalent, and four courses from the following: Economics 116; General Literature 181, 182, 183; History 27, 137, 138; Political Science 172.

European Studies: Eighteen hours to include three hours at the 200 level from both European culture and thought and European history and society areas; and six hours at the 100 level or above from the European language area.

Note: See the European Studies major requirements for list of approved courses.

ART

+Studio Art: Eighteen hours, including six hours at introductory level of which at least three hours must be in 1, 2, 3, or 4. Twelve hours at the 100 level or above.

Art History: Eighteen hours, including 5 and 6; 12 hours of 100-level courses or above.

BIOLOGY Biology 1, 2; three courses at the 100 level or higher chosen from courses acceptable for the Biology major, at least one of which must include a laboratory. One course may be taken from the advanced offerings of other biologically-oriented departments. Consult the Biology Department for a list of approved courses.

BOTANY At least 15 hours of course work to include Botany 4 or Biology 1 or Biology 2; plus three additional courses in Botany, at least one at the 200 level.

CHEMISTRY

A. Chemistry 31, 32*

B. One of the two following sequence:

1. Chemistry 141, 142** and one of the following: 121+, 160, 161, 162
2. Chemistry 161, 162 and one of the following: 42, 141, 121++

*35, 36, 37, 38 can be used in place of Chemistry 31, 32.

**143, 144 can be used in place of 141, 142. Students enrolled in 143, 144 may waive the requirements of concurrent enrollment in 145-146.

++Not available for credit for students taking 35, 36, 37, 38.

CLASSICS

Latin Language and Literature: Fifteen hours of Latin at 51 or above, to which three hours from the following are applicable: Classics 122, 153, 154, 155, 156, 158, 159.

Greek Language and Literature: Fifteen hours of Greek at 51 or above, to which three hours from the following are applicable: Classics 121, 153, 154, 155, 156, 157, 158.

Classical Civilization: Eighteen hours, including six hours of Greek or six hours of Latin at the level of 51 or above, and 12 hours from the following (of which at least nine hours must be above 100): Classics 21, 23, 24, 33, 35, 37, 42, 121, 122, 149, 153, 154, 155, 156, 157, 158, 159; Art 146, 148, 149; all Classics, Latin, or Greek courses to include special topics courses (95, 96, 195, 196, 295, 296).

+COMMUNICATION SCIENCES 80, 90, 94, 101, 105, 208 or 215.

EAST ASIAN LANGUAGES

Chinese: Eighteen credit hours of Chinese with at least six of those hours at or above the 100 level, including 102 or its equivalent. Three credit hours at or above the 100 level in linguistics or literature may be substituted for three credits of language study beyond 102 or its equivalent.

Japanese: Eighteen credit hours of Japanese language with at least six of those hours at or above the 100 level, including 102 or its equivalent. Three credit hours at or above the 100 level in linguistics or literature may be substituted for three credits of language study beyond 102 or its equivalent.

ECONOMICS Eighteen hours including Economics 11, 12; and four courses numbered 20-196, three of which must be numbered 110-196.

+ENGLISH Eighteen hours at the level of 11 or above, including at least 12 hours at the level of 101 or above. A total of six hours in General Literature and/or Film may be included in the 18 hours.

+FILM STUDIES Eighteen hours, including Art 140; Film 5 or 6; six credits from Film courses at the 100 level to include 107; three credits from English 110, 152, 163, Psychology 163, Sociology 43, Theatre 135; three credits from Film courses at the 200 level.

ENVIRONMENTAL SCIENCES

Chemistry emphasis: Chemistry 31, 32; 121 or 42; and two additional upper-division non-chemistry courses chosen in consultation with co-advisor.

Biology emphasis: Biology 1, 2 or 11, 12; 102, and two additional upper-division non-biology courses chosen in consultation with co-advisor.

Geology emphasis: Geology 55, 101, 155, and two additional upper-division non-geology courses chosen in consultation with co-advisor.

ENVIRONMENTAL STUDIES Seventeen hours in Environmental Studies consisting of 1, 2, and nine hours at the 100 level or above, including three hours at the 200 level. (Of the nine hours, one non-ENVS course at the appropriate level may be substituted with the approval of the student's advisor and the Environmental Program.)

GEOGRAPHY

Human Geography: Fifteen hours including one course from Geography 1 or 3; one course from those numbered 51 to 61; and three courses from Geography 99, 155, 158, 162, 170, 171, 172, 173, 174, 175, 177, 179, 202, 203, 233, 261, 270, 278, 287.

Physical Geography: Fifteen hours including Geography 2 or 43; one course from those numbered 51 to 61; and three courses from Geography 99, 142, 143, 144, 146, 202, 216, 242, 261, and 285.

GEOLOGY One Geology course below 100 level, 101, 102; plus six additional hours at the 100 level or above.

GERMAN AND RUSSIAN

German: Five courses at the 100 or 200 level, one of which must be 155 or 156.

Russian: Russian 51, 52; four courses in Russian at the 100 or 200 level.

HISTORY Eighteen hours of history including three hours in any course at the introductory level (00), plus nine hours at the intermediate level (100) or advanced (200) level. These must also include six hours in each of two of the department's areas of study (Western Hemisphere; Europe; Africa/Asia/Latin America).

INDIVIDUAL DESIGN MINOR The ID Minor must consist of at least 18 hours of course work, of which at least nine hours must be at the 100 level or above. No more than nine hours completed prior to application for the ID Minor may be applied to the 18 hours required for the proposed minor. No courses in the student's major department may be applied to the 18 hours required for the minor. An application must be submitted to the Committee on Honors and Individual Studies for approval. Applications may be found in the Dean's Office, College of Arts and Sciences.

MATHEMATICS

Pure Mathematics: Fifteen hours of mathematics courses numbered 51 or higher, including one of 231, 241, 250, 251.

Applied Mathematics: Fifteen hours of mathematics courses numbered 51 or higher, including one of 230, 237, 271.

MUSIC Twenty hours including six in Music History (11, 12), six in Basic Musicianship (31, 32), two in Performance Study (151, 152) or Ensemble (161-165, 171-179) in any combination, plus six in History, Theory, or Performance/Ensemble at the 100 level or above.

PHILOSOPHY One course from 101, 102, 140; one course from 201, 202, 240; and 12 additional hours in Philosophy, at least three of which must be at the 100 level or above.

PHYSICS Seventeen hours including 31 with 21, 42 with 22, 128 with 130, and three additional hours at the 200 level excluding 201 and 202. *Note:* Mathematics through 121 is needed for 128.

POLITICAL SCIENCE Eighteen hours in political science, including nine hours from the "core" courses (21, 41, 51, 71), and nine hours at the level of 100 or above.

+PSYCHOLOGY Nineteen hours including 1, 109, plus 12 hours at the 100 level or above, including at least three hours at the 200 level.

RELIGION Eighteen hours in Religion including: one introductory course from the 20-27 range; 100; one course from 101-109 range; one intermediate level course on a particular religious tradition (from 110-149); one course at the 200 level; an additional Religion course.

ROMANCE LANGUAGES

French: Eighteen hours in French numbered 100 or above. Required courses: French 103, 104; and two of the following three: 111, 112, 191. Six of the 18 credits must be in courses at the 200 level.**

Italian: Eighteen hours in courses taught in the Italian language and numbered 100 or above.**

Italian Studies: Eighteen credit hours as chosen from among the following categories: (a) Italian content (classes taught in the Italian language numbered 100 or above); (b) significant Italian content (Art History 149, 161, 164, 282 [when the topic is Italian]; Classics 122; English 122; General Literature 72 [when the topic is Italian]; Geography 158; History 124, 125; Latin 51, 52, 101, 102, 111, 112, 155, 156; all 200-level courses in Latin literature; Music 11); (c) partial Italian content (Art History 5, 6, and the following where the content is partially Italian: 155, 165; Classics 23, 155, 156, 159; English 125; Film 107, 161; Geography 55, 155; History 24, 25, 26; Political Science 141, 142; Music 12). At least six hours must be taken from category (a) and no more than six credit hours from category (b) may be applied from any one discipline. No more than three credit hours from category (c) may be applied to this minor.

Spanish: Eighteen hours in Spanish above 100, including six hours of language courses, chosen from 101, 102, 201, 202, of which at least three hours must be at the 200 level; six hours of literature courses; and six additional hours in courses numbered above 202.**

**Readings and Research (197, 198) or Advanced Readings and Research (297, 298) may not be counted toward a minor.

SOCIOLOGY Eighteen hours of Sociology to include 1, 178; nine hours in an approved concentration, three hours of which must be at the 200 level; and at least three additional hours at the 200 level. (See Sociology major requirements for list of approved concentration options.)

GERONTOLOGY The minor in Gerontology consists of 18 hours. Required courses (12 hours): Sociology 20, 120, 220, and 221 or 222. Electives (six hours): Anthropology 189; Communication Science 220; Early Childhood and Human Development 266, 283; Nursing 100; Sociology 154, 254.

Courses used to meet the requirements of the minor should constitute a coherent program and will be selected in consultation with the student's minor advisor. A list of current course offerings suitable for the minor, including special topics courses in individual departments, is available from the Department of Sociology or the Center for the Study of Aging.

Note: The Minor in Gerontology is not available to students majoring in Sociology. Sociology majors interested in Gerontology should, instead, take the Social Gerontology Concentration to fulfill the concentration requirement for the Sociology major.

STATISTICS Students must have a minor advisor in the Statistics Program and are required to complete:

- A. Fifteen hours of Statistics courses of which at least nine must be at the 100 level or above and at least one of the following introductory Statistics courses: 111, 141, 211. No more than six credits of Statistics 11/111/141/211 may apply toward the minor. Credit will not be given for both 11 and 111, or for both 111 and 141, without special permission from the Statistics Program.
- B. Math. 19 or 21, or the equivalent.
- C. Statistics 201, or Computer Science 16 or higher.

THEATRE Twenty hours to include 10, 15, 20, 40, 135, two hours of 190; one of the following courses: 136, 137, 138, or 250.

SPEECH Eighteen hours to include 12 hours from Speech 11, 111, 112, 283-4 or Theatre 5; and six hours from Speech 214 or 283-4, or Sociology 141.

VERMONT STUDIES Eighteen hours (at least five courses), of which at least nine hours must be at the 100 level or above. As an interdisciplinary minor, it must include at least 15 hours from departments outside the major. Completion of Vermont Studies 52, three of the following courses: Anthropology 164, English 160, Geography 61, Geology 55, History 184, Political Science 123, and two additional courses from an approved list chosen in consultation with the Vermont Studies advisor.

WOMEN'S STUDIES Eighteen hours of course work to include WST 73, 273 and six hours at the 100 level or above to be chosen with the approval of the Women's Studies Committee or the consent of a Women's Studies advisor. Students may take a maximum of nine hours in any one discipline toward the minor. Not all sections of a multisection course will necessarily meet Women's Studies approval for the minor. (Students should consult the course listings each semester for further details.)

ZOOLOGY Biology 1 and 2; three courses at the level of 100 or above, chosen from courses within the Biology department, at least one of which must include a laboratory.

CROSS-COLLEGE MINORS

The following minors must be completed in the following format. They have been approved by the College of Arts and Sciences and will fulfill minor requirements for Bachelor of Arts, Bachelor of Science, and Bachelor of Music candidates. **No other minor in this catalogue will fulfill the minor requirement.**

EDUCATION AND SOCIAL SERVICES

Human Development and Family Studies: Eighteen hours including ECHD 5, 60, 65; one course from 281, 295 (Adolescence and Youth), 283, 263; one course from 264, 295 (Fathering), 268; and one additional 200-level course. Independent study and field experiences may not be counted toward completion of the minor. **This minor cannot be the sole minor for sociology or psychology majors but is acceptable as a second minor, especially for persons interested in careers involving work with families and youth.**

NATURAL RESOURCES

Forestry: A minimum of 18 credit hours is required, with at least nine of these hours at the 100 level or above. Required courses for non-SNR majors: 1; 21; 73; and additional Forestry courses to total 18 credit hours.

Recreation Management: Nine hours from 1, 50, 138, 153, 157, 158, 181; and six hours from 230, 235, 240, 255, 258, 282.

Wildlife Biology (WFB): Fifteen hours to include WFB 130, 174, 271, or 273 and the remaining hours from 131, 175, 176, 185, 187, 271, 272, 273, 274, 275, 279, 285, 287.

AGRICULTURE AND LIFE SCIENCES

Applied Design: Fifteen hours including nine in required courses CDAE 15, 16, or 1; 231 or 101. After completing the required courses that will enhance problem-solving and visualization skills, student select two additional courses that will define a particular focus within design. The student's advisor must preapprove the two focus courses. Nine of the 15 hours must be at the 100 level or above. The Applied Design minor is not available to students majoring or minoring in Studio Art.

Small Business (CDAE): 61, 166, 167, 168, 266.

Consumer and Advertising: Fifteen hours including CDAE 15, 127, 128, 183, and an advisor approved elective.

Consumer Economics: Fifteen credits including 12 in required courses CDAE 58, or equivalent, 127, 257, 255; three hours from the following restricted electives: CDAE 128, 158, 159, 250, 258.

Microbiology and Molecular Genetics: Core requirements are MMG 101 and 102, and Botany 132, plus an additional six credit hours of MMG courses chosen from 195, 201, 203, 211, 220, 222, 223, and 225 depending on students needs.

Nutritional Sciences (NUSC): Fifteen hours to include NUSC 43, 53, 63, 143 plus three hours at or above the 195 level. Independent study or field experience are not applicable.

Plant and Soil Science: Sixteen hours including PSS 10 or 11, 161, plus any three additional PSS courses at the 100 level or above.

[†]A student may minor in Microbiology and Molecular Genetics upon permission of the departmental Undergraduate Affairs Committee and assignment of a minor advisor within the department who will direct the student's program plan and course selection.

ALLIED HEALTH SCIENCES

Molecular Diagnostics (BMT): Fifteen-sixteen hours to include: 242, 244, BMED 281, 293, 297, and one elective course from BMT 4, 54, 123, or MLS 222, 231, or 255. Prerequisites are Chemistry 31, 32 or 23; 141, 142 or 42; Biology 1, 2 or Anatomy and Physiology 19–20; a 2.5 in these courses. Acceptance into

this program by application only and limited to six new students per year. Contact Department of Biomedical Technologies, 302 Rowell, for more information.

BUSINESS ADMINISTRATION

Accounting (BSAD): 65 (or 60 and 61) 161, 162, 164, 168. Prerequisites are Economics 11, 12; Math. 19 or 21; Statistics 141; a 2.0 in these courses. Acceptance into this program by application only. Contact Student Services, School of Business Administration, 218 Kalkin, for more information.

Business Administration (BSAD): 65 (or 60 and 61), one course from 120, 132, 141, 150, 173, 180 and two additional courses numbered 100 – 299. Prerequisites are Economics 11, 12; Math. 19 or 21; Statistics 111 or 141; a 2.00 in these courses. Acceptance into this program by application only. Contact Student Services, School of Business Administration, 218 Kalkin, for more information.

ENGINEERING AND MATHEMATICS

Computer Science (CS): Eighteen hours in Computer Science to include at least nine hours at the 100 level or above. The course plan for the Computer Science minor must be approved by a Computer Science faculty advisor.

The following Arts and Sciences Minors are available to students not pursuing degree programs offered by the College of Arts and Sciences:

ANTHROPOLOGY	ENVIRONMENTAL STUDIES
Sociolinguistics**	GEOGRAPHY
ALANA STUDIES	Human Geography
AREA AND INTERNATIONAL STUDIES	Physical Geography
African Studies	GEOLOGY
Asian Studies	GERMAN
Canadian Studies	HISTORY**
European Studies	MATHEMATICS
Latin American Studies	Pure Math
Middle East Studies	Applied Math
Russia/East European Studies	Statistics
ART	MUSIC
Art History**	PHILOSOPHY**
BIOLOGY	PHYSICS
Biology	POLITICAL SCIENCE
Botany	RELIGION**
Zoology	ROMANCE LANGUAGES**
CHEMISTRY	French
CLASSICS	Italian
Greek	Spanish
Latin	RUSSIAN
Classical Civilization	SOCIOLOGY
ECONOMICS	Sociology
EAST ASIAN LANGUAGES	Gerontology
Chinese	THEATRE**
Japanese	Theatre
ENVIRONMENTAL SCIENCES**	Speech
	VERMONT STUDIES**
	WOMEN'S STUDIES**

**Students must receive departmental approval

PREPROFESSIONAL PREPARATION

Students who plan to enter professional colleges requiring previous collegiate preparation will find the variety of courses offered in the College of Arts and Sciences and the freedom of election in that College is such that all the requirements for any professional school may be met. Many students will desire to direct their four-year undergraduate

courses to provide, in addition to a sound general education, appropriate preprofessional training for later work in the medical sciences, law, or theology.

Special advising is available in the College for students preparing for careers in education, journalism, law, and medical sciences.

BIOLOGY A major in Biology is offered to students enrolled in the College of Arts and Sciences. It has been designed for the student who wishes to concentrate in Biology while pursuing a liberal arts education. It will also serve as a basis for programs leading to graduate study in biological fields and as an appropriate major for students in pre-medical and pre-dental programs. Majors may pursue either the B.A. or the B.S. degree. For specific requirements for these degrees, please see page 67.

JOURNALISM Admission to schools of journalism is generally open to academically-qualified students who hold the Bachelor of Arts degree with concentration in any discipline. Interested students should take a broad program in the liberal arts, including work in the social sciences and in English.

LAW American law schools, as a rule, require graduation from a four-year college with a bachelor's degree prior to admission. There is no prescribed curriculum for admission to law school, and candidates pursue their undergraduate studies in a wide range of majors. A Prelaw Advisory Committee aids students in planning their academic programs and in making application to law schools. For more information, contact the Dean's Office, College of Arts and Sciences, or the Center for Career Development.

BA/JD Program with Vermont Law School

The BA/JD Program is a joint endeavor of The University of Vermont and Vermont Law School. The Program allows exceptionally qualified students to complete both a Bachelor of Arts in the College of Arts and Sciences and a Juris Doctor at Vermont Law School in six rather than seven years. Students complete all distribution requirements and all requirements for a major and minor in Arts and Sciences in three years. If students meet the Vermont Law School specified LSAT and GPA requirements, and are determined to be qualified by the Vermont Law School Admissions Committee, they then enter Vermont Law School. The Law School will reserve a total of 12 places per year for students in the BA/JD Program. Students should apply for acceptance into the special advising program at the end of their first year at UVM. Candidates for acceptance must have a GPA of at least 3.2 and strong recommendations from UVM faculty. For application and program information, contact the Program Coordinator, Professor Howard Ball, Department of Political Science, 656-6263, or the College of Arts and Sciences, 656-3344.

THEOLOGY Graduation from a four-year college is prerequisite for admission to most theological seminaries. Although no prescribed curriculum is demanded as preparation for such professional schools, the student is advised to elect substantially from the departments of languages (particularly classics), history, philosophy, religion, psychology, and sociology.

OPTOMETRY The requirements for admission to schools of optometry vary, but typically they include courses in English, mathematics, physics, chemistry, and biology, with a minimum of two years of college work.

PHARMACY Under the Regional Plan (page 9) Vermont residents may prepare for pharmacy school at Connecticut or Rhode Island. This is a five-year undergraduate program concentrating in pharmacy, which includes two years of preprofessional work in English, mathematics, botany, chemistry, biology, physics, soil science, and fine arts.

MEDICINE AND DENTISTRY The prevailing requirements for admission to an accredited medical college include a minimum of three years of undergraduate work but most institutions recommend four years. During their sophomore year, students desiring to enter medical school should consult catalogues of colleges to which they expect to apply and arrange to include in their program courses required by those schools. They should also keep informed of events and deadlines relating to the application process by contacting the Center for Career Development.

Each student, in consultation with his/her advisor, plans a four-year program of courses which will fulfill the requirements for a bachelor's degree. To meet the minimum requirements of most medical colleges, the program should include the following:

Mathematics, one of the following options:

Math. 21,22 (recommended for able students)

Math. 19,20 (adequate)

Math. 9, 2; 21 or 19, 20 (suggested for student not immediately prepared to enter calculus)

Chemistry, two years minimum, *with laboratory*

Chemistry 31, 32, or 35, 36, 37, 38 (recommended for potential Chemistry majors)

Chemistry 141,142 (required)

Physics, one year minimum, *with laboratory*

Physics 21, 31 and 22, 42 (recommended for students with calculus background)

Physics 21,31 and 125 (recommended for students concentrating in the physical sciences or engineering)

Physics 11, 21 and 12,22 (acceptable for students without calculus background, or taking calculus concurrently)

Biology, one year minimum, *with laboratory*

Biology 1,2

The requirements for admission to colleges of dentistry vary, but in all cases include at least three years of college work. (The majority of applicants will have completed four years.) In general, the minimum requirements given above should be used in planning a program leading to entrance into a dental school. Students should consult catalogues of the dental colleges to which they expect to apply in order to make certain all requirements are met.

In general, students should avoid taking courses at the undergraduate level in those areas taught at the professional level: i.e. human anatomy, human physiology, microbiology. Many medical colleges now strongly recommend or require that students enroll in courses in the humanities and social sciences.

SECONDARY TEACHING Students in the College of Arts and Sciences who are interested in becoming eligible for a license to teach in secondary education (grades 7-12) are required to complete the teacher education application process. The application is available in 533 Waterman and should be completed early in the second semester of the applicant's sophomore year. Specific program requirements are available in 528 Waterman and should be reviewed for prerequisites prior to applying to the teacher education course sequence. The prescribed courses in education, up to 24 credit hours, can count as electives towards the Bachelor of Arts degree.

UVM students who are in their third year of study for the Bachelor's degree may apply to the Accelerated Licensure Master of Education Program. Requests for further information and application forms may be obtained by contacting the Secondary Education Program Coordinator, Department of Education, 533 Waterman Building, 656-3356; e-mail: drowe@zoo.uvm.edu. Refer also to the Graduate College catalogue.

School of Business Administration

The mission of the School of Business Administration is to educate students for leadership careers in management, conduct research which extends knowledge and contributes to the effectiveness of teaching and learning, forge productive links with the business and public management communities, and develop faculty capabilities to interpret and respond to significant changes in the future environment of management education, research, and practice.

The School offers a challenging and rigorous education to prepare its students for promising careers in industry, government, and nonprofit organizations. The graduates from this program will be equipped with the broad knowledge and analytical tools needed to operate effectively in the rapidly changing management environment.

The program is designed to cultivate the student's capacity to recognize, define, and solve problems in the most efficient manner possible. To this end, it is required that the student be exposed to a wide range of courses in the arts, humanities, and the social and physical sciences.

The first two years establish the broad intellectual base upon which the art and science of management are built and are devoted to partial completion of distribution requirements and to acquisition of the technical skills on which Upper Level management courses rely.

The junior year focuses on the business core. Seven required courses develop the framework for organizing information and structuring analysis in the context of an operating enterprise. The School believes that a broad but demanding program is in the best interest of the student's career opportunities.

The final year generally is devoted to completing a concentration, business policy, and free electives.

The School of Business Administration cooperates with the College of Engineering and Mathematics in offering a B.S. in Engineering Management. The course offerings are described on page 151.

The undergraduate and graduate programs offered by the School are accredited by the American Assembly of Collegiate Schools of Business (AACSB).

The offices of the School of Business Administration are located in Kalkin Hall.

DEGREE PROGRAM

Bachelor of Science in Business Administration – with concentrations in:

Accounting	International Management
Finance	Management and the Environment
Human Resource Management	Management Information Systems
Marketing	Production and Operations

DEGREE REQUIREMENTS

Students must comply with the degree requirements as stated in a single catalogue edition in place during the time they are enrolled. The catalogue to be followed is the one in effect at the time a student enrolls at UVM, unless the student requests in writing to follow a catalogue that is published subsequently during their enrollment at UVM. Stu-

dents who have a separation from the University of three years or more must meet the requirements of the current catalogue at the date of readmission.

A minimum of 122 approved semester hours is required for the degree of Bachelor of Science in Business Administration, including two required hours in physical education and a minimum of 55 hours in areas other than business administration and upper-level economics. A cumulative grade-point average of 2.0 is required.

Physical education courses in excess of the required two credits will not count toward the 122 hours required for graduation.

Students must complete 30 of the last 45 hours of credit in residence at UVM as a matriculated student. Additional grade requirements exist for some sets of courses, for example the Core, and are described below.

Academic Standards

Full-time students will be placed on trial if their semester average is less than a 2.0. Part-time students will be placed on trial with less than a 2.0 average in their most recent 12 credit hours. All students who have a cumulative average less than a 2.0 will be placed on trial.

Students are eligible to be dismissed in three situations: (1) failure of at least half of their course credit for any semester; (2) two successive semester averages below a 2.0; or (3) three successive cumulative grade-point averages below a 2.0.

Lower Level Core

To be completed by the end of the sophomore year, with a grade-point average of 2.0 and no more than one grade below C-.

	Hours
English 1	3
Math. 19 and 20 or Math. 21 and 22	6 or 8
Economics 11 and 12	6
Business Administration 40	3
Statistics 141	3
Business Administration 60 and 61	8
Business Administration 72	3

Distribution Courses

To be completed prior to graduation; most should be taken during first two years.

Students must complete 37 credit hours of courses distributed as described in A-E below. The number of credits is reduced to 35 if Math 21 and 22 are used to complete the Lower Level Core requirements.

A. Language and Literature (9-10 hours):

- Any two of the following: English 11-26, or 50
- At least three hours from the following:

Chinese	Italian
Classics	Japanese
English	Latin
Film	Linguistics 101, 102
French	Russian
General Literature	Spanish
German	Speech
Greek	Other Language
Hebrew	

B. Social Sciences, Fine Arts, and Philosophy (9 hours):

1. History 11 or 12, or Political Science 21
2. Psychology 1 or Sociology 1
3. At least three hours from the following:

Anthropology	Philosophy
Art	Political Science
Classics 42	Psychology
Geography	Religion
History	Sociology
International Studies	Theatre
Music	

C. Science and Science Related (10-12 hours):

1. One four-hour natural science with a laboratory experience from the following:

Biology	Geology
Botany	Physics
Chemistry	
2. One second natural science, either with or without a laboratory experience, from above. History of Science or Philosophy of Science may be used as a substitute for a nonlaboratory science.
3. One additional three- or four-hour course from the natural sciences listed above or from the following:

Agricultural Biochem.	Forestry (except FOR 1)
Animal and Food Sciences	Mathematics
Civil Engineering	Mechanical Engineering
Computer Science	Natural Resources
Electrical Engineering	Nutritional Sciences
Environmental Science	Plant and Soil Sciences
Environmental Studies	Statistics

 (ENVS 1 and 2)

D. Race Relations and Ethnic Diversity in the U.S.: One three-credit course which addresses the question of race relations and ethnic diversity in the U.S. Courses which fill this requirement are listed under *Race Relations and Ethnic Diversity* in the College of Arts and Sciences (page 62). The course selected to satisfy this requirement may also be used to fulfill one of the other distribution requirements. **Note: This is the only situation where a course may be used to fulfill more than one requirement toward a degree in Business Administration.****E. The remainder of the distribution credit hours must be selected from courses outside of Business or Economics. They may not include courses within the exclusions listed under electives below.****Upper Level Core**

To be completed beginning junior year, with a grade-point average of 2.0 and no more than one grade below C-.

In the junior year, the student will take courses in the functional areas of management, in quantitative methods, and in the environment of business. The last core course, 191, is taken in the senior year. These Core courses are: Business Administration (BSAD) 120, 132, 141, 150, 173, 180, 191; and three hours in Quantitative Methods selected from among Business Administration 170, 174, 177, 178, 270, 272, or Statistics 151, 201, 221, 223, 224, 225, 231, 233, 237, or 253.

Concentration

To be completed with a grade-point average of 2.0.

In the senior year, the student must complete at least 12 additional hours in Business Administration courses numbered 100 or above beyond those required in the Core. These courses must be selected in such a way that they build upon prior work and upon each other and point

toward the analysis of a coherent subset of managerial issues. An acceptable approach is to concentrate these courses in one of the areas of Accounting, Finance, Human Resource Management, Management and the Environment, Management Information Systems, Marketing, International Management, or Production and Operations Management. However, the student may also complete a self-designed program. In either case, the specific set of courses for the concentration must be approved by the student's faculty advisor. Students may use one course (100-level or higher) in a related discipline toward their concentration with advisor and Dean's Office approval.

Electives

Additional course work needed to meet the 122-hour requirement for graduation are free electives and may be satisfied by any UVM course subject to three restrictions:

1. No more than two hours in physical education may be counted toward the 122 hours.
2. No credit will be granted for a course if credit has been received previously in a more advanced course in the same general discipline.
3. No credit will be granted for a course which substantially duplicates material in courses offered in Business Administration or other previously completed courses.

COURSE OF STUDY

Here is *one* illustrative schedule for the program.

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
Math. 19, 20	3	3
English 1	3	—
Economics 11, 12	3	3
BSAD 40	—	3
Distribution Courses	<u>6-7</u>	<u>6-7</u>
	15-16	15-16
SOPHOMORE YEAR		
BSAD 60, 61	4	4
BSAD 72	3	—
Statistics 141	—	3
Distribution Courses	<u>9 or 10</u>	<u>9 or 10</u>
	16-17	16-17
JUNIOR YEAR		
Upper Level Core	12	9
Distribution or Electives	<u>3</u>	<u>6</u>
	15	15
SENIOR YEAR		
Concentration Courses	6	6
Electives	9	6
BSAD 191, Business Policy	<u>—</u>	<u>3</u>
	15	15

SPECIAL PROGRAMS**Professional Accounting Program**

Students planning to sit for the CPA examination should complete the Professional Accounting Program: BSAD 17, 161, 162, 164, 168, 266, 267. Completion of the Professional Accounting Program satisfies the Concentration requirement.

Additionally, a second Business Law course (BSAD 18) and a second Finance course (beyond BSAD 180) are recommended and are required for students who plan to sit for the CPA examination in New York.

International Management

Students interested in International Management are expected to spend the spring semester of their junior year studying abroad.

The University has formal arrangements with universities in Grenoble, France, and Vienna, Austria. All courses are taught in English.

It is also possible for students to spend a semester at other international universities. Overseas students need to complete BSAD 120, 150, and 180 before going abroad.

Preprofessional Work Programs

Students are encouraged to participate in preprofessional work opportunities. These opportunities include internships and cooperative education (CO-OP) programs. For both of these programs students must first successfully complete the lower level core.

Cooperative Education CO-OP opportunities are coordinated and supervised through the Center for Career Development. If a full-time CO-OP work experience is done during a regular semester, students will need to take classes in a summer session.

Internships Internships usually involve part-time work during the academic year, although summer internship opportunities also exist. The time required of an internship and whether or not it is a paid experience depends on the employer.

Credit may be available for demonstrated learning in relation to a preprofessional work experience. A faculty member in each area of business will be designated each semester to work with students and grade the written assignments. To enroll for credit, students must have a minimum of junior standing, completion of Lower Level Core, a related core course with a grade of B, and a cumulative grade-point average of 3.0. If these requirements are met, students should talk with the assigned faculty member in their field of study to discuss the written assignments required for credit and to obtain approval. Once the internship is approved, students must enroll in BSAD 194 to receive internship credit. Business students may not earn practicum or internship credit through other academic units.

MINORS

Students Majoring in Business

Students majoring in Business Administration are not required to have a minor to meet degree requirements; however, a business student may choose to have a minor outside of Business. The department issuing the minor sets the requirements and determines if the student is eligible to minor in their program. The student must contact the appropriate department to obtain more information.

Non-Business Students

Two different minors are available in the School of Business Administration for non-business majors: Business or Accounting. An application is required and may be obtained at the Student Services Office, 218 Kalkin Hall. Acceptance into the minor program requires completion of the prerequisite courses with a GPA of 2.0 or better in these courses. Admission may be more restrictive if applications exceed the capacity of the program.

Prerequisites: Economics 11, Economics 12, Math. 19 or 21, Statistics 111 or 141. Students must have basic microcomputer literacy, including a working knowledge of word processing and spreadsheet software. Students lacking this basic knowledge are responsible for attaining it through course work, self study, tutorials, or workshops.

Business Minor Requirements:

Accounting: BSAD 60 and 61 *or* BSAD 65.

Other Business requirements: Three upper level business courses (numbered 100–299), at least one of which must be from the following list: BSAD 120, 132, 141, 150, 173, or 180.

One year MBA opportunity: A student minoring in Business Administration may complete an MBA at UVM in one year after earning a bachelor's degree if: (1) BSAD 60 and 61 are completed; (2) three of BSAD 120, 132, 150, 173, and 180 are selected to meet the minor requirement; (3) the other two courses on this list are taken as electives; and (4) the student applies and is admitted to the MBA program under regular criteria.

Accounting Minor Requirements:

Introductory Accounting: BSAD 60 and 61 *or* BSAD 65. Students must earn at least a 2.0 in *each* introductory course taken to continue with an accounting minor. If a 2.0 is not achieved, a student may switch to a general Business Minor.

Upper Level Accounting Requirements: BSAD 161, 162, 164, and 168. A student must earn a 2.0 average in these four courses to earn an accounting minor.

TRANSFER TO BUSINESS ADMINISTRATION

Students planning to transfer to the School of Business Administration from another college or school on campus must comply with the Intercollege Transfer policy (page 37). Applications may be obtained at the Student Services Office at 218 Kalkin Hall.

The College of Education and Social Services

The College of Education and Social Services offers programs in Human Development, Physical Education/Athletic Training, Social Work and Teacher Education (Art, Early Childhood, Elementary, Music, Physical Education and Secondary Education). In addition to these programs, an Undecided major is available to first-year students who know they want to pursue a program in one of the helping professions, but need time to explore the available options. The College also offers an Individually Designed program for students who have completed one year of course work at UVM and have demonstrated an interest in an area of study related to the College offerings, but not available as a specific program. These challenging programs require course work in the liberal arts and sciences along with professional preparation which includes courses completed while interning in school and community settings. In many CESS programs, students are required, once they have met the criteria specified by their program of choice, to apply for admission to the professional portion of the program. It is essential for all students to strive for high academic achievement in order to be eligible for this course work in the junior and senior years of their programs.

Potential UVM students should indicate their program of interest on their application to the University. Enrolled UVM students wanting to transfer should come to the Office of Student Services (528 Waterman Building) in the College of Education and Social Services for an application. Students enrolled in an appropriate program in the College of Arts and Sciences may apply to complete teacher licensure requirements for Secondary Education while they remain in Arts and Sciences. Information is available in 528 Waterman and applications for admission to the Teacher Education program are available in 533 Waterman.

ORGANIZATION

The College has three departments:

- Education: Art, Elementary, Music, Physical Education, Secondary Education
- Integrated Professional Studies: Early Childhood, Human Development and Family Studies
- Social Work

Each of the three departments includes both undergraduate and graduate programs. Refer to the Graduate Catalogue for a listing of the programs leading to an advanced degree.

The College works cooperatively with the College of Arts and Sciences to offer the teacher education programs in Art and Music. The College also works in cooperation with the College of Agriculture and Life Sciences to offer licensure in Home Economics Education (Family and Consumer Sciences).

DEGREE PROGRAMS

Programs in the College of Education and Social Services lead to four different bachelor's degrees.

Bachelor of Science. The programs listed below lead to this degree.

Human Development and Family Studies. This program examines the way people grow and develop, form relationships and families, and learn to cope with the common and uncommon events of life.

Social Work. The principal educational objective of the program is to prepare students for beginning social work practice with individuals, families, small groups, organizations, and communities.

Teacher Education/Early Childhood Education PreK-3 Program. The Early Childhood program offers licensure through grade 3. All early childhood education students are required to select through consultation with their academic advisors an approved major concentration consisting of 30 hours of study. A list of College-approved content majors is available from the Office of Student Services, 528 Waterman.

Bachelor of Science in Art Education. Teacher Education/Art Education. The College works cooperatively with the Art Department in the College of Arts and Sciences to offer a program in Art Education which leads to both degree and licensure for grades K-12.

Bachelor of Science in Education.

Individually Designed Major. Receive degree not licensure.

Physical Education/Athletic Training. Certified athletic trainers are prepared to work in various settings on health problems of active individuals.

Teacher Education/Elementary (K-6). Elementary Education students are required to select through consultation with their academic advisors an approved major concentration consisting of 30 hours of study. A list of College-approved major concentrations is available from the Office of Student Services, 528 Waterman.

Teacher Education/Physical Education (K-12). Students who pursue the teacher education program are prepared for teaching grades K-12. Physical Education majors are required to select through consultation with their academic advisors an approved major concentration consisting of 30 hours of study.

Teacher Education/Secondary (7-12). Students in Secondary Education are required to have both a teaching major (at least 30 credits) and a teaching minor (at least 18 credits) or a teaching broadfield major (minimum 48 hours). Majors and minors are listed in the Secondary Education program description.

Bachelor of Science in Music Education. Teacher Education/Music. The College works cooperatively with the Music Department in the College of Arts and Sciences to offer a program in Music Education which leads to both degree and licensure for grades K-12.

In addition to the undergraduate degree programs, the College offers a fifth year certificate, the Postbaccalaureate Teacher Preparation Program. This program is for individuals who have earned a B.S. or B.A. and now desire to be licensed to teach.

DEGREE REQUIREMENTS

Degree requirements in the College meet rigorous standards. The requirements for each program have been approved by the College Academic Affairs Committee, the College faculty, the Dean, and the University Academic Affairs Committee. In addition, all programs for which there are national standards for accreditation meet those standards and are accredited by their professional group. The Social Work program has met the requirements for accreditation by the Council on Social Work Education (CSWE). The Athletic Training concentration, available through Physical Education, meets the standards set by the Commission of Allied Health Programs. The Teacher Education programs (Art, Early Childhood, Elementary, Music, Physical Education and Secondary Education) have been approved by the Vermont State Department of Education and accredited by the National Council for the Accreditation of Teacher Education (NCATE).

In all College programs there are general education requirements and each program requires completion of a senior internship experience. However, while there are common requirements for many of the programs, each one also has some very distinctive elements.

Typical programs of study for each program are presented in this section of the University Catalogue under the heading of "Areas of Study." These descriptions show how students might meet the requirements in each program, although all students must meet all the requirements of a specific program prior to graduation. Copies of the degree requirements for each program are available in the CESS Office of Student Services (528 Waterman) and are also provided to students during the Orientation sessions.

Upon arriving at the University, students receive an Orientation Advising Packet which explains how the requirements can be fulfilled during a four-year period. Discussions with advisors provide students with information needed to plan the time span for program completion which meets their needs, especially if it is only possible to attend the University on a part-time basis. Students who enroll in the College of Education and Social Services are expected to become very familiar with the degree requirements for their programs and to track their progress as they matriculate as students at The University of Vermont.

General Education

Candidates for a bachelor's degree in the College are required to select a minimum of 60 credit hours, as specified by the program, from the following six general areas. At least one course must be selected from each area. Each course selected must be taken for a letter grade (P/NP is not acceptable). Programs prescribe general education courses including several from one or more of the areas below. These program-determined courses contribute to fulfilling this distributive requirement. The University requirement of two semester hours of physical education activities count toward this 60-hour requirement. Students may also apply required courses in a major to meet these general educational requirements.

Arts and Letters:
Art
Classics
Speech and Theatre
English
Music

Mathematics:
Computer Science

Social Sciences:
Anthropology
Economics
Geography
History
Political Science
Psychology
Sociology

Mathematics
Statistics

Science:
Biology
Botany
Chemistry
Environmental Studies
Geology
Physics

Humanities:
Foreign Language
Philosophy
Religion

Health and Physical
Education:
Health Education
Physical Education
Methods
Selected Activities

Note: Social Work students are not required to complete a mathematics course but a statistics course is recommended.

Disciplinary Action Related To Academic Performance

The criteria for disciplinary actions, such as placement on trial, disenrollment, or dismissal are designed to encourage high level academic work from students. The CESS guidelines are more stringent than those for the University and students can be dismissed without first being placed on trial. This includes first-year students.

A student is subject to disciplinary action if (a) his or her semester or cumulative average is below 2.0; *or* (b) if he or she has failed six or more credit hours of course work in a given semester.

A student who has a cumulative grade-point average of 2.0 or higher, which is too low to meet specific program requirements, will be warned of pending disenrollment. If at the end of two subsequent semesters the student has failed to meet the GPA requirements of his/her program, he/she will be disenrolled from the College. Also, students who do not follow the course requirements of their program will also be warned of pending disenrollment. Disenrollment will then occur after the two subsequent semesters.

Students who are placed on trial rather than being dismissed who do not meet the conditions of trial will then be dismissed.

Students on trial status will not be allowed to participate in their senior internship.

AREAS OF STUDY

Human Development and Family Studies Program

The Human Development and Family Studies program focuses on individual and family development across the life span. Emphasis is given to development within various family structures and to strategies for facilitating normal development. Students learn basic and applied concepts of human development and acquire skills in working with individuals and families of different ages and backgrounds in a variety of settings. Field experience is required of all students.

Students in Human Development and Family Studies enroll in a sequence of courses and field experiences designed to provide a comprehensive understanding of individual and family development across the life span. These courses are arranged in two blocks: the introductory core and the advanced core.

The introductory core in Human Development and Family Studies involves three components. The first, Introduction to Human Development I, II and Introduction to Field Experiences, provides students an introduction to the topics pursued in the major, how they relate to everyday life settings, how knowledge in the discipline is gained, and the

types of skills necessary to both acquire and use this knowledge. The second component in the introductory core is a course covering individual development across the entire life span. Students learn what is typical of individuals at different points in their lives and the various factors, such as gender and social class, that account for these differences. The third component in the introductory core is a two-semester course dealing with the impact of families and other social institutions such as the school system on individual development. A course on Human Relations and Sexuality completes the introductory core.

The advanced core in Human Development and Family Studies consists of a series of advanced seminars and a field experience. All majors take seminars in Developmental Theory and Family Ecosystems. Four additional advanced seminars must be selected in consultation with an advisor. The field experience requires 15 to 20 hours per week. Students choose a placement from a variety of public and private local agencies. Over the past few years, field placement sites have included museums, affirmative action agencies, the court system, battered women's shelters, centers for abused and neglected children, city and state government agencies, local business and industry, child-care settings, hospitals, senior-citizen centers, and human service agencies.

A typical course sequence for a Human Development and Family Studies major is:

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
ECHD 3, 7	3	—
ECHD 5	3	—
ECHD 60	—	3
General ed. requirements, electives	9	12

	1st SEMESTER	2nd SEMESTER
SOPHOMORE YEAR		
ECHD 61	3	—
ECHD 65	—	3
General ed. requirements, electives	12	9

	1st SEMESTER	2nd SEMESTER
JUNIOR YEAR		
Adv. seminar I, II	3	3
ECHD 260, Family ecosystems	3	—
ECHD 266, Developmental theory	—	3
General ed. requirements, electives	9	12

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
Field experience	6	—
Adv. seminar III, IV	3	3
General ed. requirements, electives	6	12

Human Development and Family Studies is available as a major concentration for students in the Early Childhood, Elementary, Family and Consumer Sciences, and Physical Education licensure programs, and as a cross-college minor.

Individually Designed Program

Students enrolled in the College of Education and Social Services who are interested in an area of study, which isn't offered as one of the current options, may propose an individually designed program of study. Specific criteria and degree requirement information are available in 528 Waterman.

Physical Education Program/Athletic Training Concentration

An Athletic Training concentration is offered in physical education and is accredited by the Commission of Allied Health Education Programs (CAAHEP). Upon completion of the program and 800 hours of practical work through the training room, students are eligible to take the certification examination.

Certified athletic trainers are highly trained health professionals qualified to work in a number of settings on the health problems of active individuals. Working closely with physicians and other allied health professionals, their work includes the prevention, recognition, and immediate treatment and rehabilitation of injuries related to active participation.

The program includes a 30-credit hour liberal arts and sciences major concentration.

Admission to the program is granted upon successful completion of 45 hours of directed observation and pre-admission course work. Students are required to submit a formal application to the program director. Accreditation standards limit the number of students accepted each year. This program of study may be combined with the teacher licensure program in physical education. It is also open to students enrolled in other colleges at UVM. For more information, students may contact Sports Therapy at (802) 656-7750.

Typical Four-Year Physical Education Program/ Athletic Training Concentration

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
English 1	3	—
History 11 or 12 or Political Science 21	—	3
Computer Science 2	—	3
Sociology 1 or 19	—	3
Race and Culture	—	1
*EDHE 46	3	—
EDPE 21, Foundations	3	—
*EDPE 157, Care & Prevention	3	—
EDPE 158, Directed Obs. Exp.	1	—
EDPE 159, Directed Obs. Exp.	1	—
PEAC 28, Conditioning	1	—
Liberal Arts and Sciences Major Concentration	3	6

	1st SEMESTER	2nd SEMESTER
SOPHOMORE YEAR		
Anat. & Phys. 19, 20	4	4
Psychology 1	3	—
*EDPE 185, 186	4	3
PEAC Activities (PE Major Elective)	1	or 1
Liberal Arts and Sciences Major Concentration	3	6
*EDPE 23, First Aid	3	—

	1st SEMESTER	2nd SEMESTER
JUNIOR YEAR		
**Human Dev. 5	3	or 3
EDPE 155, Sec. Methods	—	3
EDPE 220, Sport in Society	3	—
*EDPE 167, Sports Physiology	3	—
**EDPE 260, Adapted Phys Educ	3	—
EDPE 240, Motor Learning	—	3

Liberal Arts and Sciences Major		
Concentration	3	6
*EDPE 173, Practicum	3	—
*Nutrition 43	3	or 3

Students are required to complete an internship application before being assigned a placement.

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
Philosophy 1	3	—
EDPE 295, Internship	—	12
*EDPE 166, Kinesiology	3	—
Liberal Arts and Sciences Major		
Concentration	3	—
Free Elective	5	3
*EDPE, Special Topics	1	—
Coaching Elective	2	—

* Required for athletic training students in other programs.

** Strongly recommended for athletic training students in other programs.

Social Work Program

The Social Work Program provides education for social work practice based on a liberal arts education in the social sciences and humanities. The program is fully accredited by the Council on Social Work Education. The principal educational objective of the program is to prepare students for beginning professional social work practice with individuals, families, small groups, organizations, and communities. Throughout the program of study, students gain the knowledge, values, and skills necessary to provide social services and to effect social change in institutions and the community.

The Bachelor of Science degree in Social Work requires a minimum of 122 approved credit hours (60 credits of which are general education components from the six approved academic areas, including two credits for physical education activities) and one credit for Race and Culture. Additionally, students are required to take at least one course that focuses substantially on issues concerned with Africa, Asia, the Middle East, or countries known as the Third World.

The student in consultation with his/her advisor, selects elective courses which will provide the opportunity to develop individual interests. Additional courses in computer science, economics, education, history, philosophy, political science, psychology, sociology, statistics, special education, and women's studies are recommended. Students who intend to pursue a Master of Social Work (MSW) degree are strongly advised to take a course in statistics.

Usual sequence of courses:

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
Professional Courses:		
SWSS 2, Foundations of Soc. Work	3	or 3
SWSS 51, Human Needs and Soc. Svcs.	—	3
Political Science 21	3	or 3
Psychology 1	3	or 3
Sociology 1	3	or 3
Race and Culture	1	or 1

	1st SEMESTER	2nd SEMESTER
SOPHOMORE YEAR		
Professional Courses:		
SWSS 47, Human Behavior I	3	—
SWSS 48, Human Behavior II	—	3
SWSS 167, Racism/Contemp. Issues	3	or 3

Human Biology	3	—
Economics 11	3	or 3
Psychology 152	3	or 3

Students are accepted into the College of Education and Social Services as pre-majors in Social Work. Students must apply for status as a social work major during their junior year. Application for the major requires consultation with an advisor to determine that all introductory professional and required liberal arts courses have been successfully completed. The application process includes a written statement by students that describes their interest and qualifications for a social work major and a projection of their future work in the field. Applications are received fall or early spring of each academic year. A committee of Social Work faculty review and act on each application. Notification of the faculty review is presented to the student in a letter from the Coordinator of the undergraduate program.

Acceptance as a major includes: completion of the required liberal arts courses with a minimum grade of C-; completion of the initial social work courses with a minimum grade of C and a GPA of 2.5; completion of advanced courses (SWSS 165, 166, 168, 169, 170, 171, 194) with a minimum grade of B; and an overall GPA in all courses of 2.0.

	1st SEMESTER	2nd SEMESTER
JUNIOR YEAR		
Professional Courses:		
SWSS 165, Issues and Policy I	3	—
SWSS 166, Issues and Policy II	—	3
SWSS 168, Soc. Work Intervention I	3	—
SWSS 169, Soc. Work Intervention II	—	3
SWSS 194, Intro. to Soc. Work Research	3	—

Typically students apply for SWSS 170, Field Experience, in the semester preceding their actual field experience. Prerequisites to enter the field include senior standing and acceptance as a social work major. In the senior year, students spend approximately 32 hours per week for one semester as interns in a public or private social service agency. Students are not enrolled in other courses during this semester with the exception of SWSS 171, Field Experience Seminar.

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
Professional Courses:		
SWSS 170, Field Experience	12	or 12
SWSS 171, Field Experience Seminar	3	or 3
Advisor Approved Elective	—	3

TEACHER EDUCATION

The Teacher Education programs include Art, Early Childhood, Elementary, Music, Physical Education and Secondary Education. All students are required to meet specific criteria for admittance into the professional portion of the program and for a teaching internship placement as well as for a recommendation for licensure.

REQUIREMENTS FOR TEACHER PREPARATION PROGRAMS

Candidacy

The professional programs begin with the student enrolling in the College of Education and Social Services as a candidate for licensure. Candidacy status is the stage prior to acceptance into the professional education sequence and, for some programs, may also be available to students in good standing from other colleges at UVM.

Portfolio Development and Professional Licensure

In accordance with the Standards for Vermont Educators (Vermont State Board of Education, 1991), students seeking a license to teach must develop documentation that they can perform in ways that address State standards in five areas. Each candidate must assemble that documentation in a preprofessional portfolio. At the preprofessional level, those standards may be summarized as follows:

Subject area knowledge: general knowledge in the arts and sciences with a specialty in one discipline.

Professional skills and knowledge: knowledge of teaching in public school settings.

Advocacy: commitment to supporting the growth and educational well-being of young people.

Colleagueship: commitment to working with others in schools to create a positive environment for learning and growth.

Accountability: recognition that professional growth is a responsibility of the individual teacher (as documented in the individual's portfolio).

Candidates for a teaching license may use any part of their experience as a source of documentation for these standards. Transcripts, lesson plans, videotapes, photographs, letters of endorsement, and academic papers may all be used to document skills and knowledge. Courses in the licensing programs offer students a chance to develop and test elements of the professional portfolios. At three points during the teacher preparation sequence — (1) initial application, (2) request for teaching internship, and (3) application for teaching license — students will be asked to

present either all or part of their portfolio to the teaching faculty in order to continue. Specific criteria for each review are available from program offices. Teaching license will be recommended upon the successful review of each candidate's portfolio.

REQUIREMENTS FOR TEACHING LICENSE

For students seeking a teaching license, special admissions requirements, program requirements, and exit requirements are mandated by the College of Education and Social Services based on program approval guidelines from the Vermont State Department of Education (SDE). As the SDE guidelines change, students may be required to modify their programs to meet the most current competency requirements for licensure. The current set of requirements is available from program coordinators or from the Office of Student Services, 528 Waterman. Professional licensure requires successful program completion which includes demonstration of a set of teaching competencies required by the Vermont SDE and other states with reciprocal requirements. All students are required to earn an overall average of 3.0 or above by the time they reach program completion; a minimum grade of B in student teaching; and be recommended by the program faculty to be eligible for licensure. Eligibility also requires satisfactory completion of a licensure portfolio. A licensing newsletter is available in 528 Waterman Building.

Academic Major

Candidates for teacher licensure in the College are required to select a minimum of 30 credit hours of course work in a liberal arts and sciences discipline. Courses in these disciplines constitute the major/major concentration required

Major Concentrations

(Early Childhood, Elementary, Family and Consumer Sciences*, and Physical Education)

Anthropology	Mathematics
Biological Science	Music
Chemistry	Nutritional Sciences
Classical Civilization	Physical Science
Communication	Physics
Communication Sciences	Psychology
Earth Science	Psychology and
English	Comm. Sciences
Environmental Studies	Religion
French	Sociology
Geography	Spanish
German	Studies in
Greek	Cultural Diversity
History	– Africa
Human Development and	– East Asia
Family Studies	– Latin America
IDIMC***	– Middle East
Latin	Theatre

Majors

(Secondary Education)

Biological Science
Chemistry
Earth Science
English
Environmental Studies**
French
Geography
German
History
Latin
Mathematics
Physical Science
Physics
Spanish

Minors

(Secondary Education)

Anthropology
Coaching
Economics
English
Environmental Studies**
French
Geography
German
Greek
History
Latin
Mathematics
Political Science
Psychology
Russian
Sociology
Spanish

*The College works cooperatively with the College of Agriculture and Life Sciences to offer licensure in Family and Consumer Sciences Education (Home Economics Education).

**Environmental Studies is not a Vermont State Department approved endorsement area. Students in Secondary Education who select Environmental Studies will need a second 30-hour major from the above list of majors in order to be eligible for a Vermont Teacher's license and their first content endorsement. Students who are completing a minor in Environmental Studies will not be eligible for a second endorsement in this area.

***IDIMC – Individually Designed Interdisciplinary Major Concentration

Also refer to Broadfield Majors.

by the College. This selection is guided by student interest as well as the grade level and subject areas in which the candidate plans to teach. Copies of the major/major concentration requirements listed on the chart are available through the Office of Student Services, 528 Waterman.

They are also available on the web at <http://www.uvm.edu/~cess/stservices>.

Broadfield Majors

The broadfield major requires a minimum of 48 credit hours. A minimum of 30 of the credits are fulfilled in one of the majors listed below and the remaining 18 hours (minimum) are fulfilled by completing course work in related areas. Copies of the requirements for each broadfield major are available in 528 Waterman.

Natural Science with concentrations in: Biological Science, Physical Science.

Social Studies with concentrations in: Anthropology, Economics, Geography, History, Political Science, Sociology.

Application to Teacher Education

Candidates who want to pursue teaching as a career apply to the teacher education program of their choice. Applications are available in each departmental office. Students enrolled in another college at UVM who are in good standing also may apply to Secondary Education while maintaining their primary affiliation with their home college. Students who transfer into the University also are required to complete the application to teacher education and gain acceptance before enrolling in the professional education portion of their program. These criteria were also provided at orientation. Once the candidate's application is complete, the faculty of the desired program will review the materials which include a record of academic performance at UVM, recommendations from University and public school faculty, evidence of superior course work, and other pertinent sources of information. All students must apply for acceptance into the teacher education segment of their program. Students are required to complete this application and gain acceptance before being eligible to enroll in the professional education courses in their program. This includes CESS students who are already enrolled as candidates in the teacher education programs. It also includes students in other colleges on campus who plan to maintain their primary affiliation with their home college while completing the licensure requirements in the CESS. Students who have been accepted as transfer students must also apply for acceptance into the teacher education program. The criteria are provided to new students as part of their orientation folders. The handouts are available to all students in 528 Waterman Building.

Students who meet the criteria and are eligible will be accepted. Those who do not meet the criteria for admission to Teacher Education will receive a warning of pending disenrollment letter and, after two additional semesters, will be cancelled as a degree student in the College. Students who have not been accepted into the program or transferred to another college may appeal through the College Student Affairs Committee.

Application to Student Teaching

If a candidate's application to a teacher education program is approved, the candidate completes a sequence of professional education courses and applies during the junior year to intern as a student teacher as a senior. The candidate submits his/her portfolio and applies to student teach with the Program Coordinator. The application lists the current set of criteria that permit a candidate to qualify for student

teaching. Included among the criteria are a record of strong academic performance in program and University courses, recommendations from education faculty, and evidence of superior course work. Once admitted to student teaching, the student must successfully complete the interview process and be accepted by an approved public school teacher/administrator before being placed for student teaching. After placement, the student will carry out an internship under the guidance of an approved cooperating teacher and department supervisor. Student teachers will be placed in Professional Development Schools or Partnership Schools. Although many students remain in the Burlington area, not all can be placed close to campus. Effort is made to accommodate student preference regarding placement site and the semester during which student teaching will occur. All students should be prepared to student teach in either the fall or spring semester of their senior year. Candidates must meet specific requirements to be recommended for licensure. These requirements are available in the Office of Student Services, 528 Waterman.

Note: Students who are not admitted to student teaching may appeal through the College Student Affairs Committee.

Teacher Education/Art Education (Kindergarten through Twelve)

The program in Art Education qualifies candidates to teach art in grades K through 12. Students fulfill course requirements in general education, professional art education, professional education courses, studio art, art history, and related subjects. Graduates satisfy College of Education and Social Services requirements for teacher licensure and College of Arts and Sciences requirements for an art major. The program allows sufficient additional advanced courses as recommended by the Art Department for admission to graduate school.

Students must be enrolled in the College of Education and Social Services. Those admitted as first-year students or sophomores to the Art Education Program are considered Candidates in the Program. Admission as Majors is made at the beginning of the junior year following formal review procedures during the second semester of the sophomore year.

A typical program is as follows:

<i>Art Education Major</i>		
	1st	2nd
FIRST YEAR	SEMESTER	
English Composition	3	or 3
Speech 11 <i>or</i> Theatre 5	3	or 3
History 11 <i>or</i> 12	3	or 3
Education Elective	3	or 3
EDSS 24 <i>or</i> ECHD 62 <i>or</i> 5	3	or 3
Science and Math.	3	3
Humanities	3	or 3
Physical Education	1	or 1
Art 1, 2 or 3	3	or 3
Art 5, 6	3	3
SOPHOMORE YEAR	1st	2nd
	SEMESTER	
English Lit.	3	or 3
Political Sci. 21	3	or 3
EDSS 56 (may also be fulfilled through Art course work)	3	or 3
Studio Electives		
Related Electives		

Students apply to the Art Education Major during the second semester of their sophomore year. Students must first be accepted before being permitted to enroll in required methods courses.

	1st	2nd
JUNIOR YEAR	SEMESTER	
EDAR 177	4	—
EDAR 178	4 or	—
Art History	3	or 3
Studio Electives		
Related Electives		
Teaching Reading/EDSC 215	3	or 3
EDAR 284	—	3

Students are required to complete a student teaching internship application before being assigned a placement.

	1st	2nd
SENIOR YEAR	SEMESTER	
EDAR 283	—	3
EDSC 226	12	or 12
Studio Electives		
Related Electives		
EDFS 203	3	or 3

A minimum of 124 approved semester hours is required for the degree including three semester hours of teaching reading for teacher licensure. All students must also fulfill the University requirement of two hours of physical education activities.

Students are responsible for obtaining information regarding teacher licensure and degree requirements from the Office of Student Services, 528 Waterman.

Teacher Education/Early Childhood Education Early Childhood Education PreK-3

The program is designed to provide students with the perspectives and skills necessary to work with young children from preschool through grade three in inclusionary, developmentally appropriate settings. These include the abilities to: (a) facilitate children's development of literacy, quantification, and inquiry skills; (b) offer instruction in an integrated day format; (c) assess educational progress from a portfolio perspective; (d) use educational materials in an open-ended fashion; and, (e) recognize and respect the diversity of family structures within our society.

The program involves a large field-based component and makes significant use of the Campus Children's Center and elementary schools as practicum sites. Graduates of the program are eligible for licensure from the State of Vermont.

The PreK-3 Professional Preparation Sequence involves three components. The first is a course in Child Development and a course in Family Relations. The child development course introduces students to the concepts that form the practical and theoretical foundation of the program's educational approach. The family relations course provides students a foundation in family dynamics and parent-child relationships and serves to emphasize the important links between children's home and school experiences. These two courses are taken prior to formal admission into the PreK-3 program.

The second component is a three-part professional practices sequence. This sequence provides students a first exposure to the rationale, practices, and procedures used in the provision of developmentally appropriate educational experiences for young children. The sequence includes opportunities for observation and hands-on work with children, opportunities to assist teachers in the provision of developmentally appropriate educational experiences and to discuss with teachers and other professionals the issues surrounding the provision of developmentally appropriate educational experiences.

The professional practices sequence is structured as three course blocks, taken sequentially. The first block course deals with techniques for observing and documenting children's development; the second deals with developmentally appropriate educational practices for children through age six (preschool/kindergarten); and the third for children between the ages of six and eight years (grades one through three). A significant portion of this professional practices sequence takes place in one or more preschools and elementary schools.

The third component is a two-semester student teaching sequence across the birth to eight-year age (preschool through grade three) range. This student teaching experience provides the opportunity to develop, implement, and assess (both in a cooperative and an independent fashion) developmentally appropriate educational practices. One experience would be in the Campus Children's Center and the other would be in a child centered, inclusionary grade K-3 setting.

The course of study consists of 128 credits which are divided into eight categories.

Major concentration in a liberal arts and sciences discipline	30
General Education courses	36
Professional Preparation Sequence	47
Health and Physical Education modules	2
Race and Culture course	1
CESS multicultural requirement	6
Physical Education activities	2
Electives	3 to 17

(The number of electives depends on the degree of course overlap in the General Education, major concentration, and the multicultural requirements.)

A typical sequence of study includes the following courses:

	1st	2nd
FIRST YEAR	SEMESTER	
ECHD 63	3	—
Physical Ed. Activity	1	1
General Education	6	6
Liberal Arts and Sciences		
Major Concentration	3	3
Race and Culture	1	—
ECHD 1	—	4
ECHD 60	—	3
SOPHOMORE YEAR	SEMESTER	
ECHD 100	10	—
General Education	3	—
Liberal Arts and Sciences		
Major Concentration	3	3
Health	1	—
ECHD 189	—	12
JUNIOR YEAR	SEMESTER	
General Education	9	6
Liberal Arts and Sciences		
Major Concentration	3	6
EDPE 100	—	2
Multicultural	3	3
SENIOR YEAR	SEMESTER	
EDEL 156	3	—
EDEL 176	2	—
EDEL 178	2	—
ECHD 296	3	—
Liberal Arts and Sciences		
Major Concentration	6	3

ECHD 187	-	12
EDEL 187	-	2

Teacher Education/Elementary Education
(Kindergarten through Six)

The elementary education program prepares teachers for assignments in grades kindergarten through six. The Bachelor of Science in Education is awarded upon satisfactory completion of the approved program which includes a planned sequence of professional courses, field experiences, and a full-semester internship experience.

The Elementary Education Program is a designed sequence of professional course work that achieves coherence from its theme "teaching and learning as meaningful enterprise." Embedded in a state known for its progressive schooling traditions, Elementary Education students have ample opportunity to learn about and practice the art and science of teaching. Through a web of unique relationships with area schools, Elementary Education majors build friendships with a diverse variety of children by the second year of their professional program. Several features distinguish the program:

Blocked Professional Course Work. Grounded in a theoretical orientation that seeks to limit the necessity for piecemeal education, faculty of the program have designed course work that fits together in naturally occurring curricular blocks: literacy (reading/writing, mathematics, individual differences), inquiry (social education, science, visual and performing arts), and the professional internship (student teaching, classroom management, and the adaptation of reading instruction).

Integrated Fieldwork. Professed theory about teaching is constantly exposed to the reality of public school practice. Each curriculum block has field experience attached to it. Students are thus placed in situations where theory and practice reside in reciprocal tension.

Authentic Assessment. The State of Vermont requires a results-oriented demonstration of teaching competence to qualify for the teaching license. The Elementary faculty have built in portfolio driven authentic assessments at every step of the professional program. Interns thus learn the portfolio process from the inside out and are able to apply it to themselves while learning to apply it within their public school classes.

Full Inclusion. The State of Vermont has the highest rate of inclusion of learners with special challenges in the regular classroom setting. Being educated at UVM means elementary education students learn about and practice the application of instructional adaptations for learners of exceptional need.

The elementary education curriculum includes a general education component of 60 credits from the academic areas outlined earlier. Included in the 60 hours must be two semester hours of physical education activities. Students are required to complete an approved major concentration, consisting of at least 30 hours of study in a liberal arts and sciences discipline. Specific information may be obtained from advisors or from the Office of Student Services, 528 Waterman. In addition to the major concentration and professional education requirements, certain courses are recommended to meet specific state and national requirements in elementary education. These are specified in the typical program.

Full-time students enroll in 12 to 18 credits. Elementary education students enroll in the required education courses each semester, along with several of the additional required courses listed below. These required courses are part of the general education requirement and should be completed by the end of the spring semester of the sophomore year.

- Select one course from Art 1, 2, 3, Community Development and Applied Economics 15, 16, Music 181
- English Composition and Literature
- Math. (two courses at level 15 or above)
- U.S. History
- American Government
- Child Development or Psychology 1
- Geography 1 or 2 or Anthropology 21 or 26
- Social Science
- Science
- Humanities (Philosophy, Religion, or Foreign Language)
- Physical Education Activities
- Race and Culture Requirement

A typical program is as follows:

	1st	2nd
FIRST YEAR	SEMESTER	
EDEL 10	1	1
EDEL 11	2 or	2
EDEL 24	3 or	3
EDPE 55	-	1
English Composition	3 or	3
Race and Culture	1 or	1
Physical Education Activities	1 or	1
General Education Requirements		
Liberal Arts and Sciences Major Concentration		

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
EDSS 56	3 or	3
EDEL 177 (Concurrently with EDEL 56)	2 or	2
EDSP 5 (Concurrently with EDEL 56)	3 or	3
Math. (two courses at level 15 or higher)	3	3
EDPE 100	2 or	2
English Literature	3 or	3
Physical Education Activities	1 or	1
General Education Requirements		
Liberal Arts and Sciences Major Concentration		

During the sophomore year, students must complete an Application to Teacher Education form available in 533 Waterman Building. Students will follow requirements specified in the Application to Teacher Education. Students will not be permitted to enroll in advanced education courses until they have been accepted to teacher education. The advanced courses include:

	1st	2nd
JUNIOR YEAR	SEMESTER	
Methods Block: Literacy		
EDEL 156	3 or	3
EDEL 175	3 or	3
EDEL 176	2 or	2
EDEL 178	2 or	2
Methods Block: Inquiry		
EDEL 155	3 or	3
EDEL 157	2 or	2
EDEL 158	2 or	2
EDEL 159	2 or	2
Liberal Arts and Sciences Major Concentration		

Students are required to complete a student teaching internship application in their junior year before being assigned a placement as seniors. Students will be notified by the Professional Education Office of a general meeting and are expected to attend to initiate this process. Students will follow requirements specified in the Application to Student Teaching. The course work for this stage of the program follows.

	1st	2nd
SENIOR YEAR	SEMESTER	
Internship Block		
EDEL 185	12	or 12
EDEL 187	2	or 2
EDEL 188	2	or 2
EDFS 203	3	or 3
Liberal Arts and Sciences Major Concentration		

Courses leading to a major concentration will be determined in cooperation with the academic advisor and guidelines determined by the College. A minimum of 127 approved semester hours is required for the degree.

Teacher Education/Music Education (Kindergarten through Twelve)

The curriculum in music education leading to the degree of Bachelor of Science in Music Education is recommended to students who have sufficient training and natural musical ability to justify a career in music. Prospective students must audition before entering the program. Those admitted as first-year students or sophomores to the Music Education program are considered *Candidates* in the program. Admission as a *Major* is made at the beginning of the junior year following formal review procedures during the second semester of the sophomore year. Graduates are qualified for positions as instructors and supervisors of music in public schools.

The program includes a general education component of 60 credits from the academic areas outlined earlier.

A typical program is as follows:

Music Education Major

	1st	2nd
FIRST YEAR	SEMESTER	
Major Instrument (151, 152)	1	1
Ensemble	1	1
Keyboard (5, 6): First-year piano	1	1
Basic Musicianship (31, 32)	3	3
Instrument/Voice Pedagogy	1	1
Speech 11 or Theatre 5	3	—
EDSP 5	3	3
Physical Education	1	1
Elective/Humanities Course	—	3
Race and Culture	1	or 1

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Major Instrument (153, 154)	2	2
Ensemble	1	1
Keyboard (7, 8): Second-year piano	1	1
Intermediate Theory (131, 132)	3	3
Theory Lab (133, 134)	1	1
Music History (11, 12)	3	3
Instrument/Voice Pedagogy	2	2
EDMU 281	3	—
Elective	—	3

Students apply to the Music Education major during the second semester of their sophomore year. Students must first be accepted before being permitted to enroll in required methods courses.

	1st	2nd
JUNIOR YEAR	SEMESTER	
Major Instrument (251, 252)	2	2
Ensemble	1	1
EDSC 215 or Approved Reading Course	3	—
EDSC 207	—	3
Advanced Theory (231)	3	—

Arranging (233)	3	—
Conducting (259)	—	3
EDMU 282	—	3
Instrument/Voice Pedagogy	2	1
Elective/Humanities Course	3	3

Students are required to complete a student teaching internship application before being assigned a placement.

	1st	2nd
SENIOR YEAR	SEMESTER	
Major Instrument (253)	2	—
Senior Recital (256)	—	2
Ensemble	—	1
Electronic Music (41)	—	3
Electives	—	6
EDSC 226, Student Teaching	12	—
EDFS 203, Soc., Hist. and Phil. Found of Educ.	—	3

A minimum of 124 approved semester hours is required for the degree including three semester hours of teaching reading for teaching licensure. Students must pass the piano proficiency examination prior to student teaching. Students are responsible for obtaining information regarding teaching licensure and degree requirements from the Office of Student Services, 528 Waterman.

Pedagogy classes are taken as available.

Teacher Education/Physical Education (Kindergarten through Twelve)

The program concentration in Physical Education Teacher Education qualifies candidates for licensure to teach in grades K-12. Course work around the program theme, Moving and Learning, includes a series of courses designed to provide a background to the field of physical education. Specialty courses assist the student in the development of physical education program content and teaching skills important in providing developmentally appropriate programs of physical education to children and youth in today's schools. Laboratory experiences in schools throughout the program aid students in recognizing the relationship between theory and practice.

Courses in general education and professional education as well as a liberal arts and sciences major/major concentration are also required.

Students meeting the licensing requirements are assigned a major field placement during their final year.

Typical Four-Year K-12 Teacher Education/ Physical Education Program

	1st	2nd
FIRST YEAR	SEMESTER	
English 1	3	—
History 11 or 12 or Poli. Sci. 21	—	3
Speech 11 or Theatre 5*	3	or 3
Computer Science 2	—	3
Race and Culture	—	1
EDHE 46	3	—
EDPE 21, Foundations	3	—
EDPE 157, Care & Prevention	—	3
PEAC Activities	2	2
Liberal Arts and Sciences Major Concentration	3	3

*or waiver

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Anat. & Phys. 19, 20	4	4
Psychology 1	3	—
EDPE 104, PETEX	—	5
PEAC Activities	2	2
Liberal Arts and Sciences Major		
Concentration	6	3
Elective	—	2

	1st	2nd
JUNIOR YEAR	SEMESTER	
Human Dev. 5	3 or	3
Sociology 1 or 19	3 or	3
EDPE 105	5	—
EDPE 155, Secondary Methods	—	3
EDPE 167, Sports Physiology	3	—
EDPE 220, Sports in Society	3	—
EDPE 240, Motor Learning	—	3
EDPE 260, Adapted Phys. Educ.	3	—
Liberal Arts and Sciences Major		
Concentration	3	6

Students are required to complete a student teaching application before being assigned a placement.

	1st	2nd
SENIOR YEAR*	SEMESTER	
Philosophy 1	3	—
EDPE 181, Student Teaching	—	12
EDPE 166, Kinesiology	3	—
EDSC 215, Reading	3	—
EDFS 203, Soc., Hist., and		
Phil. Found of Educ. or Elective	3	—
Liberal Arts and Sciences Major		
Concentration	6	—
Free Elective	—	3

*or waiver

Secondary Education (Seven through Twelve)

The Secondary Education Program prepares teachers to work with students with diverse needs in public school classrooms in grades 7 - 12. Through their work in the program, prospective teachers develop evidence that they can achieve the program theme of Teaching for Understanding. The challenges of a results-oriented curriculum are significant. Students are expected to show that they can make a difference among young people, without regard to race, sex, ethnic origin, or personal background. The design of Secondary Education Program curriculum is based on a belief that it is a professional teacher's responsibility to help his or her students understand themselves and their world in a way that improves their chances for success.

The secondary education curriculum includes a general education component of a minimum of 30 credits; a major of a minimum of 30 credits and a minor of a minimum of 18 credits, or a broadfield major of 48-50 credits; a professional education component of 33 credits; and electives. A minimum of 124 approved semester hours is required for the degree. The general guidelines for each of the components are listed below. Specific requirements as approved by the State Department of Education may be obtained from the Office of Student Services, 528 Waterman. Program information is also available from the Secondary Education Program Office, 533 Waterman. Full-time students enroll in 12 to 18 credits each semester. During the first two years, students concentrate on completing their general education, major, and minor requirements.

General Education Component

The general education courses must include the following courses. Two semester hours of physical education activities must be included.

English Composition and English Literature
Speech/Theatre (or demonstrated competence)
Science
Mathematics
U.S. History
American Government
Psychology 1
Humanities (Philosophy, Religion, Foreign Language)
Physical Education activities
Race and Culture

Academic Majors and Minors

Students who successfully complete their programs are recommended for licensure in their major, and may apply directly to the State Department of Education for an endorsement to also teach their minor. Students are therefore encouraged to select a minor which is also a licensure area.

Professional Education Component

By the time students begin the professional education component of their program as juniors, they should have completed most of their general education requirements and be well into their academic major (15-18 credits completed) and their academic minor (six-12 credits completed). Students need to plan to complete the remainder of their requirements as they complete the following phases of the professional education component:

I. Exploring Learners' Needs in the Context of Schools: EDFS 203; EDSC 207, 209.

Following completion of this first phase, students must submit their Initial Portfolio as their application to the Teacher Education Program. The Initial Portfolio documents content knowledge, commitment to working with young people, and understanding of learners' needs. Provided the Initial Portfolio is assessed as satisfactory, and the student has a minimum 2.5 GPA overall, in his or her major, and in the professional education course work, the student is accepted into Teacher Education and may begin work on the second phase of the program.

II. Designing and Adapting Instruction: EDSC 215, 216.

Subject methods for major: EDSC 225 (Social Studies), EDSC 227 (Science), EDSC 257 (Mathematics), EDSC 259 (Foreign Languages), or ENG 290 (English)

During the spring semester prior to the academic year in which students plan to student teach, they must submit their Internship Portfolios as the application for student teaching placement. Internship Portfolios must document content knowledge, commitment to working with young people, understanding of learners' needs, and ability to design and adapt curriculum and instructional materials. Students must meet the criteria for student teaching and attend an orientation meeting to initiate the student teaching placement process. Following a satisfactory review of a student's Internship Portfolio, he or she is nominated for a placement. Students must successfully complete the interview process and be approved for placement by the school in order to be confirmed for student teaching. In some cases, students must arrange to live off-campus during the student teaching semester.

If accepted and confirmed in a placement, all students complete a semester of full-time student teaching as the third phase of the program.

III. Achieving Results in Schools: EDSC 226, 230.

As students complete their degree program, they must submit their Licensure Portfolios which document content knowledge, commitment to working with young people, understanding of learners' needs, ability to design and adapt curriculum and instructional materials, and ability to teach for understanding with real students in a school setting. Recommendation for licensure is based both on successful completion of student teaching as well as on submission of a satisfactory Licensure Portfolio.

Information about application and assignment procedures for the Secondary Education Program may be obtained from the Department of Education Office, 533 Waterman Building. Students are responsible for obtaining information regarding the process and requirements, and for notifying the office as to changes in their status, address, or intentions for completion of their program.

Electives

All students in the College of Education and Social Services are required to enroll in an education course both semesters of their first year. Students need to plan to supplement these education electives with additional electives from the College of Education and Social Services or from other colleges, schools, and departments within the University.

Language Proficiency

A Language Proficiency Test is required for the Secondary Education Foreign Language majors.

Postbaccalaureate Teacher Preparation Program

The Postbaccalaureate Teacher Preparation Program is designed for individuals who have a bachelor's degree from an accredited four-year institution and who want to become licensed to teach in Vermont. The basic program fulfills the professional education requirements for state licensure. Areas and levels of licensure include: Grades K-12 — Art, Music, Physical Education; Grades K-6 (elementary) — general Elementary Education, Physical Education; Grades 7-12 (secondary) English, Foreign Language, Mathematics, Physical Education, Science, Social Studies.

Applicants to the Postbaccalaureate (Postbac) Teacher Preparation Program must meet the following entrance criteria:

1. Hold a bachelor's degree from an accredited institution of higher education.

2. Possess a general education background based on those studies known as liberal arts which embrace the broad areas of social and behavioral sciences, mathematics, biological and physical sciences, the humanities, and the arts.
3. Demonstrate a commitment to the teaching profession.
4. Have a minimum overall GPA of 2.5 in undergraduate course work.
5. For elementary candidates: Previous course work must include 30 semester hours in a single liberal arts discipline.
6. For secondary candidates: Previous course work must include a minimum of 30 semester hours with a minimum GPA of 2.5 in one of the academic areas listed below to meet Vermont state licensure requirements for the major academic concentration.

Majors: Biological Science, Chemistry, Earth Science, English, French, Geography, German, History, Latin, Mathematics, Physical Science, Physics, Spanish.

Broad Field Majors: Natural Science, Social Studies, Environmental Studies.

The Postbac curriculum includes both undergraduate and graduate courses. Nine to 12 graduate credits may apply toward the M.Ed. degree at UVM, contingent on acceptance into the Graduate College.

Applications for qualified applicants are reviewed on an on-going basis. Acceptance to begin in a given semester is based on availability of courses and placements at field sites. Requests for further information about the PBTP Program and application forms may be obtained by contacting the PBTP Coordinator, Department of Education, 533 Waterman Building.

Accelerated Licensure Master of Education Program for Secondary Education

UVM students who are in their third year of study for the bachelor's degree may apply to the Accelerated Licensure Master of Education program. Requests for further information and application forms may be obtained by contacting the Secondary Education Program Coordinator, Department of Education, 533 Waterman Building, 656-3356; e-mail: drowe@zoo.uvm.edu. Refer also to the Graduate College catalogue.



The College of Engineering and Mathematics

The college offers stimulating, professionally-oriented programs for students interested in careers in computer science, engineering, and mathematics. Computer science develops creative problem-solving ability, along with essential skills in current programming and computing environments. It offers the flexibility to gear studies toward business, science, engineering, mathematics, and the arts. Engineering education combines the study of mathematics and the physical, life, and engineering sciences with application to the analysis and design of equipment, processes, and complete systems. The breadth and flexibility of the engineering programs provide a sound background for engineering practice in public or private domains, for graduate study in engineering and science, and for further professional study in such fields as business, law, or medicine. Engineering management, offered in cooperation with the School of Business Administration, combines a basic education in an engineering discipline with the study of management concepts and techniques. Mathematics and statistics are designed to train students in critical thinking, problem solving, and sound reasoning, while developing a strong level of technical competence and a substantial breadth of exposure to other fields. Bachelor of Science degrees in each of these disciplines provide distinctive recognition based on challenging course work, valuable field experience, and intensive student-faculty interaction.

DEGREE PROGRAMS

The following Bachelor of Science degrees are offered in the College. Various options in each degree are described under the individual degree program.

- Civil Engineering
- Computer Science
- Electrical Engineering
- Engineering Management
- Mathematics
- Mechanical Engineering

ACADEMIC STANDARDS

In order to continue as a major in the College of Engineering and Mathematics, a student must achieve a 2.0 cumulative grade-point average at the end of the semester in which 60 cumulative credit hours have been attempted. No more than three repeated course enrollments are allowed during this 60-credit period. In the case of transfer students, applicable transfer credits will be included in determining the 60 credit hours, but grades in these courses will not be included in the grade-point average.

Students who receive a cumulative or semester grade-point average of less than 2.0 will be placed on trial. Students who have failed half their course credits for any semester, or who have had two successive semester averages below 2.0, or three successive semesters in which their cumulative grade-point average falls below 2.0, are eligible for dismissal.

To receive a degree, students must have a minimum cumulative average of 2.0. Students must complete 30 of the last 45 hours of credit in residence at UVM as matriculated students in the College of Engineering and Mathematics. Additional degree requirements are specified for each major.

No more than three grades of D, D+, or D- in the courses normally taken as part of the junior and senior curriculum in the student's major program will be acceptable. Requirements in each department are specified by the respective program curriculum committees.

A course may not be taken for credit if it is a prerequisite to one for which credit has already been granted, except by permission of the student's advisor.

Physical education courses in excess of the required two credits will not count toward requirements for graduation.

Students must comply with the degree requirements as stated in a single catalogue edition in place during the time they are enrolled. The catalogue edition to be followed is the one in effect at the time the student enrolls at UVM, unless the student requests in writing to follow an edition that is published subsequently during his/her enrollment at UVM. Students may not mix requirements from different catalogues.

AREAS OF STUDY

Minor in Computer Science A Computer Science Minor consists of 18 credits in computer science, at least nine of which are at the 100 level or above. Some Computer Science courses require additional prerequisites. The course plan for the Computer Science Minor must be approved by a CS faculty advisor.

Minor in Statistics A Statistics Minor consists of 15 credits of statistics courses, acquiring calculus knowledge equivalent to Math. 19 or 21, and gaining computer experience equivalent to Statistics 201 or a computer programming course (CS 16 or higher). Not more than seven credits of Statistics 11/51/111/140/141/143/211 may be counted. The course plan for the Statistics Minor must be approved by a Statistics faculty advisor. Contact the Statistics Program Director for complete guidelines.

Honors Thesis Program

The undergraduate thesis program, designed for the superior student with unusual initiative and intellectual curiosity, provides an opportunity to pursue a special program without the restrictions of classroom routine. The honors thesis program consists of reading, research, design, or creation in a curricular area of the student's choice, leading to a written thesis. At the time of graduation, the student's transcript and the graduation program will be appropriately denoted with "Honors Thesis" and the title of the thesis, provided that honor's level performance has been demonstrated.

The student must be matriculated in the College at the time of application for the thesis program and have a cumulative grade-point average of at least 3.0 for sophomore and junior work. The curriculum committee of the area offering the thesis course establishes the mechanics for thesis review and awarding of the grade. The thesis proposal must be approved by the College of Engineering and Mathematics Studies Committee prior to the Add/Drop deadline of the student's first semester or summer session of matriculation into the honor's thesis program. This should allow two semesters or a full summer and one semester of planned effort for the thesis research.

A thesis committee consists of at least three UVM faculty, at least two of whom are from the offering area. The chair of the committee, a permanent UVM faculty member, is also from the offering area. This committee serves to advise the student, approves of the thesis proposal before its submission to the Studies Committee, and approves of the oral defense of the thesis. The course grade is assigned by the committee chair based on consultation with the thesis committee. Six credits of effort are expected for the thesis, normally as three credits each in two semesters. Some programs within the College require senior projects as part of their prescribed curricula. Such projects can provide alternative opportunities to students interested in a design or research challenge.

Cooperative Education Program

Experiential learning is encouraged in all of our programs. Engineering, mathematics, and computer science majors find UVM's optional Cooperative Learning program (Co-op) a popular option. Co-op links students with employers in semester- and year-long preprofessional positions that convert classroom knowledge into valuable work experience. Students have a chance to explore and confirm career interests and develop contacts and exposure that can give them a competitive edge when they enter the job market. Co-op can also help finance a university education. All positions are paid a competitive wage or salary.

Computer Science Curriculum

Major Requirements The Computer Science curriculum provides a broad basic training in Computer Science with required courses in the theory of computing, hardware design, and software techniques. A minor is required so that students develop an appreciation for the applicability of their knowledge of computer science.

Students are normally required to take two credits of Physical Education activities (see Academic and General Information for exceptions). Requirements for the degree of Bachelor of Science in Computer Science are a minimum of 122 additional credits as follows:

Computer Science: 21, 26, 100, 101, 103, 104, 201, 222, 292, 224 or 243, 105 or 2xx, plus two additional 200-level courses.

Mathematics: 21, 22, 104; two of 121, 124, 173.

Electrical Engineering: 131

Statistics: 141, 151.

English: 1

Science Electives: 16 credits of approved Science Electives, as defined below.

Distributional Electives: 27 credits of approved distributional electives, as defined below.

Free Electives: 12 credits of free electives as defined below, excluding PEAC.

Minor: Students must complete an approved minor in a field other than computer science. Courses used to fulfill other requirements may be used to fulfill minor requirements.

Science Electives: Four of Physics 31 with 21, 42 with 22; Chemistry 31, 32; Biology 1, 2.

Distributional Electives: A student must complete at least two semester courses for a minimum of six credits in each of the two areas:

A. Social Science to include:

Anthropology	Political Science
Economics	Psychology
Geography	Sociology
History	

B. Humanities, Fine Arts, and Philosophy to include:

Art	Music
Drama	Philosophy
Language	Religion
Literature	Speech

Fifteen further credits in Humanities, Arts, and Social Sciences, to include at least one approved cultural diversity course. Approved cultural diversity courses are AH 95, AGRI 95, or any course approved by the College of Arts and Sciences as a course in Non-European Cultures or Race Relations and Ethnicity. Lists of currently approved courses are found under **General Requirements** in the College of Arts and Sciences section of this catalogue.

Free Electives: It is intended that free electives give the student unconstrained choice in the pursuit of new knowledge. Courses which are at a lower level than required courses are not generally accepted for free elective credit. All free electives must receive written approval of a Computer Science faculty advisor.

3-D Rule: No more than three grades of D, D+, or D- will be accepted in the following courses: CS 103 and higher, EE 131, courses used in the minor at the 100 level or above.

A typical program in Computer Science follows (where Elective includes Distributional and Free Electives, and the two PEAC credits are not indicated):

	1st SEMESTER	2nd
FIRST YEAR		
CS 21, Comp. Prog. I	4	—
Math. 21, Calculus I	4	—
Chem. 31, Intro. Chem.	4	—
Eng. 1, Written Expr.	3	—
Electives	—	6
CS 26, Comp. Prog. II	—	3
Math. 22, Calculus II	—	4
Chem 32, Intro. Chem.	—	4
	<u>15</u>	<u>17</u>

	1st SEMESTER	2nd
SOPHOMORE YEAR		
CS 100, Obj. Orient. Prog.	3	—
CS 101, Machine Org.	3	—
Math. 104, Math. Comput.	3	—
Physics 31 with 21	5	—
Electives	—	3
CS 103, Prog. Lang.	—	3
CS 104, Data Structures	—	3
Math. 124, Linear Alg.	—	3
Physics 42 with 22	—	5
	<u>14</u>	<u>17</u>

	1st SEMESTER	2nd
JUNIOR YEAR		
CS 243	3	—
EE 131, Dig. Comp. Des.	3	—
STAT 141, Statistics	3	—
Electives	3	6
CS 105, Software Engr.	3	—
CS 222, Comp. Architecture	—	3
Math. 173, Combinatorics	—	3
Stat. 151, Probability	—	3
	<u>15</u>	<u>15</u>

	1st SEMESTER	2nd
SENIOR YEAR		
CS 201, Operating Systems	3	—
CS 2xx	3	—
Electives	9	12
CS 2xx	—	3
CS 292	—	1
	<u>15</u>	<u>16</u>

Accelerated B.S./M.S. Program: A five-year combined Bachelor of Science plus Master of Science program is available. Consult the Graduate Catalogue for details.

Engineering Curricula

The College of Engineering and Mathematics offers professional programs in Civil, Electrical, and Mechanical Engineering accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). Interdisciplinary engineering programs offered by the College include Engineering Management offered in cooperation with the School of Business Administration.

Engineering involves decision making and problem solving in order to analyze, design, and create devices or systems or processes to solve human problems. Engineering education at UVM provides a thorough grounding in the engineering sciences and engineering design. Engineering design is developed and integrated in each student's program and culminates in a required major design experience which draws upon prior course work and which focuses on the issues and expectations of professional practice.

Courses in the humanities and social sciences (HSS) are required in engineering programs to broaden the student's understanding of humankind and relationships in human society. HSS electives **may not** be taken on a pass/fail basis. Sixteen to 18 credit hours, depending upon the major, must be selected from the list presented here. The courses are divided into three categories: (A) language and literature; (B) fine arts, philosophy, and religion; and (C) social sciences. At least nine credit hours must be in one category, and at least six credit hours must be in one department area. The Dean's Office and the Curriculum Committee review courses that are offered intermittently, and an updated list of these offered courses is available in the Student Services Office.

Students in **Civil Engineering, Engineering Management, and Electrical Engineering** must include a three-credit cultural diversity course as one of their required humanities and social sciences courses. A course should be chosen from the list of cultural diversity courses approved by the College of Arts and Sciences in the areas of either Non-European Cultures or Race Relations and Ethnicity in the U.S. This list is available in the department offices and the Student Services Office (103 Votey).

Category Approved Humanities Courses

- C Community Development and Applied Economics: 2, 58, 61, 157, 205, 208, 253, 254, 255
- C Anthropology: all courses* *except* 200, 290
- B Art: all Art History courses*
- C AH 95: Race and Culture
- C AGRI 95: Race and Culture
- C Botany: 6
- A ¹Chinese: all courses*
- A ¹Classics: all courses* (including Greek and Latin)
- C Economics: all courses* *except* 170, 270
- C Education/Early Childhood and Human Development: 60, 61, 62, 63, 65, 260
- A English: all courses* *except* 1, 4, 50, 117, 118, 119, and 120 and Film courses
- C Environmental Studies: 1, 2, 100, 70, 178
- A General Literature: all courses
- C Geography: 1-3, 51-61, 146-158, 170, 171, and 174-179
- A ¹German: all courses*
- A ¹Hebrew: all courses*
- C History: all courses*
- C Intl. Studies: 7-93
- A Japanese: all courses*
- C ²Military Studies: 2, 4

- B Music 3, all History and Literature courses*
- C Natural Resources: 2, 6
- C Nursing: 15, 20, 140
- B Philosophy: all courses*
- C Political Science: all courses* *except* 181
- C Psychology 1, 119, 130, 132, 152, 161, 205, 206, 233, 234, 237
- C Recreational Mgmt.: 30
- B Religion: all courses*
- C Resource Economics: 121
- A ¹Romance Languages: all courses*
- A ¹Russian: all courses*
- C Social Work: 2, 47, 48, 51, 165, 166, 167, 168, 169
- C Sociology: all courses* *except* 100, 274, 275, 285, 286, 288, 289
- B Theatre: 1, 136, 137, 138
- C Women's Studies: all courses*

*Special topics, seminars, honors, reading and research, or internships are not normally considered appropriate humanistic Social Study electives.

¹Grammar and conversational courses in a student's native language(s) are not acceptable for HSS credit. Elementary level language courses are not acceptable for HSS credit in areas where they duplicate credit received in high school, or as determined by UVM language instructors.

²Military Studies 2 and 4 are two-credit hour courses. Since most of the other HSS electives are three-credit hour courses, 2 and 4 together usually constitute one HSS course.

It is possible for engineering students to extend their undergraduate curriculum beyond the typical four-year schedules outlined on the following pages. Those who would like to complete requirements over a longer time period must meet with their faculty advisor to plan how this can be done.

Engineering students can become affiliated with their respective national professional engineering societies: the American Society of Civil Engineers, the Institute of Electrical and Electronics Engineers, the American Society for Engineering Management, and the American Society of Mechanical Engineers. Each of these organizations has an authorized student chapter at UVM. Engineering students demonstrating high scholarship attainment, combined with exemplary character, are recognized by membership in the Vermont Alpha Chapter of Tau Beta Pi, the national engineering honor society. In addition, all engineering students may become affiliated with the student chapter of the Society of Women Engineers. These student organizations present opportunities for students to conduct activities similar to those of the national societies.

TYPICAL FIRST-YEAR CURRICULUM FOR ENGINEERING STUDENTS* (see footnotes for exceptions)

	1st	2nd
FIRST YEAR	SEMESTER	
Engr. 1. Intro to Engr.	1	—
CS 21, Comp. Prog. I [†]	4	—
English 1, Written Exp.*	3	—
Chemistry 31, Intro.	4	—
Math. 21, 22, Calculus I & II	4	4
HSS Elective**	—	3
Physics 31 with 21, Fund. of Physics***	—	5
HSS Elective	—	3
Engr. 2, Graph.Comm.	—	2
Phys. Ed.	<u>1</u>	<u>1</u>
	17	18

*Some students will be asked to take English 1 in the second semester. These students should exchange an HSS course in the spring semester.

**In the second semester, the first-year Computer Engineering Option replaces one HSS elective with Physical Education.

***In the Electrical Engineering Options 3 and 4, Physics 31 with 21 is replaced by Chemistry 42 for Option 3, and Chemistry 32 for Option 4.

*First-year curriculum for Mechanical Engineering students begins on page 98.

[†]Civil Engineering students are advised to substitute CS16, Matlab.

Civil and Environmental Engineering

The curriculum in Civil Engineering leading to the degree of Bachelor of Science in Civil Engineering offers instruction in environmental engineering, hydraulics and hydrology, soil mechanics, structural engineering, and transportation engineering, as well as in the engineering sciences, mathematical sciences, natural sciences, humanities, and the social sciences.

There are two options leading to the degree of Bachelor of Science in Civil Engineering: General Civil Engineering and Environmental Engineering. The degree requires a minimum of 132 semester hours, plus two credits of physical education activities.

The goal of the curriculum is to prepare students for a variety of opportunities for their future in the profession. Students are encouraged to prepare for life-long learning to enhance their choices for further study or for employment in a global marketplace for engineering professionals. The curriculum also focuses on environmentally-responsible engineering practices.

Engineering design is developed and integrated in each student's program and culminates in a required major design experience which draws upon prior course work and which focuses on the issues and expectations of professional practice.

No more than three grades of D, D+, or D- will be acceptable in all required courses in engineering and engineering science including design and professional electives as stated in the curricula below for the junior and senior years.

OPTION 1 - General Civil Engineering

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Math. 121, Calculus III	4	-
Physics 42 with 22, Electromag. Modern Physics	5	-
CE 1, Statics	3	-
CE 10, Surveying	3	-
CE 12, Surveying Lab.	-	1
Statistics 143, Statistics for Engineers	3	-
Math. 271, Applied Math/Engineers	-	3
ME 12, Dynamics	-	3
Science Elective	-	4
CE 11, Geomtronics	-	3
HSS Elective ¹	-	3
	18	17

	1st	2nd
JUNIOR YEAR	SEMESTER	
CE 100, Mech. of Materials	3	-
CE 140, Transportation	3	-
CE 150, Environmental Engineering	3	-
CE 160, Hydraulics	4	-
CE 101, Materials Testing	-	2
CE 151, Water/Wastewater	-	3
CE 170, Struct. Analysis I	-	4
ME 40/44, Thermo/Heat Transfer	-	4
HSS Elective	3	3
	16	16

	1st	2nd
SENIOR YEAR	SEMESTER	
EE 100, Elect. Principles	4	-
CE 172, Steel Design	3	-
CE 171, Struct. Analysis II	3	-
CE 180, Geotechnical Principles	4	-
CE 125, Eng'g Econ./Decisions	-	3
CE 173, Reinf. Concrete Design	-	3
Design Elective ²	-	3
CE 176, Senior Design Seminar	-	1
Professional Elective ³	-	3
HSS Elective	-	3
	14	16

OPTION 2 - Environmental Engineering

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Math. 121, Calculus III	4	-
Physics 42 with 22, Electromag. Modern Physics	5	-
CE 1, Statics	3	-
CE 10, Surveying	3	-
CE 12, Surveying Lab.	-	1
Statistics 143, Statistics for Engineers	3	-
Math. 271, Applied Math/Engineers	-	3
ME 12, Dynamics	-	3
Chemistry 32	-	4
Biology 2	-	4
HSS Elective ¹	-	3
	18	18

	1st	2nd
JUNIOR YEAR	SEMESTER	
CE 100, Mech. of Materials	3	-
CE 150, Environmental Engineering	3	-
CE 160, Hydraulics	4	-
ME 40/44, Thermodynamics	4	-
CE 101, Materials Testing	-	2
CE 151, Water/Wastewater	-	3
CE 154, Environ. Analysis	-	2
CE 170, Struct. Analysis I	-	4
HSS Elective	3	3
	17	14

	1st	2nd
SENIOR YEAR	SEMESTER	
EE 100, Elect. Engrn. Concepts I	4	-
CE 140, Transportation	3	-
CE 180, Geotechnical Principles	4	-
Professional Elective ³	3	-
CE 125, Eng'g Econ./Decisions	-	3
CE 173, Reinf. Concrete Design	-	3
Design Electives ²	-	6
CE 176, Senior Design Seminar	-	1
HSS Elective	-	3
	14	16

²Design Electives are CE 141, 142, 161, 175, 181, 230, 250, 251, 253, 255, 256, 258, 261, 264, 265, 280, 283.

³Professional Electives are all Design Electives plus CE 171, 191, 192, any CE 200 level course, Natural Resource 278.

⁴May be replaced by CE 172, Steel Design.

Electrical and Computer Engineering

The curriculum in Electrical Engineering leading to the degree of Bachelor of Science in Electrical Engineering offers instruction in electrical and electronic circuits, electromagnetics, semiconductor devices, signal and system analysis, communications, digital systems, well as in physical and life sciences, humanities, and social sciences.

There are four options leading to an ABET accredited degree of Bachelor of Science in Electrical Engineering: General Electrical Engineering, Computer Engineering, Biomedical Engineering, and Premedical Engineering. The degree requires a minimum of 130 semester hours for Option 1, 128 semester hours for Option 2, 130 for Option 3, and 130 credit hours for Option 4. In addition, two credits of physical education activities are required.

Students may pursue a cross-college or departmental minor provided that they fulfill all Electrical Engineering degree requirements.

Engineering design is developed and integrated in each student's program and culminates in a required major design experience which draws upon prior course work and which focuses on the issues and expectations of professional practice.

An accelerated master's degree program leading to an M.S. in Materials Science is available. For specific program requirements refer to the Graduate College Catalogue.

No more than three grades of D, D+, or D- will be acceptable in all required courses in engineering, basic science, and computer science including all technical electives as stated in the catalogue for the junior and senior years.

OPTION 1: General Electrical Engineering

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Math. 121, Calculus III	4	-
EE 3, Linear Circuits Analysis I	3	-
EE 81, Sophomore Lab I	2	-
EE 131, Fund. of Digital Design	3	-
Physics 42 and 22, Electromag. & Mod. Phys.	5	-
Math. 271, Applied Math	-	3
HSS Elective	-	3
EE 82, Sophomore Lab II	-	2
HSS Elective [†]	-	3
EE 4, Linear Circuit Analysis II	-	3
Statistics 143/151	-	3
	<u>17</u>	<u>17</u>

	1st	2nd
JUNIOR YEAR	SEMESTER	
EE 120, Electronics I	3	-
EE 141, EM Field Theory I [†]	3	-
EE 163, Solid State Electronics I [†]	4	-
EE 171, Signals & Systems I [†]	4	-
EE 183, Jr. Lab I	2	-
HSS Elective [†]	3	3
EE 121, Electronics II	-	3
EE 142, EM Field Theory II [†]	-	3
EE 164, Solid State Electronics II [†]	-	3
EE 174, Intro to Comm. Sys. [†]	-	3
EE 184, Jr. Lab II	-	2
Phys. Ed.	-	1
EE 134, Microprocessors [†]	-	4
	<u>15 or 16</u>	<u>15 or 16</u>

	1st	2nd
SENIOR YEAR	SEMESTER	
Non-EE Eng. Sci. Elective ^{##}	3	-
EE Eng. Sci. Elective ^{***}	3	-
EE Tech. Elective ^{****}	3	-
Approved EE Design Sequence I ^{**}	3	-
EE 185, Senior Lab	1	-
Remaining EE Sequence	3-4	-
EE Tech. Elective ^{****}	-	3
EE 186, Sr. Lab II	-	1

EE Eng. Science Elective ^{***}	-	3
Remaining EE Sequence	-	6-7
Approved EE Design Sequence II ^{**}	-	3
	<u>16 or 17</u>	<u>16 or 17</u>

*Non-EE Engr. Sci. Electives: CE 1, 10, 150; ME 12, 40, 114.

**A 100- or 200-level EE design course sequence approved by an Electrical Engineering faculty advisor.

***EE Engr. Sci. Elective: 210, 228, 241, 242, 245, 246, 261; EE 242, 246.

****Tech. Electives: EE 113, 164, 210, 221, 222, 227, 228, 231, 241, 245, 250, 261, 266, 275, 276; CS 26, 100, 101, 103, 104, 201, 222; Phys. 170, 128, 201, 202; ME 12, 14, 40, 114, 150; CE 125; Chem. 162; Math. 104, 124, 173; Statistics 143, 151. All 200-level Math. and Statistics courses except for practicum, seminar, and special topics.

[†]No credit may be received for both EE 140 (offered in prior years) and the current EE 141.

^{##}Non-EE Eng. Sci. Elect. and an elective from spring semester can be exchanged.

[†]Pick two of the first 3 or 4 EE sequence; take remainder in fourth year.

[†]Required Humanities course - student must elect one from the list of approved cultural diversity courses in the College of Arts and Sciences in the areas of either Non-European Cultures or Race Relations and Ethnicity in the U.S.

OPTION 2: Computer Engineering

	1st	2nd
FIRST-YEAR	SEMESTER	
CS 21, Comp. Programming I	4	-
Math 21, Calculus I	4	-
Chemistry 31	4	-
English 1, Written Expression	3	-
Physical Education	1	-
Engr. 1	1	-
HSS Elective	-	3
Math 22, Calculus II	-	4
Physics 31 and 21	-	5
Physical Education	-	1
Engr. 2	-	2
	<u>17</u>	<u>15</u>

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Math. 121, Calculus III	4	-
Physics 42 and 22	5	-
EE 3, Linear Circuit Analysis I	3	-
EE 81, Sophomore Lab I	2	-
HSS Elective	3	-
Math 271, Applied Math	-	3
CS 26, Computer Programming II	-	3
EE 4, Linear Circuit Analysis II	-	3
EE 82, Sophomore Lab II	-	2
Statistics 143/Stat 151	-	3
HSS Elective	-	3
	<u>17</u>	<u>17</u>

	1st	2nd
JUNIOR YEAR	SEMESTER	
EE 120, Electronics I	3	-
Math 104, Fund. of Comp.	3	-
EE 163, Solid State I or EE 171	4	-
EE 131, Digital Design	3	-
HSS Elective	3	-
EE 121, Electronics II	-	3
CS 104, Data Structures	-	3
EE 134, Microprocessors	-	4
Approved CS Elective ^{****}	-	3
HSS Elective	-	3
	<u>16</u>	<u>16</u>

	1st	2nd
SENIOR YEAR	SEMESTER	
EE 171, Sig. & Syst. or EE 163	4	—
EE 183, Junior Lab I	2	—
EE 141, EM Field Theory I [#]	3	—
EE/CS Elective **	3	—
Approved EE Design Seq. I***	3	—
Approved CS Elective****	—	3
EE 184, Junior Lab II	—	2
Non-EE Engineering Sci. Elective*	—	3
EE/CS Elective**	—	3
Approved EE Design Seq. II***	—	3
HSS Elective	—	3
	15	17

*Non-EE Engr. Sci. Electives: See Option 1.

**Any 100- or 200-level CS or EE course approved by a Computer Engineering advisor.

***A 100- or 200-level EE course sequence approved by a Computer Engineering advisor.

****Any 100- or 200-level CS course approved by a Computer Engineering advisor.

[#]No credit may be received for both EE 140 (offered in prior years) and the current EE 141.

OPTION 3: Biomedical Engineering

	1st	2nd
FIRST-YEAR	SEMESTER	
CS 21, Comp. Programming I	4	—
Eng. 1, Written Exp.	3	—
Chem. 31, Intro. Chem.	4	—
Math 21, Calculus I	4	—
Engr. 1	1	—
Phys. Ed.	1	1
Math. 22, Calculus II	—	4
Chem. 42, Intro. Organic Chem.	—	4
HSS Elective	—	3
Engr. 2	—	2
HSS Elective	—	3
	17	17

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Math 121, Calculus III	4	—
Phys. 31 & 21, Intro. Phys.	5	—
EE 3, Linear Circuit Analysis I	3	—
EE 81, Sophomore Lab I	2	—
HSS Elective	3	—
Physics 42 & 22, E&M & Mod. Phys.	—	5
Math 271, Applied Mathematics	—	3
HSS Elective	—	3
EE 4, Linear Circuit Analysis II	—	3
EE 82, Sophomore Lab II	—	2
	17	16

	1st	2nd
JUNIOR YEAR	SEMESTER	
EE 120, Electronics I	3	—
EE 171, Signals & Sys. I	4	—
EE 183, Junior Lab I	2	—
EE 163, Solid St. Phys. I	4	—
Stat. 143/151	3	—
EE 184, Junior Lab II	—	2
EE 134, Microprocessors or EE 227	—	4-3
EE 121, Electronics II	—	3
ME 114, Intro. to Eng. Mechanics	—	3
Physiol. & Biophys. 101	—	4
	16	16-15

	1st	2nd
SENIOR YEAR	SEMESTER	
ME 207, Biomechanics I	3	—
Physiol. & Biophys. 102	4	—
EE 141, EM Field Theory I [#]	3	—
EE 185, Senior Lab I	1	—
EE Design Elective**	3	—
HSS Elective	3	—
EE 142, EM Field Theory II	—	3
EE 174, Intro. to Comm. Systems	—	3
EE 134 or 227, Bio. Meas. Inst. & Sys.	—	4-3
EE 186, Senior Lab II	—	1
EE 187, Senior Project	—	3
HSS Elective	—	3
	17	17-16

**EE Design Elective: EE 131, 187, 221, 222, 224, 231, 246, 250, 275, 276.

[#]No credit may be received for both EE 140 (offered prior years) and the current EE 141.

OPTION 4: Premedical Engineering

	1st	2nd
FIRST-YEAR	SEMESTER	
CS 21, Comp. Programming I	4	—
Eng. 1, Written Exp.	3	—
Chem. 31, Intro. Chem.	4	—
Math 21, Calculus I	4	—
Engr. 1	1	—
Phys. Ed.	1	1
Math 22, Calculus II	—	4
Chem. 32, Intro. Chem.	—	4
HSS Elective	—	3
Engr. 2	—	2
HSS Elective	—	3
	17	17

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Math. 121, Calculus III	4	—
Physics 31 & 21, Intro. Phys.	5	—
EE 3, Linear Circuit Analysis I	3	—
EE 81, Sophomore Lab I	2	—
HSS Elective	3	—
Phys. 42 & 22, E&M & Mod. Phys.	—	5
Math. 271, Applied Mathematics	—	3
EE 4, Linear Circuit Analysis II	—	3
EE 82, Sophomore Lab II	—	2
HSS Elective	—	2
	17	15

	1st	2nd
JUNIOR YEAR	SEMESTER	
Biology I, Prin. of Biology	4	—
Non-EE Eng. Sci. Elective*	3	—
Chem. 141, Organic Chem.	4	—
HSS Elective	3	—
Stat. 143/151	3	—
Biology 2, Prin. of Biology	—	4
EE 134, Microprocessors	—	4
HSS Elective	—	3
Chem. 142, Organic Chem.	—	4
	17	15

	1st	2nd
SENIOR YEAR	SEMESTER	
EE 141, EM Field Theory I [#]	3	—
EE 120, Electronics I	3	—
EE 183, Junior Lab I	2	—
EE 171, Signals & Sys. I	4	—

EE 163, Solid St. Phys. I	4	—
EE 174, Intro. Comm. Sys.	—	3
EE 121, Electronics II	—	3
EE 142, EM Field Theory II	—	3
EE 184, Junior Lab II	—	2
EE 187, Senior Project	—	3
EE Engr. Science Elective***	—	3
	<u>16</u>	<u>17</u>

*Non-EE Eng. Sci. Elective: See Option 1.

***EE Eng. Science Elective: See Option 1.

*No credit may be received for both EE 140 (offered in prior years) and the current EE 141.

Engineering Management

A curriculum in Engineering Management leading to the degree of Bachelor of Science in Engineering Management is offered in cooperation with the School of Business Administration. Engineering management is a broad discipline concerned with the art and science of planning, organizing, directing, and controlling activities that have a technical component. Designing, producing, selling, and servicing products in the marketplace require managers who possess both an ability to apply engineering principles and a skill in managing technical projects and people in technical jobs. The curriculum is designed to provide a basic education in an engineering discipline with the study of management concepts and techniques. The curriculum incorporates the equivalent of one-half year of study in the area of the humanities and social sciences. Candidates for this degree must earn a minimum of 128 semester hours, depending upon the engineering option selected, plus two credits of physical education activities. Engineering Management students are reminded that they must choose one HSS elective from the list of approved cultural diversity courses in the College of Arts and Sciences in the areas of either Non-European Cultures or Race Relations and Ethnicity in the U.S.

OPTION 1: Civil Engineering (131-132 hours)

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
CE I, Statics	3	—
CE 10, Surveying	4	—
Economics 11, Prin. of Economics	3	—
Math. 121, Calculus III	4	—
Bus. Ad. 60, Financial Acctng.	4	—
Math. 271, Applied Math.	—	3
Bus. Ad. 61, Managerial Acctng.	—	4
Physics 42, with 22, EM & Mod. Phys.	—	5
ME 12, Dynamics	—	3
ME 14, Mechanics of Solids	—	3
	<u>18</u>	<u>18</u>

	1st	2nd
JUNIOR YEAR	SEMESTER	
Stat. 143, Stat. for Engineers; or 211, Stat. Methods I	3	—
EE 100, Elect. Engr. Concepts I	4	—
Economics 12, Prin. of Economics	3	—
CE 160, Hydraulics	4	—
CE 125, Engr. Economics	—	3
CE 140, Trans. Engineering	3	—
Bus. Ad. 141, Mgmt. Info. Systems	—	3
CE 170, Structural Analysis	—	4
Bus. Ad. 173, Prod. & Oper. Analy.	—	3
HSS Elective	—	3
Phys Ed.	—	1
	<u>17</u>	<u>17</u>

	1st	2nd
SENIOR YEAR	SEMESTER	
Bus. Ad. 120, Mgmt. & Organ. Behav.	3	—
CE 150, Environmental Engr.	3	—
EMgt. 185, Senior Project	3	—
HSS Elective	3	—
Bus. Ad. 178, Quality Control; or Stat. 224, Statistics for Qual. & Prod.	3	—
Bus. Ad. 270, Quant. Analysis; or 271, Discrete Simulation	—	3
CE Conc. Elective*	—	3-4
EMgt. 175, Mgmt. of Technology	—	3
Engr. Mgmt. Elective**	—	3
	<u>15</u>	<u>12-13</u>

*CE Concentration electives: CE 11, 141, 151, 161, 171, 172, 175, 180, 260, 261, and ME 40 with 44.

**Engineering Management electives: Bus. Ad. 143, 144, 145, 168, 170, 174, 177, 192; and Statistics 221, 224, 225, 229, 231, 233, 237, 253.

OPTION 2: Electrical Engineering (130-131 hours)

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Economics 11, Prin. of Economics	3	—
Math. 121, Calculus III	4	—
Bus. Ad. 60, Financial Acctng.	4	—
EE 3, 4, Linear Circuit Analysis I, II	3	3
EE 81, 82, Sophomore Lab I, II	2	2
Math. 271, Applied Math.	—	3
Bus. Ad. 61, Managerial Acctng.	—	4
Physics 42 with 22, EM & Mod. Phys.	—	5
Phys. Ed.	1	—
	<u>17</u>	<u>17</u>

	1st	2nd
JUNIOR YEAR	SEMESTER	
Stat. 143, Stats. for Engr.; or Stat. 211, Stat. Methods I	3	—
Economics 12, Prin. of Economics	3	—
EE 131, Digital Design	3	—
CE 125, Engr. Economics	—	3
EE 120, 121, Electronics I, II	3	3
Bus. Ad. 141, Mgmt. Info. Systems	3	—
EE 134, Microcomputer Based Systems	—	4
Bus. Ad. 173, Prod. & Oper. Analy.	—	3
HSS Elective	—	3
	<u>15</u>	<u>16</u>

	1st	2nd
SENIOR YEAR	SEMESTER	
Bus. Ad. 120, Mgmt. & Organ. Behav.	3	—
EMgt. 185, Senior Project	3	—
Bus. Ad. 178, Quality Control; or Stat. 224, Stats. for Qual. & Prod.	3	—
HSS Elective	3	—
EE 163, Solid State Phys. Elect.; or 171, Signals & Systems	4	—
EE 231, Dgtl. Comp. Design	—	3
Bus. Ad. 270, Quant. Analysis; or 271, Discrete Simulation	—	3
EE Conc. Elective*	—	3-4
EMgt. 175, Mgmt. of Technology	—	3
Engr. Mgmt. Elective**	—	3
	<u>16</u>	<u>15-16</u>

*EE Conc. Electives: EE 113, 141, 163 (if not used to fulfill another requirement), 164 (163 is prerequisite), 171 (if not used to fulfill another requirement), 174 (171 is prerequisite), EE 183-184 (both courses are needed to meet this requirement), 210, 228, 250, and 251.

**Engineering Management electives: Bus. Ad. 143, 144, 145, 168, 170, 174, 177, 192; and Statistics 221, 224, 225, 229, 231, 233, 237, 253.

OPTION 3: Mechanical Engineering
(130-132 hours)

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
CE 1, Statics	3	—
ME 40 with 44, Thermodyn. and Heat Transfer	4	—
Economics 11, Prin. of Economics	3	—
Math. 121, Calculus III	4	—
Bus. Ad. 60, Financial Acctng.	4	—
Math. 271, Applied Math.	—	3
Bus. Ad. 61, Managerial Acctng	—	4
Physics 42 with 22, EM & Mod. Phys.	—	5
ME 12, Dynamics	—	3
ME 14, Mechanics of Solids	—	3
	18	18

	1st	2nd
JUNIOR YEAR	SEMESTER	
Stat. 143, Stats. for Engr.; or Statistics 211, Stat. Methods I	3	—
EE 100, Elect. Engr. Concepts I	4	—
Economics 12, Prin. Of Economics	3	—
ME 101, Engr. Materials	3	—
CE 125, Engr. Economics	—	3
ME 82, ME Laboratory I	—	1
ME 171, Design of Elements	—	3
Bus. Ad. 141, Mgmt. Info. Systems	3	—
EE 101 or ME 162, EE Concepts/Mfg. Eng.	—	3-4
Bus. Ad. 173, Prod. & Oper. Analy.	—	3
HSS Elective	—	3
Phys. Ed.	1	—
	17	16-17

	1st	2nd
SENIOR YEAR	SEMESTER	
Bus. Ad. 120, Mgmt. & Organ. Behav.	3	—
ME 143/161, Fluid Mechanics/Mfg. Engr.	3	—
EMgt. 185, Senior Project	3	—
HSS Elective	3	—
Bus. Ad. 178, Quality Control; or Stat. 224, Stats. for Qual. & Prod.	3	—
Bus. Ad. 270 or 272, Quant. Anal./Simulation	—	3
ME Conc. Elective*	—	3-4
EMgt. 175, Mgmt. of Technology	—	3
Engr. Mgmt. Elective**	—	3
	15	12-13

*ME concentration electives: ME 42, 111, 144, 161 (if not used to fulfill another requirement), 162 (if not used to fulfill another requirement), 172; and EE 131, 134.

**Engineering Management electives: Bus. Ad. 143, 144, 145, 168, 170, 174, 177, 192; and Statistics 221, 224, 225, 229, 231, 233, 237, 253.

Mechanical Engineering

The curriculum in Mechanical Engineering leading to a degree of Bachelor of Science in Mechanical Engineering offers instruction in design, solid and fluid mechanics, materials, manufacturing processes and systems, as well as in engineering, life and physical sciences, humanities, and social sciences.

There are four options leading to the degree of Bachelor of Science in Mechanical Engineering: (1) General Mechanical Engineering (126 semester hours); (2) Biomedical Engineering (126 semester hours); (3) Manufacturing Engineering (126 semester hours); (4) Premedical Engineering (129 semester hours). In addition, all options require two credits of physical education activities.

Engineering design is developed and integrated in each student's program and culminates in a required major design experience with draws upon prior course work and which focuses on the issues and expectations of professional practice.

An accelerated master's degree program leading to an M.S. in Mechanical Engineering or Materials Science is available to students in the general and manufacturing option and an M.S. in Biomedical Engineering is available to students in the biomedical engineering option. For specific program requirements refer to the Graduate College Catalogue.

No more than three grades of D, D+, or D- will be acceptable in all required courses in engineering, basic science, and computer science including all technical electives as stated in the Catalogue for the junior and senior years.

General Option (1)

	1st	2nd
FIRST YEAR	SEMESTER	
Eng. 1, Intro. to Engr.	1 ¹	—
Eng. 1, Writ. Exp.	3	—
Chem. 31, Intro.	4	—
Math. 21, 22, Cal. I&II	4	4
HSS Electives	1 ²	3
Engr. 2, Graph. Comm.	—	2
CS 21, Comp. Prog. I	4	—
Phys. Ed.	1	1
Phys. 31/21, Intro. Phys	—	5
	17	15

¹Recommended, not required.

²Race and Culture

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
ME 82 Mech Eng Lab I	—	1
Stat. 143, Basic Stat.	—	3
Math. 121, Calc. III	4	—
CE 1, Statics	3	—
ME 40, Thermo.	3	—
HSS Elective	3	—
Math. 271, Ap. Math. Engrs.	—	3
Phys. 42/22 EM&Mod Phys.	5	—
ME 12, Dynamics	—	3
ME 14, Mech. Solids	—	3
ME 42, Engr. Thermo.	—	3
	18	16

	1st	2nd
JUNIOR YEAR	SEMESTER	
ME 101, Materials	3	—
ME 111, System Dyn.	3	—
ME 143, Fluid Mech.	3	—
ME 123, 124, ME Lab II, III	2	2
EE 100, 101, Con. I&II	4	4
ME 144, Heat Trans.	—	3
ME 171, Des. of Elem.	—	3
HSS Elective	—	3
	15	15

	1st	2nd
SENIOR YEAR	SEMESTER	
ME 161, Manuf. Engr. I	3	—
ME 183, Mech. Eng. Lab IV	2	—
ME 185, Sr. Project	2	—
ME Elective ¹	3	3
Tech. Elective ²	3	3
ME Elective ³	—	4
ME 186, Sr. Project	—	1
HSS Electives	3	3
	16	14

¹ME course 200-level or higher.²Any 100-level or higher courses in EM and BA (except Stat. 111 and ME 114); or CS 14, CS 16, or CS 26; or Natural Sciences with approval of advisor.³ME 162 and 164, or ME 265 and 164.**Biomedical Option (2)**

	1st	2nd
FIRST YEAR	SEMESTER	
Eng. 1, Intro. to Engr.	1 ¹	—
Eng. 1, Writ. Exp.	3	—
Chem. 31, Intro.	4	—
Math. 21, 22, Calc. I&II	4	4
HSS Electives	1 ²	3
Engr. 2, Graph. Comm.	—	2
CS 21, Comp. Prog. I	4	—
Phys. Ed.	1	1
Phys. 31/21, Intro. Phys.	—	5
	17	15

¹Recommended, not required.²Race and Culture

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Stat. 143, Basic Stat.	—	3
Math. 121, Calc. III	4	—
CE 1, Statics	3	—
ME 40, Thermo.	3	—
HSS Elective	3	—
Math. 271, Appl. Math. Engrs.	—	3
Phys. 42/22, EM&Mod Phys.	5	—
ME 12, Dynamics	—	3
ME 14, Mech. Solids	—	3
ME 42, Engr. Thermo.	—	3
ME 82, Mech. Engr. Lab I	—	1
	18	16

	1st	2nd
JUNIOR YEAR	SEMESTER	
ME 101, Materials	3	—
EE 100, Concepts I	4	—
ME 143, Fluid Mechanics	3	—
ME 123, 124, ME Lab II, III	2	2
Anat. & Phys. 19 & 20	4	4
ME 171, Des. of Elem.	—	3
ME 144, Heat Trans.	—	3
EE 101, Elec. Engr. Concepts II	—	4
	16	16

	1st	2nd
SENIOR YEAR	SEMESTER	
ME 161, Manuf. Engr. I	3	—
ME 183, Mech. Eng. Lab IV	2	—
ME 185, Sr. Project	2	—
ME 207, Biomechanics I	3	—
ME 111, System Dynamics	3	—
Tech. Electives ¹	3	3
ME 208, Biomechanics II	—	3
ME 186, Sr. Project	—	1
HSS Electives	—	6
HSS Electives	—	3
	16	16

¹Any 100-level or higher courses in EM and BA (except Stat. 111 and ME 114); or CS 14, CS 16, or CS 26; or Natural Sciences with approval of advisor.**Manufacturing Option (3)**

	1st	2nd
FIRST YEAR	SEMESTER	
Eng. 1, Intro. to Engr.	1 ¹	—
Eng. 1, Writ. Exp.	3	—
Chem. 31, Intro.	4	—
Math. 21, 22, Calc. I&II	4	4
HSS Electives	1 ²	3
Engr. 2, Graph. Comm.	—	2
CS 21, Comp. Prog. I	4	—
Phys. Ed.	1	1
Phys. 31/21, Intro. Phys.	—	5
	17	15

¹Recommended, not required.²Race and Culture

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Stat. 143, Basic Stat.	—	3
Math. 121, Calc. III	4	—
CE 1, Statics	3	—
ME 40, Thermo.	3	—
HSS Elective	3	—
Math. 271, Appl. Math. Engrs.	—	3
Phys. 42/22, EM&Mod. Phys.	5	—
ME 12, Dynamics	—	3
ME 14, Mech. Solids	—	3
ME 42, Engr. Thermo.	—	3
ME 82, Mech Eng Lab I	—	1
	18	16

	1st	2nd
JUNIOR YEAR	SEMESTER	
ME 101, Materials	3	—
ME 111, System Dyn.	3	—
ME 143, Fluid Mech.	3	—
ME 123, 124, ME Lab II, III	2	2
EE 100, 101, Elec. Engr. Concepts I, II	4	4
ME 144, Heat Trans.	—	3
ME 171, Des. of Elem.	—	3
HSS Elective	—	3
	15	15

	1st	2nd
SENIOR YEAR	SEMESTER	
ME 161, Manuf. Engr. I	3	—
ME 183, Mech. Engr. Lab IV	2	—
ME 185, Sr. Project	2	—
Tech. Elective ¹	3	—
Tech. Elective ¹	3	3
ME 162, Manuf. Eng. II	—	3
ME 164, Manuf. Des. Proj.	—	1
ME 186, Sr. Project	—	1
HSS Electives	3	3
ME Elective ²	—	3
	16	14

¹Any 100-level or higher courses in Em and BA (except Stat. 111 and ME 114); or CS 14, CS 16, or CS 26; or Natural Sciences with approval of advisor.²ME course 200-level or higher.**Premedical Option (4)**

	1st	2nd
FIRST YEAR	SEMESTER	
Engr. 1, Intro. to Engr.	1 ¹	—
Eng. 1, Writ. Exp.	3	—
Chem. 31, 32, Intro.	4	4
Math. 21, 22, Calc. I&II	4	4
HSS Electives	1 ²	3

Engr. 2, Graph. Comm.	—	2
CS 21, Comp. Prog. I	4	—
Phys. Ed.	1	—
Phys. 31/21, Intro. Phys	—	5
	17	18

¹Recommended, not required.

²Race and Culture

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Stat. 143, Basic Stat.	3	—
Math. 121, Calc. III	4	—
CE 1, Statics	3	—
ME 40, Thermo.	3	—
Math. 271, Appl. Math. Engrs.	—	3
Phys. 42/22, EM&Mod. Phys.	—	5
ME 12, Dynamics	—	3
ME 14, Mech. Solids	—	3
Biol. 1/2, Princ. Biol.	4	4
Phys. Ed.	1	—
	18	18

	1st	2nd
JUNIOR YEAR	SEMESTER	
ME 101, Materials	3	—
ME 111, System Dyn.	3	—
ME 143, Fluid Mech.	3	—
ME 123, 124, ME Lab II, III	2	2
Chem. 141, 142, Org. Chem.	4	4
ME 144, Heat Trans.	—	3
ME 171, Des. of Elem.	—	3
HSS Elective	—	3
ME 82 Mech Eng Lab I	1	1
	15	16

	1st	2nd
SENIOR YEAR	SEMESTER	
ME 161, Manuf. Engr. I	3	—
ME 183, Mech Eng Lab IV	2	—
ME 185, Sr. Project	2	—
ME 207, Biomech. I	3	—
EE 100, 101, EE Concepts I, II	4	4
ME 265 Int. Prod. Dev.	—	3
ME 186, Sr. Project	—	1
HSS Electives	—	9
	14	17

Mathematics and Statistics Curricula

The College of Engineering and Mathematics offers programs in several areas of the mathematical sciences and their applications. The curriculum leads to the Bachelor of Science degree in Mathematics. The Applied and Interdisciplinary Mathematics option combines a major in applied mathematics with an approved concentration in an allied field that emphasizes the application of mathematics. The Statistics Program offers a major in Statistics within this degree.

Accelerated master's programs in Mathematics, Statistics, and Biostatistics are also offered. These programs allow students to earn both their B.S. and M.S. degrees in as little as five years. Details are given in the following sections for Mathematics and Statistics.

A Handbook for Mathematics and Statistics Majors, available from the Mathematics and Statistics department office or the Undergraduate Mathematics Student Organization, provides additional information on the mathematics and statistics degree programs, honors in mathematics and statistics, mathematics and statistics courses, advising and other support for students, extracurricular activities, career options, and other material of interest to potential majors.

Basic Curriculum

General Mathematics: Math. 21, 22, 121, 51, 52, 124; and one of Math. 231, 241, 250, 251.

Statistics: Math. 21, 22, 121, 51, 52, 124; and one of Statistics 241 or 261.

Applied and Interdisciplinary Mathematics: Math. 21, 22, 121; Math. 51 or Computer Sci. 21; Math. 124, 230, and 237.

In addition to the Basic Curriculum above, candidates for the degree of Bachelor of Science in Mathematics must complete the following requirements A, B, C, and D.

A. Major Courses

General Mathematics: A minimum of 24 additional hours in Mathematics, Statistics, or Computer Science courses numbered 100 or above. At least 18 hours must be in courses numbered 200 or above and no more than 12 hours may be chosen from Computer Science.

Statistics: A minimum of 24 additional hours in Mathematics, Statistics, or Computer Science courses numbered 100 or above, of which at least 21 hours must be in Statistics and include Stat. 141, 143 or 211; 151 or 251; 201; 221 or 227; and 281 or 293. At least 18 hours must be in course numbered 200 or above and no more than 12 hours may be chosen from Computer Science.

Applied and Interdisciplinary Mathematics: A minimum of 18 additional hours in Mathematics, Statistics, or Computer Science courses numbered 100 or above, 12 of which must be numbered 200 or above.

B. Allied Field Courses

Allied fields include the following:

Twenty-four hours selected from the following Allied Fields:

- | | |
|-------------------------|-----------------------------|
| (1) Physical Sciences | (6) Agricultural Sciences |
| (2) Biological Sciences | (7) Business Administration |
| (3) Medical Sciences | (8) Psychology |
| (4) Engineering | (9) Economics |
| (5) Computer Science | |
| (12 or higher) | |

Each student in consultation with his or her advisor must plan a sequence of Allied Field courses consistent with his or her professional and personal goals. A student interested in pursuing intensive studies in an area not specifically listed is encouraged to plan a program with his or her advisor and submit it to the appropriate departmental committee for review and approval. The requirements are as follows:

General Mathematics: Twenty-four hours selected from the above list of Allied Fields. Of these 24 hours, at least six must be in courses numbered 100 or above, and at least six must be taken in fields (1) to (5). Courses used to satisfy requirement A above may not be used to satisfy this requirement.

Statistics: Twenty-four hours selected from the above list of Allied Fields, including at least one laboratory experience in science or engineering. Of these 24 hours, at least six must be in courses numbered 100 or above and at least six must be taken in fields (1) to (5). Courses used to satisfy requirement A above may not be used to satisfy this requirement.

Applied and Interdisciplinary Mathematics: At least seven courses with a concentrated focus in an allied field. The major courses in requirement A and the Allied Field courses in requirement B must form a coherent program that has the written approval of the student's faculty advisor in the Mathematics and Statistics Department. When appropriate, and with the written approval of the advisor, at most three courses can overlap requirements A and B.

C. Humanities and Social Science Courses

(Courses used to satisfy requirement B above may not be used to satisfy this requirement.)

English 1, and 21 hours of courses selected from categories I, II, and III listed below. These 21 hours must be distributed over at least two categories, and at least six hours must be taken in each of the two categories chosen. Statistics majors must include Speech 11.

I. Language and Literature

Chinese	Greek
Classics	Hebrew
English	Italian
French	Linguistics
General Literature	Russian
German	Spanish

II. Fine Arts, Philosophy, and Religion

Art	Religion
Film	Speech
Music	Theatre
Philosophy	

III. Social Sciences

Anthropology	History
Communication Sciences	Political Science
Economics	Psychology
Geography	Sociology

D. Total Hours

A minimum of 120 semester hours is required, plus two hours in physical education activities. First-year students must include the one-hour Race and Culture course, Allied Health 95.

E. Grades

No more than three grades of D, D+, or D- in the 200/300 level Mathematics and Statistics courses used to satisfy the "Core Curriculum" and "Major Courses" requirements will be acceptable.

Mathematics

The mathematics curriculum is quite flexible. It is designed to provide a sound basic training in mathematics that allows a student to experience the broad sweep of mathematical ideas and techniques, to utilize the computer in mathematics, and to develop an area of special interest in the mathematical sciences.

In addition to the Bachelor of Science degree described here, the Department of Mathematics and Statistics also offers a Bachelor of Arts degree in the College of Arts and Sciences. A faculty advisor from Mathematics will assist students in determining which degree program best suits their individual needs and plans. Some of the career plans for which a well-designed major in mathematics can provide ideal preparation are highlighted below.

Recommendations for Major Courses

In consultation with their advisor, students should choose an area of interest within the mathematics major and plan a coherent program that addresses their interests in mathematics and its applications. This area might be one of those listed below, or it might be another area suggested by the student. As a guide, students interested in one of the areas would typically take at least three courses in that area, including all of the courses marked with an asterisk (*). In addition, students should take courses from at least two other areas. Because of its centrality in mathematics, students should make sure that they take at least one course

listed under Classical Mathematics. In following these recommendations, a course listed in more than one area is meant to be counted only once.

1. **Classical Mathematics.** Classical mathematics encompasses those areas having their roots in the great traditions of mathematical thought, such as geometry and topology, mathematical analysis, algebra and number theory, and discrete mathematics. Courses in this area include the following: *Math.* 173, 231, 236, 240, 241*, 242, 250, 251*, 252, 255, 257, 260, 264, 273, 331, 353.

2. **Applied Mathematics.** Applied Mathematics involves the use of mathematical methods to investigate problems originating in the physical, biological, and social sciences, and engineering. Mathematical modeling, coupled with the development of mathematical and computational solution techniques, illuminates mechanisms which govern the problem and allows predictions to be made about the actual physical situation. Current research interests of the faculty include biomedical mathematics, fluid mechanics and hydrodynamic stability, asymptotics, and singular perturbation theory. Courses in this area include the following: *Math.* 230*, 236, 237*, 238, 240, 272, 274.

3. **Computational Mathematics.** Computational mathematics involves both the development of new computational techniques and the innovative modification and application of existing computational strategies to new contexts where they have not been previously employed. Intensive computation is central to the solution of many problems in areas such as applied mathematics, number theory, engineering, and the physical, biological and natural sciences. Computational mathematics is often interdisciplinary in nature, with algorithm development and implementation forming a bridge between underlying mathematical results and solution of the physical problem of interest. Courses in this area include the following: *Math.* 173, 230, 237*, 238, 274, *Statistics* 201.

4. **Theory of Computing.** The mathematical theory of computing deals with the mathematical underpinnings allowing effective use of the computer as a tool in problem solving. Aspects of the theory of computing include: designing parallel computing strategies (graph theory), analyzing strengths and effectiveness of competing algorithms (analysis of algorithms), examining conditions which ensure that a problem can be solved by computational means (automata theory and computability), and rigorous analysis of run times (complexity theory). Courses in this area include the following: *Math.* 173, 223, 224*, 243, 273, 325, *Computer Science* 346, 353.

5. **Mathematics of Management:** Mathematics of Management involves the quantitative description and study of problems particularly concerned with the making of decisions in an organization. Problems are usually encountered in business, government, service industries, etc., and typically involve the allocation of resources, inventory control, product transportation, traffic control, assignment of personnel, and investment diversification. Courses in this area include the following: *Math.* 173, 221*, 222, 230, 236, 273, *Statistics* 141 or 211, *Statistics* 151 or *Math.* 207, *Statistics* 224, 241, 253.

6. **Actuarial Mathematics:** Actuaries use quantitative skills to address a variety of problems within business environments, and especially within the life insurance industry. Two professional organizations sponsor qualifying examinations and grant recognition to actuaries in the U.S. and Canada. A unique feature of the actuarial profession is that formal training is typically completed after graduation "on-the-job." Students planning an actuarial career can prepare for and complete some actuarial examinations prior to graduation. Several departmental courses serve as preparation for the examinations: *Math.* 21, 22, 121, and 124 for the first examination; *Statistics* 141 or 211,

(Statistics 151 or Math. 207)*, and (Statistics 241 or 261)* for the second examination; Statistics 221 or 231, 225, and 253 for the third examination; Math. 221, 222, and Statistics 252b for the fourth examination; and Math. 237 for the fifth examination.

7. **Probability and Statistical Theory.** Probabilistic reasoning is often a critical component of practical mathematical analysis or risk analysis and can usefully extend classical deterministic analysis to provide stochastic models. It also provides a basis for statistical theory, which is concerned with how inference can be drawn from real data in any of the social or physical sciences. Courses in this area include the following: Math. 222, 241, 242, (Statistics 151 or Math. 207)*, Statistics 241*, 252a, 252b, 261, 262, 270.

Recommendations for Allied Field Courses

Students who select the Applied and Interdisciplinary Mathematics option are required to consult with their advisor in setting up their concentration in an Allied Field, as described under requirements B. Students who select the General Mathematics option should also discuss Allied Field courses with their advisor and choose ones which complement their mathematical interests. Students with certain mathematical interests are advised to emphasize an appropriate Allied Field as indicated below and take at least six hours in courses numbered 100 or above in that field.

Applied Mathematics: Allied Field (1), (2), (3), (4), (6), or (9).

Computational Mathematics: Allied Field (4) or (5)

Mathematics of Management: Allied Field (7). Students interested in Mathematics of Management are advised to include Economics 11 and 12 in their choice of Humanities and Social Sciences courses, and to include Business Administration 60 and 61 in their choice of Allied Field courses. Those wishing to minor in Business Administration should contact the School of Business Administration and also take Business Administration 173 and two other courses chosen from Business Administration 168, 170, 174, 177, 178, and 272.

Statistics

Students receiving the B.S. in Mathematics may elect Statistics as their major. In addition, students receiving a B.A. degree in Arts and Sciences may concentrate in Statistics as a part of their Mathematics major. Statistics is a mathematical science extensively used in a wide variety of fields. Indeed, every discipline which gathers and interprets data uses statistical concepts and procedures to understand the information implicit in their data base. Statisticians become involved in efforts to solve real world problems by designing surveys and experimental plans, constructing and interpreting descriptive statistics, developing and applying statistical inference procedures, and developing and investigating stochastic models or computer simulations. To investigate new statistical procedures requires a knowledge of mathematics and computing as well as statistical theory. To apply concepts and procedures effectively also calls for an understanding of the field of application.

The curriculum is designed for students who plan to enter business, industry, or government as statisticians; to become professional actuaries; or to continue on to graduate school in statistics/biostatistics or another field where a quantita-

tive ability can prove valuable (business, operations research, medicine, public health, demography, psychology, etc.). The courses and curricula are administered through the Statistics Program Steering Committee which includes faculty from Statistics, College of Medicine Biometry Facility, Psychology, Natural Resources; and the Agricultural Experiment Station. Students are encouraged to undertake special projects to gain experience in data analysis, design, and statistical computing. Also, experience can be gained with local industry and other organizations for those interested in quality control, industrial statistics, survey and market research or forecasting, for example.

A minor in Statistics can be earned by taking a total of 15 credits of Statistics courses, Math. 19 or 21 or equivalent, and Statistics 201 or Computer Science 16 or above. Note that Mathematics majors can minor in Statistics as well.

Students earning the B.S. in Mathematics may earn a double major in Mathematics and Statistics by meeting the requirements of the Statistics major and earning an additional 18 credits in Mathematics, to include one of Math. 231, 241, 250 or 251.

Further details on the Statistics major and minor curricula may be obtained from the Director of the Statistics Program. The Handbook for Mathematics and Statistics majors, available from the Mathematics and Statistics department office, also provides a wealth of useful information.

Premedical Concentration in Statistics. Each student electing the Premedical Concentration in Statistics will fulfill the general requirements for the Statistics major. Statistics 200 is recommended as an important elective for students interested in medicine or allied health. In addition, the pre-medical concentration should include as a minimum two years of chemistry with laboratory (Chemistry 31, 32, or 35, 36, 37, 38, and 141, 142), at least one year of physics with laboratory (Physics 21, 31, 22, 42 or 21, 31, 125), and at least one year of biology with laboratory (Biology 1, 2). Exposure to medical research problems will be provided through supervised experiences in the College of Medicine Biometry Facility.

Concentration in Quality. Students interested in methods of quality control and quality improvement are encouraged to develop a concentration in quality. Regularly offered courses include Statistics 224 and 265. Related courses to consider include Business Administration 178 and others in the Production and Operations Management and Quantitative Methods area of Business Administration. Also, special topics courses in Total Quality Management have been offered as Statistics 95 (summers) and Statistics 295. Project experience in industrial quality control or in health care quality can be gained in Statistics 191 and 281, or 293-294.

Accelerated Master's Programs. A master's degree in Statistics or in Biostatistics can be earned in a shortened time by careful planning during the junior and senior years at UVM. For example, the M.S. could be earned in just one additional year, because six credits of undergraduate courses can also be counted concurrently towards the M.S. degree requirements. Students should discuss this possibility with the Statistics Program Director as soon as they think they may be interested in this program. Also consult the Graduate College catalogue.

The Division of Health Sciences

The Division of Health Sciences brings together several related programs: the School of Allied Health Sciences, the School of Nursing, and the College of Medicine.

The School of Allied Health Sciences

The School of Allied Health Sciences offers a variety of programs that provide clinical education experiences in a variety of appropriately approved hospitals and health facilities in Vermont and throughout the United States.

Applicants to Allied Health programs realize there is always an element of risk through exposure to infectious disease. Faculty and clinical staff make every effort to educate all students in appropriate modes of infection control in order to minimize these risks.

A Hepatitis B immunization series and a tetanus booster within the last 10 years are required prior to beginning the clinical experience. Immunization will be available through the Student Health Center for a discounted fee. In our experience, health insurance coverage for immunization varies. If and when coverage is provided, pre-authorization by the insurance provider is usually required. Fees generally range from \$120 to \$150. The University is not responsible for medical costs resulting from injury during clinical rotation, or during any other curricular activity, unless this injury is due to negligence by the University. All Allied Health students must carry their own health insurance. The Center for Health and Wellbeing, UVM Student Health, offers a student insurance plan for students who need health insurance.

ORGANIZATION

The School consists of three departments: Biomedical Technologies (which houses Biomedical Technology, Medical Laboratory Science, Nuclear Medicine Technology, and Radiation Therapy); Dental Hygiene; and Physical Therapy.

DEGREE PROGRAMS

The Bachelor of Science degree is awarded for:

- Biomedical Technology
- Medical Laboratory Science
- Nuclear Medicine Technology
- Physical Therapy
- Radiation Therapy

The Associate in Science degree is awarded for:

- Dental Hygiene

DEGREE REQUIREMENTS

Requirements for admission and for degrees offered are detailed under the specific areas of study which follow. The School of Allied Health Sciences reserves the right to require the withdrawal of any student whose academic record, performance, or behavior in the professional programs is judged unsatisfactory. All candidates for admission must be able to perform the essential clinical as well as academic requirements of Allied Health programs. These re-

quirements include: the capacity to observe and communicate; sufficient motor ability to perform physical diagnostic examinations and basic laboratory and clinical procedures; emotional stability to exercise good judgment and to work effectively in stressful situations; and intellectual ability to synthesize data and solve problems. Allied Health students must be able to meet these technical standards either with, or without, reasonable accommodations.

AREAS OF STUDY

Biomedical Technologies

Programs in the Department of Biomedical Technologies lead to Bachelor of Science degrees in Biomedical Technology, Medical Laboratory Science, Nuclear Medicine Technology, and Radiation Therapy. A core curriculum of approximately 40 credit hours serves students in all four programs. A cross-college minor in Molecular Diagnostics is available within the department. In addition to these undergraduate offerings, a Master of Science degree is offered by the department. The courses of study for each undergraduate degree program, the Accelerated Master's Program, and the Molecular Diagnostics minor are described below.

Graduates of all four programs are prepared for immediate employment, as well as to pursue postbaccalaureate education in the life sciences or professional education in medicine. Courses in the humanities and basic sciences are taken in the department and throughout the University, including the College of Medicine.

Requirements for admission are the same as the general University requirements, with the addition that applicants must have taken high school biology, mathematics through trigonometry, and chemistry; physics is highly recommended.

Bachelor of Science. A minimum of 127 semester credit hours including two credit hours of physical education, an overall grade-point average of 2.0, and a 2.0 GPA in professional courses are required for graduation in all four areas of study.

Departmental Honors. A student of at least junior standing whose minimum grade-point average is 3.0 in professional and basic science courses is eligible for invitation by the faculty to participate in the departmental honors program. Students who accept the invitation will be required to complete one of the following options: (1) participation in at least two senior level specialty seminars with completion of an independent reading thesis; (2) completion of an independent research project. Excellent and committed work will be required for a student to be granted Departmental Honors.

BIOMEDICAL TECHNOLOGY This four-year curriculum leading to the baccalaureate degree prepares students for careers in biotechnology. All students pursuing this degree option are required to complete an approved cross-college minor, as well as a research internship.

The student's major course of study blends basic science course work with intensive laboratory experiences. Special emphasis is placed on the application of molecular diagnostics to the health sciences industry.

	1st	2nd
FIRST YEAR	SEMESTER	
Chemistry 23 (or 31-32)	4	(4)
Biomedical Technologies 1	1	-
Biomedical Technologies 3	1	-

English	3	—
Math. (19 or higher)	3	—
Computer Science	—	3
Biomedical Technologies 34	—	3
Electives	3	6-10
Physical Education	1	1
AH 95 or AGRI 95, Race and Culture	1	—
	17	17

	1st	2nd
SECOND YEAR	SEMESTER	
Anatomy & Physiology 19-20	4	4
Biomedical Technologies 4	3	—
Biomedical Technologies 54	—	4
Biomedical Technologies 123	4	—
Chemistry 42	—	4
Statistics 141	3	—
Electives	3	3
	17	15

	1st	2nd
THIRD YEAR	SEMESTER	
Biochemistry 201	3	—
Biochemistry 202	1	—
Biochemistry 212 or 230	—	3
Biomedical Technologies 242	—	3
Biomedical Technologies 244	1	—
Biomedical Technologies 295	3	—
Biomedical Technology 293	—	1
Biomedical Technology 284-285	3	3
Pathology 101	3	—
Electives	3	6
	17	16

	1st	2nd
FOURTH YEAR	SEMESTER	
Biomedical Technology 281	4	—
Biomedical Technologies 296	2	—
Biomedical Technology 286	3	—
Biomedical Technology 298	—	3
Medical Laboratory Science 222	—	3.5
Medical Laboratory Science 231	3	—
Statistics 200	3	—
Electives	—	6.5
	15	13

Approved Minors. Students in the Biomedical Technology degree program are required to complete a cross-college minor. Students should contact the department administering the minor program and fill out the application. If accepted, the student will be assigned a "minor advisor" from that department who must approve all program plans and course selections. Students wishing to pursue a minor not listed should contact their advisor.

The following have been approved:

Accounting. Prerequisites are Economics 11, 12, Math. 19 or 21, Statistics 111 or 141. Requirements are Business Administration 65 or 60, 61, plus 161, 162, 164, 168.

Business Administration. Prerequisites are Economics 11, 12, Math. 19 or 21, Statistics 111 or 141. Requirements are Business Administration 65 or 60, 61, plus three courses from 120, 132, 141, 150, 173, 180.

Computer Science. Requirements are 18 hours in computer science to include at least nine hours at the 100 level or above. Note: Careful planning of prerequisite math courses will be required.

Consumer Economics. Requirements are Community Development and Applied Economics 58, 157, 158, 159,

127 or 155, plus one from 127, 128, 150, 151, 158, 291 or 296. Fifteen credit hours are required.

Microbiology and Molecular Genetics. Requirements are MMG 101, 102, plus seven hours from 201, 203, 211, 212, 222, 223, 225, 230 or 254.

MEDICAL LABORATORY SCIENCE This four-year curriculum leading to the baccalaureate degree is accredited by the National Accrediting Agency for Clinical Laboratory Sciences.

The clinical laboratory scientist is involved in the development, performance, and evaluation of laboratory tests that lead to assessment of health status, diagnosis of disease, and monitoring of therapeutic treatment. The clinical laboratory experience is obtained at Fletcher Allen Health Care — Vermont's Academic Medical Center (FAHC), the VT-NH Red Cross Blood Center, and the Vermont State Health Department Laboratories.

On completion of the baccalaureate program, graduates are eligible for national certification.

Upon consultation with an advisor, students may follow an individualized curriculum that can lead to certification in one of the clinical laboratory specialties (Microbiology, Chemistry, Hematology, or Immunology).

	1st	2nd
FIRST YEAR	SEMESTER	
Chemistry 23 (or 31-32)	4	(4)
Biomedical Technologies 1	1	—
Biomedical Technologies 3	1	—
English	3	—
Math. (10 or higher)	3	—
Computer Science	—	3
Biomedical Technologies 34	—	3
Electives	3	6-9
Physical Education	1	1
AH 95 or AGRI 95, Race and Culture	1	—
	17	16-17

	1st	2nd
SECOND YEAR	SEMESTER	
Anatomy & Physiology 19-20	4	4
Biomedical Technologies 54	—	4
Biomedical Technologies 123	4	—
Statistics 111 or 141	3	—
Chemistry 42	—	4
Electives	6	3
	17	15

	1st	2nd
THIRD YEAR	SEMESTER	
Biochemistry 201	3	—
Biochemistry 202	1	—
Biochemistry 212 or 230	—	3
Biomedical Technologies 242	—	3
Biomedical Technologies 244	1	—
Biomedical Technologies 295	3	—
Biomedical Technology 293	—	1
Med. Lab. Science 262	—	4
Microbiology 222	—	4
Pathology 101	3	—
Allied Health 120	3	—
Electives	3	—
	17	15

	1st	2nd
FOURTH YEAR	SEMESTER	
Med. Lab. Science 201, 220, 230, 250, 256, 260	5-6	5-6
Med. Lab. Science 222	—	3.5
Med. Lab. Science 255	3	—

Med. Lab. Science 231	3	—
Biomedical Technologies 110-111	0.5	0.5
Biomedical Technologies 296	2	—
Elective	3	3
	16.5-17.5	12-13

An affiliation agreement with Trinity College, Burlington, Vermont, allows Trinity students who meet the requirements of the program to complete their senior year requirements at UVM.

Option: Cytotechnology The Department of Biomedical Technologies, in cooperation with the School of Cytotechnology at Fletcher Allen Health Care, offers a baccalaureate curriculum with specialization in Cytotechnology. Cytotechnology involves the diagnosis of human disease through microscopic study of cells. The primary function of a cytotechnologist is to prepare and evaluate a variety of cellular samples for the presence of cancer and precancerous lesions. The program is accredited by the Committee on Accreditation of Allied Health Education (CAAHEP).

Requirements for admission are the same as those for the medical laboratory science curriculum. Admission to the University does not guarantee acceptance into the FAHC School of Cytotechnology. A separate application process for the senior year is required during the junior year. On completion of the baccalaureate program, graduates are eligible to take the national certification exam.

The minimum requirements for the first three years at the University include 20 semester hours of biological science, eight semester hours of chemistry, and three semester hours of mathematics. Students may follow the medical laboratory science curriculum with appropriate substitutions or may satisfy the requirements through other majors. Recommended biological science courses include a combination of the following: general biology, anatomy-physiology, genetics, microbiology, histology, parasitology, cell biology, and embryology.

	1st	2nd
FOURTH YEAR	SEMESTER	
Medical Cytology I-II Lecture	4	4
Medical Cytology I-II Lab	4	4
Cytology Seminar	2	—
Laboratory Techniques	—	3
Cytology Practicum	—	12
	10	23

A minimum of 33 credit hours in the senior year and a total of 127 credit hours are required for the B.S. degree.

NUCLEAR MEDICINE TECHNOLOGY This four-year curriculum leading to the baccalaureate degree is accredited by the Joint Review Committee on Educational Programs in Nuclear Medicine Technology.

Nuclear medicine technology is the medical specialty concerned with the use of small amounts of radioactive materials for diagnosis, therapy, and research. Though many other diagnostic techniques are available, nuclear medicine uniquely provides information about both the structure and function of virtually every major organ system.

	1st	2nd
FIRST YEAR	SEMESTER	
Biomedical Technologies 1	1	—
Biomedical Technologies 3	1	—
Biomedical Technologies 34	—	3
Chemistry 23 (or 31-32)	4	(4)
Computer Science	—	3
English	3	—
Math. (10 or higher)	3	—

Psychology 1	—	3
Electives	3	3-6
Physical Education	1	1
AH 95 or AGRI 95, Race and Culture	1	—
	17	16-17

	1st	2nd
SECOND YEAR	SEMESTER	
Anatomy & Physiology 19-20	4	4
Biomedical Technologies 4	3	—
Chemistry 42	—	4
Nuclear Medicine Tech. 51	3	—
Nuclear Medicine Tech. 52	—	3
Nuclear Medicine Tech. 75	2	—
Statistics 111 or 114	—	3
Electives	3	3
	15	17

	1st	2nd
THIRD YEAR	SEMESTER	
Biochemistry 201	3	—
Biochemistry 202	1	—
Biomedical Technologies 110	—	0.5
Biomedical Technologies 242	—	3
Biomedical Technologies 244	1	—
Biomedical Technologies 295	3	—
Biomedical Technology 293	—	1
Nuclear Medicine Tech. 153	3	—
Nuclear Medicine Tech. 154	—	3
Nuclear Medicine Tech. 155	3	—
Nuclear Medicine Tech. 156	—	3
Nuclear Medicine Tech. 163	1	—
Nuclear Medicine Tech. 164	—	2
Pathology 101	3	—
Electives	—	3
	18	15.5

	1st	2nd
FOURTH YEAR	SEMESTER	
Biomedical Technologies 296	2	—
Nuclear Medicine Tech. 263	3	—
Nuclear Medicine Tech. 264	—	15
Allied Health 120	3	—
Electives	6	—
	14	15

Clinical education takes place at one of our clinical affiliations. The initial experience is obtained at the Fletcher Allen Health Care (FAHC). At least one experience will be at an affiliation outside Burlington which will require additional room, meals and transportation expenses.

CLINICAL AFFILIATIONS

NUCLEAR MEDICINE TECHNOLOGY

Central Maine Medical Center, Lewiston, ME
 Central Vermont Hospital, Berlin, VT
 Hartford Hospital, Hartford, CT
 Lahey Clinic, Burlington, MA
 Maine Medical Center, Portland, ME
 Mercy Hospital, Portland, ME
 Dartmouth-Hitchcock Medical Center, Hanover, NH
 Fletcher Allen Health Care, Burlington, VT
 Pharmalogic, LTD, Williston, VT
 Winchester Memorial Hospital, Winchester, MA

Note: The above list of clinical affiliations is subject to change.

Students who already have the Associate in Science degree in Nuclear Medicine Technology may apply for transfer into the baccalaureate program. Requirements are a total of 127 credit hours for graduation, including approved transfer credits

from their associate degree. Additional courses required for the baccalaureate degree are Psychology 1, Statistics 111 (or 141), Chemistry 42 (or 141 and 142), Pathology 101, Biochemistry 201 and 202, Biomedical Technologies 34, 242, 244, 295, Biomedical Technology 293, and Allied Health 120.

RADIATION THERAPY This four-year curriculum leading to the baccalaureate degree is accredited by the Joint Review Committee on Education in Radiologic Technology.

Radiation Therapy is the medical specialty that uses high energy radiations (x-rays, gamma rays, electron beams, etc.) in the treatment of disease. Radiation therapists are responsible for daily treatments, providing support for patients as they cope with their disease, and contributing as vital members of the medical team responsible for the patient's treatment plan.

	1st	2nd
FIRST YEAR	SEMESTER	
Biomedical Technologies 1	1	—
Biomedical Technologies 3	1	—
Biomedical Technologies 34	—	3
Chemistry 23 (or 31-32)	4	(4)
Computer Science	—	3
English	3	—
Math. (10 or higher)	3	—
Psychology 1	—	3
AH 95 or AGBI 95, Race and Culture	1	—
Physical Education	1	1
Electives	3	3-6
	17	16-17

	1st	2nd
SECOND YEAR	SEMESTER	
Anatomy & Physiology 19-20	4	4
Biomedical Technologies 4	3	—
Physics 11-12	4	4
Radiation Therapy 52	—	2
Radiation Therapy 75	2	—
Sociology	—	3
Electives	3	3
	16	16

	1st	2nd
THIRD YEAR	SEMESTER	
Allied Health 120	3	—
Biomedical Technology 293	—	1
Biomedical Technologies 295	3	—
Nutrition 43	3	—
Pathology 101	3	—
Radiation Therapy 144	—	1
Radiation Therapy 173	2	—
Radiation Therapy 174	—	1
Radiation Therapy 176	—	3
Statistics 111 (or 141)	—	3
Electives	2	6
	16	15

	1st	2nd
FOURTH YEAR	SEMESTER	
Biomedical Technologies 296	2	—
Radiation Therapy 223	3	—
Radiation Therapy 274	—	14
Radiation Therapy 275	2	—
Radiation Therapy 277	4	—
Radiation Therapy 280	—	3
Elective	3	—
	14	17

Clinical education takes place at one of our clinical affiliations. The initial experience is obtained at the Fletcher Allen Health Care (FAHC). At least one experience will be an affiliation outside Burlington which will require additional room, meals, and transportation expenses.

CLINICAL AFFILIATIONS

RADIATION THERAPY

Dartmouth-Hitchcock Medical Center, Hanover, NH
Elliot Hospital, Manchester, NH
Fletcher Allen Health Care, Burlington, VT
Massachusetts General Hospital, Boston, MA

Note: The above list of clinical affiliations is subject to change.

Students who already have the Associate in Science degree in Radiation Therapy may apply for transfer into the baccalaureate program. Requirements are a total of 127 credit hours for graduation including approved transfer credits from their Associate degree. Additional required courses for the baccalaureate degree are Chemistry 23 (or 31 and 32), Physics 11 and 12, Allied Health 120, Pathology 101, Biomedical Technology 293, Biomedical Technologies 295, and 12 credit hours of special topics (Biomedical Technologies 299) in the concentration areas of dosimetry, topographical anatomy, patient care, treatment planning, and quality assurance. These independent studies will be coordinated by the student's advisor.

CROSS-COLLEGE MINOR. The Department of Biomedical Technologies offers a cross-college minor in Molecular Diagnostics. The minor emphasizes the applications of molecular biology techniques to diagnostic testing. The program of study includes 15-16 credit hours of both didactic and laboratory experiences. Prerequisite courses include at least one semester each of general and organic chemistry and two semesters of biology, or anatomy and physiology. Acceptance into the program requires the completion of the prerequisite courses with a GPA of 2.5 or better. An application is required for admission and may be obtained in 302 Rowell Building.

Required Courses: Immunology (BMT 242), Immunology Laboratory (BMT 244), Molecular Applications (BMED 281), Research Concepts (BMED 293), Undergraduate Research (BMED 297); plus 3-4 credit hours from BMT 4, 34, 54, 123, MLS 222, 231, 255.

ACCELERATED MASTERS PROGRAM. A master's degree in Biomedical Technology can be earned in a shortened time by careful planning in the junior and senior years at UVM. Students should discuss this possibility with the Department Graduate Program Director as soon as they think they might be interested in this program. For example, the M.S. could be earned in one additional year, as six credits of undergraduate courses may also be counted concurrently towards the M.S. degree requirements. Applications and further information may be obtained from the Graduate Program Director in the Department. Also consult the Graduate College catalogue for further information.

Dental Hygiene

The Department of Dental Hygiene offers a two-year curriculum leading to an Associate in Science degree and a Certificate in Dental Hygiene.

The program is accredited by the Commission on Dental Accreditation of the American Dental Association. Graduates are eligible to write the National Board Examination in Dental Hygiene. The program meets requirements for licensure determined by most states.

Requirements for admission to Dental Hygiene are the same as for the general University. Applicants are welcome to visit the department to discuss dental hygiene with faculty and students.

The courses of study are designed to give the student a well-rounded foundation in basic sciences, specific knowledge in dental sciences, and an understanding of the humanities. Clinical experience is obtained in the Department's dental hygiene clinic where patients of all ages present with a variety of clinical problems. Dental hygiene students also have an opportunity to increase their communication skills through oral health education presentations in area schools.

The dental hygiene curriculum is highly structured, and semester course loads are heavy. Students who have the opportunity to complete liberal arts and/or basic science courses prior to entering the program are encouraged to do so. Further guidance can be obtained by calling or writing to the departmental office. First-year Dental Hygiene students should add approximately \$1,500 for an instrument kit and clinical attire.

	1st	2nd
FIRST YEAR	SEMESTER	
Dental Hygiene 1, 2	4	2
Dental Hygiene 11, 12	3	3
Dental Hygiene 61	—	2
Nutritional Sci. 43	3	—
Anatomy & Physiology 19-20	4	4
Chemistry 23	—	4
English 1	3	—
Psychology 1	—	3
Physical Education	<u>1</u>	<u>—</u>
	18	18

	1st	2nd
SECOND YEAR	SEMESTER	
Dental Hygiene 62	—	3
Dental Hygiene 91	2	—
Dental Hygiene 141	3	—
Dental Hygiene 143	3	—
Dental Hygiene 146	—	2
Dental Hygiene 181-182	4	4
Microbiology BMT 54 or MMG 65	4	—
Sociology or Anthropology	—	3
Speech 11	—	3
Elective	—	3
AH 95 or AGRI 95, Race and Culture	<u>1</u>	<u>—</u>
	17	18

A minimum of 71 approved credit hours, including one hour of physical education, and a minimum grade-point average of 2.0 are required for the Associate in Science degree in this curriculum. A grade of C or better is required for all professional courses.

Physical Therapy

The Department of Physical Therapy offers a four-year curriculum leading to a Bachelor of Science degree. The program is accredited by the Commission on Accreditation in Physical Therapy Education, American Physical Therapy Association. First-year students admitted in the fall of 1998 will be the last class accepted in the current physical therapy undergraduate program. Transfer into the B.S. program at the sophomore level may be possible in 1998 and 1999, on a space available basis.

A new physical therapy program leading to a Master of Physical Therapy (MPT) is currently under institutional review. If approved, students may enter the new program in the fall of 2000.

In the first two years of the Physical Therapy program, students will concentrate on the necessary prerequisite courses in the humanities, sciences, and social studies. In the sophomore year, the student will begin the basic sciences of anatomy and physiology and the professional program in Physical Therapy, which continues throughout the junior and senior years. The junior and senior years are devoted to the professional program, and clinical education experiences during that time provide the student with concurrent opportunities to apply acquired knowledge and skills.

	1st	2nd
FIRST YEAR	SEMESTER	
Psychology 1	3	—
Chemistry 23 and 26	4	4
Math. 10, 19, or above by placement	3	—
English 1	—	3
Psych. 152	—	3
Elective (required)*	3	3
Physical Education	1	1
Elective (optional)*	3	3
AH 95 or AGRI 95, Race and Culture	<u>1</u>	<u>—</u>
	15-18	14-17

*First or second semester.

	1st	2nd
SECOND YEAR	SEMESTER	
Physics 11, 21	5	—
Physics 12, 22	—	5
Anatomy 201	5	—
Physiology & Biophysics 101	—	4
Physical Therapy 41	3	—
Physical Therapy 120	—	6
Physical Therapy 142	—	1
Early Childhd. and Human Dev. 5	<u>3</u>	<u>—</u>
	16	16

	1st	2nd
THIRD YEAR	SEMESTER	
Anatomy 202	3	—
Physiology & Biophysics 102	4	—
Pathology 101	3	—
Physical Therapy 121-122	4	3
Physical Therapy 124	—	5
Physical Therapy 126	—	1
Physical Therapy 131-132	2	2
Physical Therapy 143-144	1	2
Statistics 111	—	3
Pharmacology 190	<u>—</u>	<u>2</u>
	17	18

SUMMER PT 156 Clinical Education (8 weeks - 4 credit hours)

	1st	2nd
FOURTH YEAR	SEMESTER	
Physical Therapy 125	2	—
Physical Therapy 127	5	—
Physical Therapy 133	3	—
Physical Therapy 145	2	—
Physical Therapy 158; 160*	—	12
Physical Therapy 175 (optional)	2	—
Physical Therapy 177	<u>3</u>	<u>—</u>
	15-17	12

*PT 158, 160 Clinical Education (8 weeks each, 6 credit hours each)

A minimum of 127 credit hours are required for graduation, to include two credit hours of physical education, and six credit hours of electives, three of which must be in the humanities. Because the baccalaureate program in Physical Therapy may be discontinued in 2002, students should plan

to complete their degree requirements by August 31, 2002.

A minimum grade-point average of 2.0 is required for the baccalaureate degree in this curriculum. The minimum grade allowed in a professional course is C-; in clinical education the minimum grade is S. At the end of each semester and prior to each Clinical Education placement, the faculty review the development of professional attitudes and behaviors of the students in this program as well as the quality of their academic record.

The full-time Clinical Education Program (PT 156, 158, 160) is an integral part of the curriculum, offering the student opportunities to apply academic knowledge in the clinical setting. The program is widely affiliated throughout the U.S., but focused in the Northeast. Students affiliating will be responsible for the cost of medically required vaccinations, transportation, and living expenses (including room and board) during the eight-week period of the junior summer and the 16-week period of the senior spring semester. All students in the program are required to carry professional liability insurance prior to enrolling in the clinical education experience. Students should plan their finances to include these expenses.

The affiliations will be scheduled as indicated unless insufficient clinical sites are available; in that case, students may be required to complete clinical affiliation requirements in an alternate time period.

The School of Nursing

The School of Nursing offers an undergraduate educational program to prepare qualified individuals for the practice of professional nursing and a graduate program for advanced nursing practice. The program leads to the Bachelor of Science degree and is approved by the Vermont State Board of Nursing and accredited by the National League for Nursing, the national accrediting agency for schools of nursing.* Graduates of the program are eligible to apply for registered nurse licensure.

Applicants must satisfy the general admission requirements for the University.

Financial Aid is available in the form of scholarships, loans, awards, and employment (see section on Financial Aid).

The offices of the School of Nursing are located in the Rowell Building.

**The National League for Nursing Accrediting Commission, 350 Hudson Street, New York, NY 10014 (212-989-9393) serves as a resource for information regarding tuition, fees, and length of program.*

DEGREE REQUIREMENTS

A minimum 2.0 grade-point average is required for graduation. Grades in nursing focus courses are based on achievement in theory and in clinical/laboratory practice, both of which must be satisfactory to receive a passing grade. The School of Nursing reserves the right to require the withdrawal from nursing of any student whose health, academic record, or performance and behavior in nursing is judged unsatisfactory.

PROFESSIONAL RESPONSIBILITY

The School of Nursing at The University of Vermont endorses the following statement of the ANA Code for Nurses:

The Nurse provides services with respect for human dignity and the uniqueness of the client, unrestricted by considerations of social or economic status, personal attributes, or the nature of health problems.

Applicants to nursing must realize that there has always been an element of risk through exposure to infectious disease. Faculty will make every effort to educate all students in appropriate modes of infection control in order to minimize these risks. In this regard, each student's personal health is important. The Student Handbook details the health requirements for the major (e.g. Hepatitis B immunization). Additional clinical requirements, such as CPR certification, and professional liability insurance are also addressed in the Student Handbook.

All students in the program are responsible for their own transportation to and from the agencies which are used for clinical experiences. Clinical agencies are located throughout the State of Vermont as well as in New York and New Hampshire.

AREA OF STUDY

The curriculum leading to the baccalaureate degree is designed to prepare qualified students to provide professional nursing care to individuals of all ages, families from diverse cultural backgrounds and groups in any setting offering health care services such as hospitals, extended care facilities, and community health agencies, such as schools, home health agencies, or occupational health services. The required courses in the humanities and social sciences complement the preparation for nursing as well as contribute to a well-rounded education. Graduates are eligible to apply for licensure as registered nurses and have the foundation for continued formal study in nursing at the master's and doctoral levels.

The curriculum, conducted in four academic years, provides balance in general and professional education. Courses in the sciences — biological, physical, social, and humanities — serve as a foundation for the nursing courses.

A minimum of 127 approved semester hours is required for the Bachelor of Science degree. A grade of C- is required in selected cognate nursing prerequisite courses (see Student Handbook for details). A grade of C or better is required in all nursing major courses. Full-time and part-time plans of studies are available. All students are required to complete the program within six years after admission.

A typical full-time program of studies follows:

	1st	2nd
FIRST YEAR	SEMESTER	
English	3	3
Psychology 1, 152	3	3
Chemistry 23, 26	4	4
Sociology 1*	—	3
Environmental Studies **	4	—
Electives	3	3
Physical Education	<u>1</u>	<u>1</u>
	18	17

*any sociology course under 100

**ENVS 1, 2 or 7 or ENSC 1

	1st	2nd
SECOND YEAR	SEMESTER	
Human Development 5	3	—
Microbiology 65	4	—
Anatomy & Physiology 19-20	4	4
Nutritional Science 43	3	—
Statistics 111 or 141	3	—
Professional Nursing 110	—	3

Professional Nursing 111	-	2
Professional Nursing 112	-	1
Professional Nursing 113	=	5
	17	15

THIRD YEAR	1st SEMESTER	2nd SEMESTER
Professional Nursing 120	3	-
Professional Nursing 121	2	-
Professional Nursing 122	2	-
Professional Nursing 123	2	-
Professional Nursing 124	2	-
Professional Nursing 128	3	-
Professional Nursing 131	-	3
Professional Nursing 132	-	3
Professional Nursing 133	-	1
Professional Nursing 134	-	5
Phil./Rel./Ethics	=	3
	16	15

FOURTH YEAR	1st SEMESTER	2nd SEMESTER
Professional Nursing 231	2	-
Professional Nursing 234	5	-
Professional Nursing 235	4	-
Elective	3	3
Professional Nursing 240	-	3
Professional Nursing 241	-	2
Professional Nursing 242	=	7
	14	15

The general education courses found in the curriculum outline are divided into categories, with specific credit requirements attached to each. In consultation with the faculty advisor, course selection is based on individual needs and interest.

	Credit Hours
Basic Sciences	29
Social Sciences	9
Humanities and Languages	9
Human Development; Environmental Studies	6-7
General Electives	12
Physical Education	2
	68

REGISTERED NURSE PROGRAM

The program for registered nurses has been designed in light of the current and future changes the faculty of the School of Nursing anticipate in the health care delivery system and to better serve the registered nurse returning to school. The program is an RN-BS-MS accelerated program, with an option for students to "step-out" after completion of the baccalaureate requirements with a B.S. degree. Separate application is required for the graduate program.

The focus of the **baccalaureate program** component is on health and health promotion for individuals, families, groups, and communities; and the factors that influence delivery of health care services.

<u>The baccalaureate nursing course sequence includes:</u>	Hours
Nursing Research	2
Introduction to Nursing Informatics	1
Health Assessment and Promotion: Individuals, Families, and Communities	8
Clients and Populations at Risk	8
Nursing Theory	3
Nursing Issues and Health Care Trends	3

<u>The baccalaureate non-nursing courses include:</u>	Hours
General Chemistry	4
Outline of Organic and Biochemistry	4
Environmental Studies	4
Elements of Statistics	3
Human Development	3
Microbiology and Pathogenesis	4
Fundamentals of Nutrition	3
Anatomy and Physiology 19, 20	8
Philosophy/Religion Ethics	3
Written Expression	3
General Psychology	3
Sociology	3
English elective	3
General Education electives	18

ADVANCED STANDING

The School of Nursing provides an opportunity for individuals who have successfully completed college courses to receive advanced standing. Admission to the program is essentially the same as for other applicants to UVM. In accordance with University policy, the student may apply for transfer credits or credits by examination in general education, sciences, and nursing courses.

Individuals planning to seek admission with advanced standing are urged to write to the School of Nursing for more detailed information and to arrange for a personal interview prior to applying for admission or taking courses for college credit at this or another institution.

GRADUATE STUDIES

Students interested in master's preparation in nursing may obtain information on admission and curricula in the Graduate Catalogue, available in the offices of the Graduate College.

College of Medicine

Information on admission and curricula may be obtained from the offices of the Dean of the College of Medicine located in the Given Medical Building.

The School of Natural Resources

In the School of Natural Resources, excitement for discovery and a commitment to life-long learning are central. Our emphasis on the integration of natural science and cultural perspectives reflects the interdisciplinary context in which ecosystem management, resource planning, and environmental concerns must be addressed. We believe that there is a strong interplay between teaching and scholarship and that each is vital to the other.

The School of Natural Resources seeks to cultivate an appreciation and enhanced understanding of ecological and social processes and values aimed at maintaining the integrity of natural systems and achieving a sustainable human community. We pursue this goal by generating and broadly disseminating knowledge and by challenging students, colleagues, and citizens to acquire knowledge, skills, and values to become innovative, environmentally responsible, and accountable leaders.

We are actively committed to diversity — biodiversity in natural communities and cultural diversity in human communities. Individual and professional responsibility, as well as scholastic excellence, are emphasized within the School's supportive atmosphere. Faculty members are conscientious advisors, and students communicate frequently with them for guidance in clarifying educational, career, and personal goals. While these programs prepare students for a variety of positions in natural resources and the environment, graduates are also well prepared to pursue careers or advanced study in other professions.

The Office of the Dean of the School is located in the George D. Aiken Center for Natural Resources.

DEGREE PROGRAMS AND OPTIONS

The Bachelor of Science degree is awarded for the following programs:

- Environmental Sciences
- Environmental Studies
- Forestry
- Natural Resources
 - Aquatic Resources
 - Resource Ecology
 - Integrated Natural Resources
- Recreation Management
- Resource Economics
- Wildlife and Fisheries Biology
 - Wildlife Biology
 - Fisheries Biology

Undecided: Students interested in studying natural resources, but who wish to postpone their decision on a specific major, enroll in *Undecided-Natural Resources*.

Honors Program

An Honors Program is open to qualified juniors and seniors. Honors students undertake advanced studies in an environment that encourages original thought and creativity. Their projects provide valuable experience in designing, implementing, and reporting results of research.

Internships and Cooperative Education

Experiential learning is encouraged. The School offers students assistance in securing summer, part-time, and permanent employment in natural resources fields. Well-developed internship and cooperative education programs award aca-

demetic credit for contracted work experiences. These opportunities to explore and confirm career interests, to develop professional contacts and exposure, give graduates a competitive edge when they enter the job market.

Accelerated Master's Program

This program affords Forestry students interested in *Public Forest Administration* the opportunity to obtain both an undergraduate B.S. degree in Forestry and a Master's in Public Administration degree in a total of five years, rather than the traditional six-year minimum. Further information is available from the offices of the Forestry Program and the MPA Program.

DEGREE REQUIREMENTS

Students must be matriculated in the School of Natural Resources and in residence at The University of Vermont during the period in which they earn 30 of the last 45 hours of academic credit applied toward the degree.

Students must earn a cumulative grade-point average of 2.0 or above.

Students must complete a program of study which includes:

1. SNR core curriculum.
2. SNR distribution courses.
3. University requirement in Physical Education Activities (two credits).
4. SNR major requirements.

SNR CORE CURRICULUM

SNR's core curriculum provides a common experience for all students. The innovative seven-course sequence creates an integrated foundation upon which the individual majors in the School are constructed. Core courses focus on the underlying fundamentals from which natural resources disciplines have evolved and the application of these fundamentals to problems or issues in the natural world and society. The core courses also promote development of thinking, communications, problem solving, and analytical skills. Faculty from all undergraduate programs teach in the core.

The SNR core curriculum represents a body of knowledge, skills, and values that the faculty believe is central to the study of natural resources and the environment. Seven courses are required:

	Hours
Nat. Res. 1, Natural History and Field Ecology	4
Nat. Res. 2, Nature and Culture	3
Nat. Res. 103, Ecology, Ecosystems and Environment	3
Nat. Res. 104, Social Processes and the Environment	3
Nat. Res. 105, Environmental Problem Analysis	1
Nat. Res. 205, Ecosystem Management: Integrating Science, Society, and Policy	3
Nat. Res. 206, Environmental Problem Solving and Impact Assessment	4
	<hr/> 21

NR 1 and NR 2 provide an introduction to the study of natural resources and the environment from natural and social science standpoints, respectively. At the completion of these courses, students should (1) have a basic understanding of the School's integrated approach to natural resources and the environment, (2) be better prepared to make informed decisions about their academic majors, and

(3) be prepared to advance to an intermediate level of study in natural resources. The intermediate courses in the sequence, NR 103 and NR 104, emphasize ecosystems and social systems, respectively. They are linked through a one-credit interdisciplinary problem analysis module, NR 105. The last two courses focus directly on integrated and holistic management. In NR 206, the capstone course taken senior year, students are challenged to synthesize and apply the interdisciplinary knowledge, skills, and values they have learned to contemporary natural resources and environmental issues.

DISTRIBUTION REQUIREMENTS

SNR distribution requirements provide students with educational experiences fundamental to their personal and professional lives. They are intended to encourage investigation of a variety of academic areas and guarantee an education of breadth as well as depth. Courses are required in five areas:

HUMAN CULTURES AND CIVILIZATIONS

Two courses, each from a different department:

- Art, Classics, History, Philosophy, foreign language, Music, Religion, English literature, Theatre (not 5); Geography 51–58, 158, 170, or 171

HUMAN RELATIONSHIPS

Three courses including one from each of the following groups:

- a. Economics 11, 12, or Comm. Dev. and App. Econ. 61
- b. Sociology, Psychology (not 121), Political Science, or Anthropology
- c. One-credit course in Race and Culture.

WRITING AND SPEAKING

Two courses including one from each of the following groups:

- a. English 1, 50, or 53
- b. Speech 11, Theatre 5, or CDAE 183

QUANTITATIVE ANALYSIS AND PROBLEM SOLVING

Two courses including one from each of the following groups:

- a. Math. 10, 17, 19 or higher-level Math.
- b. Nat. Res. 140, Statistics 111, 141, or 211

BIOLOGICAL AND PHYSICAL SCIENCE

Two courses, one from each of the following groups (one course must be a lab science):

- a. Biology (not 3 or 6), Botany (not 6), Anat. and Neurobiol., Ag. Biochem. (not 10), Anim. Sci. (not 1, 4, or 6), Biochemistry, Microbiol. and Molecular Genetics
- b. Physics, Chemistry, Geology, Plant and Soil Sci. 161

Except for the Race and Culture requirement, distribution electives must be three- or four-credit hour courses.

MAJOR REQUIREMENTS

Environmental Sciences

The Environmental Sciences major provides students with the fundamental knowledge and hands-on experience to identify, analyze, and solve "real world" environmental problems arising from human activities.

A total of 122 credits are required for the degree. Required courses: *BIOL 1, 2; *CHEM 31, 32; **CHEM 42; GEOL 55 or PSS 161; *MATH 19, 20; *NR 140 or STAT 141; ENSC 1, 101, 130, 201, 202; 14 credits in one of the following concentrations — Pollution Ecology, Environmental Analysis and Assessment, Environmental Microbiology, Agriculture and the Environment, Conservation Biology and Biodiversity, or Environmental Resources.

For further information about Environmental Sciences, see page [47].

*Also fulfills SNR distribution requirement.

**Students interested in areas such as environmental analysis and assessment should consider taking more advanced courses, such as CHEM 141/142.

Environmental Studies

Environmental Studies is an interdisciplinary major which combines required core courses with a self-designed program of study chosen to meet individual learning goals. The Environmental Studies core courses include perspectives of the sciences, social sciences, and humanities in local, national, and global contexts.

A total of 120 credits are required for the degree. Required courses: ENVS 1, 2, 151, 201, 202; 30 hours of approved environmentally-related courses at the 100 or 200 level, including three hours at the 200 level, with at least one course in each of four areas — natural sciences, humanities, social sciences, and international studies (may be fulfilled by a study abroad experience).

For further information about Environmental Studies, see page [46].

Forestry

The Forestry Program emphasizes the health, productivity, and sustainability of forest ecosystems across a mosaic of ownerships with diverse management objectives. Valuing diversity in all its forms, we provide an education that integrates the principles of biological, ecological, and social sciences with an appreciation for the humanities. The Program promotes the ethics of good stewardship and emphasizes practical experience, good judgment, and creativity. The curriculum is accredited by the Society of American Foresters.

Students supplement a core of required Forestry and related courses with a student-proposed, faculty-approved¹ area of concentration that provides curricular flexibility and addresses the individual interests of the student. The concentration represents at least 15 credit hours and may be self-designed², an appropriate University minor, or a natural resource oriented study abroad experience.

A total of 126 credits are required for the degree. Required courses: *BIOL 1, 2; *CHEM 23; *MATH 19; NR 25, *140; PSS 161; FOR 21, 81, 121, 122, 123, 182, 272; FOR 134 or PSS 107; FOR 146 or NR 143; 15 additional credits in areas of concentration.

¹Must be endorsed by the student's advisor and approved by the Forestry faculty prior to the last three semesters of study.

²At least 12 credits are to be at the 100-level or higher.

* Also fulfills SNR distribution requirement.

Natural Resources

The Natural Resources curriculum combines course work from disciplines within and outside the School to produce an individualized major focused on an ecological theme or the human/environment relationship. Students may major in *Aquatic Resources*, *Resource Ecology*, or *Integrated Natural Resources*.

A total of 122 credits are required for the degree.

Aquatic Resources: This option provides a strong fundamental education in the basic sciences with an emphasis on water including lake, stream, and wetland ecology; water quality; and water resource management. Required courses:

*BIOL 1,2; *GEOL 1 or PSS 161; *MATH 19, 20; CHEM 23 or CHEM 31,32; CHEM 26 or CHEM 42 or CHEM 141,142; NR 25, 102, 250/ 251; NR 278/170; PHYS 11 or 31; 15 additional credits in *Option Electives* to be chosen from approved list of water resource related courses in consultation with student's academic advisor. Any course substitution request must be approved **prior to the end of the add/drop period** for the semester in which the student enrolls in the substitute course.

Resource Ecology: This option explores the biology and ecology of plants and animals in both aquatic and terrestrial systems and allows students to select courses around specific individual interests. Required courses: *BIOL 1,2; *GEOL 1 or PSS 161; *MATH 19; *NR 140; CHEM 23 or CHEM 31, 32; CHEM 26 or CHEM 42 or CHEM 141, 142; NR 25; PHYS 11 or 31; 24 additional credits in *Option Electives* to be chosen from approved list in consultation with student's academic advisor. Any course substitution request must be approved **prior to the end of the add/drop period** for the semester in which the student enrolls in the substitute course.

Integrated Natural Resources: This option is designed to provide a broad natural resources education giving students considerable flexibility in selecting courses. It is for students who have strong interests in natural resources and the environment, clear academic direction, and the motivation to develop a well-focused, personally meaningful course of study.

Required courses (minimum nine credits): Students elect from a list of approved courses at least one course in each of three areas — *biology/ecology; natural resources social sciences and communication; and quantitative and analytical methods*. These courses are in addition to those taken to fulfill SNR distribution requirements.

Individualized Program of Study (minimum 30 credits): The student develops a proposal that establishes objectives and defines 30 credits of course selection for the last four semesters. Courses must be at the level of 100 or above and have an ENSC, ENVS, FOR, NR, RM, RSEC, or WFB prefix. With careful selection of courses, students develop concentrations such as **Solid Waste Management, Environmental Education, Resource Management, Resource Planning, Resource Conservation, International Resource Issues, and Resource Spatial Analysis**. All programs of study must be endorsed by the advisor, then approved by the faculty. If not approved, the student may not continue in the INR option and must seek another major. The program of study is to be completed by the end of the sophomore year (60 credits). Transfer students with more than 60 credits must have a program of study approved as part of the transfer application. It is expected that these students will be active in the program for at least two years (four semesters) after transferring into the INR option. Any course substitution request must be approved **prior to the end of the add/drop period** for the semester in which the student enrolls in the substitute course.

Recreation Management

The Recreation Management major integrates the study of environmentally based tourism and hands-on management of outdoor recreation resources. Students may major in **Public Outdoor Recreation** or **Private Outdoor Recreation and Tourism**. Public recreation resources include parks, forests, wilderness areas, and other outdoor recreation environments at the local, regional, state, and federal government levels. Private resources include ski areas, campgrounds, resorts, and other natural resource-based recreation facilities. The program permits specialization in several types of private recreation businesses, including ski resorts.

A total of 126 credits are required for the degree.

Private Outdoor Recreation and Tourism: Required courses: RM 1, 50, 157, 158, 181, 230, 258, 282, 191; three courses selected from RM 138, 153, 235, 240, 255; and nine additional credits of professional electives to be chosen from approved list.

Public Outdoor Recreation: Required courses: RM 1, 138, 153, 181, 191, 235, 240, 255, 282; three courses selected from RM 50, 157, 158, 230, 258; and nine additional credits of professional electives to be chosen from approved list.

Resource Economics

Resource Economics deals with the application of economic theory to natural resources allocation problems. The major prepares an individual to effectively use economics and conservation in achieving an efficient and equitable use of natural resources.

A total of 124 credits are required for the degree. Required courses: *MATH 19, 20 or MATH 21, 22; *GEOL 1; CS 2 or CS 3 or CDAE 85; *EC 11, 171,172; CDAE 61 or EC 12; NR 102, 143, 254; ENVS 178, 290, 293; RSEC 121, 152, 222; FOR 153, 155; CE 125; WFB 175.

* Also fulfills SNR distribution requirement.

Wildlife and Fisheries Biology

The areas of wildlife biology and fisheries biology deal with the management and conservation of animal populations that range from species that are common enough to be hunted/fished to species that are endangered. Management strategies may include manipulation of populations directly or indirectly through alteration of habitat. Courses emphasize applied ecology and provide hands-on experience in labs and field trips. All Wildlife and Fisheries Biology majors complete the same core of courses during the first year. As sophomores, students elect either the **Wildlife Biology** or the **Fisheries Biology** option. Required courses in the major satisfy educational requirements of the U.S. Office of Personnel Management for entry-level positions in these fields.

A total of 122 credits are required for the degree.

Courses required for all majors: *MATH 19 or 21; *NR 140; *BIOL 1, 2; *CHEM 23; CHEM 26 or 42; BIOL 101 or BOT 132; NR 25; FOR 121; GEOL 1 or PSS 161; WFB 161, 174.

Additional requirements for **Wildlife Biology** option: FOR 21; WFB 130, 131, 150; BOT 109; BIOL 217; three courses (one must have a lab) selected from WFB 271/272, 273/274, 275, or 279.

Additional requirements for **Fisheries Biology** option: PHYS 11/21 and 12/22; WFB 232; NR 250/251, 278; NR 260/ WFB 272; NR 270 or WFB 279; six additional hours selected from NR 270, NR 280, BIOL 264, BOT 234, WFB 271, WFB 279, WFB 286.

* Also fulfills SNR distribution requirement.

MINOR REQUIREMENTS

The Bachelor of Science degree in Natural Resources does not require completion of a minor. However, many students in the School of Natural Resources do complete minors, either within the School or in other departments across campus. Interested students should contact the chair of the minor program or department.

Aquatic Resources: Interested students should obtain an application from the Dean's Office and contact Professor McIntosh. Requirements include completion of NR 102 and at least 12 additional credit hours from the following list: CE 154; NR 236, 250, 251, 255, 260, 270, 278, 280; WFB 272, 279. The additional credits must include at least one laboratory course (CE 154, NR 251, or WFB 272).

Environmental Studies: The minor requires 17 credit hours of Environmental Studies courses consisting of 1, 2, and nine hours at the 100-level or above, including three hours at the 200-level. Of the nine hours, one non-ENVS course at the appropriate level may be substituted with approval of the student's advisor and the Environmental Program.

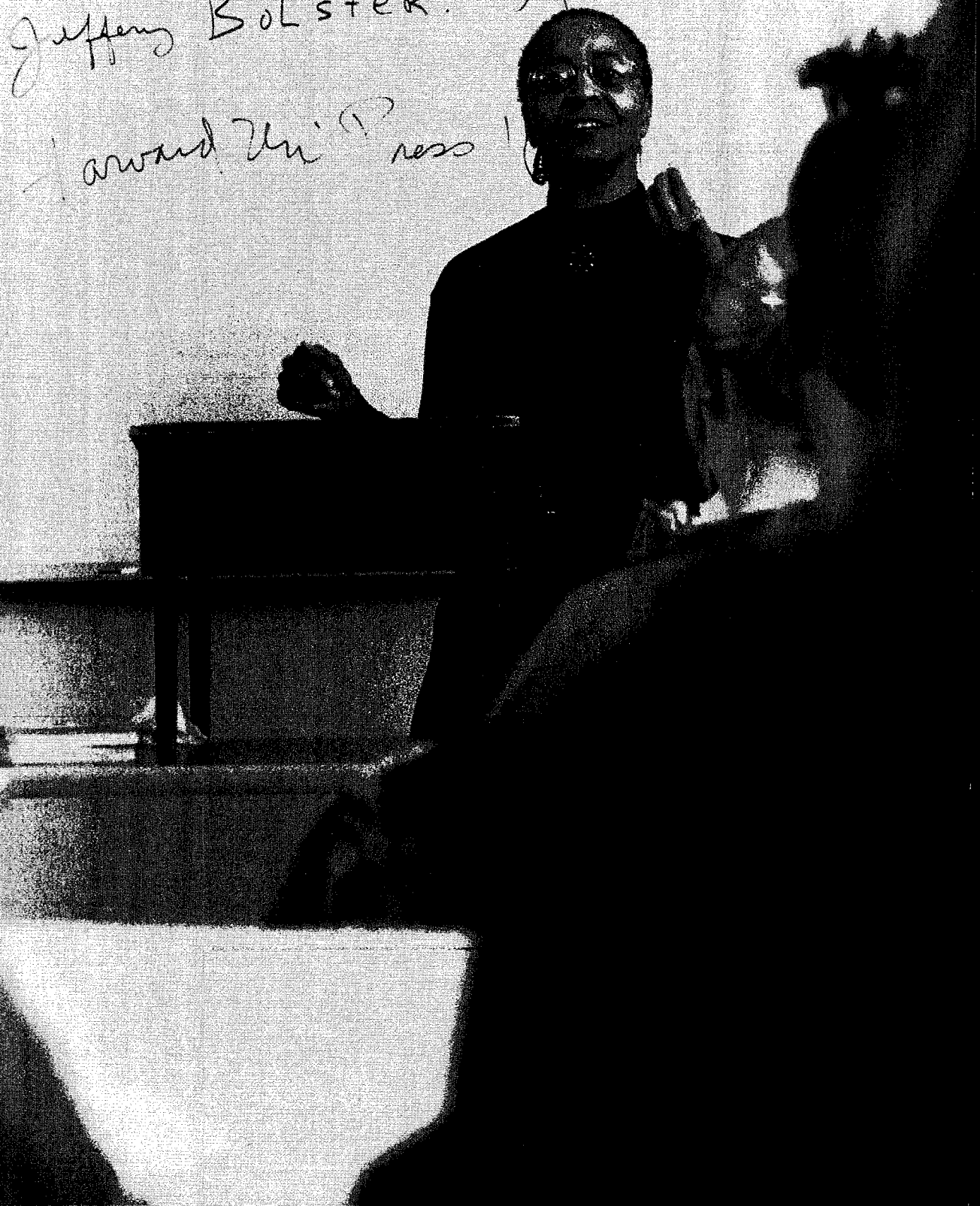
Forestry: Applications for the minor must be filed no later than June 1 of the year preceding graduation. A minimum of 18 credit hours is required, with at least nine at the 100-level or higher. Required courses: FOR 1*, 21, 73; additional FOR courses to total 18 credits. *Students in the School of Natural Resources may not count FOR 1 towards completion of a Forestry minor.

Recreation Management: The minor requires a planned course of study which will provide a substantive introduction into the field of recreation management. Interested students should contact the Program Chair. A total of 15 credit hours are required. A minimum of nine credits are to be selected from RM 1, 50, 138, 153, 157, 158, 181. A minimum of six credits are to be selected from RM 230, 235, 240, 255, 258, 282.

Resource Economics: Applications for the minor must be filed no later than June 1 of the year preceding graduation. Students must complete a minimum of 15 credit hours. Required courses: RSEC 121; ENVS 289 or RSEC 222. Nine additional credits selected from FOR 152, ENVS 290, GEOG 3; CDAE 180, 264; EC 172. Special elective: students may select a course, with approval of the advisor, to meet special interests.

Wildlife Biology: Applications for the minor must be filed no later than June 1 of the year preceding graduation or of the completion of the requirements for the minor. A minimum of 15 credit hours is required in prescribed and elective courses. Required courses: WFB 130, 174; WFB 271 or 273. Elective courses: WFB 131, 150, 176, 185/186, 187/188, 272, 273, 274, 275, 279, 285/286, 287/288; NR 224.

Black Jacks
Jeffery Bolster. African American
around the Press!



Courses of Instruction

The University reserves the right to change course offerings at any time.

The departments and areas of instruction are arranged alphabetically, and the college/school in which each is located is indicated.

A student who lacks the stated prerequisites for a course may be permitted to enroll by the instructor. Such students must inform the instructor that they lack the prerequisites, and the instructor will make appropriate efforts to ascertain that they are properly qualified.

Courses are divided into three levels: introductory, intermediate, and advanced. Where appropriate, a department may limit enrollment in a particular course. Such limitations, other than class size, must be explicitly stated.

Courses numbered from 1-99 are introductory courses. Introductory courses emphasize basic concepts of the discipline. In general, they presuppose no previous college work in the subject. The only exceptions to this rule are those cases in which there is a two-semester introductory sequence. In such cases, the second semester course may have the first semester course as a prerequisite.

Courses numbered from 100-199 are intermediate courses. An intermediate course covers more advanced material than that treated in introductory courses. Students will be expected to be familiar with the basic concepts of the subject and the course will present more difficult ideas. Intermediate courses will generally be more specialized than introductory courses. An intermediate course will always have a minimum prerequisite of three hours prior study in the discipline or in another specified discipline.

Courses numbered from 200-299 are advanced courses. An advanced course presents concepts, results, or arguments which are only accessible to students who have taken courses in the discipline (or, occasionally, in a related discipline) at the introductory and intermediate levels. Prior acquaintance with the basic concepts of the subject and with some special areas of the subject will be assumed. An advanced course will always have a minimum prerequisite of three hours prior study at the intermediate level in the discipline, or in a related discipline, or some specified equivalent preparation.

Some, but not all, 200-level courses carry graduate credit. Graduate students must refer to the UVM Graduate Catalogue which lists all courses carrying graduate credit. Seniors who wish to take a course for graduate credit must receive permission through the office of their dean (see page 39) prior to enrolling in the course.

Some departments make further subdivisions of courses at some levels. Where this applies, an explanation can be found at the beginning of the department's list of courses.

Two numerals separated by a comma (as in 17,18) indicate that the separate semester courses may be taken independently for credit. Two numerals separated by a hyphen (as in 17-18) indicate that the semester courses may not be taken independently for credit, and, unless otherwise stated, they must be taken in the sequence indicated. In cases where two numerals are separated either by a comma or by a hyphen, the odd-numbered course will be taught in the fall and the even-numbered course in the spring.

The number of credit hours per semester is stated in each course description. For some courses, the course title is followed by a pair of numerals connected by a hyphen and

enclosed in parentheses as in (2-3); this form indicates the number of class hours respectively of lecture and laboratory.

African Studies

COLLEGE OF ARTS AND SCIENCES

Prof. Joshua Forrest, Glen Elder, Co-Chairs

See Area and International Studies for special topics course listings.

Agriculture (AGRI)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

95 Introductory Special Topics One to three hours.

99 Beginnings: First-Year Seminar Introduction to campus resources, identification of students' interests, goals, skills, and values to provide better understanding of themselves and become acclimated to college life. Required for all first-year students in CALS. One hour. Patterson.

125 Teaching Assistant Development TA's develop skills in areas of leadership, group dynamics, interpersonal effectiveness, and assertiveness as group facilitators in Beginnings course. *Prerequisite:* Sophomore standing, permission. Three hours. Patterson.

195,196 Special Topics Appropriate for interdepartmental and interdisciplinary topics in Agriculture and Life Sciences. Permission of Dean's Office. Credit as arranged. Foss.

ALANA Studies (ALAN)

COLLEGE OF ARTS AND SCIENCES

Prof. Donald A. Grinde, Director

(ALANA: African, Latino, Asian, Native American.)

51 Introduction to ALANA Studies Survey of the experience of ALANA peoples in the U.S. as well as a theoretical analysis of issues of race, culture, gender, and diverse traditions in the American multicultural setting. Three hours.

55 Racism and American Culture Survey and analysis of racism in the development of American institutions and its effects upon ALANA groups and societies. Three hours.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. Three hours.

158 American Multicultural Heritage History and culture of ALANA groups, their role in and contributions to the American cultural heritage. *Prerequisite:* 51 or 55 or having previously satisfied the College of Arts and Sciences Race and Ethnicity requirement. Three hours.

159 American Cultural Images of ALANA Peoples Comparative study of ALANA groups and the stereotypical and archetypal impressions projected on peoples of color in American society. *Prerequisite:* 51 or 55 or having previously satisfied the College of Arts and Sciences Race and Ethnicity requirement. Three hours.

191, 192 Field Experience, Internship *Prerequisites:* Junior standing, six hours of 100-level courses in appropriate field and program permission (a contract must be obtained from and returned to the ALANA Studies program during preregistration). Three hours.

195, 196 Intermediate Special Topics Intermediate courses or seminars beyond the scope of existing ALANA offerings. See Schedule of Courses for specific titles. *Prerequisite:* Sophomore standing. Three hours.

277 Seminar in ALANA Studies Interdisciplinary examination of theories on the position of ALANA peoples in U.S. culture and society. Emphasis on relationship between race, class, gender, and ethnicity. *Prerequisites:* Six hours in ALANA Studies; admission to ALANA Studies minor program. Three hours. (Not offered for graduate credit.)

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departments. See Schedule of Courses for specific titles. *Prerequisite:* Junior standing. Three hours. (Not offered for graduate credit.)

297, 298 Independent Study in ALANA Studies Special topics in consultation with ALANA Studies faculty. *Prerequisites:* Permission of program director; junior standing. Three hours. (Not offered for graduate credit.)

Allied Health (AH)

SCHOOL OF ALLIED HEALTH SCIENCES

95 Introductory Special Topics One to three hours.

103 Social and Cultural Determinants of Health The course integrates public health and social science concepts to study the determinants of health and disease in populations. Focus is on underserved populations. *Prerequisite:* Race and Culture (AH 95 or AGRI 95) recommended. Three hours. Alternate years.

115 Women's Health Advocacy Common health care decisions facing young women. Choices in reproductive technology, sexually-transmitted infection prevention, menstrual cycles, pap smears, and care options. Two hours. O'Brien. Fall semester.

120 Health Care Ethics A study of ethical principles and applications used to help resolve dilemmas in health care delivery. Introduction to ethical decision-making models used in the practice of modern health care. *Prerequisite:* Sophomore standing or above, or instructor's permission. Three hours. Huot. Fall semester.

Anatomy and Neurobiology (ANPS; ANNB)

COLLEGE OF MEDICINE

Professors Parsons (Chairperson), Wells (Emeritus), Young (Emeritus); Associate Professors Cornbrooks, Fiekers, Forehand, Mawe, May, Powers; Assistant Professors Jaworski, Vizzard; Research Associate Professor Cornbrooks; Research Assistant Professor Braas; Lecturers Ezerman, Fonda, Szilva.

19-20 Undergraduate Human Anatomy and Physiology Two-semester course with credit given only upon completion of both semesters. Structure and function of human body using cadaver projections, histological material, and physiological experiments. Required of all Medical Lab Science, Nursing, Nutritional Sciences, Dental Hygiene, Radiation Therapy, Nuclear Medicine Technology, and Physical

Education students; others with instructor's permission. *Prerequisite:* 19 for 20. Four hours. Szilva, Webb.

197,198 Undergraduate Research Individual laboratory research under guidance of faculty member. *Prerequisite:* Departmental permission. Three or six hours.

201 Human Cross Anatomy (3-6) Lectures and detailed regional dissections emphasize functional anatomy of major systems (e.g. musculoskeletal, cardiovascular, nervous). Required of Physical Therapy students; others with departmental permission. Five hours. Mawe, May.

202 Neuroanatomy (2-3) Structural basis of nervous system function, including spinal reflex organization, detailed analysis of sensory and motor systems, clinical examples, human brain dissection. Includes histology of selected tissues and organs. Required of Physical Therapy students; others with departmental permission. Three hours. Vizzard.

Animal Sciences (ASCI)*

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Professors Bramley (Chairperson), Carew, Foss; Associate Professors Gilmore, Mischler, Nichols, Plaut; Assistant Professor Knapp; Lecturers Davis, Rogers; Research Professor Pankey; Adjunct Professors Sniffen, Thomas; Extension Assistant Professor Glaze; Adjunct Assistant Professors S. Donnelly, Levine, Stewart-Ballard, Sturgis, Tuerk.

**Note: Department name change pending final approval by Board of Trustees.*

1 Introductory Animal Sciences (3-3) An overview of the genetics, nutrition, reproduction, and management of livestock-and-recreation-species; introduction to animal food products, animal disease, and biotechnology. Four hours. Bramley.

4 Dairy Cattle Judging (2) Principles of dairy cattle judging demonstrated and practiced using live animals. Two hours. Gilmore.

6 Introduction to Companion Animal Care and Management (3) Scientific principles of nutrition, breeding, and selection, health, management practices, pet therapy, and animal bonding. Primary emphasis on cat and dog. Three hours.

43 Fundamentals of Nutrition I, II Comprehensive study of specific nutrients in terms of their availability, function, and utilization in mammalian species. *Prerequisites:* High school chemistry and biology. Three hours. Carew.

71 Zoos, Exotics, and Endangered Species (3) An overview of endangered species, the international trade in wildlife and historical perspectives and current issues pertaining to zoos, aquaria and conservation centers. Three hours. Tuerk.

110 Principles of Animal Feeding (3-3) Principles of meeting the nutrient requirements of animals, especially as they relate to the practical problems of formulation and production systems. *Prerequisite:* 43. Four hours. Knapp.

113 Livestock Production (2-3) Organization and operation of livestock enterprises. Theory and application of feeding and breeding and management programs and principles. *Prerequisite:* 110. Three hours.

115 Introduction to Equine Studies (3-3) Overview of the scientific and practical application of equine management and selection principles. Housing, nutrition, herd health, reproduction, and career opportunities. Four hours. Davis.

116 Equine Reproduction and Management (3-3) In-depth investigation of equine reproduction and physiology, mare and stallion endocrinology, breeding techniques, processing semen, embryo transfer parturition, neonatal foal care, and marketing in the equine industry. *Prerequisites:* 1, 115 or instructor permission. Four hours. Davis.

117 Horse in Health and Disease (3) Discusses the basic anatomy and physiology of the horse. Describes common equine diseases and problems, their diagnosis, prevention, and treatment. Three hours. Levine.

118 Animal Health (3) A study of small and large domestic animal diseases. Natural response to disease, methods of diagnosis, control, and treatment. *Prerequisites:* Microbiology 65 or 101 or instructor permission. Three hours. Levine.

119 Equine Training Techniques Behavior modification and training of the young horse under saddle and in the cart. Introduction to interdisciplinary directions open to the equine athlete and to conditioning programs associated with these options. Three hours. Davis.

121 Equus A hands-on equine management experience. Students perform horse duties, recordkeeping, and make financial and management decisions on a horse boarding operation. *Prerequisites:* Sophomore standing; instructor permission. Four hours. Davis.

122 Animals in Society/Animal Welfare (3) Designed to heighten awareness and understanding of human-animal relationships in society, agriculture, and science. *Prerequisite:* Sophomore standing. Three hours. Rogers.

131 Practical Equine Management: Showmanship and Training In-depth introduction to horse training techniques combined with enhancing riding skills through instructor and self-evaluation. Taught at Miner Institute, Chazy, NY. *Prerequisites:* 1, 115, 116 or instructor's permission. Eight hours in summer.

132 Career Skills for the Equine Industry A skills development course focusing on communication and laboratory skills important for jobs in equine medicine, research, and teaching. Taught at Miner Institute, Chazy, NY. *Prerequisites:* 1, 115, 116 or instructor's permission. Four hours.

134-135 CREAM (Co-operative for Real Education in Agricultural Management) A two-semester course in which students perform the work and make the financial and management decisions associated with the CREAM dairy herd. *Prerequisite preferred:* Sophomore/junior standing, instructor permission. Eight hours. Gilmore.

141 Animal Biology (3-3) A comprehensive review of the structure and function of domestic animals, emphasizing those of economic importance. Differences between mammalian and avian species are discussed. *Prerequisites:* Biology 1, a chemistry course or instructor permission. Four hours. Mischler.

161 Laboratory Animal Medicine (3) An introduction to laboratory animal science and welfare covering animal care and management, the correct performance of experimental procedures, and the regulatory and legislative framework governing it. *Prerequisite:* A biology course or instructor's permission. Three hours. Nichols. Alternate years, 1997-98.

163 Clinical Veterinary Medicine (3) Introduction to clinical diagnostic and analytical skills in veterinary medicine based upon case studies in companion animals. *Prerequisite:* 141 or Biology 2; junior standing. Three hours. Sturgis.

195, 196 Field Experience Professionally-oriented field experience under joint supervision by faculty and business or community representative. *Prerequisite:* Department chair's permission. Total credit towards graduation cannot exceed 15 hours.

197, 198 Undergraduate Research Research activity under direction of qualified staff member. Must have faculty member approval. Written proposal and report required. *Prerequisites:* Junior standing, departmental chairperson permission. One to three hours.

211 Summer Experience in Farm Management (30 hr/wk) A work-study program on the modern practices associated with farm management. Taught at Miner Institute, Chazy, NY. For students with a strong interest in farm management. *Prerequisites:* Junior, senior, or graduate standing; departmental permission. Four hours. (Not offered for graduate credit.)

212 Animal Genetics and Breeding (4) A review of Mendelian genetics, the study of genetic engineering applications, a review of statistics, and the study of selection and mating schemes. *Prerequisites:* A course in statistics (141 preferred), Biology 1, or permission. Four hours. Gilmore.

213, 214 Dairy Herd Management (3-3) Organization and management of the dairy herd. Practical application of feeding, reproduction, milking, and general management principles. *Prerequisites:* Junior standing or instructor permission. Four hours.

215 Physiology of Reproduction (3-3) Fundamental principles of the physiology of reproduction with emphasis on, but not limited to, farm animals. *Prerequisite:* 120 or instructor permission. Four hours. Plaut. Alternate years, 1997-98.

216 Endocrinology (3) Physiology of endocrine and autocrine/paracrine systems and growth factors. *Prerequisite:* Course in both biology and physiology; one course in anatomy desirable. Three hours. Plaut. Alternate years, 1998-98.

220 Lactation and Milking. The history and development of machine milking and dairy herd automation. Includes mammary anatomy, physiology, and immunology as well as methods of collection and storage of milk of good hygienic quality. *Prerequisites:* 134-135; a chemistry course, preferably Agricultural Biochemistry 201 or instructor permission. Three hours. Bramley.

230 Agricultural Policy and Ethics Examines American agriculture and policies from various perspectives — historical, political, ecological, technological, social, economic, and ethical. Emphasis on contemporary issues, policy options, future developments. *Prerequisite:* Junior standing or permission. Three hours. Rogers.

281 Animal Sciences Career Seminar Discussion and workshop activities exploring careers in animal and food sciences. Includes resume preparation and interview training. *Prerequisite:* Junior standing ASCI major. One hour. Pankey.

282 Animal Sciences Graduate Seminar Reports and discussions of problems and special investigations in selected fields. One hour, required each year for graduate students. Pankey.

297, 298 Special Topics in Animal Science Written courses in seminars or topics beyond the scope of existing offerings. See Schedule of Courses for specifics. *Prerequisite:* Department chair's permission. May enroll more than once for maximum of 15 hours.

Anthropology (ANTH)

COLLEGE OF ARTS AND SCIENCES

Professors Gordon (Chairperson), Haviland, Woolfson; Associate Professors Lewin, Pastner; Assistant Professor Petersen; Research Associate Professor Thomas.

21 Human Cultures Introduction to cultural anthropology focusing on the life ways of non-Western societies and how anthropologists study them. Three hours.

24 Prehistoric Archaeology Examination of the origins and development of culture from the earliest human fossils through the appearance of civilization; the nature of archaeological data and interpretations. Three hours.

26 Physical Anthropology Introduction to the study of the evolution and racial differentiation of humanity. Three hours. Haviland.

95, 96 Introductory Special Topics Introductory courses or seminars beyond scope of existing departmental offerings. See Schedule of Courses for specific titles.

101 Anthropology of Third World Development A survey of the role of applied anthropology in the understanding and analysis of development efforts to alleviate (mostly) third world problems. *Prerequisite:* 21. Three hours. Gordon.

128 Linguistic Anthropology Introduction to the anthropological study of language, focusing on language and communication as they pertain to how we become human and what makes us human. *Prerequisites:* 21. Three hours. Woolfson.

160 North American Indians Ethnographic survey of major native American cultures of Mesoamerica and the U.S. against background of aboriginal culture history, and problems of contact with European cultures. *Prerequisite:* 21. Three hours. Haviland. Alternate years.

161 Cultures of South America Ethnographic survey of major native American cultures south of Mesoamerica against background of aboriginal culture history, and their relation to present day culture spheres. *Prerequisite:* 21. Three hours. Petersen. Alternate years.

162 Cultures of Africa Ethnographic survey of representative native societies of sub-Saharan Africa and major colonial/immigrant minorities emphasizing changes resulting from colonialism, independence, and modernization. *Prerequisite:* 21. Three hours. Gordon. Alternate years.

163 South Pacific Cultures Survey of major cultural areas of the South Pacific including problems of prehistory, contact with Western colonialism, and contemporary life. *Prerequisite:* 21. Three hours. Alternate years.

164 Indians of the Northeast: Vermont Vermont's native peoples from their earliest appearance in the region until today. Archaeological and ethnographic data reviewed in the broader perspective of aboriginal Northeastern cultural history. *Prerequisite:* 21 or 24. Three hours. Haviland. Alternate years.

165 Peoples of South Asia Culture and social organization of peoples of Pakistan, India, Bangladesh, and Sri Lanka. Theoretical issues in anthropological analysis of these societies discussed. *Prerequisite:* 21. Three hours. Pastner. Alternate years.

166 Peoples of the Middle East Culture and social organization of peoples living in lands from Morocco to Afghanistan, including a consideration of Islam. *Prerequisite:* 21. Three hours. Lewin. Alternate years.

167 Native Peoples of Canada Traditional life-ways of the native peoples of Canada, Indian, and Inuit; contemporary issues in native life in Canada. *Prerequisites:* 21 or Geography 52 or History 65 or 66. Woolfson. Alternate years.

168 The French in North America Cultural patterns of French people in Canada, New England, and Louisiana with particular references to the problems of persistence and change. *Prerequisite:* 21 or International Studies 91 or 92. Three hours. Woolfson. Alternate years.

169 Latinos in the United States Survey of peoples of Latino/Hispanic descent living in the U.S. Course examines their similarities and differences in history, ethnic identification and cultural practices. *Prerequisite:* 21. Three hours.

170 Pastoral Nomads Examination of social and economic organization of migratory herding peoples against a backdrop of environmental pressures and participation in larger social systems. *Prerequisite:* 21. Three hours. Pastner. Alternate years.

171 Anthropology in the Round: The Anthropology of Sculpture Seminar/practicum covering the social context and roles of sculpture cross-historically and cross-culturally. Students create a sculpture based on documented anthropological and historical sources. *Prerequisite:* 21, any Art History course or instructor's permission. Three hours. Pastner.

172 Women, Society, and Culture Cross-cultural treatment of women which emphasizes the interrelationships between female status, social organization, and ideological systems. *Prerequisite:* 21. Three hours. Lewin. Alternate years.

175 Ethnography of Art Analysis of the art of tribal and non-Western peoples of Africa, Oceania, and North American Indians, emphasizing the relation of art to social and ideological systems. *Prerequisite:* 21. Three hours. Lewin. Alternate years.

177 Crisis Cults and Movements Examination of prophetic, millenarian, and revolutionary sects and movements emphasizing non-Western, nonindustrial societies. Specific movements viewed in their cultural context. *Prerequisite:* 21. Three hours. Pastner. Alternate years.

178 Sociolinguistics Exploration of language and nonverbal interactions as cultural activities. Focus on rules and patterns people display appropriate to communication and social interaction. *Prerequisite:* 128. Three hours. Woolfson.

179 Cultural Ecology (Same as Geography 179.) Interrelationships of social groups and their natural environments and resource bases, with primary emphasis on nonindustrial cultures. *Prerequisite:* 21 or Geography 1. Three hours. Gade, Pastner (taught on a rotating basis). Alternate years.

180 Psychological Anthropology Cross-cultural study of the individual in a sociocultural context examining cognition and culture, symbols, alternative states of consciousness, human sexuality, deviance and madness, and ethnotherapy. *Prerequisite:* 21. Three hours. Alternate years.

181 Law, War, and Disorder Introduction to the anthropology of law and conflict management emphasizing the cultural fora and social organization of disputes and efforts to deal with conflict. *Prerequisite:* 21. Three hours. Gordon.

182 Anthropological Folklore Explores the various genres of folklore and their cultural contexts in non-Western societies. Some emphasis on the folklore of Africa and Native Americans. *Prerequisite:* 21. Three hours. Alternate years.

185 Urban Anthropology Study of urbanization and urban life in non-Western countries including such topics as urban-rural ties, peasant migrations, and sociocultural adjustment to urban living. *Prerequisite:* 21. Three hours. Alternate years.

187 Race and Ethnicity (Same as Sociology 119.) Description and analysis of ethnic, racial, and religious groups in the U.S. Examination of social/cultural patterns in the

larger society and in these groups themselves. *Prerequisite:* 21. Three hours. Danigelis, Diouf, Mahler, Tang.

188 Historical Archaeology Survey of field, lab, and archival research methods; specialized studies of material culture; selected topics on ethnicity in the Americas, gender and status. *Prerequisites:* 24. Three hours. Alternate years.

189 Aging in Cross-Cultural Perspective Aging from an anthropological perspective. Topics include the biology of aging; aging in hunting, pastoral, fishing, and horticultural societies; aging in contemporary ethnic America. Three hours. *Prerequisites:* 21 or Sociology 20. Woolfson. Alternate years.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

200 Field Work in Archaeology Methods and techniques of archaeological investigation in field situations and the laboratory analysis of data. *Prerequisites:* 24, one 100-level course in anthropology or history, instructor's permission. Three to six hours. Summers only.

201 Practicum and Internship Supervised service or research integrating theoretical and practical anthropological issues. *Prerequisite:* Nine hours of anthropology.

210 Archaeological Theory Development of archaeology from the 19th century to the present including concepts of form, space and time, intellectual attitudes, current systems theory, and research strategies. *Prerequisites:* 24, one 100-level anthropology course; or Historic Preservation 201; or graduate standing in Historic Preservation Program, or History 121, 122, or 149. Three hours. Alternate years.

225 Anthropological Theory Schools of anthropological thought examined in relation to data on non-Western societies and the historical and social context in which the anthropologist works. *Prerequisites:* 21, one 100-level course. Three hours. Lewin.

228 Social Organization Examination of the basic anthropological concepts and theories used in the cross-cultural analysis of kinship and marriage. *Prerequisites:* 21, one 100-level course. Three hours. Lewin.

250 Museum Anthropology The cultural context of selected archaeological and ethnographic collections at Fleming Museum; cataloging, conservation, research, and interpretation of objects; exhibition design and ethical issues. *Prerequisites:* Junior standing; Anthropology, Art History, Studio Art majors and minors. Three hours. Porter (Museum Director). Alternate years.

283 Colonialism The concepts, ideologies, and practice(s) of colonialism within a sociocultural and historical context emphasizing the cultures of the colonizer and the colonized and the interaction thereof. *Prerequisites:* 21, one 100-level course, or 21, six hours in the social sciences. Three hours. Alternate years. Gordon.

284 Microethnography Tape recorders and video cameras used to explore human patterns of communication; specifically phonemic, paralinguistic, haptic and kinesic detail, as well as ethnographic semantics. *Prerequisite:* 128 or Linguistics 101. Three hours. Woolfson.

290 Methods of Ethnographic Field Work Examination of theoretical and ethical premises of field work methodology with practical experience in participant observation, interviewing, the genealogical method, and the recording of data. *Prerequisite:* Twelve hours of anthropology. Three hours. Alternate years.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

mental offerings. See Schedule of Courses for specific titles. *Prerequisites:* 21, one 100-level course.

297, 298 Advanced Readings and Research *Prerequisite:* Junior or senior standing. One to three hours.

HONORS – ARTS AND SCIENCES

202, 203 Honors/Anthropology See page 64 and contact Department for specific requirements. Three hours each.

Area and International Studies (AIS)

COLLEGE OF ARTS AND SCIENCES

Executive Committee: Professors Diouf (Director), Elder, Escaja, Ford, Mahoney, McKenna, McCann, Mierse, Seybolt, Youngblood.

7, 8, 9, 10 Directed Language Study in Critical Languages

91 Introduction to Area (A) Introduction to Canada: A team-taught introduction to Canada through interdisciplinary perspective. (B) Introduction to Russia and East Europe: An interdisciplinary overview from the perspectives of economics, fine arts, geography, history, political science, Russian language and literature, and sociology. (C) Introduction to Western Europe. Primarily designed for first-year students. Three hours.

93 Southern Africa: The Politics of Race and Culture An interdisciplinary introduction analyzing the forces that led to creation of that system of government known as *Apartheid*. Assessment of strategies and tactics of change. Three hours.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

191, 192 Internships Approved programs of learning outside the classroom. Internships must be undertaken directly in the field and involve activity in which substantive learning about the program area can take place. Variable credit, one to six hours.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

291 European Studies Seminar Multidisciplinary study of Europe as a geocultural area primarily for European Studies majors. Content will vary by instructor from departments including, for example, Classics, History, Political Science. *Prerequisite:* Permission of instructor. Three hours.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. *Prerequisite:* Permission by Executive Committee of International Studies. Other area courses offered by individual academic departments.

297, 298 Advanced Readings and Research Independent study of a specific area subject or theme with an approved instructor. *Prerequisites:* Junior/senior standing, and permission of area Program Director. Variable credit, one to six hours.

HONORS – ARTS AND SCIENCES

234, 235 Honors/Area and International Studies See page 64 and contact Department for specific requirements. Three hours each.

Also see specific course listings under Canadian Studies, Latin American Studies, Asian Studies, African Studies, European Studies, and Russian and East European Studies.

Art (ART)

COLLEGE OF ARTS AND SCIENCES

Professors Davison, Lipke, Owre, Zucker; Associate Professors Brennan, Carter, Fessler-Stephany, Higgins, Lyman, McIntyre, Mierse (Chairperson), Seyller; Assistant Professors Owen, Schneider; Instructor Peters.

STUDIO ART

1 Drawing Introductory study of visual experience through drawing and its transformation of the three-dimensional visual world onto a two-dimensional surface. Emphasis varies with instructor. Three hours.

2 Two-Dimensional Studies A studio course exploring through classroom projects how we perceive space and how we work with materials and concepts to organize two-dimensional surfaces. Three hours.

3 Three-Dimensional Studies Introductory study of the manipulation and actual space in diverse media. Emphasis varies with instructor. Three hours.

4 Introduction to Film/Video Production Introductory study of the principles and properties of four-dimensional media, including the mechanical and electronic phenomena behind the creation of a moving image. Three hours. Lyman.

11 Introduction to Fine Metals Emphasizes design in the third dimension. Basic metal fabrication techniques, soldering, forming, forging, fusing, and casting. Drawing required. Three hours. Peters. Fall semester only.

95 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

111 Fine Metals Continuation of three-dimensional fabrication with work in chasing, repousse, casting, stone setting, and more complex methods of construction. Design and drawing required. *Prerequisite:* 11. Three hours. Peters. Fall semester only.

113 Clay: Hand Building Investigation of surfaces and three-dimensional forms. Focus on variety of construction methods, surface treatment, and firing techniques. Related clay and glaze technology. *Prerequisites:* 1, 2, or 3. Three hours. Carter.

114 Clay: Wheel Throwing Development of throwing skills and the capacity to create a range of forms. Investigation of surface treatment techniques such as slip painting and glazing. Low-fire and stoneware firing. Related clay and glaze technology. *Prerequisites:* 1, 2, or 3. Three hours. Carter.

115 Intermediate Drawing Intense investigation of drawing and elements related to the discipline. The figure used to introduce drawing exercises dealing with contour, gesture, color, and compositional geometry. *Prerequisite:* 1 or 2. Three hours. Owre.

116 Drawing From the Figure Drawing from the model, emphasizing in-depth studies in different media. *Prerequisite:* 1. Three hours.

121 Painting Painting as an investigation of color, space, and visual perception using traditional motifs and exploring individually developed directions. *Prerequisites:* 1, 2. Three hours. Owen.

131 Printmaking: Etching Basic procedures in zinc plate printing stressing design and technical control of aquatint,

etching, drypoint, and embossment. *Prerequisites:* 1, 2. Three hours. Davison. Offered alternate semesters.

132 Printmaking: Silkscreen Basic procedures in stencil printing stressing design and technical control of stencil cutting, glue and tusche resist, and photo-silkscreening. *Prerequisites:* 1, 2. Three hours. Davison. Offered alternate semesters.

133 Printmaking: Lithography Basic procedures in planographic printing from stone, stressing design and technical competence. Intensity of investigation varies with individual student. *Prerequisites:* 1, 2. Three hours. Davison.

137 Photography Photographic processes as methods of seeing, emphasizing visual discovery through informed manipulation of materials. Students explore light, camera, photosensitive materials relating to photographic realities. *Prerequisite:* 2. Three hours. Brennan, Higgins.

138 Color Photography Exploration of color films, cameras, and color printing processes as a means for recording, enhancing, and expressing students' subjective experiences. *Prerequisite:* 1 or 2. Three hours. Brennan.

139 Animation Techniques of single frame filmmaking, including drawing on film, producing a flipbook, animating a repetitive form, a two-dimensional sequence, and a three-dimensional sequence. *Prerequisite:* 1, 2, or 3. Three hours. Lyman.

141 Sculpture Exploration of manipulative materials. *Prerequisites:* 1, 3. Three hours. Schneider, Zucker.

142 Art From Scraps Students explore in a series of projects how discarded objects and materials from everyday life, the "found object" tradition, can become the materials for sculpture. *Prerequisite:* 1, 2, or 3. Three hours. Schneider.

143 Intermediate Film/Video Production Exploration of the principles and properties of sound and moving image through projects in synchronous sound filmmaking and live studio production. *Prerequisite:* 4 and either 1, 2, or 3, or instructor permission. Three hours. Lyman.

144 Computer Art New approaches to making imagery using computers both as direct means of production and as vehicles for work in other media. No prior experience with computers necessary. *Prerequisite:* 1 or 2. Three hours.

145 Graphic Design The application of graphic design principles to practical problems, including the impact of popular design on society, exploration of visual elements in contemporary printing processes. *Prerequisite:* 1 or 2. Three hours. McIntyre.

147 Visual Environment Exploration of public spaces, structures, architectural detail, landscaping, roadways, lighting, etc. Field trips; meetings with planners and architects; projects. *Prerequisites:* 1, 2, or 3. Three hours.

191 Field Experience, Internship *Prerequisites:* Junior standing, six hours of 100-level courses in appropriate field, departmental permission (a contract must be obtained from and returned to the Art Department during preregistration). Three hours.

195 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197 Readings and Research: Tutorial in Studio Art Independent/individual research in studio art. *Prerequisites:* Junior standing, six hours of studio art courses at 100 level, departmental permission (a contract must be obtained from and returned to the Art Department during preregistration). Three hours.

213 Advanced Ceramics Advanced investigations of methods exploring content, form, surface, and color of ceramics and elements related to the discipline. *Prerequisite:* 113 or 114. Three hours. Carter.

215 Advanced Drawing Intense investigation of drawing and elements that relate to that discipline. Emphasis on conceptual method, contemporary techniques, and both objective and nonobjective source material. *Prerequisite:* 115. Three hours. Owre.

221 Advanced Painting Advanced explorations of painting emphasizing issues of scale, materials, and techniques both traditional and contemporary, and their relationship to both the discipline and current issues. *Prerequisites:* 121. Three hours. Owen.

237 Advanced Photography Continuation of 137, further exploring the implications of photography and encouraging students to use the medium to better understand their relationships to the world. *Prerequisite:* 137 or 138. Three hours. Higgins.

241 Advanced Sculpture Advanced investigation of sculpture. Students work on individual projects under supervision of instructor. Periodic group discussion and analyses of work in progress. *Prerequisite:* 141. Three hours. Schneider, Zucker.

281 Advanced Studies in Studio Art Work in close consultation with faculty sponsor on a specific and advanced project. *Prerequisites:* Senior standing, major or qualified minor in studio art, departmental permission (a contract must be obtained from and returned to the Art Department during preregistration), six hours of 100-level courses in topic of contract. Three hours.

283 Advanced Seminar in Studio Art Advanced seminar for senior studio art majors covering a range of topics. *Prerequisites:* Senior standing, major in studio art, instructor's permission. Three hours. (Not offered for graduate credit.)

295 Advanced Special Topics in Studio Art Advanced work in existing departmental offerings. *Prerequisite:* Instructor's permission only. Three hours.

HONORS – ARTS AND SCIENCES

204, 205 Honors/Studio Art See page 64 and contact Department for specific requirements. Three hours each.

ART HISTORY

5 Western Art: Ancient through Medieval Introduction to the visual arts, primarily painting, sculpture, and architecture in the Western world from prehistoric through Gothic. Three hours.

6 Western Art: Renaissance to Modern Introduction to the visual arts, primarily painting, sculpture, and architecture in the Western world from Renaissance to present. *Prerequisite:* It is recommended that Art 5 be taken before 6. Three hours.

8 Asian Art Introduction to the artistic traditions and major architectural monuments of India, China, Japan, and Southeast Asia. Three hours. Seyller.

96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

140 History of Optical Media As Art Theory and development of the art of "optical media:" photography, film, and video. Emphasis on discovery and explication of technical, aesthetic, and expressive properties. *Prerequisite:* 6. Three hours. Lyman.

146 Egypt and the Ancient Near East The development of sculpture, painting, and architecture in the cradles of Western civilization: Mesopotamia, and Egypt. 3000-300 B.C. *Prerequisite:* 5. Three hours. Mierse.

148 Greek Art Development of painting, sculpture, architecture, and related arts in Greek lands from 3000-30 B.C. *Prerequisite:* 5. Three hours. Mierse.

149 Roman Art Examination of the artistic experiments made by Roman painters, sculptors, and architects from 3rd century B.C. to 5th century A.D. *Prerequisite:* 5. Three hours. Mierse.

155 Topics in Medieval Art Selected aspects of European art from the end of the Roman Empire through the Gothic period. Material and emphasis vary with instructor. May be repeated for credit with instructor's permission. *Prerequisite:* 5. Three hours.

158 Northern European Art 1400-1600 Netherlandish and German art of the period. Special attention to Jan van Eyck, Rogier van der Weyden, Hugo van der Goes, Dürer, Bosch, and Bruegel. *Prerequisite:* 5. Three hours. Fengler-Stephany.

161 Italian Renaissance Painting Painting in Italy from Gothic innovations of Giotto and Duccio through establishment of 15th century Renaissance style to the High Renaissance works of Leonardo da Vinci, Raphael, and Michelangelo. The development of Venetian painting. *Prerequisite:* 5. Three hours. Fengler-Stephany.

164 Italian Renaissance Sculpture Sculpture in Italy from its Gothic sources through the Renaissance period. Special attention to Ghiberti, Donatello, and Michelangelo. *Prerequisite:* 5. Three hours. Fengler-Stephany.

165 Topics in European Art, 1600-1800 Selected aspects of the painting, sculpture, and architecture of the Baroque, Rococo, and/or Neo-Classical periods. Material and emphasis vary with instructor. May be repeated for credit with instructor's permission. *Prerequisite:* 6. Three hours.

170 Topics in Modern Art Selected aspects of the painting, sculpture, and architecture of Europe and North America during the 19th and 20th centuries. Material and emphasis vary with instructor. May be repeated for credit with instructor's permission. *Prerequisite:* 6. Three hours.

172 19th Century European Painting Examination of major movements in European painting from Neo-Classicism and Romanticism through Post-Impressionism. *Prerequisite:* 6. Three hours. Lipke.

174 20th Century Art A survey of movements and new media in European and American painting, sculpture, mixed media, performance, and the influences of film and photography on traditional media. *Prerequisites:* Three hours of art history and preferably 172 or 181. Three hours. Lipke. Alternate years, 1999-00.

177 19th and 20th Century Architecture and Design The theory and practice of building and design from the early 19th century to the recent past. *Prerequisites:* 6 or a course in Historic Preservation. Three hours.

179 Topics in Contemporary Art A study of selected examples of recent and current art and/or architecture. Material and emphasis vary with instructor. May be repeated for credit with instructor's permission. *Prerequisite:* Three hours of Art History. Three hours.

180 North American Art 1600-1900 Painting, sculpture, and architecture in the U.S. and Canada from colonial beginnings (Hispanic, Franco, Anglo) to WWI. Emphasis on the development of nationalist sensibilities as they emerge from European sources. *Prerequisites:* 6 or International Studies 91 (Canada). Three hours. Lipke.

185 Japanese Art Architecture, sculpture, painting, prints, and decorative arts and their relationship to Japanese culture. *Prerequisites:* Three hours in art history or one of the following Asian Studies courses: Geography 58, History 151, Religion 21, 132, 141. Three hours. Seyller. Alternate years, 1998-99.

187 Chinese Painting History of Chinese painting, emphasizing the landscape painting of the 11th to 17th

centuries. *Prerequisite:* Six hours in art history, three at the 100 level or instructor's permission. Three hours. Seyller. Alternate years, 1998–99.

188 Indian Painting Mural, manuscript, and miniature painting from India from 5th to 19th century. Topics to include: courtly and religious patronage and regional styles. *Prerequisites:* Three hours of art history or instructor's permission. Three hours. Seyller.

189 Topics in Non-Western Art Selected aspects of the art of an area not covered in our regular European, American, and Asian courses. Material and emphasis vary with instructor. May be repeated for credit with instructor's permission. *Prerequisite:* Three hours in Art History. Three hours.

190 Field Experience, Internship in Art History *Prerequisites:* Junior standing, six hours of 100-level course work in appropriate field, departmental permission (a contract must be obtained from and returned to the Art Department during preregistration). Three hours.

192 Intermediate Special Topics in Asian Art Intermediate courses on topics beyond the scope of existing departmental offerings in Asian Art. See Schedule of Courses for specific titles. *Prerequisite:* Three hours.

196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

198 Readings and Research *Prerequisite:* Departmental permission. Three hours.

199 Topics in Gender, Ethnicity, and Art Study of selected aspects of gender, "race," or ethnicity in art, and/or of the contributions of women or ethnically diverse people to the visual arts. Material and emphasis vary with instructor. May be repeated for credit with instructor's permission. *Prerequisite:* Three hours in Art History. Three hours.

201 Architecture, Landscape, and History (See Historic Preservation 201.) *Prerequisites:* Six hours advanced studies in art and architecture, permission. Three hours.

282 Seminar in Western Art Selected topics in Western Art. See Schedule of Courses for specific offerings each semester. *Prerequisites:* Six hours of 100-level Art History courses, including three hours in the area of the seminar; junior or senior standing. Three hours.

285 Seminar in Asian Art *Prerequisites:* One of the following: Art 8, 185, 187, 188 or 196 (Asian); three additional hours of 100-level courses either in art history or Asian Studies. Seyller.

296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

HONORS – ARTS AND SCIENCES

206, 207 Honors/Art History See page 64 and contact Department for specific requirements. Three hours each.

Asian Studies

COLLEGE OF ARTS AND SCIENCES

Prof. Seybolt, Director

The following courses are among the course offerings; see department listings for specific descriptions. "E", "S", indicates courses on East and South, subareas of Asia respectively. Also see Area and International Studies for special topics listings.

Courses entirely on Asia: **Anthropology** 165 (S); **Art** 8 (E, S), 185 (E), 187 (E), 188 (S), 192 (E, S), 285 (E, S); **Chi-**

nese 1, 2 (E), 51, 52 (E), 101, 102 (E), 171, 172 (E), 201, 202 (E); **Geography** 58 (E); **History** 50 (E), 51 (E), 150 (E), 151 (E), 152 (E), 250 (E), 252 (E); **Japanese** 1, 2 (E), 51, 52 (E), 101, 102 (E), 201 (E), 202 (E); **Philosophy** 3 (E), 121 (E), 122 (E), 221 (E); **Political Science** 170 (S), 175 (E), 176 (E); **Religion** 21 (E, S), 131 (S), 132 (E, S), 134 (S), 141 (E), 145 (E), 240 (E, S).

Courses significantly on Asia: **Anthropology** 101 (E, S), 163 (S); **Business Admin.** 227 (E, S), 259 (E); **Education (EDFS)** 206 (E, S); **Geography** 1 (E, S, W); **Music** 15 (E, S); **Political Science** 256 (E); **Psychology** 237 (E, S); **Religion** 20 (E, S), 101 (E, S), 104 (E, S), 106 (E, S), 108 (E, S), 168 (E, S).

Biochemistry (BIOC)

COLLEGE OF MEDICINE

Professors Chiu, Collen, Cutroneo, Long, Mann (Chairperson), Meyer, J. Thanassi; Associate Professors Franchlyn, Hart, P. Tracy, R. Tracy; Adjunct Associate Professor Crabb; Assistant Professor Morrical; Research Associate Professors Kalafatis, Mason, N. Thanassi; Research Assistant Professor B. Lyons.

191, 192 Undergraduate Research Participation in a research program currently being pursued by a faculty member of department. Written report due at end of each semester. *Prerequisites:* Chemistry 31, 32 or 35, 36. Some programs may require additional courses in chemistry. Credit as arranged, up to four hours per semester.

212 Biochemistry of Human Disease Molecular approach to genetic, metabolic, and infectious diseases; recombinant DNA technology and medicine; diagnostic enzymology. *Prerequisites:* Chemistry 42 or 141; Agricultural Biochemistry 201. Three hours. Chiu, Hart.

Biological Sciences (BSCI)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Professors Barrington, Bramley (Director), Burke, Carew, Foss, Ulbrich; Associate Professors Hoffman, Johnson, Kindstedt, Pintauro, Plaut, Ross, Tierney; Assistant Professor Molofsky, Paris; Lecturers Rogers, Silverstein, Tessmann.

195, 196 Biological Sciences Seminar Presentations and discussion of selected topics by students, staff, and invited guests. Suggested attendance for all seniors in Biological Science for one semester. One hour.

197, 198 Undergraduate Research Special study and research activity under direction of qualified staff member. Requires written proposal and final project report. *Prerequisites:* Junior/senior standing, research advisor and program chairperson approval. Credit as approved with maximum of six hours for undergraduate program.

Biology (BIOL)

COLLEGE OF ARTS AND SCIENCES

Professors Bell, Heinrich, Schall, Van Houten (Chairperson); Associate Professors Davison, Goodnight, Gotelli, Kilpatrick, Landesman, Stevens, Vigoreaux; Assistant Professors Brody, Conn, Murakami, Schneider.

1A, IB* Principles of Biology Principles of cellular biochemistry, cell biology, genetics and evolution. Topics pre-

sented: biochemistry; metabolism, cell structure and function; respiration; photosynthesis; molecular, Mendelian and population genetics; microevolution. Credit not given for both 1 and 11. Four hours.

*Section B is for science majors with concurrent enrollment or credit in Chemistry 31.

2A, 2B* Principles of Biology Principles of organismal biology; nature of scientific inquiry, plant form and function, pollination ecology, animal phylogeny illustrated by comparative anatomy and physiology; animal behavior. Credit not given for both 2 and 12. Four hours.

*Section B is for science majors with concurrent enrollment or credit in Chemistry 32.

3 Human Biology For nonscience majors. Selected biological topics relevant to humans, such as cancer, human genetics, environmental toxicants; biological concepts necessary for understanding these problems. Three hours. Landesman.

4 The Human Body Introduction to basic human anatomy and organ system physiology emphasizing normal homeostatic mechanisms and the changes that accompany common disorders and diseases. Three hours. Landesman.

6 Evolutionary Biology For nonscience majors. The process of biological evolution; evidence for evolution; mechanisms of evolutionary change; origin of adaptations; evolution of behavior; social and reproductive behavior. Three hours. Schall.

11 Exploring Biology Exploring biology from cells to organisms. Topics include origins of life; ancestral organisms; uni- and multi-cellular energetics; evolution of respiration and metabolism; and the genetic code. *Prerequisites:* Biology/Zoology, Environmental Sciences (A&S) majors only, others by permission; concurrent enrollment or credit in Chemistry 31 or 32. Credit not given for both 1 and 11. Four hours.

12 Exploring Biology An evolutionary perspective to exploring biology. Topics include patterns of inheritance; Darwinian evolution; evolution of biodiversity; ecology of organisms; human effects on biological systems. *Prerequisites:* Biology/Zoology, Environmental Sciences (A&S) majors only, others by permission; enrollment or credit in Chemistry 31 or 32. Credit not given for both 2 and 12. Four hours. Brody.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

101 Genetics Study of the basis of inheritance, covering topics from classical genetics to modern molecular studies. Analysis of genetic data emphasized. *Prerequisites:* 1, 2; organic chemistry recommended. Three hours. Van Houten.

102 Environmental Biology (3-3) Ecosystem and community structure; population growth; species interactions and niche dynamics; population and chromosomal genetics; speciation in fossil records; ecology of animal behavior; applied ecology. *Prerequisites:* 1, 2; Math. 19 or 21. Four hours. Goodnight, Gotelli.

103 Cell Structure and Function (3-3) Molecules, structures, and physiology of cell membranes; energy transformations; nuclear and cytoplasmic events; extracellular matrix; cell signaling; and cell types and fates. *Prerequisites:* 2, Chemistry 32; organic chemistry recommended. Four hours. Vigoreaux.

104 Comparative Animal Physiology (3-3) Physiology of organs and organ systems in animals emphasizing basic principles of physiology common to all forms. *Prerequisite:* 103; Physics 12 recommended. Four hours.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Undergraduate Research Individual laboratory research under guidance of faculty member. Students must follow the guidelines outlined on page 66 or they will be disenrolled. *Prerequisites:* Junior or senior standing, departmental permission. Three or six hours.

202 Quantitative Biology Mathematical concepts applied to biological problems such as growth, metabolism, temperature effects, kinetics, and graphic interpretation of data. Statistics not treated. *Prerequisite:* At least one intermediate level course in biology, Math. 9, or instructor's permission. Three hours. Davison.

203 Population Ecology Analysis of growth, regulation, and interrelations of biological populations in theoretical, laboratory, and natural systems. *Prerequisite:* Biology 102. Three hours.

205 Advanced Genetics Laboratory Lecture/discussions alternated with laboratories to provide experiences with genetic techniques. Bench work and data analysis emphasized. *Prerequisite:* 101. Four hours. Van Houten.

206 Immature Insects Evolution, morphology, taxonomy, and natural history of immature insects. Laboratory covers some morphology, but is predominantly identification. *Prerequisites:* Junior standing; major or minor in Biology. Four hours. Bell.

208 Morphology and Evolution of Insects (2-4) Interrelationships, fossil history, comparative anatomy of major insect groups. Morphology and way of life of representatives of important insect orders and classes of arthropods. *Prerequisite:* 102 or 104. Four hours. Bell.

209 Field Zoology (2-4) Collection, identification of invertebrates; September field work. Half of student's collection is general, identified to family; half is one or two groups identified to species. *Prerequisite:* 102 or 104. Four hours. Bell.

212 Comparative Histology (2-4) Anatomy of tissues, chiefly vertebrate. Tissue similarities and specializations of organs among the various groups of animals in relation to function. *Prerequisite:* 104. Four hours. Landesman.

217 Mammalogy (3-3) Classification, identification, morphology, evolution, and distribution of mammals. *Prerequisite:* 102. Four hours. Kilpatrick.

219 Comparative and Functional Vertebrate Anatomy (2-4) Structure, function, and phylogeny; survey of evolutionary and functional trends; investigation of the structure of all chordate groups. *Prerequisite:* 104. Four hours. Kilpatrick. Alternate years, 1998-99.

223 Developmental Biology An analysis of the cellular, subcellular, molecular, and genetic mechanisms that operate during oogenesis and embryogenesis in invertebrate and vertebrate organisms. *Prerequisites:* 101, 103. Three hours. Landesman.

225 Physiological Ecology Processes by which animals cope with moderate, changing, and extreme environments. *Prerequisites:* 102, 104. Three hours. Heinrich.

238 Winter Ecology Natural history and winter adaptation of plants and animals of western Maine. Field work during winter break; oral and written report completed during spring semester. *Prerequisite:* Permission of instructor. Three hours. Heinrich.

246 Ecological Parasitology Parasite-host interactions examined with evolutionary perspective. Topics include the origin of parasites, evolution of virulence, and ecological consequences of parasitism. Laboratory includes original

experiments. *Prerequisite:* 102. Four hours. Schall. (Not offered for graduate credit.)

254 Population Genetics The forces that change gene frequencies in populations are examined. Topics include Hardy-Weinberg-Castle equilibrium, selection, mutation, migration, genetic drift, and quantitative genetics. *Prerequisites:* 102; calculus and statistics recommended. Four hours. Stevens.

255 Comparative Reproductive Physiology Various means by which animals reproduce. Special emphasis on the embryological origin and evolutionary relationships of sex cell differentiation. *Prerequisite:* 104. Three hours. Davison.

263 Genetics of Cell Cycle Regulation Molecular events during the cell cycle; mutants defective in cell cycling; comparison of normal and transformed (cancer) cell cycling. *Prerequisite:* 101 or instructor's permission. Three hours. Van Houten. Alternate years, 1999–00.

264 Community Ecology Theoretical and empirical analyses of community structure. Topics include population growth, metapopulation dynamics, competition, predation, species diversity, niches, disturbance succession, island biogeography, and conservation biology. *Prerequisites:* 102; at least junior standing. Three hours. Gotelli.

265 Developmental Molecular Genetics Current topics in developmental genetics explored through lectures and discussions of current literature; emphasis on molecular approaches. *Prerequisites:* 101. Three hours. Van Houten. Alternate years, 1998–99.

267 Molecular Endocrinology Study of hormone action at the cellular and molecular level. *Prerequisite:* 101. Four credits.

270 Speciation and Phylogeny Contributions of modern research in such fields as genetics, systematics, distribution, and serology to problems of evolutionary change. *Prerequisite:* 101 (102 recommended). Three hours. Kilpatrick. Alternate years, 1999–00.

281 through 284 Seminar Review and discussion of current zoological research. Attendance required of Biology graduate students. Seniors in zoological research programs may enroll. Without credit.

295 through 299 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

HONORS – ARTS AND SCIENCES

208, 209 Honors/Biology See page 64 and contact Department for specific requirements. Three hours each.

Biomedical Technologies (BMT)

SCHOOL OF ALLIED HEALTH SCIENCES

Associate Professor Emeritus Lachapelle; Associate Professors Huot (Chair), Izzo, Reed, Sullivan; Assistant Professor Chen; Lecturers Ball, Kellogg; Lecturer Emeritus Marschke; Clinical Associate Professors Patt, Wilcke; Clinical Assistant Professors Chiaravalle, Pembroke, Wadsworth; Clinical Instructors Birch, Bushor, Chatoff, Dopp, Durett, Elgert, Fiore, Gibson, Giroux, Hammond, Hard, Hills, Jarvis, Koktowski, Lew, Lunde, McCarthy, McGovern, Messier, Morgan, Morley, Newman, Powden, Purchase, Reardon, Relation, Rowley, Shea, Standage, Sullivan, Tumielewicz, Westensfeld, White.

1 First Year Seminar Discussion of relevant issues in the Biomedical Sciences. Topics include public health, cancer prevention, radiation science, and health and well-being. S/U grading. One hour.

3 Medical Terminology Terminology related to medical science and hospital services. Fall and spring. One hour.

4 Introductory Radiologic Science (3-0) Introduction to ionizing radiation, emphasizing its interaction with matter, its effect on the human body, and methods of protecting patients and technologists. Three hours.

34 Human Blood Cells Lecture and laboratory experiences in cells of the blood, their quantitation, physiology, and alterations in disease. Spring. Three hours. Reed.

54 Principles of Microbiology Lectures and laboratory experiences dealing with the structure, physiology, and control of microorganisms, in particular those of medical importance. Spring. Four hours. Chen.

110, 111 Phlebotomy Basic techniques in blood collection, including choice of anticoagulants, equipment, sterility, and protection from blood-borne pathogens. One-half hour.

123 Introduction to Clinical Chemistry Lectures and laboratory experiences introduce basic principles in the quantitative analysis of body fluids; test results are correlated with clinical case studies. *Prerequisite:* Chemistry 23 or 31 and 32. Fall. Four hours. Sullivan.

229 Seminar: Clinical Chemistry Discussion of recent advances in clinical chemistry. One hour. Sullivan. (Not offered for graduate credit.)

239 Seminar: Hematology Discussion of recent advances in hematology. One hour. Reed. (Not offered for graduate credit.)

242 Immunology Concepts of the human immune system. Topics covered include: cellular and humoral immunity; immunoglobulin and T-cell receptor structure and function; autoimmunity; hypersensitivity; tumor immunology; immunodeficiency. *Prerequisites:* Biology 1 and 2 or Anatomy and Physiology 19 and 20. Spring. Three hours. Huot. (Not offered for graduate credit.)

244 Immunology Laboratory Laboratory exercises that utilize techniques which elucidate antigen-antibody reactions. Techniques covered include: agglutination; precipitation; immunodiffusion; fluorescence; cell labelling and quantitation; ELISA applications. Fall. One hour. Huot.

249 Seminar: Immunology Discussion of recent advances in immunology. One hour. Huot. (Not offered for graduate credit.)

259 Seminar: Clinical Microbiology Discussion of recent advances in clinical microbiology. One hour. (Not offered for graduate credit.)

269 Seminar: Immunohematology Discussion of recent advances and practices used in transfusion medicine. Spring. One hour. (Not offered for graduate credit.)

295 Principles of Education and Management Introduction to theories of education and management. Fall. Three hours.

296 Senior Seminar Review of case studies for clinical correlation. Fall. Two hours.

299 Special Topics Courses or seminars beyond scope of existing departmental offerings. *Prerequisite:* Departmental permission. Variable credit.

BIOMEDICAL TECHNOLOGY (BMED)

281 Molecular Applications Lecture and laboratory course focused on application of molecular biology techniques to diagnostic testing and biotechnology. Techniques include Northern and Western blot analysis, *In situ* hybridization, tissue culture, immunoassay development and use. *Prerequisites:* Chemistry 31, 32 or 23; 141, 142 or 42; Biology 1, 2 or Anatomy and Physiology 19, 20. Fall. Four hours. Reed.

284 Undergraduate Research I Research projects sponsored by faculty. *Prerequisite:* Instructor's permission. One to three hours.

285 Undergraduate Research II Research projects sponsored by faculty. *Prerequisite:* 284, instructor's permission. One to three hours.

286 Undergraduate Research III Research projects sponsored by faculty. *Prerequisite:* 285, instructor's permission. One to three hours.

293 Research Concepts Discussion of research methodology including analysis of primary scientific literature. Spring. One hour.

297 Undergraduate Research Research projects sponsored by faculty. *Prerequisite:* Instructor permission. Spring, fall. Variable credit.

298 Undergraduate Research Seminar Current literature related to student research project will be presented and discussed. Students will be required to present a seminar on their research project. *Prerequisites:* 284, 285, 286 or 297, advanced standing. Spring. Three hours. Huot.

MEDICAL LABORATORY SCIENCE (MLS)

170 Medical Cytology Practicum Development of diagnostic expertise (speed and accuracy) through the daily evaluation of slides of gynecologic and nongynecologic materials. Spring. Twelve hours.

171 Medical Cytology I Identification of cells and concepts of cell growth and differentiation. Biology and cytopathology of the female genital tract. Patient management and specimen collection techniques introduced. Four hours. Giroux.

172 Medical Cytology II Biology and cytopathology of the nongynecologic body systems. *Prerequisites:* 171, 173. Cytology Lab I. Four hours. Giroux.

173 Medical Cytology Lab I Microscopic study and recognition of normal and abnormal cellular manifestations in gynecologic materials. Four hours. Giroux.

174 Medical Cytology Lab II Microscopic study and recognition of normal and abnormal cellular manifestations in the nongynecologic body systems. *Prerequisites:* 171, 173. Four hours. Giroux.

175 Cytology Seminar Interesting case reports and journal review articles are developed and presented in written and oral form. Two hours. Giroux.

179 Cytology Techniques Handling and processing of cellular specimens. Includes collection, fixation, smear preparation, cytocentrifuge, staining, and safety techniques. Summer. Three hours. Kellogg.

201 Body Fluid Analysis Lectures and laboratory experiences focusing on the complete analysis of urine, cerebral spinal fluids, serous fluids, synovial fluid, and other human body fluids. Majors only. Spring, fall. One hour.

220 Clinical Practicum: Chemistry Experiences with chromatography, immunoassays, random access analyses, and a variety of manual and automated test systems. MLS majors only. Fall, spring. Three and one-half hours. Sullivan.

222 Advanced Clinical Chemistry Two-part course detailing testing techniques including chromatography, electrophoresis, nephelometry, electrochemistry, and automation; clinical case studies on the pathophysiology of diseases when abnormal chemistry test results are present. Lab focuses on troubleshooting and problem solving. *Prerequisite:* Biochemistry 212. Spring. Variable credit. Three to three and one-half hours. Sullivan.

230 Clinical Practicum: Hematology Experiences in clinical analysis of blood cells in the FAHC laboratories. MLS majors only. Fall, spring. Two hours. Reed.

231 Pathophysiology of Blood Cells Advanced theory and analysis of blood cell physiology and related pathology. Concepts of hemostasis and clinical assessment methods. *Prerequisite:* concurrent enrollment in Biochemistry 212. Fall. Three hours. Reed.

250 Clinical Practicum: Microbiology Practical experiences at Fletcher Allen Health Care. MLS majors only. Fall, spring. Two hours.

255 Advanced Clinical Microbiology Advanced instruction in the study of clinically significant microorganisms, infectious disease process, and laboratory methods used for the isolation and identification of microorganisms from clinical specimens. Fall. *Prerequisite:* Microbiology 222. Three hours.

256 Parasitology Lectures and laboratory experiences in the identification of parasitic organisms and their relationship to disease. MLS majors only. Fall, spring. One hour.

260 Clinical Practicum: Immunohematology Clinical experiences in operation of a hospital transfusion service and regional reference laboratory. MLS majors only. Fall, spring. One and one-half hours.

262 Advanced Immunohematology Advanced theory and experience related to human blood groups and transfusion practice. *Prerequisites:* 244 and concurrent enrollment in BMT 242. Spring. Four hours.

291-292 Biomedical Technologies Honors See "Departmental Honors" page 103 and contact the Department for specific requirements.

NUCLEAR MEDICINE TECHNOLOGY (NMT)

51 Principles of Nuclear Medicine Lecture and laboratory experiences to introduce the theories and practice of nuclear medicine technology. Three hours. Fall. Izzo.

52 Nuclear Medicine Radiopharmacy The radiopharmaceutical aspects of nuclear medicine technology, including radiation physics, safety, tracer principles, and dosimetry. *Prerequisite:* Biomedical Technologies 4. Three hours. Spring. Izzo.

75 Medical Imaging Techniques Introduction to radiographic anatomy and the various imaging techniques presently available to include magnetic resonance imaging (MRI), positron emission tomography (PET), ultrasound, etc. Two hours. Fall.

153 Nuclear Medicine Clinical Procedures I Principles of diagnostic imaging procedures emphasizing the nuclear medicine technologist's role in patient care and preparation, radiopharmaceutical selection, image acquisition, and data processing and analysis. *Prerequisite:* 52. Three hours. Fall.

154 Nuclear Medicine Clinical Procedures II Principles and technical considerations of *in vivo* and *in vitro* nuclear medicine diagnostic and therapeutic procedures. *Prerequisite:* 153. Three hours. Spring.

155 Instrumentation I Nuclear medicine instrumentation, with emphasis on planar imaging devices, computer, and quality control; introduction to SPECT camera systems. *Prerequisite:* 52. Three hours. Fall. Izzo.

156 Instrumentation II Advanced nuclear medicine instrumentation with emphasis on state-of-the-art imaging devices. *Prerequisite:* 155. Three hours. Spring. Izzo.

163 Nuclear Medicine Clinical Practicum I Students observe and participate in Fletcher Allen Health Care's Nuclear Medicine Department. NMT majors only. One hour. Fall.

164 Nuclear Medicine Clinical Practicum II Students participate in routine imaging procedures emphasizing patient care, positioning, and instrumentation. NMT majors only. *Prerequisite:* 163. Two hours. Spring.

263 Advanced Nuclear Medicine Clinical Practicum III Experience in advanced clinical and pharmacological procedures. NMT majors only. *Prerequisite:* 164. Three hours. Fall.

264 Nuclear Medicine Internship Full-time clinical experience at an affiliated institution. NMT majors only. *Prerequisite:* 263. Fifteen hours. Spring. Izzo.

RADIATION THERAPY (RADT)

52 Principles of Radiation Therapy Introduction to the practice and theory of radiation therapy through lectures and discussions. *Prerequisite:* Biomedical Technologies 4. Two hours. Spring.

75 Medical Imaging Techniques Introduction to radiographic anatomy and the various imaging techniques presently available to include magnetic resonance imaging (MRI), positron emission tomography (PET), ultrasound, etc. Two hours. Fall.

144 Seminar: Patient Care Issues Topics will include new treatment modalities, outreach programs, coping with disease, etc. RADT majors only. S/U grading. One hour.

173 Clinical Laboratory: Radiation Therapy Introduction to the clinical environment through activities which include patient care and handling, immobilization techniques, therapy unit calibrations and manipulation, etc. RADT majors only. *Prerequisite:* 52. Two hours. Fall.

174 Clinical Practicum: Radiation Therapy Students participate and observe in the Fletcher Allen Health Care Radiation Therapy Department. RADT majors only. One hour. Spring.

176 Clinical Radiation Oncology The various types of neoplasms, methods of diagnosis of treatment, and elementary pathology are presented. RADT majors only. *Prerequisites:* Anatomy and Physiology 19–20. Spring. Three hours.

223 Clinical Practicum: Radiation Therapy A continuation of RADT 174 emphasizing increasing clinical capabilities. RADT majors only. *Prerequisite:* 174. Three hours. Fall.

274 Clinical Internship: Radiation Therapy Students are assigned to approved clinical education sites to observe and increase their participation in the clinical environment. Evaluations based on defined clinical objectives and competencies to be completed by the clinical and University faculty. RADT majors only. *Prerequisites:* Successful completion of all previous required major courses and concurrent enrollment in RADT 280. Spring. Fourteen hours.

275 Dosimetry Treatment plan verification using three-dimensional computer models, simulation data, and knowledge of treatment unit capabilities. RADT majors only. *Prerequisites:* Math. (10 or higher), Computer Science. Fall. Two hours.

277 Techniques in Radiation Therapy Instructs students in the theory and clinical application of radiotherapeutic techniques. RADT majors only. *Prerequisites:* Concurrent enrollment in 275 and 223. Fall. Four hours.

280 Quality Assurance and Treatment Planning The integration of clinical oncology, radiobiology, dosimetry, and treatment planning, and how they affect patient outcomes. RADT majors only. Spring. Three hours.

Botany and Agricultural Biochemistry (BOT)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Professors Barrington (Chairperson), Etherton, Ulrich, Weller, Worley; Associate Professors Currier, Hoffmann, Hughes, Tierney; Assistant Professors Molofsky, Paris; Research Associate Professor Lintilhac; Research Assistant Professor Perkins; Lecturers Daniel, Olivetti.

AGRICULTURAL BIOCHEMISTRY (AGBI)

10 Introductory Biochemistry (3) The biochemical substances and reactions that control important living processes. A direct introduction to biochemistry not requiring preparation in the sciences. Three hours.

191 Biochemistry of Nucleic Acids (2) Structure, function, and properties of nucleic acids, nucleoproteins, and enzymes or proteins that act on nucleic acids. Emphasis on experimental approach. *Prerequisite:* 10 or equivalent or instructor's permission. Two hours. Weller. Alternate years, 1998–99.

195 Special Topics *Prerequisite:* Instructor's permission.

197, 198 Undergraduate Research *Prerequisite:* Departmental permission. One to three hours.

201 General Biochemistry (3-3) Broad coverage of biochemistry including principles of analytical biochemistry. *Prerequisite:* Chemistry 42 or 141. Three hours and lab (one hour) as AGBI 202. Weller.

202 General Biochemistry Laboratory (0-3) Introduction to techniques and equipment used for the isolation and quantitative analysis of amino acids, proteins, carbohydrates and DNA enzymes in biological materials. *Prerequisite:* Credit for or concurrent enrollment in 201. One hour.

220 Molecular Biology (3-3) Structure and biological function of nucleic acids, proteins, and enzymes. Emphasis on optical, electrophoretic, and ultracentrifugal methods. *Prerequisite:* 201 and 202 or instructor's permission. Three hours and lab (one hour) as AGBI 221. Currier.

221 Molecular Biology Laboratory (0-3) Laboratory practice in protein characterization by disc electrophoresis and isoelectric focusing, DNA separation and characterization by agarose gel electrophoresis, restriction digests, polymerase chain reaction, and Southern blots. *Prerequisite:* Credit for or concurrent enrollment in 220. One hour. Currier, Weller.

230 Advanced Biochemistry (3-3) Study of metabolic cycles emphasizing research methods involving radioisotopes and chromatography. *Prerequisite:* 201 and 202 or 220 and 221 or instructor's permission. Three hours and lab (one hour) as AGBI 231. Currier.

231 Advanced Biochemistry Laboratory (0-3) Laboratory experimentation emphasizing chromatography. Introduction to modern GLC and HPLC techniques, protein secondary structures, and enzyme isolation, purification, and characterization. *Prerequisite:* Credit for or concurrent enrollment in 230. One hour. Currier.

250 Plant Biochemistry (2) Study of specific biochemical principles unique to plants concentrating on the biochemistry of plant cell walls, photosynthesis, and secondary metabolites. *Prerequisite:* 201. Two hours. Currier. Alternate years, 1999–00.

295 Special Topics *Prerequisite:* Instructor's permission.

BIOLOGY (BIOL)

1A, 1B* Principles of Biology Principles of cellular biochemistry, cell biology, genetics and evolution. Topics pre-

sented: biochemistry; metabolism, cell structure and function; respiration; photosynthesis; molecular, Mendelian and population genetics; microevolution. Four hours.

*Section B is for science majors with concurrent enrollment or credit in Chemistry 31.

2A, 2B* Principles of Biology Principles of organismal biology; nature of scientific inquiry, plant form and function, pollination ecology, animal phylogeny illustrated by comparative anatomy and physiology; animal behavior. Four hours.

*Section B is for science majors with concurrent enrollment or credit in Chemistry 32.

252 Molecular Genetics (See Botany 252.)

BOTANY (BOT)

4 Introduction to Botany (3-3) Structure, function, and reproduction of plants. Fundamental aspects of plant science with implications of botanical knowledge needed for applied plant sciences. Credit not given for both Botany 4 and Biology 1. Four hours. Olivetti.

6 The Green World Evaluation of the impact of plants on the aesthetic, cultural, social, medical, and religious lives of peoples of the world. Botany and Biological Science majors will not receive credit for Botany 6 as part of program distribution requirements. Three hours. I. Molofsky.

101 Genetics (See Biology 101.)

104 Physiology of the Plant Body (3-3) Study of the plant as a whole, growth and development, water and mineral relations, environmental factors, and regulatory processes. *Prerequisites:* One year of plant or biological science, beginning chemistry recommended, or instructor's permission. Four hours. Etherton.

108 Morphology and Evolution of Vascular Plants (3-3) Evolutionary relationships of vascular plants as inferred from plant structure, ecology, geography, and reproductive biology. Synthesis includes both fossil and extant groups. *Prerequisite:* 4 or Biology 1, 2. Four hours. Alternate years, 1998–99. Paris.

109 Systematics and Phylogeny (3-3) Classification; evolution of flowering plants; characterization and recognition of major families; species and generic concepts; biosystematics; taxonomic keys; preparation of herbarium specimens. *Prerequisite:* 4 or Biology 1, 2. Four hours. Paris.

117 Plant Pathology (3-2) Diagnosis, life history, control of diseases caused by fungi, viruses, bacteria, nematodes, parasitic plants, and environmental factors. Physiology, biochemistry, and genetics of host-parasite interaction. *Prerequisite:* 4 or Biology 1, 2. Four hours. Ullrich. Alternate years, 1999–00.

132 Principles of Genetics Introduction to transmission and molecular genetics with reference to prokaryotic, animal, and plant systems. *Prerequisites:* Biology 1, 2; Chemistry 31, 32. Three hours. I. Tierney.

151 Plant Anatomy (3-2) A laboratory course in which students observe, draw, and write about the microscopic structure of flowering plants. *Prerequisite:* 4 or Biology 1, 2. Three hours. Etherton. Next offered 1999–00.

160 Plant Ecology (3-3) Introduction to interactions among plants and their environments. Dynamics of aquatic and terrestrial ecosystems emphasizing populations; physiological ecology; experimental design and analysis. *Prerequisite:* 4 or Biology 1, 2. Four hours. I. Hoffmann.

193, 194 College Honors (For Arts and Sciences seniors.)

197, 198 Undergraduate Research and Apprenticeships Individual projects under direction of a faculty member. Project may involve original research, readings, or appren-

ticeships. *Prerequisites:* Junior or senior standing, departmental permission. Three to six hours.

205 Mineral Nutrition of Plants Role of essential elements for plant growth including classical and modern approaches to the study of ion availability and transport. *Prerequisite:* 104. Three hours. Etherton.

209 Biology of Ferns Evolutionary biology; a survey of New England ferns and discussion of their phylogenetic relationships; current research emphasizing morphological, biogeographical, genetic, and phytochemical aspects of speciation. *Prerequisite:* 108; 101 or 132 recommended. Three hours. Barrington. Alternate years, 1999–00.

213 Plant Communities (2-2) Plant sociology; structure and organization of the plant community; sampling methods and analysis of data; climatic and edaphic factors; field work. *Prerequisite:* 109 or departmental permission. Three hours. II. Not offered 1998–99.

223 Fundamentals of Field Science (3-3) Pattern and process in natural systems. Weekly discussion of unifying questions in science. Field labs teach sampling and analysis of vegetation, soils, and animals. *Prerequisite:* Graduate standing or several university courses in earth sciences, life sciences, and chemistry. Three hours. Hughes.

232 Botany Field Trip Trips to selected environments outside Vermont, led by faculty members representing different fields of botany. Overall, integrated approach to ecology, structure, and function. One hour. Costa Rica, semester break 1998–99. Barrington.

234 Ecology of Freshwater Algae (2-3) Environmental factors influencing distribution and seasonal succession; quantitative methods for estimating standing crop productivity; kinetics of algal growth; competitive and synergistic interactions. *Prerequisite:* 160 or Biology 102. Three hours. Hoffmann. Alternate years.

241 Tropical Plant Systematics Principles and methods of angiosperm phylogeny. Recent systematic and evolutionary research on flowering plants; survey of tropical flowering plant families. Student presentations on recent research. *Prerequisite:* 109. Four hours. Barrington. Alternate years, 1998–99.

251 Principles of Light Microscopy for Biologists Introduction to the optics, construction, and care of the light microscope. Theory of phase and interference contrast, fluorescence, and video methods. *Prerequisite:* One year of physics or permission. One hour. Lintilhac.

252 Molecular Genetics: Regulation of Gene Expression in Eukaryotes How cells control the flow of genetic information from gene into active gene product. Distinctions between quiescent and active genes, mechanisms of genetic communication/regulation. *Prerequisites:* Biology 101 or Agricultural Biochemistry 201 or Biochemistry 301, or equivalent; others by instructor's permission. Three hours. Ullrich. Alternate years, 1999–00.

254 Genetics of Fungi Understanding the classical and molecular genetics of fungi with respect to their contributions in agriculture, basic genetics, biotechnology, industry, recombinant DNA, and gene expression. *Prerequisites:* Biology 101, or Agricultural Biochemistry 201 or Biochemistry 301 or equivalents; others by instructor's permission. Three hours. Ullrich. Alternate years, 1998–99.

256 Advanced Plant Genetics Review of major topics in higher plant genetics and cytogenetics. Designed to be applied to the systematics, breeding, and gene engineering of higher plants. *Prerequisite:* 132 or Biology 101. Three hours. Not offered 1998–99.

257 Physiology of the Plant Cell (3-2) Detailed study of photosynthesis, plant cell membrane function, and plant

cell growth. *Prerequisites:* 104, Chemistry 141, 142 or Chemistry 42, Physics 11, 12 or 31, 42. Four hours. Alternate years, 1999–00.

258 Biology of the Fungi Taxonomy, genetics, physiology, ecology, and economic importance of the fungi. Representatives of each major group are explored with respect to the above. Includes microbiological technique and laboratory culture of the fungi. *Prerequisites:* 101 or 104 or 132 or permission. Four hours. Ullrich. Alternate years, 2000–2001.

261 Plant Growth and Development Theoretical and experimental approaches to vegetative and reproductive morphogenesis in plants. Biophysics and biomechanics of cell and organ growth. Pattern formation, meristem structure, and phyllotaxis. *Prerequisites:* 104, 108, or permission. Three hours. Lintilhac.

281, 282 Botany Seminar Presentations of personal research by faculty, graduate students, and outside guest speakers. Required attendance of Botany graduate students and seniors in botanical research programs. Without credit.

295 Special Topics For advanced students within areas of expertise of faculty. Aspects of ecology, physiology, genetics, cytology, bryology, pteridology, paleobotany, photobiology, membrane physiology, and cell biology. *Prerequisite:* Departmental permission.

HONORS – ARTS AND SCIENCES

210, 211 Honors/Botany See page 64 and contact Department for specific requirements. Three hours each.

Business Administration (BSAD)

SCHOOL OF BUSINESS ADMINISTRATION

Professors Brandenburg, Grinnell, Gurdon, Hunt, Savitt, Sesnowitz (Dean), Shirland; Associate Professors Averyt, Cats-Baril, Dempsey, Gatti, Jesse, Kraushaar, McIntosh, Noordewier, Parke, Sinkula, Tashman, Thompson; Assistant Professors Baker, Battelle, Ramagopal; Visiting Assistant Professor Golann; Lecturer Woodman.

Note: In many business courses, students are required to use microcomputer applications to complete assignments. The extent of computer use in a particular course is dependent on the nature of the course and the instructor. Students are assumed to be able to use standard microcomputer applications or to acquire that knowledge through course work in computers, self study, tutorials, or workshops.

BUSINESS ENVIRONMENT

17, 18 Business Law Concepts of law as related to business, including law of contracts, sales, bailments, and negotiable instruments, business and laws of agency, partnerships, and corporations. *Prerequisite:* Sophomore standing. Three hours.

72 The Economics of Business Builds on basic economics, looking at creative destruction and how equilibrium is achieved in the functional areas of the firm; including production, marketing, finance, human resources, and corporate strategy. *Prerequisites:* Economics 11, 12; sophomore standing. Three hours.

132 Legal and Political Environment of Business Interaction of business and society. Emphasis on business roles in the complex and dynamic, legal, political, and social environment. *Prerequisites:* Economics 11, 12; junior standing. Three hours.

191 Business Policy Processes of total enterprise strategy formation, implementation, and performance measurement. Uses and limits of techniques for strategy analysis. Strategic change and the job of the general manager. *Prerequisite:* Senior standing. Three hours.

192 Business Process Improvement Familiarizes students with the basic conceptual issues of continuously improving business processes to compete more effectively on quality, time, and cost. *Prerequisite:* Junior standing. Three hours.

194 Internship Independent research under faculty supervision, in connection with a preprofessional work experience. Written requirements include a substantive analysis of an aspect of the internship, linking it with the academic curriculum. *Prerequisites:* Completion of Lower Level Core courses; at least one Upper Level Core course, cumulative GPA of at least a 3.0; permission of the School of Business Administration. Three hours.

195, 196 Special Topics Specialized or experimental courses offered as resources permit.

197, 198 Independent Study Independent investigation designed by the student as a means of applying prior course work to a specialized problem. Well suited for senior projects. *Prerequisite:* Permission of BSAD Undergraduate Studies Committee.

236 Contemporary European Business Issues Examines European business issues and provides global perspective on developing policies for multinational firms. Presents the complexities of political, social, and economic issues. (Offered summer only.) *Prerequisite:* Senior standing. Three hours.

237 Contemporary African Business Provides students with a global perspective on developing policies appropriate for multinational firms. Examines African financial markets, current political, social, and economic issues. (Offered summer only.) *Prerequisite:* Senior standing. Three hours.

295 Advanced Special Topics Advanced courses on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles and prerequisites. *Prerequisite:* Senior standing. One to three hours.

ACCOUNTING

60 Financial Accounting Introduction to generally accepted accounting principles and techniques regarding corporations, partnerships, and proprietorships as they apply to income determination and financial position presentation. *Prerequisite:* Sophomore standing. Four hours.

61 Managerial Accounting Introduction to use of accounting for planning, cost behavior and control, and decision making. *Prerequisite:* 60 or 65. Four hours.

65 Fundamentals of Accounting Overview of the financial accounting model and basic managerial accounting concepts, including accounting for service, merchandising and manufacturing companies, financial Statement components (assets, liabilities and equity), cost analysis, and budgeting. *Prerequisite:* Sophomore standing. Business Administration majors will not receive credit for BSAD 65. Four hours.

161, 162 Intermediate Accounting Principles, concepts, techniques, and issues involved in accounting for the assets, liabilities, and owners equity and their related effect on income determination of an enterprise. *Prerequisites:* 60 for 161, junior standing; 161 for 162. Three hours.

164 Introduction to Federal Taxation Examination of the Internal Revenue Code primarily regarding individuals and property transactions. Tax research methodology, and the taxation of corporate and partnership income, are introduced. *Prerequisites:* 60 or 65, junior standing. Three hours.

168 Cost Accounting Accounting for inventory valuation and income determination, nonroutine decisions, policy making and long-range planning. *Prerequisites:* 61, junior standing. Three hours.

260 Financial Statement Analysis A study of the concepts and techniques underlying corporate financial statement analysis, emphasizing business equity valuation. *Prerequisites:* 180 or 308. Three hours.

263 Accounting and the Environment An examination of the critical role of accounting in implementing and assessing the firm's environmental strategy. A variety of accounting issues are addressed through readings and case studies. *Prerequisites:* Junior standing, 61 or 65 or concurrent enrollment in 308. Three hours.

266 Advanced Accounting Accounting for partnerships, special sales contracts, parent-subsidiary relationships, fiduciary relationships, and governmental units. *Prerequisite:* 162. Three hours.

267 Auditing Independent and internal auditing. Topics include standards, ethics and legal responsibilities of the profession, financial statements, audit concepts, and techniques, and the audit option. *Prerequisite:* 162. Three hours.

FINANCE

180 Managerial Finance The financial function in the corporation. Techniques for evaluating current use of resources and proposed resource acquisitions or dispositions. *Prerequisites:* 61 or 65, Economics 12, Statistics 141 or 111, junior standing. Three hours.

181 Issues in Financial Management Examines key areas of financial decision making. With cases and problems, issues such as capital budgeting, leasing, mergers, and acquisitions examined. *Prerequisite:* 180. Three hours.

183 International Financial Management Theories and practices of international financial management examined. Topics investigated include: systems of international exchange, spot and forward markets, and expropriation and exchange risk. *Prerequisite:* 180. Three hours.

185 Topics in Financial Theory and Practice One- to three-credit modules focusing on financial theory and applications. Subjects covered vary each year, including: financial futures markets, options, municipal securities, bankruptcy, SEC regulation, bankers acceptances, interest rate swaps, mortgage-backed bonds, securitization of index trading. *Prerequisite:* 180. One to three hours.

188 Finance Honors Seminar Provides students with the opportunity to: (1) engage in the study of advanced topics in finance; (2) conduct independent research; and (3) present and defend that research. *Prerequisites:* 180, senior standing, instructor's permission. Three hours. Not offered 1998-99.

282 Security Valuation and Portfolio Selection Examination of theories and evidence on the investment decision process including operations of equity securities markets, market efficiency, financial asset prices, and portfolio management. *Prerequisite:* 180. Three hours.

284 Financial Institutions and Markets Study of level and structure of interest rates and characteristics of financial institutions and markets. Topics include market vs. natural rate of interest, interest rate structure, behavior of interest rates. *Prerequisite:* 180. Three hours.

HUMAN RESOURCE MANAGEMENT

120 Principles of Management and Organizational Behavior Fundamentals of management, organization theory, behavior, and interpersonal communication in a transnational context. *Prerequisite:* Junior standing. Three hours.

121 Selected Topics in Organization Behavior Focuses on ways in which individuals and work groups within organizations can be better utilized as organizational resources. *Prerequisite:* 120. Three hours.

123 Collective Bargaining and Conflict Resolution Focuses on union-employer relations and on developing the student's negotiation skills. Topics include the union contract, the causes of strikes, and the techniques for resolving conflict. A bargaining simulation is incorporated. *Prerequisite:* 120. Three hours.

127 International Management Reviews special problems in the management of human resources in a global economy. Focuses on cultural differences, a comparison of labor-management systems in a number of countries, the role of multinational corporations, and the impact of foreign enterprises on employment practices in host countries. *Prerequisites:* 120; senior standing. Three hours.

222 Human Resource Management Critical examination of contemporary problems in human resource management; including job analysis, recruitment, training and employee development, health and safety, compensation, performance appraisal, and related topics. *Prerequisite:* 120, senior standing. Three hours.

226 Current Issues in Management and Organizational Theory Subjects may include training and development, selection and recruitment, and affirmative action. *Prerequisite:* 120. One to three hours.

MANAGEMENT INFORMATION SYSTEMS

40 Information Technology and Management Introduction to use of technology and computers in decision-making functions of management. Includes coverage of information technology, computer software applications, and programming. Credit cannot be received for Computer Science 2 after completion of BSAD 40. Three hours.

141 Management Information Systems Integrates computer hardware and software concepts with a classical methodology for developing business information systems. Presents the relevant factors in the development of information systems. Discusses the problems of analyzing, designing, and implementing such systems. *Prerequisites:* Statistics 141 or 111, Math. 20 or 21, BSAD 40 or Computer Science major, junior standing. Three hours.

142 Structured Business Programming Fundamental principles of business computer programming. Topics include: the constructs of structured programming, modular development, sequential and nonsequential access techniques. Exercises include data editing, reporting, file updating. An on-line program development mode is used. *Prerequisite:* 141. Three hours.

143 Structured Analysis and Design of Business Systems In-depth study of business information system development cycle emphasizing analysis and design phases. Structured analysis and design techniques used to develop models of business information systems. Case studies such as payroll, inventory, accounts receivables, order entry, billing. *Prerequisite:* 141. Three hours.

144 Data Base Development and Administration Data base system development cycle from analysis to design, implementation, and administration. Central focus on complex data structure modeling, data base implementation and administration. A project involving analysis, design, and implementation required. *Prerequisites:* 141, 143, or instructor's permission. Three hours.

145 Managing the Information System Resource Theory and practice of managing resources of an organization's information system. Responsibilities and interactions of upper level, function area, and information system managers

emphasized. Topics include project selection and control, staffing, organizing, planning, and managing the information system function. *Prerequisites:* 120, 143, concurrent enrollment in 144, or instructor's permission. Three hours.

MARKETING

150 Marketing Management The place of marketing in our economy. Analysis of the market structure by function, institutions, and commodities. Consumer and organizational activities reviewed. *Prerequisites:* Statistics 141 or 111, Economics 11, 12; junior standing. Three hours.

152 Business to Business Marketing Exploration and analysis of the marketing of goods and services to organizations. Topics include organizational buying, market segmentation, positioning, pricing, communication, physical distribution and customer service, and sales management. *Prerequisite:* 150. Three hours.

153 Consumer Behavior Exploration and analysis of research evidence from marketing and behavioral science relevant to a theory of consumer behavior. Emphasis also given to research methodologies. *Prerequisite:* 251 (co-requisite of 251 when 153 and 251 offered same semester). Three hours.

155 Marketing Communications Emphasizes the coordination of advertising and sales promotion into cohesive, single-minded promotional programs. Stresses the need to integrate promotional activity into the overall marketing strategy. *Prerequisite:* 150. Three hours.

158 Current Marketing Developments Analysis of both present and future changes affecting marketing theory and practice. Topics include social changes, functional and institutional marketing system changes. Individual research projects required. *Prerequisite:* 150. Three hours.

159 Marketing Planning and Programming The use of advanced cases to aid in the formulation of overall policies and planning strategies for marketing programs. Topics include product planning and channel selection. *Prerequisites:* 150 and one other marketing course. Three hours.

251 Marketing Research The role of research in a marketing information framework. Emphasis on survey research, data collection, and analysis. Experimental designs also examined. *Prerequisites:* 150. Three hours.

258 International Market Analysis Examines the cultural, economic, historic, and political factors that affect the analysis of foreign markets. Specific attention is given to the processes by which market entry decisions are developed and implemented. *Prerequisites:* Senior or graduate standing; BSAD 150 or permission of instructor. Three hours.

PRODUCTION AND OPERATIONS MANAGEMENT AND QUANTITATIVE METHODS

170 Business Forecasting Methods Looks inside the crystal ball at major forecasting methods (Smoothing, Regression, Econometric, Box-Jenkins, Combined), and analyzes elements of good forecasting practice in an organization. Extensive use of PC forecasting packages. *Prerequisites:* Statistics 141, Economics 11, 12; junior standing. Three hours.

173 Production and Operations Analysis Study of methods used in planning, analysis, and control of production and service processes. Topics include forecasting, scheduling, production and inventory control, sequencing, line balancing, learning curves, and networks. *Prerequisites:* Math. 20 or 21, Statistics 141; junior standing. Three hours.

174 Manufacturing Planning and Control Study of systems to plan and control flows of materials through manufacturing. Topics include production, materials, and capacity planning; master scheduling; shop-floor control, and

just-in-time production. *Prerequisite:* 173 or senior standing in Engineering or Mathematics. Three hours.

175 The Management of Technology (Same as Engineering Management 175.)

177 Decision Analysis Probability models as applied to the optimal choice among alternative actions or strategies when outcomes are uncertain. *Prerequisite:* Statistics 141, Economics 11 or 12; junior standing. Three hours.

178 Quality Control Analysis and design of systems for obtaining quality in operations. Statistical process control (SPC) emphasized, along with current management philosophies and concepts. *Prerequisites:* Math. 20 or 21, Statistics 141 or equivalent; junior standing. Three hours.

270 Quantitative Analysis for Managerial Decisions Application of management science methods to managerial decision making, emphasizing modeling and use of solution results. Topics include mathematical programming, waiting-line analysis, and computer simulation. *Prerequisites:* Math. 20 or 21, Statistics 141. Three hours.

272 Discrete Simulation Discrete simulation using monte-carlo techniques and the GPSS simulation processor; mathematical modeling of systems; control systems; validation and sensitivity analysis. *Prerequisites:* Statistics 141 or 151, senior standing. Three hours.

293 Integrated Product Development (Same as Mechanical Engineering 265, Statistics 265.) Project-based course focusing on the entire product life cycle. Team dynamics, process and product design, quality, materials, management, and environmentally-conscious manufacturing. *Prerequisite:* Senior standing. Three hours.

Canadian Studies

COLLEGE OF ARTS AND SCIENCES

Prof. André Senecal, Director

The following courses are among the course offerings; see department for specific description. Also see Area and International Studies for special topics listings.

Anthropology 128, 167, 178; **Area and International Studies** 91, 197, 198, 295, 296; **Art** 180, 282 (when the topic is Canadian); **Business Administration** 234; **English** 157, 158; **French** 285, 293; **Geography** 52, 210; **Geology** 272 (when field course goes to Canada), 273; **History** 65, 66, 165, 265; **Political Science** 71, 173, 273; **Sociology** 31, 96, 132.

Chemistry (CHEM)

COLLEGE OF ARTS AND SCIENCES

Professors Allen, Flanagan, Geiger (Chairperson), Jewett, Krapcho, Kuehne, Strauss; Associate Professors Goldberg, Leenstra, Welton; Assistant Professors Landry, Madalenoit.

Note: Credit cannot be given for: 31 and also 23 or 25 or 35 or 37; 32 and also 36 or 38; 23 and also 25; 23 and also 35 or 37; 26 and also 28; 26 and also 42 or 44; 25 and also 35 or 37; 28 and also 42 or 44; 38 and also 121; 42 and also 141; 42 and also 143; 44 and also 141 or 143; 141 and also 143; 142 and also 144; 142 and also 143, 144; 160 and also 162.

19 Mathematical Preparation for General Chemistry Designed to fill in gaps, largely mathematical, in students' backgrounds and preparation for introductory chemistry. Enrollment by permission. No credit. Meets only during first four weeks of semester.

20 Chemical Principles and Contemporary Applications (3-3) Lecture plus lab. Designed for nonscience majors. An integrated approach to principles of chemistry within context of contemporary technological issues. Four hours.

23 Outline of General Chemistry (3-3) One-semester survey of principles and concepts of general chemistry, designed primarily to meet needs of students in agricultural and health sciences. Four hours.*

25 Outline of General Chemistry One-semester survey of principles and concepts of general chemistry, designed primarily to meet the needs of students in agricultural and health sciences. NO LABORATORY. Three hours.*

26 Outline of Organic and Biochemistry (3-3) Broad overview of most important facts and principles of organic and biochemistry and interrelationships between these branches of chemistry. *Prerequisite:* 31 or 23. Four hours.*

28 Outline of Organic and Biochemistry Broad overview of most important facts and principles of organic and biochemistry and of interrelationships between these branches of chemistry. NO LABORATORY. *Prerequisite:* 31 or 23 or 25. Three hours.*

*Not available to students enrolled in the College of Arts and Sciences.

31, 32 Introductory Chemistry (3-3) Basic course in principles and concepts of general chemistry. These courses, or Chemistry 35, 36 serve as suitable prerequisites for 100-level courses in Chemistry. *Prerequisite:* 31 or 35 for 32. Four hours.

35, 36 General Chemistry (3-0) General and analytical chemistry for students with a strong background in physical sciences and mathematics. Recommended for students concentrating in physical sciences. *Prerequisites:* One year of high school chemistry, concurrent enrollment or background in calculus. High school physics recommended; concurrent enrollment in 37, 38 required; 31 or 35 required for 36. Three hours.

37, 38 Introductory Inorganic Chemistry Laboratory (0-3) Laboratory introduction to inorganic chemistry. Inorganic qualitative analysis; synthesis, reactions, and characterization of inorganic compounds; qualitative analysis, thermochemistry, and kinetics of inorganic systems. *Prerequisite:* Concurrent enrollment in 35, 36. One hour.

42 Introductory Organic Chemistry (3-3) Concepts for understanding chemistry of structurally simple organic compounds of everyday importance. These principles applied to more complex molecules such as polymers and biologically important compounds such as proteins, lipids, and carbohydrates. (Does not satisfy medical school entrance requirements for undergraduate preparation in organic chemistry.) *Prerequisite:* 31 or 23. Four hours.

44 Introductory Organic Chemistry Concepts for understanding chemistry of structurally simple organic compounds of everyday importance. These principles applied to more complex molecules such as polymers and biologically important compounds such as proteins, lipids, and carbohydrates. (Does not satisfy medical school entrance requirements for undergraduate preparation in organic chemistry.) NO LABORATORY. *Prerequisite:* 31 or 23 or 25. Three hours.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

121 Quantitative Analysis (2-6) Theory and practice of volumetric and gravimetric analysis. Theoretical discussion of indicators, buffers, pH, etc. Introduction to data analysis, spectrophotometry, and chromatography. *Prerequisites:* 31, 32. Not open to students with credit for 37, 38. Four hours.

123 Quantitative Analysis Laboratory (0-6) Laboratory component of 121. Quantitative chemical analysis using gravimetric, titrimetric, volumetric, potentiometric, and spectrophotometric methods. *Prerequisites:* 35, 36, 37, 38. Two hours.

141, 142 Organic Chemistry (3-3) Survey of properties and reactions of organic compounds with consideration of bonding, stereochemistry, mechanisms, principles of reactivity, spectroscopy, syntheses, and utilization. Designed for premedical, pre dental, and preveterinary students and for those majoring in biological and physical sciences. *Prerequisites:* 31, 32 or 35, 36; 141 for 142. Four hours.

143, 144 Organic Chemistry for Chemistry Majors (3-0) Survey of principles and reactions of organic chemistry for chemistry majors. Concurrent enrollment in 145 required for 144. *Prerequisites:* 31, 32 or 35, 36; 143 for 144. Three hours.

145, 146 Organic Chemistry Laboratory (0-6) Laboratory practice in separation, purification, synthesis, identification, spectroscopy, and physical organic techniques as applied to organic compounds. For Chemistry majors. Concurrent enrollment in 144 required for 145. Two hours.

160 Physical Chemistry for Biological Science Students Aspects of physical chemistry most pertinent to work in biological sciences: acid-base equilibrium, theory of solutions, thermodynamics and kinetics. *Prerequisites:* 32, Physics 42. Three hours.

161 Physical Chemistry Elementary quantum chemistry, bonding, spectroscopy, and statistical mechanics. *Prerequisites:* 32 or 36; Physics 42 or 145, Math. 121. Three hours.

162 Physical Chemistry Properties of gases and solutions; thermodynamics and kinetics. *Prerequisites:* 32 or 36; Physics 42 or 145, Math. 121. Three hours. *Note:* Chemistry 162 may be taken before 161.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

201 Advanced Chemistry Laboratory (1-6) Laboratory and discussion only. Laboratory problems requiring modern analytical, physical, and inorganic synthetic techniques. *Prerequisites:* 146, 221, credit for or concurrent enrollment in 161 or 162. Three hours.

202 Advanced Chemistry Laboratory (0-6) Laboratory only. Laboratory problems requiring modern analytical, physical, and inorganic synthetic techniques. *Prerequisites:* 201. Two hours.

214 Polymer Chemistry Polymer size and weight distributions. Kinetic models for step polymerization, addition polymerization, copolymerization. Physical properties, characterization of polymers in the solid state and in solution. *Prerequisites:* 144, 162. Three hours. Allen. Alternate years.

221 Instrumental Analysis Systematic survey of modern methods of chemical analysis. Fundamental principles and applications of spectroscopy, electrochemistry, and separation techniques. *Prerequisites:* Credit for or concurrent enrollment in 161 or 162. Three hours. Geiger, Goldberg.

222 Advanced Analytical Chemistry In-depth coverage of selected modern instrumental methods of chemical analysis, emphasizing most recent developments in spectroscopy, electrochemistry, and separation techniques. *Prerequisite:* 221. Three hours. Geiger, Goldberg.

224 Chemical Separations Theory and practice of chromatographic separations. Emphasis on gas-liquid, liquid-liquid, and liquid-solid chromatography. *Prerequisite:* 221. Three hours. Alternate years.

225 Electroanalytical Chemistry Principles of modern electrochemical analysis focusing mainly on finite current

methods — voltammetry, polarography, chronoamperometry, cyclic voltammetry, etc. Introductory to modern operational amplifier instrumentation. Double layer theory and electron transfer kinetics. *Prerequisite:* 161. Three hours. Geiger. Alternate years.

226 Analytical Spectroscopy Principles of optical spectroscopic methods of analysis. Emphasis on theory and practice of atomic spectroscopy and new molecular spectroscopic methods. *Prerequisite:* 221. Three hours. Geiger, Goldberg.

227, 228 Special Topics in Analytical Chemistry Selected topics of current interest in analytical chemistry. New techniques and methodologies, especially in chemical instrumentation. Credit as arranged.

231 Inorganic Chemistry Survey of inorganic systems: symmetry, group theory, structure, bonding, acid-base chemistry, crystal field theory; solid state, ionic, covalent and electron deficient systems. *Prerequisite:* 161. Three hours. Allen, Landry.

232 Advanced Inorganic Chemistry Ligand field and molecular orbital theories applied to transition metal complexes; introduction to organometallic chemistry, inorganic reaction mechanisms, bioinorganic chemistry. *Prerequisite:* 231. Three hours. Allen, Landry.

234 Organometallic Chemistry Systematic survey of synthesis, properties, structures, bonding, and reactions of both main group and transition series organometallic compounds. Variation of structure and metal-carbon bond stability throughout periodic system. *Prerequisite:* 231. Three hours. Allen. Alternate years.

236 Physical Inorganic Chemistry Fundamental physical basis for spectroscopic techniques and other observable phenomena important to field of inorganic chemistry. Topics include ligand field theory, magnetism, magnetic resonance, Mossbauer spectroscopy, and optical activity. *Prerequisites:* 161, 232. Three hours. Allen. Alternate years.

237, 238 Special Topics in Inorganic Chemistry Areas of current interest involving inorganic systems such as bioinorganic, solid state and polymers with unusual properties. Credit as arranged.

241 Advanced Organic Chemistry Stereochemistry, reactivity criteria, reaction mechanisms, and synthetic methods stressed. Reactive intermediates such as carbanions, carbocations, carbenes, and free radicals used to systematize mechanistic discussions. *Prerequisites:* 142, 162. Three hours. Krapcho, Kuehne, Madalengoitia, Strauss.

242 Advanced Organic Chemistry Detailed mechanistic descriptions of processes which may include enolate reactions and stereochemical considerations, addition processes such as halogenation, cycloadditions, hydroboration, hydride and metal-ammonia reductions, annulations such as biomimetic cyclizations, oxidation processes, rearrangements, eliminations, and examinations of approaches to multistep syntheses. *Prerequisite:* 241. Three hours. Krapcho, Kuehne, Madalengoitia, Strauss.

251 Physical Organic Chemistry Structure-reactivity relationships, molecular properties and their interpretation. Methods and results of investigations of mechanisms of common organic reactions. *Prerequisites:* 142, 162. Three hours. Bushweller, Krapcho, Strauss. Alternate years.

253 Practical NMR Spectroscopy Introduction to high resolution pulsed Fourier transform nuclear magnetic resonance spectroscopy. Chemical shifts, scalar coupling, relaxation, molecular symmetry considerations, chemical exchange effects. *Prerequisites:* 142 or 144, 161. Three hours.

257, 258 Special Topics in Organic Chemistry Advanced level discussion of specific topics in organic chemistry of cur-

rent interest such as photochemistry, carbenes, bioorganic chemistry, magnetic resonance, etc. Credit as arranged.

262 Chemical Thermodynamics Systematic study of application of thermodynamics to chemical problems. Concepts of statistical thermodynamics introduced. *Prerequisites:* 161, 162. Three hours. Flanagan. Alternate years.

263 Introduction to Quantum Mechanics General considerations of quantum mechanics. Development of techniques pertinent to application of quantum mechanics to chemical problems. *Prerequisites:* 161, 162. Three hours. Weltin. Alternate years.

264 Fundamentals of Spectroscopy In-depth discussion of the theory of molecular states and transitions between them, with applications to electronic spectroscopy. Explicit treatment of vibrations in molecules. *Prerequisites:* 161, Math.121. Three hours. Leenstra. Alternate years.

265 Statistical Mechanics Development of statistical mechanics and its application to problems of chemical interest. *Prerequisites:* 161, 162; 263 recommended. Three hours. Flanagan. Alternate years.

266 Molecular Orbital Theory Introduction to Hückel molecular orbital method. Energy levels and orbitals, molecular properties and their interpretation. Effects of substituents on electronic structure. Extensions of Hückel method. *Prerequisites:* 142, 161. Three hours. Weltin. Alternate years.

267, 268 Special Topics in Physical Chemistry Advanced discussion of physical chemistry and chemical physics, group theory, solid state, molecular orbital theory, irreversible thermodynamics, kinetics and mechanisms, solution theory, calculations, spectroscopy. Credit as arranged.

282 Senior Seminar Oral and written presentation of a subject of current chemical interest. *Prerequisite:* Audit of 381. One hour.

291 Undergraduate Research Special study in inorganic, analytical, physical, or organic chemistry with an assigned staff member. Findings submitted in written form. *Prerequisite:* Departmental permission. Credit as arranged with maximum of four hours per semester and 12 hours for the undergraduate program.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific title.

HONORS — ARTS AND SCIENCES

212, 213 Honors/Chemistry See page 64 and contact Department for specific requirements. Three hours each.

Chinese (CHIN)

COLLEGE OF ARTS AND SCIENCES

1, 2 Elementary Chinese A study of Mandarin Chinese designed to give the beginning student the fundamental grammar and vocabulary for speaking, reading, and writing the modern national language. Four hours.

51, 52 Intermediate Chinese A continuation of 1, 2 designed to enable the student to converse in everyday Chinese, and to read and write simple texts. *Prerequisite:* 2 or equivalent. Four hours.

101, 102 Advanced Chinese Structured readings with emphasis on sentence structures, vocabulary expansion, and increased fluency in self-expression. *Prerequisite:* 52 or equivalent. Three hours.

197, 198 Readings and Research Individual research project or directed reading in area of special interest to student. *Prerequisite:* Instructor's permission. Variable credit.

201, 202 Advanced Conversation and Composition To improve oral and written proficiency through reading newspapers and short stories, discussion, and composition. *Prerequisites:* 102 or equivalent for 201; 201 for 202. Three hours.

GENERAL LITERATURE

171, 172 Chinese Literature in Translation Selected topics in Chinese Literature. Readings and discussion are in English. No knowledge of Chinese language is required. *Prerequisite:* One course in literature or Asian Studies concentrating on East Asia. Three hours.

Civil and Environmental Engineering (CE)

COLLEGE OF ENGINEERING AND MATHEMATICS

Professors Beliveau, Cassell, Dawson, Hemenway, Laible, Pinder; Associate Professors Dougherty, Downer, Hayden, Olson (Chairperson); Research Assistant Professors Eppstein, Karatzas, Rizzo.

1 Statics (3-0) Fundamentals of statics; composition and resolution of forces; the analysis of force systems in two and three dimensions; and centroids and moments of inertia. *Prerequisite:* Math. 22. Three hours.

10 Surveying Plane surveying methods including distance and angle measurements, leveling, traverse surveys and adjustments, propagation of errors in surveying measurements, and topographical mapping. *Prerequisites:* Math. 21, Computer Science 16. Three hours.

11 Geometronics (2-4) Selected items in analytical photogrammetry; celestial observations, elements of photointerpretation; theory of curves; and digital terrain analysis. *Prerequisites:* 10, 12, Math. 22. Three hours.

12 Surveying Laboratory Laboratory exercises in surveying applications: distance, angle, elevation, traverse, and topography. *Prerequisites:* Taken concurrently with, or following, 10. One hour.

15 Pollution and Solutions (3-0) Introduction to environmental issues and potential solutions. Emphasis on problem solving: description, decomposition, research, analysis, and performance evaluation. Three hours.

100 Mechanics of Materials (3-0) (Same as Mechanical Engineering 14.) Stress, strain, temperature relationships, torsion, bending stresses, and deflections. Columns, joints, thin-walled cylinders. Combined stresses and Mohr's circle. *Prerequisites:* 1, Math. 121, Mechanical Engineering 12 or concurrent enrollment. Three hours.

101 Mechanics of Materials Laboratory (1-3) Experimental stress analysis methods; fundamental properties of metals, plastics, and wood; effects of size, shape, method, speed of loading, and strain history on these properties. *Prerequisite:* 100. Two hours.

125 Engineering Economics and Decision Analyses Comparing engineering alternatives; economic evaluations including costs, returns, taxes, and depreciation; project optimization with linear/non-linear models; scheduling; risk and reliability analyses by simulation. *Prerequisites:* Math. 20 or 22, junior standing. Three hours.

140 Transportation Engineering (3-0) Analysis of transportation systems; technological characteristics; the transportation planning process and techniques of travel

modeling and forecasting for both urban and rural areas. *Prerequisite:* 10, junior standing in CE, or instructor's permission. Three hours.

141 Traffic Operations and Design (3-0) Characteristics of vehicular and pedestrian traffic; highway and intersection capacity; measurement and analysis of traffic characteristics; design and application of controls. *Prerequisite:* 140. Three hours.

142 Structural Roadway Design (3-0) Properties of construction materials; design of mixes; analyses of pavement performance; structural design of pavements; highway earthwork, drainage, and construction techniques. *Prerequisites:* 141, 180. Three hours. Dawson.

150 Environmental Engineering (3-0) Basic phenomena and theoretical principles underlying water supply, air and water pollution control, and industrial hygiene. *Prerequisites:* Chemistry 31 or 25, Math. 22. Three hours. Hemenway.

151 Water and Wastewater Engineering (2-3) Functional design of water supply systems and wastewater management facilities; population projections, estimation of water and waste quantities, sewers, distribution systems, treatment facilities; governmental regulations. *Prerequisites:* 150, 160. Three hours. Hemenway.

154 Environmental Analytical Practice (1-4) Analytical procedures used in measuring environmental parameters (includes BOD, COD, Alkalinity, Coliform). Fundamental methods applied to actual waste samples and subsequent data analysis. *Prerequisites:* 150; Chemistry 31, 32. Two hours.

160 Hydraulics (3-3) Mechanics of incompressible fluids; flow meters; flow in closed conduits and open channels; elements of hydraulic machinery; laboratory studies of flow and hydraulic machinery. *Prerequisite:* Mechanical Engineering 12. Four hours. Downer.

161 Water Resource Engineering Design (3-0) Formulation of water resource projects; development of design methods for: surface water, risk, storage, and control structures, open channels, and drainage systems; design project. *Prerequisite:* 160. Three hours. Downer.

170 Structural Analysis 1 (3-3) Analysis of statically determinate beams, frames, and trusses; expected loads, reactions; influence lines; moving loads; geometric methods for displacement calculations; introduction to matrix analysis for trusses. *Prerequisites:* 100, Computer Science 16. Four hours. Beliveau, Laible.

171 Structural Analysis 11 (3-0) Statically indeterminate structural analysis by consistent deformation and stiffness methods; determinations of deflections by energy methods; matrix analysis for frame structures and computer-aided analysis. *Prerequisite:* 170. Three hours. Beliveau, Laible.

172 Structural Steel Design (3-0) Theory and design of steel structures including flexural members, axially loaded members and combined stress members; design of composite members; and plastic analysis and design. *Recommended Corequisite:* 171. Three hours. Beliveau.

173 Reinforced Concrete (3-0) Analysis of stresses in plain and reinforced concrete members; design of reinforced concrete structures; and theory of prestressed concrete. *Prerequisite:* 171. Three hours. Beliveau.

175 Senior Design Project (0-3) Comprehensive design projects will integrate the multiple areas of specialization in civil engineering. Student teams will prepare and present designs to professional review panels. *Prerequisite:* Senior standing in CE. Three hours.

176 Senior Design Seminar (1-0) Guest lecturers from private practice discussing professional issues; integration of multidiscipline teams from student design projects; and oral and written presentations. *Co-requisite:* One design elective; senior standing. One hour.

180 Geotechnical Principles (3-3) Identification, description, and physical properties of soils; characteristics of natural deposits; stress distribution, permeability, consolidation, shear strength, and stability of soils; laboratory testing of particulate systems. *Prerequisite:* 100. Four hours. Olson.

181 Geotechnical Design (3-3) Evaluation of subsoil conditions and earth pressures; design of retaining walls, substructures for buildings and bridges, and cofferdams. *Prerequisite:* 180. Four hours. Olson.

191, 192 Special Projects (3-0) Investigation of special topic under guidance of faculty member. Library investigations, unique design problems, laboratory and field studies. *Prerequisites:* Senior standing, departmental permission. Three hours.

193, 194 College Honors

195 Special Topics *Prerequisite:* Senior standing in Civil or Mechanical Engineering.

248 Hazardous Waste Management Engineering Management of hazardous and industrial waste from generation to disposal; emphasis on pollution prevention within industry; waste minimization, recovery, reuse, treatment technologies; environmental regulations, risk assessment, costs and public policy; group projects. *Prerequisites:* Senior standing in engineering or sciences. Three hours.

249 Solid Wastes (3-0) Significance of solid wastes from municipal, industrial, agricultural, mining; optimization and design of collection, disposal, recycle systems; sanitary landfills, incineration, composting, material recovery. *Prerequisites:* Chemistry 25, Physics 25. Three hours.

251 Environmental Facilities Design — Wastewater (2-3) Design of wastewater conveyance and treatment facilities; sewage treatment plant design; equipment selection. *Prerequisite:* 151. Three hours.

252 Industrial Hygiene (3-2) Industrial hygiene problems; effects of pollutants on health; threshold limit values; emphasis on the engineering evaluation of hazard and control techniques. *Prerequisites:* Chemistry 25, Physics 25. Three hours. Hemenway.

253 Air Pollution (3-0) Sources of air pollution, methods of measurement, standards, transport theory and control techniques used. Emphasis on source measurement and contaminant control design. *Prerequisites:* Chemistry 25, Math. 21. Three hours. Hemenway.

254 Environmental Quantitative Analysis (3-3) Chemistry and microbiology of water quality management; diffusion, equilibria, reaction kinetics, acids and bases, colloids, enzymes, bacterial physiology, pollution indicator organisms; laboratories demonstrate standard techniques. *Prerequisites:* Chemistry 31 or 25, Math. 22. Four hours. Hemenway.

255 Physical/Chemical Processes for Water and Wastewater Treatment Theory of physical/chemical processes for treating waters and wastewaters; reactor dynamics, mass transfer, adsorption, ion exchange, precipitation/coagulation, sedimentation, filtration, membrane processes; bench-scale and pilot-scale experimentation. *Prerequisites:* 150, 151, 154 or equivalent or permission of instructor. Three hours.

256 Biological Processes for Water and Wastewater Treatment Theory and application of biological processes for treating industrial and domestic wastewaters and contaminated ground water; microbiological considerations; aerobic and anaerobic processes; reactor design, in-situ bioremediation; bench-scale and pilot-scale experimentation. *Prerequisites:* 151 and 154 or equivalent or permission of instructor. Three hours.

259 Measurement of Airborne Contaminants (2-3) Quantifying airborne contaminants from processes and ambient

levels. Laboratories demonstrate calibration and measurement, stack sampling and ambient air monitoring, and specific contaminant generation and measurement. *Prerequisite:* 252 or 253. Three hours. Hemenway.

260 Hydrology (3-0) Theory of precipitation, run-off, infiltration, and ground water; precipitation and run-off data; and application of data for use in development of water resources. *Prerequisites:* 160, Statistics 141. Three hours. Downer.

261 Open Channel Flow (3-0) Application of the laws of fluid mechanics to flow in open channels; design of channels and transition structures including riprap and culverts; gradually-varied flow problems. *Prerequisite:* 160. Three hours. Downer.

265 Ground Water Hydrology (3-0) Principles of ground water hydraulics, well characteristics, aquifers, and use of numerical methods to solve ground water flow problems. *Prerequisites:* Calculus III and programming experience or instructor's permission; graduate standing or senior Civil Engineering standing. Three hours.

280 Applied Soil Mechanics (3-0) Use of soil mechanics in evaluation of building foundations, braced excavations, earth structures; lateral earth pressures, pile foundations, caisson foundations, slope stability, and construction problems. *Prerequisite:* 180. Three hours. Olson.

283 Designing with Geosynthetics (3-0) Geotextiles, geogrids, geonets, geomembranes, geocomposites, geopipes. Design for separation, reinforcement, filtration, drainage, erosion, control, liners. Applications in transportation, drainage, solid waste containment. Material testing, behavior. *Prerequisite:* 180. Three hours.

295 Special Topics Content is dictated by expanding professional interest in newly developing, or recently developed, technical areas in which there is particular need or opportunity. Three hours. *Prerequisite:* Senior or graduate standing.

Classics (CLAS)

COLLEGE OF ARTS AND SCIENCES

Professors Ambrose, R. Rodgers, B. Saylor Rodgers (Chairperson) Schlunk; Assistant Professor Bailly; Adjunct Assistant Professor Cirignano.

GREEK (GRK)

There are no prerequisites to any Greek course. Students who have previously studied Greek should consult the department.

The first two semesters of a foreign language are excluded from the 45-hour limit on courses from a single department that can be counted toward the 122 hours required for the Bachelor of Arts degree.

1, 2 Elementary Greek Four hours.

3 Self-Paced Greek Fundamentals of Classical Greek through tutorial instruction, credit dependent on amount of material learned. May be repeated for credit. No credit with 1 and 2. Up to eight hours.

51, 52 Intermediate Greek Review of syntax. Fall semester: Readings from Plato, Herodotus, and Euripides. Spring semester: Readings from Homer. Three hours each course. Ambrose, Schlunk.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

111, 112 Greek Prose Style Readings in literary prose analyzed stylistically and imitated in composition. Required of Greek majors. Three hours. B. Saylor Rodgers, Schlunk.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

201 Greek Orators Selected speeches of Lysias and Demosthenes. Three hours. B. Saylor Rodgers. Alternate years, as needed.

202 Greek Comedy Two plays of Aristophanes. Three hours. Ambrose. Alternate years, as needed.

203 Greek Historians Thucydides, Books I and II; selections from Herodotus and Xenophon's *Hellenica*. Three hours. B. Saylor Rodgers. Alternate years, as needed.

204 Greek Tragedy Sophocles' *Antigone*, and Euripides' *Medea*, or two equivalent plays. Three hours. Ambrose. Alternate years, as needed.

205 Greek Philosophers Dialogues of Plato with attention to language and dialectical method; Aristotle, Xenophon or Presocratic philosophers may be read. Three hours. Bailly. Alternate years, as needed.

206 Greek Epic Reading in the *Iliad* and *Odyssey*. Problems of epic composition and language together with mythological and historical background. Three hours. Schlunk. Alternate years, as needed.

227 Greek Lyric Poetry A study of early Greek personal, elegiac, and choral poetry from Archilochus to Pindar, including Sappho and Alcaeus, Simonides and Bacchylides. *Prerequisites:* Two years of college Greek or equivalent. Three hours. Schlunk. Alternate years, as needed.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

HONORS – ARTS AND SCIENCES

230, 231 Honors/Greek See page 64 and contact Department for specific requirements. Three hours each.

LATIN (LAT)

There are no prerequisites to any Latin course. Students who have had two years of high school Latin normally enroll in Latin 3 or Latin 51. Those who have had more normally enroll in Latin 101. Students with two years of high school Latin may take Latin 1 for credit only by departmental permission and only if the two years were taken two years prior to entrance into the University.

The first two semesters of a foreign language are excluded from the 45-hour limit on courses from a single department that can be counted toward the 122 hours required for the Bachelor of Arts degree.

1, 2 Elementary Latin For students who present less than two years of high school Latin. Four hours.

3 Self-Paced Latin Fundamentals of Classical Latin through tutorial instruction, credit dependent on amount of material learned. Maybe repeated for credit. No credit with 1 and 2. Up to eight hours.

51, 52 Intermediate Latin Fall semester: Selections from Cicero and other prose authors. Spring semester: Selections from Vergil and Ovid. Three hours each course. Ambrose, B. Saylor Rodgers, R. Rodgers, Schlunk.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

101, 102 Survey of Latin Literature Selections from principal Roman authors. Three hours. R. Rodgers.

111, 112 Latin Prose Style Readings in literary prose analyzed stylistically and imitated in composition. Required of B.A. and B.Ed. Latin majors. Three hours. B. Saylor Rodgers.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

203 Republican Prose Extensive reading in Caesar and Sallust, and in the speeches of Cicero. Three hours. B. Saylor Rodgers. Alternate years, as needed.

204 Epic Poets Extensive reading in Lucretius, Vergil, Ovid, and others. Three hours. Ambrose, Schlunk. Alternate years, as needed.

227 Roman Lyric Poets Selections from the works of Catullus, Horace, Propertius, and Tibullus. Three hours. Schlunk. Alternate years, as needed.

251 Roman Letters Letters of Cicero, Horace, and Pliny. Three hours. B. Saylor Rodgers. Alternate years, as needed.

252 Comedy Two plays of Plautus and Terence. Study of the precursors of this literary form. Three hours. Ambrose. Alternate years, as needed.

253 Roman Oratory Selections from Cicero's *De Oratore*, *Orator*, *Brutus*, and from his speeches. Historical development of forensic and other rhetorical canons. Three hours. R. Rodgers. Alternate years, as needed.

255 Historians of the Empire Historians of the Empire. Augustus, *Res Gestae*; Tacitus, *Annals*, I–IV; selections from Suetonius and Ammianus Marcellinus. Three hours. B. Saylor Rodgers. Alternate years, as needed.

256 Satire Selections from Horace, Persius, Juvenal, Petronius. Study of the development of this literary form. Three hours. R. Rodgers. Alternate years, as needed.

271 Silver Latin Extensive reading of post-Augustan authors not included in other advanced courses. Three hours. R. Rodgers. Alternate years, as needed.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

HONORS – ARTS AND SCIENCES

236, 237 Honors/Latin See page 64 and contact Department for specific requirements. Three hours each.

CLASSICS (CLAS)

Courses entitled "Classics" are not foreign language courses. All readings are in English and no prior knowledge of Greek and/or Latin is required.

21 Classical Greek Civilization (Same as History 21.) A study of the "Golden Age of Pericles," the course covers the whole of Athenian society from art to war, culminating in the trial of Socrates. Three hours. B. Saylor Rodgers, Schlunk.

22 Etymology Derivation of English words from Greek and Latin bases. Training in analysis of unfamiliar words, special attention to scientific vocabulary. Three hours.

23 Classical Roman Civilization (Same as History 22.) Growth of the Roman Empire; political and social disruption in the Roman world from the second century B.C.E., through the first century C.E. Three hours. B. Saylor Rodgers, R. Rodgers.

24 Myths and Legends of the Trojan War Homeric epics, Virgil's *Aeneid*, selections from tragedy dealing with the Trojan War and Greco-Roman cultural identity. Examples from art and archaeology supplement the literary theme. Three hours. R. Rodgers.

33 Alexander the Great and His Legacy Alexander's conquests, development of his heroic status, emulation by later military figures, growth of legends and romances, the foundation of Hellenistic society, culture, and technology. Three hours. B. Saylor Rodgers.

35 The End of the Roman Republic Participants describe the Republic's end: Caesar justifies conquest and civil war; Catullus and Sallust reveal a society in turmoil; Cicero documents first-century politics: political gangs, bribery, and violence. Three hours. B. Saylor Rodgers.

37 Early Roman Empire: Literature in Translation Poetry and prose in the first century C.E. (the age of Augustus, Nero, Trajan), emphasizing varieties and limitations of political and literary freedom. Three hours. R. Rodgers.

42 Mythology Greek myth in literature, art, and music from antiquity to modern times. No prerequisites. Three hours. Spring semester. Ambrose.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

121 History of Greece (Same as History 121.) Political and social developments of ancient Greece: birth of democracy, conflict of autonomy and hegemony, federal states, invention of "otherness," spatial and cultural restraints on citizenship. *Prerequisites:* History 9 or Classics 21 (History 21) or appropriate work in Classics. Three hours. B. Saylor Rodgers.

122 History of Rome Expansion of Rome in Italy and conquest of the Mediterranean world: cultural conflict, development of a unifying national identity, and the foundation of European states. *Prerequisites:* History 9 or Classics 23 (History 22) or appropriate work in Classics. Three hours. B. Saylor Rodgers.

149 History of the Ancient Near East Survey of primary civilizations of Egypt and Mesopotamia and the secondary cultures of Anatolia, Syria-Palestine, Assyria, and Persia. *Prerequisites:* History 9 or Classics 21 (History 21) or appropriate work in Classics. Three hours. B. Saylor Rodgers.

153 Greek Drama Plays of Aeschylus, Sophocles, Euripides, and Aristophanes in their historical and cultural setting. Three hours. *Prerequisite:* Sophomore standing.

154 Greek Historians Survey of the Greek creation and development of historical writing, or transformation of myth to history, from early fifth century through the Roman conquest. *Prerequisite:* 21 or 121 recommended. Three hours.

155 Ancient Epic Homer, Apollonius, and Vergil, as well as readings selected from other Greek and Latin epic (including epyllia) and didactic poetry. *Prerequisite:* Sophomore standing. Three hours.

156 Greek and Roman Satiric Spirit Comedy, satire, epigram and prose fantasy as vehicles for political, social, and literary criticism in the Greco-Roman world. *Prerequisite:* Sophomore standing. Three hours. R. Rodgers.

157 Greek Feminism (Same as History 157, Women's Studies 157.) The construction of the status of women in ancient Greek society. Readings include lyric, tragic, and comic poetry, philosophy, oratory, novel, and nonliterary documents. *Prerequisites:* Sophomore standing, three hours in literature, history, anthropology, or sociology. Three hours. Ambrose.

158 Greco-Roman Political Theory History of Greco-Roman political thought and political reality, as revealed by lawgivers, philosophers, politicians, and historians. *Prerequisite:* Sophomore standing. Three hours. B. Saylor Rodgers.

159 Roman Historians Survey of Roman historical writing from the Punic Wars to the end of the Roman empire in

the west; Roman development and extension of Greek historiographical models. *Prerequisite:* 154, or 23 or 122. Three hours. B. Saylor Rodgers.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

221, 222 Seminar in Ancient History Selected aspects of Near Eastern, Greek, or Roman History (e.g. trade and colonization, imperialism, social and political institutions, cultural and intellectual developments). *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours. B. Saylor Rodgers.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

See also: Art 148 (Greek Art) and Art 149 (Roman Art); European Studies.

For the Teaching of Latin, see Secondary Education 259.

Prizes from endowed funds are awarded to outstanding graduating seniors and outstanding students in sophomore Latin.

HONORS - ARTS AND SCIENCES

214, 215 Honors/Classics See page 64 and contact Department for specific requirements. Three hours each.

Communication Sciences (CMSI)

COLLEGE OF ARTS AND SCIENCES

Professor Guitart (Chairperson); Associate Professor McCauley; Assistant Professor Roberts.

1 Elementary American Sign Language I Fundamentals of expression and understanding of American Sign Language, including grammar, facial markers, body classifiers, vocabulary, and fingerspelling. Elements of Deaf Culture are also explored. Three hours.

2 Elementary American Sign Language II Fundamentals of expression and understanding of American Sign Language, including grammar, facial markers, body classifiers, vocabulary, and fingerspelling. Elements of Deaf Culture are also explored. *Prerequisites:* 1 or equivalent experience. Three hours.

20 (F) Introduction to Disordered Communication Survey of language, speech, and hearing disorders, emphasizing the importance of understanding such disorders as a part of the fuller understanding of human behavior. Three hours.

51 Intermediate American Sign Language Continuation of 1, 2 designed to foster further development of proficiency in American Sign Language and appreciation of Deaf Culture. *Prerequisites:* 2, or equivalent experience. Three hours.

80 Introduction to Linguistics Introduction to biological, cognitive, and cultural bases of human communication through language, and to modern linguistic theory. Assignments provide opportunities for critical thinking and writing. Three hours. Guitart.

90 (S) Phonetics Linguistic, acoustic, and articulatory phonetics applied to the description of speech. Stresses use of the International Phonetic Alphabet with English, foreign languages, and disordered speech. Three hours. McCauley.

94 (S) Development of Spoken Language Speech and language acquisition interpreted in light of current learning and cognitive theory, linguistic theory, and methods of linguistic analysis. Three hours. Roberts.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

101(F) Speech Science Structure and function of the respiratory, phonatory, and articulation systems of the vocal tract utilized for production of speech. Models of speech production emphasized. Four hours. Guitar.

105 Hearing Science Study of processes of human hearing emphasizing sound, acoustics, psychoacoustics, perception of speech, and the anatomy and physiology of the hearing mechanism. *Prerequisite:* 80 or permission. Three hours.

125, 126 Clinical Experience A supervised exposure to clinical practice in speech-language pathology. Students gain experience as assistants in the University speech-language clinic. *Prerequisite:* Six hours in Communication Sciences. Three hours.

160 Intercultural Communication Exploration of communication between individuals of different races, socioeconomic status, ethnic groups, genders, and occupations. Emphasis on culturally-based misunderstanding, conflict, and resolution. Three hours. Roberts.

162 Regional Dialects Study of dialects throughout the U.S., with focus on Vermont. Emphasis on methods and on the social meaning of dialect variation. Alternate years. Three hours. Roberts.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

208 Cognition and Language (Same as Psychology 208.) Study of cognition and language in terms of mental representation models; contemporary models of memory, as well as capacity theories of language comprehension and production. *Prerequisite:* Psychology 109 or 101 or Statistics 101 or 141. Three hours.

215 Cognition and Aging (Same as Psychology 215.) Changes in both sensory and cognitive aspects of aging, including changes in vision, hearing, perception, learning, and memory. *Prerequisite:* 208 or permission of instructor. Three hours.

251 Disorders of Speech In-depth survey of speech disorders: articulation, fluency, voice, etc., including those with functional as well as organic etiology will be considered. Includes one hour laboratory for systematic observation and analysis of speech therapy. *Prerequisites:* 90, 101. Four hours.

261 Disorders of Language In-depth survey of language disorders including aspects in reception and expressive use of language. Includes one hour laboratory as in 251. *Prerequisite:* 94. Four hours.

262 Measurement of Communication Processes Introduction to the scientific method and measurement principles used in group and single-case research on communication and as applied to persons with communication disorders. *Prerequisites:* 80, 101, 105; Statistics 111 or 141. Four hours.

271(F) Audiological Assessment Examination of basic parameters in measurement of hearing. Pure tone testing, masking, impedance, and speech evaluations. *Prerequisite:* 105 or instructor's permission. Three hours.

272 Auditory Habilitation of Hearing Impaired Children Survey of the handicapping effect of hearing disorders on the developing child and the principles of rehabilitation utilized for treatment of this disorder. *Prerequisites:* Fifteen credits in CS&D, including 94, 271. Three hours.

281 Cognitive Neuroscience The structure and organization of the human central nervous system as relative to higher cognitive and linguistic behaviors. *Prerequisites:* Nine hours at the 200 level; Biology 4. Three hours.

282 Medical Speech-Language Pathology Overview of populations and terminology specific to practice within medical settings. Topics include motor speech, aphasia, dementia, swallowing, laryngectomy/voice, cognition, and tracheostomy/ventilator dependence. *Prerequisites:* Nine hours in Communication Sciences or instructor's permission. Three hours.

283 Swallowing Disorders Introduction to normal and disordered swallowing function across the life span including etiologies, signs/symptoms of dysphagia, diagnostic procedures and treatment within an interdisciplinary model. *Prerequisites:* Nine hours in Communication Sciences or instructor's permission. Three hours.

284 Augmentative Communication An introduction to development and selection of augmentative/alternative communication strategies and systems for persons with severe communication challenges. *Prerequisites:* Nine hours in Communication Sciences or instructor's permission. Three hours.

285 Collaborative Intervention within School Settings Introduction to a transdisciplinary approach to collaborative, curriculum-based assessment and intervention for students with special needs in school settings. *Prerequisites:* Nine hours in Communication Sciences or instructor's permission. Three hours.

287 Current Research in Language Acquisition Recent advances in the study of child language. *Prerequisite:* 94. Three hours.

291, 292 Clinical Study Supervised practicum experiences with children and adults presenting disorders of speech, hearing, and language. *Prerequisite:* 262. Credit as arranged.

293, 294 Seminar *Prerequisite:* Instructor's permission. Variable credit.

295, 296 Advanced Special Topics Advanced courses of seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

298 Senior Seminar Analysis of research methods and topics in human communication leading to the student's preparation of a research proposal. *Prerequisites:* 80, 90, 94, 101, 262. Three hours.

HONORS – ARTS AND SCIENCES

216, 217 Honors/Communication Sciences See page 64 and contact Department for specific requirements. Three hours each.

Community Development and Applied Economics (CDAE)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Professor Halbrendt (Chairperson); Associate Professors Bloom, Ferreira, Ford, Kolodinsky, Pelsue, Petrillo, Schmidt; Assistant Professors Sullivan, Wang; Lecturers Ashman, Dombro; Extension Professor Bigalow; Extension Associate Professors Harris, Patterson, Scannell; Extension Assistant Professors Carlson, Wackernagel; Adjunct Lecturers Fritz, McElvany.

- 1 Drafting and Design Drawing** Basic drafting methods and procedures of architectural, three-view, oblique, isometric, and perspective drawings. Creating freehand pictorial presentation drawings. Three hours. Ferreira.
- 2 World Food, Population, and Development** Agricultural development emphasizing natural and economic phenomena and the effect of food supplies on population trends and policies. Three hours. Ford.
- 6 Energy Alternatives (3-0)** Concepts of energy, work, and power. Energy conversion, utilization, and conservation. Alternatives to fossil fuels including solar, wind, biomass, etc. Energy systems for rural areas. Three hours.
- 15 Design (1-4)** Creative decision making in the visual arts. Use of principles and elements of design in selection and creation of aesthetic and functional designs. Three hours. Pettillo.
- 16 Sketching and Illustration (1-4)** Techniques of sketching, color rendering, and scale drawing in relation to nature forms, the human figure, and interior space. Preparation of portfolio. *Prerequisite:* 15. Three hours. Pettillo. Spring.
- 30 Design Studio Skills: Woodworking** Common methods, processes, materials, and equipment employed in transforming wood into useful products. Three hours. Bloom.
- 35 Design Studio Skills: Welding/Metalworking** Skills, tools, and processes to cut, shape, and join metallic materials intended for artisans, designers, and craftpersons. Emphasis on welding, machining, and metal fabrication. Three hours. Ferreira.
- 58 Consumers and the Market** Overview of market problems facing consumers in contemporary life emphasizing consumer education, information, and protection. Three hours. Spring.
- 61 Principles of Agricultural and Resource Economics** Introduction to principles of economics through the analysis of problems of agricultural production and resource development. Three hours. Halbrendt.
- 85 Computer Applications in Agriculture and Life Sciences** Use of computer operating systems programming languages, electronic communications, word processing, spreadsheet modeling and graphics, and internet software related to the agricultural and life sciences. Three hours. Leonard, Patterson.
- 101 Computer-Aided Drafting and Design (CADD)** Using a computer to create, manipulate, and record drafting and design concepts, symbols, and conventions to prepare technical and/or presentation drawings. *Prerequisite:* 1 or instructor's permission. One to three hours. Ferreira.
- 110 Entrepreneurial Industrial Production (1-4)** Principles, concepts, methods employed in organizing capital, labor, tools, machines for producing products. Students function as labor source and mass produce and market a product. *Prerequisites:* 30 or 35 or 166, or instructor's permission. Three hours. Bloom.
- 117 History of Costume** (See Theatre 41.) *Prerequisite:* Art 6 or Theatre 1. Three hours. Fall.
- 125 Retail Management** Examination of a variety of retail contexts emphasizing practices and techniques necessary for successful operation: the retail mix, merchandising, and related developments in retailing. *Prerequisite:* Sophomore standing. Three hours. Sullivan.
- 127 Consumer Motivation** Analysis of consumer choices from a sociopsychological and economic perspective. Application of consumer behavior theory emphasized. *Prerequisites:* Sophomore standing. Three hours. Kolodinsky. Spring.
- 128 The Consumer and Advertising** Examination of advertising strategy and how it impacts consumers and the economy. Extensive application of critical analysis to actual advertising campaigns from development through evaluation. *Prerequisite:* junior standing. Three hours. Kolodinsky. Fall.
- 131 Light Frame Buildings (3-0)** Site planning, building planning, material selection. Functional and structural considerations including heating, ventilating, and insulation. Consideration of environmental relationships. *Prerequisite:* 6 or Math. 9 or 10. Three hours. Ferreira.
- 151 Housing, Consumers, and Society** Introduction to factors influencing consumer choice in housing including social-psychological, economic, and community aspects. *Prerequisite:* Economics 11 or equivalent and a sociology or psychology course. Three hours. Alternate years, 1997-98.
- 156 Law, Ethics, and Responsibility** The roles of law and ethics in guiding the actions of individuals and organizations, and the impact of those actions on others, including consumers, employees, communities, and developing countries. Three hours. Ashman. Spring.
- 157 Consumer Law** Analysis of the statutes, regulations, and case law that protect consumers from unfair and deceptive advertising and sales practices. *Prerequisite:* Sophomore standing. Three hours. Ashman. Fall.
- 158 Personal and Family Finance** An examination of personal and family financial management concepts and topics within various income levels and stages in the life cycle. *Prerequisites:* Economics 11 or equivalent. Three hours. Scannell. Fall.
- 159 Consumer Assistance Program** Jointly sponsored by UVM and Vermont Attorney General. Under supervision of an attorney, students respond to phone and mail requests for consumer information and handle consumer complaints. *Prerequisite:* Sophomore standing. Three to six hours. Ashman.
- 166 Small Business Management** Introduction to the theory and practice of organizing and operating a small business. Emphasis on basic concepts in financing, accounting, legal arrangements, regulations, taxes, and decision making. *Prerequisite:* Sophomore standing. Three hours.
- 167 Small Business Finance** Addresses the financial needs and issues of small business: recordkeeping, payroll, cash flow, financial statements, analysis, and financing. *Prerequisites:* 61 or equivalent, 166. Three hours.
- 168 Small Business Marketing** Examines the role of marketing in small business. Focus on development of marketing plan and its use in guiding small business operations. *Prerequisite:* 61 or equivalent. Three hours. Sullivan.
- 169 Small Business Computer Application** Using the microcomputer to accomplish tasks specific to small businesses. One credit modules may include spreadsheets, databases, presentations, mapping markets, WWW, project management and local area networks. *Prerequisites:* 85 or equivalent. One to six hours.
- 170 Solar Strategies for Building Construction** Passive, active, and hybrid heating; photovoltaic electric systems. Physical principles, site evaluation, component and system analysis, materials selection, and design of low-cost systems. *Prerequisite:* Math. 10 or permission. Three hours.
- 171 Agriculture in Economic Development** Role of agriculture in development of less-developed countries. Discussion of alternative economic development models. *Prerequisites:* 2, 61 or equivalent. Three hours. Ford.
- 175 Farm Credit Fellowship Practicum/Seminar** Acquaints students who have a strong interest in farm management

and farm finance with financial intermediaries serving agriculture. *Prerequisites:* 167. Three hours.

180 Real Estate Appraisal Basic concepts and methods of measuring real estate values. *Prerequisites:* 61 or equivalent, or instructor's permission. Three hours. Silver.

183 Communication Methods Analysis of media impact and presentation of information through press, radio, television, and audiovisual techniques. Three hours. Patterson.

191 Special Problems Independent projects under direction of a faculty member. Includes undergraduate teaching assistance. 291 number for juniors and seniors only. *Prerequisites:* Permission. One to six hours (maximum).

195 Special Topics Lectures or readings on contemporary issues in Community Development and Applied Economics. Enrollment may be more than once, up to 12 hours.

196 Field Experience/Practicum Professionally-oriented field experience under joint supervision by faculty and business or community representative. Total credit toward graduation in 196 and 296 cannot exceed 15 hours. *Prerequisites:* Permission. One to 15 hours. Ferreira.

205 Rural Communities in Modern Society (See Sociology 205.) Schmidt.

207 Markets, Food, and Consumers Learn how producers, processors, wholesalers, cooperatives, retailers, consumers, and governments affect the movement of food and fiber products through the production-marketing chain. *Prerequisite:* 61 or equivalent. Three hours. Alternate years.

208 Agricultural Policy and Ethics An examination of American agriculture and policies from various perspectives — historical, political, ecological, technological, social, economic, and ethical. Emphasis on contemporary issues, policy options, and future development. *Prerequisites:* 61 or equivalent, permission. Three hours. Rogers (Animal Sciences).

210 Seminar in Small Business Marketing and Entrepreneurism Students learn through participation in a series of guest lectures and field trips, the challenges, opportunities, and strategies faced and employed by small business entrepreneurs in the area of marketing. *Prerequisite:* 168 or 207. Three hours. Sullivan.

218 Community Organization and Development (See Sociology 207.) Schmidt.

231 Applied Computer Graphics Directed research, planning, design, technical experimentation, production and evaluation for computer-generated design application. *Prerequisite:* 15 or permission. Three hours. Petrillo. (Not offered for graduate credit.)

233 Rural Planning (See Geography 233.) *Prerequisites:* 61 or equivalent, senior standing. Three hours.

237 Economics of Sustainable Agriculture Comparative economic analysis of small vs. large scale, full- vs. part-time farming, traditional vs. alternative agricultural systems, specialization vs. diversification, and issues in agricultural sustainability. *Prerequisites:* 61 or equivalent, or permission. Three hours. Pelsue. Alternate years 1998–99.

250 Research Methods for Applied Economists Examination of methods useful in the collection and analysis of qualitative and quantitative data. Includes critical evaluation of literature, hands on data analysis, and interpretation of results. *Prerequisites:* Statistics 141 or permission. Four hours. Kolodinsky. Spring.

253 Macroeconomics for Applied Economists Explore macroeconomic principles and concepts as they affect individuals and businesses in local, regional, national, and global economics. *Prerequisites:* Economics 11, and CDAE 61 or equivalent. Three hours.

254 Microeconomics for Applied Economists The study of economic choices of individuals and firms, and the analysis of competitive and noncompetitive markets. Emphasis on application of intermediate microeconomic theory. *Prerequisites:* 61 or equivalent, Mathematics 19, or instructor's permission. Three hours.

255 Consumer Economics Analysis and application of micro-economic principles as they relate to consumers, including consumption and saving; investments in human capital; and market work, household production, and leisure choices. *Prerequisites:* 254. Three hours. Kolodinsky. Fall.

258 Consumer Policy: Issues and Analysis Examination and analysis of contemporary issues underlying a variety of consumer policies such as health care, income inequality, and consumer protection. *Prerequisites:* 254 or permission, Political Science 21 or similar course. Three hours. Spring. (Not offered for graduate credit.)

264 Price Analysis and Forecasting Supply-demand relationship and price determination, price uncertainty and risk, futures and option contracting, market structure and performance, qualitative price forecasting methods and applications. *Prerequisites:* 254, Math. 19, or permission; computer science and statistics helpful. Three hours.

266 Small Business Decision Making Applications of quantitative methods in analysis of small business decisions. Topics include incremental analysis, uncertainty, inventory policies, queuing theory applications, and mathematical programming. *Prerequisites:* 166, 167, or equivalent. Three hours. Wang.

267 Small Business Planning Instruction and guidance in the actual process of preparing a business plan. Students prepare a business plan including a market analysis; and legal, financial, and operational plans. *Prerequisites:* Senior standing, 85, 266, or equivalent. Four hours.

272 Seminar on World Food Problems and Policies Review of recent books and periodical literature; discussion and written or oral reports on topics of contemporary interest. *Prerequisites:* Junior standing, instructor's permission. Three hours. Ford. Alternate years with 273.

273 Agricultural Planning and Project Development Agricultural sector planning and project development processes with a focus on policy instruments; links between agriculture and the rest of the economy; data requirements; and activity preparation, evaluation, and implementation. *Prerequisite:* 171 or instructor's permission. Three hours. Ford. Alternate every other year with 272.

291 Special Problems Independent projects under the direction of a faculty member. Includes undergraduate teaching assistance. *Prerequisite:* Departmental permission. Students may enroll more than once for a maximum of 12 hours. One to six hours.

292 Seminar Reports, discussions, and investigations in selected fields. May enroll more than once up to six hours. One to three hours.

295 Special Topics Lectures or readings on contemporary issues in Community Development and Applied Economics. Enrollment may be more than once, up to 12 hours.

296 Field Experience/Practicum Professionally-oriented field experience under joint supervision by faculty and business or community representative. Total credit toward graduation in 196 and 296 cannot exceed 15 credits. Ferreira.

297, 298 Undergraduate Research Work on a research problem under direction of a staff member. Findings submitted in written form as prescribed by the department. *Prerequisite:* Senior standing. Three hours.

Computer Science (CS)

COLLEGE OF ENGINEERING AND MATHEMATICS

Professor Colbourn; Associate Professors Snapp, Yang; Assistant Professors Baruah, Xue; Lecturers Douglas, Eppstein, Erickson.

- 2 Microcomputer Applications Software (2-2)** Popular applications software packages: word processors, spreadsheets, databases. Emphasis on hands-on experience. *Prerequisite:* Two years high school algebra. May not be taken for credit after receipt of credit for any CS course numbered 11 or higher. Three hours.
- 3 Concepts of Computer Systems** Introduction to computer systems, components, system software, editors, utilities and language processors, programming, problem solving, applications. May not be taken for credit concurrently with, or following receipt of credit for, any CS course numbered higher than 3. *Prerequisite:* Two years high school algebra. Three hours.
- 5 Introductory Special Topics** *Prerequisite:* Instructor permission. Hours variable. May not be taken for credit after any CS course numbered 16 or higher.
- 14 Visual Basic Programming** Programming in the MS Windows environment using forms, objects, methods, functions, and code. Creation of regular applications and customized office suite applications. *Prerequisites:* 2 or Business Administration 40, or instructor permission. Three hours.
- 16 Programming in MATLAB for Engineers and Scientists (3-2)** Problem solving, computer programming, and the use of standard numerical methods in the context of engineering and scientific applications using MATLAB. *Prerequisite:* Math. 21; or Math. 10 (or equivalent, with instructor permission) and concurrent enrollment in Math. 21. Four hours.
- 21 Computer Programming I** Introduction to algorithmic problem solving. Designed to provide a foundation for further studies in computer science. Credit not given for more than one in the pair CS 11, 21. *Prerequisite:* Math. 10 or a strong background in secondary school algebra and trigonometry. Four hours.
- 26 Computer Programming II** Introduction to more advanced programming concepts that provide a foundation for further study in computer science. Topics include data structures and algorithms, concepts of style, design, documentation, testing and debugging techniques. *Prerequisites:* 21. Three hours.
- 95 Special Topics** *Prerequisite:* Instructor's permission. Hours variable.
- 100 Object-Oriented Programming** Object-oriented software analysis, design, and programming using a modern object-oriented programming environment. Topics include encapsulation, information hiding, inheritance, and polymorphism. *Prerequisite:* 26. Three hours.
- 101 Computer Organization** Introduction to computer system organization including performance, assembly language, machine-level data representation, arithmetic for computers, processor datapath control, memory, and input/output. *Prerequisite:* 26. Three hours.
- 103 Programming Languages** Systematic treatment of principles underlying the features and implementation of programming languages. Contrast of traditional procedural languages and at least one nontraditional language. *Prerequisite:* 26. Three hours.
- 104 Data Structures** Lists, Strings, Arrays, Trees and Graphs. Storage systems and structures. Storage allocation and garbage collection. Searching and sorting techniques. Generalized data management systems. *Prerequisites:* 26, Math. 52 or 104. Three hours.
- 105 Software Engineering** Treatment of software engineering problems and principles, including documentation, information hiding, and module interface specification syntax and semantics. Requires participation in a team project. *Prerequisite:* 100, 104. Three hours.
- 148 World Wide Web** Design and implementation of web pages to support forms, queries, active server pages, authentication, and security. Electronic commerce on the web. *Prerequisites:* 14 or 16 or 21 or Business Administration 141 or instructor's permission. Three hours.
- 193, 194 College Honors**
- 195 Special Topics** *Prerequisite:* Instructor's permission. Hours variable.
- 201 Operating Systems** Supervisory and control software for multiprogrammed computer systems. Processes synchronization, interprocess communication, scheduling, memory management, resource allocation, performance evaluation, object-oriented systems, case studies. *Prerequisites:* 103, 104. Three hours.
- 202 Compiler Construction** Practice in design and implementation of translators for ALGOL-like languages. Regular and context-free grammars, parsing, code generation for stack and register machines. Interpreters. Run-time storage administration for block-structured languages. *Prerequisites:* 103, 104, 243. Three hours.
- 204 Database Systems** Techniques for processing very large collections of data. Secondary storage. Database design and management. Query languages and optimization. Database recovery. *Prerequisites:* 100, 104; 101 recommended. Three hours.
- 222 Computer Architecture** Architecture of computing systems. Control unit logic, input/output processors and devices, asynchronous processing, concurrency, parallelism, and memory hierarchies. *Prerequisites:* 101, EE 131. Three hours.
- 224 Analysis of Algorithms** (Same as Math. 224.) Introduction to both analytical and experimental techniques in algorithm analysis. Basic algorithm design strategies. Introduction to complexity theory. *Prerequisites:* 103, 104, Math. 173. Three hours.
- 243 Theory of Computation** (Same as Math. 243.) Introduction to theoretical foundations of computer science. Models of computation. Church's thesis and noncomputable problems. Formal languages and automata. Syntax and semantics. *Prerequisite:* 104. Three hours.
- 251 Machine Intelligence** Introduction to methods for realizing intelligent behavior in computers. Knowledge representation, planning, and learning. Selected applications such as natural language understanding and vision. *Prerequisites:* 103, 104. Three hours.
- 256 Neural Computation** Introduction to artificial neural networks, their computational capabilities and limitations, and the algorithms used to train them. Statistical capacity, convergence theorems, backpropagation, reinforcement learning, generalization. *Prerequisites:* Math. 124 (or 271), Statistics 151, programming skills, graduate standing or instructor's permission. Three hours.
- 260 Parallel Algorithms and Programming Techniques** Taxonomy of parallel computers, basic concepts for parallel computing, effectiveness and scalability, parallel algorithms for variety of problems, message-passing programming paradigm and data-parallel languages. *Prerequisite:* 104 or permission of instructor. Three hours.
- 265 Computer Networks** Introduction to the theoretical and pragmatic principles of computer networking and client-

server computing. Topics include: Local Area Networks; the Internet; ATM technology; TCP programming. *Prerequisite:* 101, 104. Three hours.

266 Network Security and Cryptography Security and secrecy in a networked environment. Cryptography: public and private key. Authentication: trusted agents, tickets. Electronic mail and digital signatures. Privacy and national security. *Prerequisites:* 104, Math. 124 or 271. Three hours.

274 Computer Graphics Graphical representation of two- and three-dimensional objects on color raster displays. Line generation, region filling, geometric transformations, hidden line and surface removal, rendering techniques. *Prerequisite:* 104, Math. 121, Math. 124 or 271. Three hours.

292 Senior Seminar Oral presentations that pertain to the ethical practice of computer science in government, industry, and academia. Topics may include computer security, copyright, and patent law. *Prerequisite:* Senior standing in computer science. One hour.

294 Independent Readings and Research Independent readings and investigation under the direction of faculty member. *Prerequisite:* Department's permission. Three hours.

295 Special Topics in Computer Science Lectures, reports, and directed readings on advanced topics. *Prerequisite:* Department's permission. Three hours.

Dental Hygiene (DHYG)

SCHOOL OF ALLIED HEALTH SCIENCES

Associate Professor H.C. Hill (Chair); Clinical Associate Professors Bowen, S. Hill; Clinical Instructors Dugas, Tessier, Zablotsky; Clinical Assistant Professors Ivey, Levi; Lecturers Averill, Grimes, Keyworth, MacDonald, Marshall, Peterson, Rowell; Instructors Molind, Vennmar.

1 Introduction to Dental Hygiene Principles of dental hygiene, orientation to clinical practice, and preclinical experience. Four hours. Keyworth.

2 Introduction to Clinical Dental Hygiene A continuation of 1 with early clinical experience. *Prerequisites:* 1, Anatomy and Physiology 19. Two hours. Keyworth.

11 Oral Tissues I Introduction to the morphology and physiology of the oral tissues. Three hours. Grimes.

12 Oral Tissues II Continuation of 11 emphasizing head and neck anatomy and oral embryology. *Prerequisites:* 11, Anatomy and Physiology 19. Three hours. Grimes.

61 Radiography Study, demonstration, and practice of fundamentals of intraoral radiographic technique. Recognition of radiographic appearance of common oral disorders. *Prerequisites:* 1, 11, Anatomy and Physiology 19 or permission. Two hours. H.C. Hill.

62 Community Oral Health Discussion and project participation in the planning, development, and implementation of dental health education, public health dentistry, and the private practice of dentistry. Three hours. Ivey.

91 Dental Materials Study and manipulation of the materials commonly used in dental practice. *Prerequisites:* 2, 12 or permission. Two hours. H.C. Hill.

141 Clinical Dental Pharmacology Introduction to clinical pathology and pharmacological management in the treatment of dental patients. *Prerequisites:* 2, 12. Three hours. S. Hill.

143 Periodontics Morphologic and functional aspects of the supporting structures, recognition and therapy for diseases of the periodontium. *Prerequisites:* 2, 12, Anatomy and Physiology 20. Three hours. H.C. Hill.

146 Oral Pathology Functional and organic diseases of the oral cavity and their clinical management. *Prerequisite:* 143 or permission. Two hours. S. Hill.

181 Senior Clinic and Seminar Clinical practice with patients from simple to more difficult cases, both children and adults. *Prerequisites:* 2, 12, 61, Anatomy and Physiology 20. Four hours.

182 Senior Clinic and Seminar Continuation of 181. *Prerequisites:* 143, 181. Four hours.

195 Special Topics *Prerequisites:* Instructor's permission.

Economics (EC)

COLLEGE OF ARTS AND SCIENCES

Professors Alnasrawi, Gibson; Associate Professors Gedeon, Knodell, McCrate, Rizvi (Chairperson), Thomson, Woolf; Assistant Professors Brooks, Mazzoleni, Seguino.

All courses in the Department of Economics carry three hours of credit unless otherwise stated or arranged.

Not all courses are offered every semester; for complete information, consult the Schedule of Courses printed each semester. The Department also publishes a brochure of extended course descriptions each semester.

Courses numbered 11-96 are introductory courses. All of these courses may be applied towards the minor, and all except 20 towards the major, in Economics.

11 Principles of Macroeconomics Introduction to economic concepts, institutions, and analysis, particularly as related to the economy as a whole.

12 Principles of Microeconomics Study of individual economic units with particular emphasis on market interactions among firms and households. *Prerequisite:* 11.

20 Economic Problems Exploration of a current economic issue. Topics vary and may include international trade, debts and deficits, environment, ethnicity, race and gender, and employment and work.

60 Capitalism and Human Welfare Investigates theories of growth of the capitalist economy and the historical process of the ascendance, domination, and recent relative decline of the U.S. economy.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

Courses numbered 110-196 are intermediate-level courses. They have 11 and 12 as prerequisites. However, students with the appropriate interdisciplinary background may be admitted into 110, 113, 116, 153, and 156 by permission of the instructor. Economics 170, 171, and 172 also pre-suppose Math. 19. Prerequisites noted in the following descriptions are in addition to these.

110 American Economic History Survey of the economic history of the U.S. from colonial origins through early 20th century, emphasizing economic and institutional changes and events promoting economic growth and development.

113 Evolution of Capitalism Origins and development of capitalism; their social-economic institutions and their transference from Western Europe to North America.

116 Comparative Economic Systems Major economic systems of mixed capitalist and socialist variety, their theoretical models, basic institutions, and policies from a comparative point of view.

120 Money and Banking Commercial and central banking with special attention given to the Federal Reserve system, monetary theory, and policy.

130 Public Policy Revenues and expenditures of federal, state, and local governments and intergovernmental relationships; the effects of expenditures and taxation upon individuals, business institutions, and the national economy.

133 Economics of Environmental Policy Investigation of the relationship of markets and government regulation to environmental quality. Alternative public policies to improve efficiency and equity will be evaluated.

140 Economic Development Theories of economic growth applied to developing countries of the contemporary world including the political and social determinants of economic progress.

143 International Economics I: Trade Theory, policy, and history of international trade patterns, terms of trade, protectionism, competitiveness, structural adjustment, and international aspects of microeconomics.

146 International Economics II: Finance Theory, policy, and history of foreign-exchange markets, balance of payments, world monetary arrangements, and international aspects of macroeconomics and capital markets.

150 Labor Economics The economics of work, including wage determination, unemployment, productivity, discrimination, unions, and policy issues.

153 Race, Ethnicity, and the Economy Courses investigating the economic status and significance of racial and ethnic divisions in historical and contemporary U.S. society. Content varies by instructor. *Prerequisite:* Sophomore standing.

156 Women in the U.S. Economy Historical and theoretical overview of women's participation in the U.S. economy, emphasizing economic controversies surrounding family structure and pay equity issues.

160 Industrial Organization The structure, conduct, and performance of U.S. industry and appraisal of its economic efficiency and social impact, including governmental policies.

170 Economic Methods Introduces statistical and mathematical methods for understanding economic literature including probability distributions, data sources, statistical concepts, and simple regression, taught using economic examples and applications. *Prerequisite:* Math. 19.

171 Macroeconomic Theory Keynesian and other theories of the macroeconomy. Government policies in relation to the problems of employment, price stability, and growth. *Prerequisite:* Math. 19.

172 Microeconomic Theory Analysis of consumer demand, supply, market price under competitive conditions and monopolistic influences, and the theory of income distribution. *Prerequisite:* Math. 19.

194 ISSP Thesis Design, research, and writing of a thesis on an economic topic for students in the Integrated Social Sciences Program.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

Courses numbered 200-298 are advanced courses and all have 170, 171, and 172 as prerequisites. The courses numbered 210 through 260 are seminars whose topics are drawn from broad areas within economics. The precise content of these seminars varies from semester to semester and a given seminar may be repeated if its content differs. Consult the Schedule of Courses or departmental brochure for details.

Economics courses are not offered for graduate credit.

210 Seminar A: Economic History, Systems, and Ideas Topics on the evolution of economic systems and ideas.

220 Seminar B: Macroeconomics and Finance Topics such as national economic policies, income, wealth and welfare, financial markets and the macroeconomy, central banking, and other issues concerning macroeconomics and money.

230 Seminar C: Microeconomics and its Applications Topics from microeconomics and fields applying it, such as game theory, health economics, environmental economics, the Vermont economy, and urban and regional economics.

240 Seminar D: International and Development Economics Topics such as the economies of countries or regions, international trade agreements, international debts, deficits and structural adjustment, and aspects of development economics.

250 Seminar E: Labor, Race, and Gender Topics such as labor-management relations, aspects of contemporary labor markets, discrimination, economics of education, and other aspects of the economics of gender and race.

260 Seminar F: Firms, Institutions, and Growth Topics such as antitrust and regulation, decision making and the firm, technological change and industrial policies, and the economics of growth.

270 Econometrics and Applications A combination of economic theory, mathematics, and statistics for testing economic hypotheses and developing economic models. Conceptual development and applications.

295, 296 Advanced Special Topics Advanced courses or seminars beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

297, 298 Readings and Research Independent study with permission of supervising professor prior to registration.

HONORS — ARTS AND SCIENCES

218, 219 Honors/Economics See page 64 and contact Department for specific requirements.

Education (ED)

COLLEGE OF EDUCATION AND SOCIAL SERVICES

Professors Abruscato, Agne, Clarke, Conrad, Fitzgerald, Fox, Griffin, Hasazi, Larson, Lipson, Nash, Paolucci-Whitcomb, Shiman, Stevenson, Tarule, Williams, Witkin; Associate Professors Barbour, Bishop, Capone, Erb, Glesne, D. Goldhaber, J. Goldhaber, Hunter, Lang, Manning, Meyers, Mosenthal, B. Nichols, Rathbone, Roche, Sandoval, Shelton, Wessinger; Assistant Professors Aiken, Andreas, Burdett, Coffey, Connolly, Dewees, Geroski, Kasser, Salembier, Weinstock; Research Associate Professors Cloninger, Giangreco; Research Assistant Professors Backus, Dennis, Hamilton, Kelly, Welkowitz; Lecturers Alnasrawi, Alosa, Baker, Bossange, Cass, Cravedi-Cheng, Dague, Daniels, Edelman, Fightlin-Day, T. Fox, Friedrichs, Furney, Heise, Hock, Holland, Kay, Leo, Mehkelsen, Morgan, Moroz, Morris, Mueller, E. Nichols, Prue, Pugh, Razza, Ross-Allen, Rubin, Sugarman, Tulikangas, Wadley-Bailey, Widrick, Yuan; Visiting Associate Professor Proulx; Visiting Assistant Professors Fulkwiler, Pierce, Vargas, Wang.

Any information concerning course instructor may be obtained from department chairperson at the beginning of each semester.

The College of Education and Social Services offers the following courses on a program basis. Departmental permission is required for enrollment. Individual courses may require a lab fee.

55 Special Topics I Designed so that its content and structure may accommodate special issues not especially appropriate within the boundaries of an existing course. Open to first-year students. Two to six hours.

181 Student Teaching Teaching in elementary or secondary schools under guidance of cooperating teachers, principals, and college supervisors. A full-time, full semester, 12-credit experience. *Prerequisites:* Acceptance into the teacher education program; must meet criteria for student teaching. Variable credit, three to 12 hours.

197 Readings and Research Individual research problem or directed reading in an area of special interest to the student. *Prerequisite:* Instructor's permission. Variable credit, one to four hours. May be repeated up to eight hours.

200 Contemporary Issues Designed so that content and structure may accommodate special issues not especially appropriate within boundaries of an existing course. *Prerequisite:* Twelve hours in education and related areas. One to six hours.

295 Laboratory Experience in Education Supervised field work designed to give students experience in specialized areas for their professional development. *Prerequisite:* Instructor's permission. Credit as arranged.

ART EDUCATION — EDAR

140 Foundation Studio for Elementary Education Majors Students select a foundation studio course (Art 2, 3 or 4) from those sections designated each semester on the course schedule. See course descriptions listed under Art. Three hours.

177 Curriculum and Practice in Elementary Art Study and implementation of curriculum in elementary school. Students work directly in an elementary classroom. Lectures and discussions. *Prerequisites:* Eighteen hours studio art, junior standing. Four hours.

178 Curriculum and Practice in Middle and High School Art Study and implementation of curriculum in middle and high school. Students work directly in a middle or high school. Lectures and discussions. *Prerequisite:* Eighteen hours studio, junior standing. Four hours.

283 Seminar: Current Issues in Art and Education/Student Teaching Research and discussion of issues relevant to contemporary art and the teaching of art. *Prerequisite:* Senior standing or permission. Three hours.

284 Seminar: Current Issues in Art and Education/Alternative Sites Research, discussions, and field work relevant to contemporary art and the teaching of art. *Prerequisite:* Junior standing or permission. Three hours.

COUNSELING — EDCO

220 Developmental Perspectives in Counseling Approaches to understanding human behavior in applied settings. Emphasis on behavior development as an interpersonal process. *Prerequisite:* Twelve hours in education and psychology. Three hours.

291 Special Topics in Counseling Special issues in counseling not appropriate to content of an existing course. Variable hours.

EARLY CHILDHOOD AND HUMAN DEVELOPMENT AND FAMILY STUDIES — ECHD

1 Infant/Toddler Curriculum Block Study of infant/toddler development through a combination of lecture, discussion, observation, and participation in an infant/toddler group setting. *Prerequisite:* Majors only or permission. Four hours. Offered spring 1999 only. D. Goldhaber.

3 Introduction to Early Childhood and Human Development I First of three seminars designed to introduce students to the concepts and practices of the discipline. Emphasis on methods of studying individuals and families. *Prerequisite:* Majors only. Two hours. Weinstock.

5 Human Development A comprehensive survey of life span individual and family development within social and historical context. Three hours. Shelton, Weinstock.

7 Introduction to Field Work in Early Childhood and Human Development Third of three seminars introducing concepts and practices of the discipline. Emphasizes supervised field experience in a child and/or adult developmental service setting. One hour. Weinstock.

20 Aging: Change and Adaptation (Same as Nursing 20 and Sociology 20.) Individual and social meanings of aging and old age; physical, physiological, psychological, and sociological changes accompanying aging; individual, family, community, and societal adaptations to aging. Three hours. Cutler.

60, 61 The Context of Human Development The impact of the family, community, and various agencies, systems, and conditions within society upon the developing individual. Three hours. Shelton.

63 Child Development The biological, psychological, and social growth and development of children and their relationships with family, peers, and institutions. *Prerequisites:* Sophomore standing. Psychology 1. Three hours. D. Goldhaber.

65 Human Relationships and Sexuality Sexual responsibility and the biological, social, psychological growth, and development of human beings in terms of sex role identity. Three hours. Barbour.

100 Preschool Curriculum Block Examines the development and education of children three to five years of age through lecture, discussion, observation and participation in an early childhood preschool setting. *Prerequisite:* ECHD 1. Ten hours. J. Goldhaber. Offered fall 1998 only.

152 Biology of Aging (Same as Nursing 100.) Three hours.

167 Sexual Identities Exploration of diverse lesbian, gay, bisexual, and/or transgender identities, families, and communities, and their current personal, social, and cultural meanings and contexts. *Prerequisites:* Three hours in Human Development or related field; sophomore standing. Three hours. Weinstock.

187 Field Practicum Full semester student teaching internship in a primary (K-3) setting. *Prerequisite:* 189; permission. Eight hours.

189 Early Childhood Practices Supervised planning and conducting the Early Childhood Laboratory Center. Integrated Readings and Research, Early Childhood Seminar, and Curriculum Workshop. *Prerequisite:* Permission. Variable credit, up to 15 hours. Burrington, D. Smith.

195 Special Topics Lectures, laboratories, readings, or projects relating to contemporary areas of study. Enrollment may be more than once, accumulation up to 12 hours. *Prerequisite:* Varies with course.

260 Family Ecosystem Family viewed in and as an environment for human development. The family ecological approach applied to practical family concerns. *Prerequisites:* Senior standing or instructor's permission. Three hours. Shelton.

263 Advanced Child Development Survey of professional literature in child development with special emphasis on influence of early life experiences throughout the life cycle. *Prerequisites:* 80, 81 or equivalent. Three hours. D. Goldhaber, Shelton.

264 Contemporary Issues in Parenting Contemporary cultural factors that influence adult lifestyles and their relationship to successful parenting. *Prerequisites:* Nine hours in Human Development or instructor's permission. May be taken more than once. Three hours. Shelton, Weinstock.

266 Seminar in Human Development Intensive study of issues in human development and their application in a wide variety of professional areas. May be taken more than once up to a maximum of 12 hours. *Prerequisites:* Junior standing, nine hours in Human Development or instructor's permission. Three hours.

267 Advanced Seminar in Sexual Identities Intensive study of lesbian, gay, bisexual, and/or transgender identities, families, and communities in diverse individual, social, political, and cultural contexts. *Prerequisites:* Junior standing, nine hours in Human Development or instructor's permission. Three hours. Weinstock.

268 Seminar in Close Relationships Causal conditions influencing formation, maintenance, and dissolution of intimate adult relationships. Draws on theory and students' personal experiences to explicate the nature of close relationships in contemporary American society. *Prerequisites:* Junior standing, nine hours in Human Development or instructor's permission. Three hours. Weinstock. Offered in alternate years. Not offered 1998–99.

291 Special Problems Reading, discussion, and special field and/or laboratory investigations. *Prerequisite:* Departmental permission. Students may enroll more than once up to 12 hours. One to six hours.

295 Special Topics Lectures, laboratories, readings, or projects relating to contemporary areas of study. Enrollment may be more than once, accumulation up to 12 hours. *Prerequisite:* Departmental permission.

296 Field Experience Professionally-oriented field experience under joint supervision by faculty and community representative, credit arranged up to 15 hours. *Prerequisite:* Departmental permission.

EDUCATION — EDSS

1 Schooling, Learning, and Society Introduction to issues and problems in American education: schools and learning, professional careers, individuals in systems, characteristics of learners. Required readings and papers. Three hours.

60 'An Introduction to Helping Skills for the Educator Examines phenomenon of "helping" in American society within its sociological, cultural, economic, political, and educational contexts. Emphasis on how helping professionals function both to help and to hinder clients in society. Three hours.

193 Environmental Education Philosophy, concepts, and teaching-learning strategies of environmental education. *Prerequisite:* Three hours in education or instructor's permission.

207 The University and Third World Development Examination of the role of educational policies on urbanization vs. ruralization in the human capital formation process of third world countries. *Prerequisites:* Six hours of political science, history, geography, or economics, or instructor's permission. Three hours. (Not offered for graduate credit.)

211 Educational Measurements Essential principles of measurement in education. Topics include validity, reliability, principles of test construction, item analysis, and analysis of standardized tests as they apply to classroom. *Prerequisite:* Twelve hours in education and related areas. Three hours.

238 Teaching with a Global Perspective Approaches to teaching global and multicultural issues: justice and human rights, peace, and the environment. Development of curriculum materials. Links between local and global concerns. *Prerequisite:* Twelve hours of education and related areas. Three hours.

239 Service-Learning Internships/Field Studies Professional education course designed to facilitate student's integration of academic, social, personal, and career objectives through seminar or project syllabus method of support for internship experience in the community. *Prerequisite:* Instructor's permission, junior standing. Variable credit, one to 12 hours.

248 Educational Media Modern instructional aids, theory and practice; educational media related to psychology of teaching and learning. *Prerequisite:* Twelve hours in education and related areas. Three hours.

ELEMENTARY EDUCATION — EDEL

10 Introduction to Teaching and Learning as Meaningful Enterprise Orientation to professional program. Introduction to research base for meaningful teaching and learning. Analysis of teaching autobiographies by successful teachers. One credit each semester for two consecutive semesters.

11 Computers in the Elementary Education Classroom Students use the University's network and internet, exchange e-mail, construct electronic portfolios, and examine software to help them in their studies and future classrooms. Two hours.

24 Learners and the Learning Process Distinctions among dominant theories of learning and development. Learning theories applied to selected issues derived from context of schools. Students work with individual learner in appropriate setting. Three hours.

56 Teachers and the Teaching Process Students examine lives of teachers, demands of the profession, and selected models of teaching. Student observation of teachers in appropriate settings and knowledge of learning and development. *Prerequisites:* 10, 24; concurrent with EDEL 177, EDSP 5. Three hours.

155 Laboratory Experience in Inquiry Supervised practicum in field sites. Implementation of teaching methods from Inquiry Block. Documentation of classroom work, child study, and development of portfolio. *Prerequisites:* Admission to Elementary Teacher Education Program; concurrent with EDEL 157, 158, 159. Three hours.

156 Teaching Mathematics for Meaning Methods of teaching mathematics in elementary school. Research base for how children learn mathematics and how math curriculum is organized. Special focus on teaching diverse groupings of learners. *Prerequisites:* Admission to Elementary Teacher Education Program; concurrent with EDEL 175, 176, 178. Three hours.

157 Social Education and Social Studies Methods of social education for elementary-aged school children. Promoting children's efficacy by nurturing personal interests. Development of folio of developmentally-sound examples of social studies learning. *Prerequisites:* Admission to Elementary Teacher Education Program; concurrent with EDEL 155, 158, 159. Two hours.

158 Teaching Science for Meaning Methods of science education for elementary-aged school children. Translate science content into meaningful science inquiry. Preparation of demonstration teaching lessons. *Prerequisites:* Admission to the Elementary Teacher Education Program; concurrent with EDEL 155, 157, 159. Two hours.

159 The Visual and Performing Arts, K–6 Incorporation of the visual and performing arts in elementary school curriculum. Focus on artistic expression as a way of learning. Emphasis on cross-cultural art, music, drama. *Prerequisites:* Admission to Elementary Teacher Education Program; concurrent with 155, 157, 158. Two hours.

175 Laboratory Experience in Literacy Supervised practicum in a field site. Implementation of teaching methods from Literacy Block. Documentation of classroom work, child study, and development of portfolio. *Prerequisites:* Admission to Elementary Teacher Education Program; concurrent with EDEL 156, 176, 178. Three hours.

176 Language Arts and Literacy Skills Cognitive research base for the social context of children's learning. Methods of language arts as literate activity. Emphasis on emergence of literacy in the child of special need. *Prerequisites:* Admission to Elementary Teacher Education Program; concurrent with EDEL 156, 175, 178. Two hours.

177 Children's Literature and Literacy Learning about the breadth of literature available for use in elementary school. Developing the ability to evaluate and use literature in reading and writing activities. Emphasis on bias-free methods. *Prerequisites:* Admission to Elementary Teacher Education Program; concurrent with EDEL 56, EDSP 5. Two hours.

178 Meeting Individual Needs: Assessment and Instruction Methods of responding to individual differences within a heterogeneous classroom. Sources of student variability, developing settings of least restriction, and appropriate assessment strategies. *Prerequisites:* Admission to Elementary Teacher Education Program; concurrent with EDEL 156, 175, 176. Two hours.

185 Student Teaching Internship Supervised student teaching internship in field site. Fifteen-week total immersion as a beginning teacher. Responsibilities specified in internship handbook. Documentation of activities for professional portfolio. Concurrent with EDEL 187 and 188. *Prerequisite:* Method Blocks in Inquiry and Literacy. Variable credit: Three to 12 hours.

187 Planning, Adapting, and Delivering Reading Instruction in Meaningful Contexts Methods of diagnostic teaching in reading and writing. Identifying components of effective programs and use of research findings to deliver instruction in meaningful contexts. Documentation of personal model of literacy for professional portfolio. Concurrent with 185 and 186. *Prerequisite:* Method Blocks in Inquiry and Literacy. Two hours.

188 Principles of Classroom Management Application of basic learning principles to classroom management. Creation of behavior management plans with emphasis on social and academic behavior of diverse groupings of children. Concurrent with 185 and 187. *Prerequisite:* Method Blocks in Inquiry and Literacy. Two hours.

222 Cultivating Children's Literacy in the Elementary/Middle School Classroom Contemporary research and practice related to the development of strategic, motivated, and independent readers and writers. Emphasis on integrating reading and writing within collaborative environments.

234 Literature and Language for Children and Youth Characteristics, interest, and reading habits of children and young people; criteria for selection and evaluation of literature; organizing book unit for teaching literature and for content areas emphasizing development of oral and written expression. *Prerequisite:* Twelve hours in education and related areas or instructor's permission. Three hours.

241 Science for the Elementary School Examines a number of elementary school science programs. Emphasis on methods and materials relating to construction and use of science units for children in grades K-6. *Prerequisite:* Twelve hours in education and related areas and instructor's permission. Three hours.

244 Social Studies in the Elementary School Study of literature, research, and problems in teaching social studies

in the elementary school. *Prerequisite:* Twelve hours in education and related areas. Three hours.

FOUNDATIONS — EDFS

2 School in Society Introduction to the school as a complex institution and to the many roles it plays in our society. Focus on interrelated themes of socialization, equality, excellence, social change. Three hours.

203 Social, Historical, and Philosophical Foundations of Education Critical examination of central educational/social issues and values with special emphasis on the struggle for justice and equality. Themes include schooling and social class, race, and gender; the purposes of education; and the responsibilities of teachers. *Prerequisite:* Licensure programs only. Junior standing. Three hours.

204 Seminar in Educational History Struggles for Freedom and Equality. Selected topics in history of education. Education in democratic and authoritarian social orders. Discussions and research and around such topics as education of women, black heritage, American higher education in transition. *Prerequisite:* Twelve hours in education and related areas or instructor's permission. Three hours.

205 History of American Education Educational principles and practices in the U.S. as they relate to main currents of social history. Discussions focus on key ideas of historic and contemporary significance. *Prerequisite:* Twelve hours in education and related areas or instructor's permission. Three hours.

206 Comparative Education The study of educational policy and practice in selected countries. Focus on the making of citizens, the achievement of equity goals, and related development issues in countries such as China, Japan, Kenya/Tanzania, and Russia. *Prerequisite:* Twelve hours in education and related areas. Three hours.

209 Introduction to Research Methods in Education and Social Services Seminars and research projects introduce students to methods of historical, descriptive, experimental, quasi-experimental, field studies, and survey research. Three hours.

255 School as a Social Institution Examination of the school and related social institutions, with particular focus on: social class, race, and ethnicity, socialization, role of the family, management of knowledge, and social change. *Prerequisite:* Twelve hours in education and related areas. Three hours.

HEALTH EDUCATION — EDHE

46 Personal Health Concepts of personal health related to problems of daily living. Mental health, sex education, nutrition and weight control, fatigue and relaxation, chronic and communicable disease, stimulants and depressants. Three hours.

150 Seminar in Health Education Research, discussion, and critical examination of selected topics and special issues in health not currently covered in existing courses. *Prerequisite:* Six hours in health education or instructor's permission. Variable credit, one to four hours.

173 Practicum in Field Experience Individually prescribed teaching experience involving work with health agencies, both public and private. Responsibilities approximate those commonly associated with student teaching. *Prerequisite:* Permission. Variable credit, one to four hours.

182 Health Methods and Materials Fundamental methods of teaching health as applied to school and public health education. Consideration of materials applicable to health education, evaluation techniques, preparation of teaching units and bibliographies. *Prerequisite:* 46. Three hours.

208 School Health Programs Organization of total school health program. Problems and administration in area of school environment, health services, health education, and school-community relationship. *Prerequisite:* 46 or equivalent. Three hours.

211 Community Health Education Governmental and voluntary agencies' sociological, historical, educational, environmental, and medical influences. Role of community health educator in these influences and major American health concerns. *Prerequisite:* 46. Three hours.

220 Stress Management for Health Professionals Physiological, psychological, and sociological aspects of stress. Theory, practices, teaching techniques, and application relevant to teaching students and/or clients. *Prerequisite:* 46. Three hours.

HIGHER EDUCATION—EDHI

202 Human Relations in University Residence Halls Emphasis on human relations, group dynamics, advising models, student development theory, organizational development, and contemporary student issues in a residential environment. *Prerequisite:* Residence hall staff. One hour. (Not offered for graduate credit.)

213 Leadership: Theories, Styles, and Realities Introductory course in leadership development designed for student leaders. Includes study of planning, time management, organizational theory, communication skills, group process, team building. Two hours. (Not offered for graduate credit.)

214 Advanced Seminar in Leadership Focuses on student leaders' experiences and how those experiences relate to activities beyond the University setting. Two hours.

FAMILY AND CONSUMER SCIENCES EDUCATION

Courses related to this program are offered through the Nutrition and Food Sciences Department (see page 178).

MUSIC EDUCATION — EDMU/MUS

The Music Department offers a number of pedagogy courses in specific musical areas. All are open to nonmajors by permission of the instructor. See EDMU/Music course listings.

55 Special Topics I Designed so that its content and structure may accommodate special issues not especially appropriate within the boundaries of an existing course. Open to first-year students. Two to six hours.

181 Music for Elementary Teachers Development of musical skills, understandings, and attitudes pertinent to the teaching of music in elementary classroom. *Prerequisite:* Elementary majors, acceptance into teacher education program. Three hours. Cosenza.

197 Readings and Research Individual research problem or directed reading in an area of special interest to the student. *Prerequisite:* Instructor's permission. Variable credit, one to four hours. May be repeated up to eight hours.

240 Musical Creativity in the General Music Class Designing a course of study for the general music class. Developing musical concepts and perception through individual differences. *Prerequisite:* Undergraduate major in Music Ed. or instructor's permission. Three hours. Not offered every semester.

243 Recent Trends in Music Education Study of recent thought and practices in music education. Examination of current trends. *Prerequisite:* Undergraduate major in Music Ed. or instructor's permission. Credit variable, one to four hours. Not offered every semester.

281 Elementary Music Education Methods Methods and materials for teaching music in elementary schools. Five hours classroom observation per week required. *Prerequisite:* Junior standing in Music Ed. Three hours. Cosenza.

282 Secondary Music Education Methods Methods and materials in the teaching of vocal and instrumental music in secondary schools. Five hours classroom observation per week required. *Prerequisite:* Junior standing in Music Education. Three hours. Cosenza.

290 Basic Concepts in Music Education Disciplinary backgrounds; historical and philosophical foundations; fundamental considerations of the functions of music in the schools; development of a personal philosophy. Three hours. Not offered every semester.

295 Laboratory Experience in Education Supervised field work designed to give students experience in specialized areas for their professional development. *Prerequisite:* Instructor's permission. Credit as arranged.

PHYSICAL EDUCATION — EDPE

21 Foundations of Physical Education Review of historical, philosophical, and scientific foundations as a basis for physical education. Study of vocational opportunities associated with physical education as a profession. Three hours.

23 Advanced First Aid and Emergency Care To meet the needs of individuals who are in a position to provide first aid and emergency care frequently. Red Cross certification for successful performance in Advanced First Aid Emergency Care. *Prerequisite:* PE, HDS, and Health majors, others by instructor's permission. Three hours.

26 Water Safety Instructor Advanced performance skills in swimming, diving, survival, and rescue techniques. Theory and practice in techniques of teaching aquatic skills. Red Cross certification as Water Safety Instructor or Instructor for Beginning Swimming. *Prerequisite:* Current Red Cross Lifesaving Certificate. Two hours.

32 Recreational Sports Officiating Basic techniques and skills of rule interpretation for officiating recreational sport competition. Two hours.

54 History, Philosophy, and Trends in Recreation Review of chronological history of evolution of recreation movement; examination of past and emerging theories and philosophies of recreation and leisure; exploration of trends in recreation and leisure and probable impact on our life styles. Three hours.

100 Teaching Physical Education in the Elementary School Planning, organization, and practice skills appropriate for teaching movement patterns to children aged 4-12. *Prerequisite:* Sophomore standing, Elem. Ed. majors only. Two hours.

104, 105 Physical Education Teaching Experience (Petex) Experience-based course sequence emphasizing relationship of motor development to learning. Includes age level needs and appropriate physical education activity sequences. First semester: grades K-3; second semester (105); grades 4-6. *Prerequisites:* 23 or 157, junior standing. Five hours.

122 Coaching Basketball Experiences include theory and technique in coaching basketball, as well as the organization and conduct of a basketball program, defensive and offensive strategies. *Prerequisite:* Skill competency in basketball, sophomore standing; PE majors, coaching minors, others by instructor's permission. Three hours.

123 Coaching Baseball/Softball Theory and technique of coaching interscholastic baseball and softball. Includes practice, game, and schedule organizations. *Prerequisites:* Skill competency in baseball/softball, sophomore standing or instructor's permission. Two hours.

124 Coaching Track Analysis and practice of the skills, techniques, and knowledge involved in coaching interscholastic track. *Prerequisites:* Skill competency in track, sophomore standing or instructor's permission. Two hours.

125 Coaching Soccer Theory and technique of coaching interscholastic soccer. Includes practice, game and schedule organization. *Prerequisites:* Skill competency in soccer, sophomore standing or instructor's permission. Two hours.

126 Coaching Gymnastics Analysis and practice of skills, techniques, and knowledge involved in teaching and coaching gymnastics. *Prerequisites:* Skill competency in gymnastics, sophomore standing. Two hours.

127 Coaching Swimming Knowledge, analysis, and practice of skills and techniques involved in coaching swimming. *Prerequisite:* Skill competency in swimming, sophomore standing or instructor's permission. Two hours.

128 Coaching Field Hockey Theory and technique of coaching interscholastic field hockey. Includes skill and game analysis; practice, game, and schedule organization; and development of a coaching philosophy. *Prerequisite:* Skill competency in field hockey. Two hours.

129 Coaching Volleyball Theory and techniques of coaching volleyball. Includes skill and game analysis, practice, game and schedule organization. *Prerequisite:* Skill competency in volleyball, sophomore standing or instructor's permission. Two hours.

130 Coaching Tennis Analysis and practice of skills, techniques, and knowledge essential for teaching/coaching tennis. Methodology for individual and large group instruction. *Prerequisite:* Skill competency in tennis, sophomore standing or instructor's permission. Two hours.

131 Coaching Lacrosse Theory and techniques of coaching lacrosse. Includes skill and game analysis, practice, game and schedule organization. *Prerequisite:* Skill competency in lacrosse, sophomore standing or instructor's permission. Two hours.

135 Adaptive Aquatics Skills and techniques for teaching the handicapped to swim. Prepares instructors to deal with a full range of physical, mental, and emotional handicapping conditions in an aquatic setting. *Prerequisite:* 26 or instructor's permission. Two hours.

141 Alternative Careers in Physical Education and Sport Analysis of nonteaching employment opportunities, career options related to sport within a broad range of school and nonschool settings. *Prerequisite:* Sophomore standing. Credit not given for both 21 and 141. Three hours.

145 Seminar in Athletics Contemporary issues, strategy, analysis, and problems areas related to selected comparative sports. Variable credit, one to four hours.

155 Physical Education in the Secondary School Theories of teaching which include unit plan development, classification and grouping of students for instruction, and a variety of teaching methods. Laboratory experience in teaching activity skills to youth aged 12-18. *Prerequisite:* Junior standing, PE majors only. Three hours.

157 Care and Prevention of Athletic Injuries Prevention, recognition, and care of injuries related to school physical education and athletic programs. Three hours.

158, 159 Directed Observation Experience in Athletic Training A laboratory sequence offered for those students seeking admission into the Athletic Training Education Program. Includes training room procedures and basic injury assessment skills. 158, emergency protocols; 159, basic injury assessment. Must be taken with EDPE 157. One hour.

166 Kinesiology Designed for the teacher/coach to analyze factors of peak physical performance. Muscle actions, mechanical principles, related factors enhancing move-

ment are emphasized. *Prerequisite:* One year of biological science; PE majors, coaching minors; others by instructor's permission. Three hours.

167 Exercise Physiology Investigates responses of various physiological systems during exercise. Addresses techniques in assessment of athletic performance and reviews current scientific approaches to training and understanding the elite athlete. *Prerequisite:* PE majors, coaching minors; others by instructor's permission. Three hours.

168 Tests and Measurements in Exercise and Sport Science Concepts of qualitative and quantitative assessment and analysis in the movement sciences. Introduction to basic statistics and statistical software packages common in data analysis and presentation. *Prerequisites:* Six hours in EDPE, junior standing. Three hours.

172 Psychology of Coaching Application of psychological subdisciplines to coaching. Learning, motivation, transfer, retention, emotion, and personality variables discussed with implications for the coach. *Prerequisites:* Psychology 1, junior standing. Three hours.

173 Practicum in Field Experience Individually prescribed teaching experience involving work with youth groups in activities related to physical education, health, or recreation. Responsibilities approximate those commonly associated with student teaching. *Prerequisite:* 104, 105, or 155, instructor's permission. Variable credit, two to four hours.

185 Injury Evaluation and Recognition in Athletic Training Course is integrative and clinical in nature, consisting of injury evaluation and recognition skills. Injury mechanisms, etiology, pathology, clinical signs and symptoms. *Prerequisites:* 157, 158, and/or 159. Four hours.

186 Advanced Athletic Training II Emphasis upon use of modalities and techniques of rehabilitation in treatment of athletic injuries. *Prerequisites:* 157, 185; PE, PT majors; others by instructor's permission. Three hours.

192 Recreational Sports Programming I Exploration and examination of the philosophy, science, and communications within a recreational sports setting. Three hours.

193 Recreational Sports Programming II Exploration, examination, and development of skills in programming techniques, governance procedures, and facility maintenance operations in recreational sports. *Prerequisite:* 192 or permission. Three hours.

195 Recreation Leadership and Programming Practical approach to significance, theories, and characteristics of leadership content, and methods of program planning. Field work practice in planning and leadership techniques. *Prerequisite:* 54. Three hours.

201 Administration of Athletic Programs Designed to provide athletic director, school administrator, and teacher-coach with background for effective administration of athletic program of schools. Scheduling, budgeting, management, equipment, policy, public relations, and educational justification. *Prerequisite:* Twelve hours in education and psychology. Three hours.

203 Principles of Physical Education Principles basic to sound philosophy of physical education for appraisal of historical development; relationship to health education, recreation and other areas; foundation and functions of physical education in contemporary society. *Prerequisites:* Admission to the program, junior standing. Three hours.

220 Sport in Society Examines sport as a social institution, emphasizing interrelationships between sport and the social context in which it exists; analyzes functions and dysfunctions of sport in contemporary society. *Prerequisite:* Sociology 1 or 19, or equivalent. Three hours. Wessinger.

230 Philosophy of Coaching In-depth study of over 100 major philosophical coaching considerations. Lectures by visiting coaches. Study in areas of need and interest. *Prerequisite:* Junior standing. Three hours.

240 Principles of Motor Learning and Human Performance Study of nature of motor learning; factors effecting motor learning, such as motivation, emotion, and stress; concepts of transfer and retention; alternatives in teaching and coaching methodologies based upon applied principles in motor learning. *Prerequisites:* 166, ECHD 62 or 63. Three hours.

241 Seminar in Physical Education and Athletics Examination and analysis of contemporary issues and trends in physical education and athletics not especially appropriate within boundaries of an existing course. *Prerequisite:* Twelve hours in physical education and related areas. Variable credit, two to four hours.

253 Curriculum Design in Health and Physical Education Philosophy and techniques of curriculum innovation in health and physical education. Emphasis upon interrelationships between student needs and interests, teaching methodology, evaluative procedures, community involvement, and administrative organization patterns. *Prerequisites:* Junior standing, 104, 105, 46 or 155. Three hours.

260 Adapted Physical Activity Examines current issues surrounding physical activity programming for individuals with disabilities. Emphasizes instructional strategies and modifications for effectively including students with diverse abilities into physical activity. *Prerequisites:* 155, 104, 105 or equivalent teaching experience. Three hours.

265 Exercise and Sport Science Discussion and integration of topics related to exercise physiology, kinesiology, motor learning, and sociocultural aspects of sport. *Prerequisites:* 166, 167, 220, 250; senior standing, or permission. Three hours.

PHYSICAL EDUCATION—PEAC

Physical Education Activities. Two hours weekly for a half or whole semester. One-half or one credit.

Two hours of physical education activities are required of undergraduate students (see page 38). The program is centered around the physical needs, abilities, and interests of young adults. The aims are to help all to improve and maintain physical fitness; to provide opportunity to establish skills in a variety of movement activities; to bring performance in elected physical activities to a high level of satisfying proficiency; to find enjoyment in physical activity and lasting interest in continuing voluntary participation. Classes are coeducational unless indicated for men or women only.

Aerobic Exercise	Modern Dance
Archery	Racquetball
Badminton	Stress Reduction
Ballroom Dance	Squash
Conditioning	Swimming
Fencing	Tennis
Folk and Square Dance	Volleyball
Golf	Walking for Fitness
Handball	Weight Training
Lifeguard Training	

The following activities require special fees for transportation and/or instruction. The student must also provide special attire and/or equipment in those activities marked with an asterisk ():*

Ballet	Moo Gong Do*
Bowling	Mountain Biking*
Cross Country Skiing	Sailing
Downhill Skiing*	SCUBA
Figure Skating*	Ski Instructors*
Hatha Yoga	Snowboard Instructors*
Horseback Riding	Snowboarding*

Ice Skating*
Judo*

Telemarking*

The following activities, co-offered by the Physical Education and Military Studies Departments, may be counted toward the physical education requirements:

Backpacking
Military Fitness
Orienteering

One credit per sport per year may be earned for participation in Varsity Sports and Approved Club Sports. The athlete must enroll for PEAC 000, Varsity Sports, or PEAC 005, Club Sports, during the year of participation. No retroactive credit will be granted. The list of Approved Club Sports is available in the Physical Education Activity Office each year.

Activities are offered at various levels of instruction and numbered as follows:

- Level 1. Beginner, very first experience with an activity.
- Level 2. Beginning mastery of basic skills and knowledges, equivalent to seven weeks of previous instruction.
- Level 3. Intermediate; equivalent of 14 weeks of instruction.
- Level 4. Intermediate-Advanced; introduction to more complex skills and strategy.
- Level 5. Advanced.

SECONDARY EDUCATION — EDSC

207 Adolescent Learning from a Behavioral and Cognitive Perspective An indepth examination of cognitive learning theory and its background in behavioral and other learning theories, with application to teaching in a secondary setting. Three hours.

209 Practicum in Teaching Working with teachers and students in a secondary school, licensing candidates will assess the needs of students, document effects of direct service and the need for new curriculum. *Prerequisite:* EDFS 203, EDSC 207 or concurrent enrollment. Three hours.

215 Reading in the Secondary Schools Design of methods and materials for integrating reading and learning skills in content instruction. Focus on learning support for at risk learners. *Prerequisites:* Acceptance into licensure program. Three hours.

216 General Methods for Secondary Teachers Development of teaching methods for secondary instruction, adaptation to learning styles, models of teaching with design, lesson planning and assessment, with focus on cross-disciplinary collaboration. *Prerequisites:* Acceptance into licensure program. Three hours.

225 Teaching Social Studies in Secondary Schools Multiple teaching modes, questioning techniques, microteaching laboratory, analysis of historical content to determine students' prerequisite cognitive skills and processes for construction of historical scenarios. *Prerequisite:* Acceptance into licensure program. Three hours.

226 Teaching Internship Collaboration with professional teachers in design and implementation of effective instruction, with special focus on developing programs in a high school setting. *Prerequisites:* EDFS 203, EDSC 207, 209, 215, 216, Special Methods. Variable credit, eight to twelve hours.

227 Teaching Science in Secondary Schools Consideration of science curricula for grades 7–12. Teaching science as problem solving, research in science teaching, evaluation strategies, instructional techniques, and affective education through science. *Prerequisites:* Acceptance into licensure program. Three hours.

230 Teaching for Results Analysis of planning, curricu-

lum, design, teaching, evaluation, and classroom management from perspective of research and practice. Special focus on the student with special needs. *Prerequisite:* Concurrent enrollment in 226. Three hours.

257 Teaching Mathematics in Secondary Schools Contemporary secondary school mathematics curricula and instructional strategies for grades 7–12. Topics may include problem solving, research in mathematics education, use of calculators and computers, manipulatives, and evaluation. *Prerequisites:* Acceptance into licensure program. Three hours.

259 Teaching Foreign Language in Secondary Schools An overview of language teaching methodology. The learning/teaching process as it relates to language learning; techniques used in the teaching and testing of second language skills and culture. *Prerequisite:* Acceptance into licensure program. Three hours.

SPECIAL EDUCATION—EDSP

5 Issues Affecting Persons With Disabilities Students explore the effects of severe disabilities. Best service practices, current legislation, advocacy, and family issues for children and adults are emphasized. Three hours.

201 Foundations of Special Education Examination of historical and current trends in treatment of handicapped individuals, including effects of litigation, legislation, and economic considerations on educational and residential service delivery systems. *Prerequisite:* Twelve hours in education and related areas or instructor's permission. Three hours.

216 Meeting the Curriculum and Instructional Needs of All Students Introduction to curriculum and instruction for all students with a focus on individuals who present academic and behavioral challenges. Emphasis on assessment, evaluation, curriculum, instruction, theories of learning, and social development. *Prerequisite:* Permission. Three hours.

224 Meeting the Instructional Needs of All Students Students apply principles of learning and social development to improve academic and social skills of all individuals with a focus on those who present academic and behavioral challenges. *Prerequisite:* Permission. Three hours.

275 Developing Vocational Instruction for Students With Special Needs Development of instructional strategies for including handicapped students in vocational education. Procedures for developing, implementing, and evaluating individualized vocational plans. *Prerequisite:* Admission to an approved teacher certification program or permission. Three hours.

290 Meeting the Curriculum Needs of All Students Intensive study of essential curriculum and technology areas related to the development, adaptation, and assessment of all students with a focus on those who present academic and behavioral challenges. *Prerequisite:* Permission. Three hours.

Electrical Engineering (EE)

COLLEGE OF ENGINEERING AND MATHEMATICS

Professors Absher, Mirchandani, Oughstun, Williams; Associate Professors Fuhr, Titcomb, Varhue.

UNDERGRADUATE COURSES

3 Linear Circuit Analysis I (3-0) Circuit elements, laws, and analysis. Network principles and theorems. Energy-storage elements. Transient analysis; time-constants. Sinusoids and phasors. Sinusoidal steady-state response and power. *Prerequisite:* Math. 22. Three hours.

4 Linear Circuit Analysis II (3-0) Complex frequency and network functions. Resonance. Magnetically coupled circuits. Two-port networks. Fourier series and Fourier transforms in circuit and systems analysis. Laplace transform techniques. *Prerequisite:* 3; corequisite, Math. 271. Three hours.

94 Bioengineering Applications of Physical Principles II (3-3) Application of principles of electromagnetism and electrical engineering to understanding the structure and function of the human body and to diagnostic and therapeutic instrumentation. Four hours. Not offered 1998–99.

100 Electrical Engineering Concepts I (3-3) Introduction to analog and digital electrical measurements and circuits; introduction to microprocessors. No credit for EE majors. *Prerequisite:* Physics 42 with 22 or 125. Four hours.

101 Electrical Engineering Concepts II (3-3) Microcontroller applications: design and implementation of motor, lamp, home environmental systems; music synthesis. Assembly programming of microprocessors. No credit for CS or EE majors. *Prerequisite:* 100. Four hours.

113 Electromechanical Energy Generation and Distribution (3-0) Principles basic to electromechanical energy conversion devices and systems. Energy interchange among magnetic and mechanical circuit elements. Continuous energy conversion in ideal and practical rotating machines. *Prerequisite:* 141. Three hours. Alternate years.

120 Electronics I (3-0) DC and low frequency operation of MOS and bipolar transistors. Analysis and design of single-stage circuits. Circuit design with operational amplifiers. Use of circuit simulation software. *Prerequisite:* 4. Three hours.

121 Electronics II (3-0) Properties of amplifiers. Amplifier design. Feedback in electronic circuits. High-frequency circuit models and limitations. Operational amplifiers. *Prerequisite:* 120. Three hours.

131 Fundamentals of Digital Design (3-0) Combinational logic simplification and design, MSI and PLD components, synchronous and asynchronous sequential design, algorithmic state machines, registers, counters, memory units, testing and testable design. *Prerequisite:* Computer Science 16 or 21. Three hours.

134 Fundamentals of Microcomputer Based Systems (3-3) In-depth study and applications of a modern microprocessor in embedded digital systems for real-time control and data acquisition. Assembly language and the design of interfaces. *Prerequisites:* 3 or 100, and Computer Science 16 or 21; EE 131 and Computer Science 101 desirable. Four hours.

141 Electromagnetic Field Theory I Basic laws and elementary applications of electromagnetic fields; vector analysis, steady-state electric and magnetic fields, boundary value problems, transmission lines. No credit may be received for both EE 140 (offered in prior years) and the current EE 141. *Prerequisites:* EE 4, Math. 271, Physics 42. Three hours.

142 Electromagnetic Field Theory II Basic laws and elementary applications of electromagnetic fields, waves and radiation; Maxwell's equations, Poynting's theorem, plane wave propagation, wave guides, antennas. *Prerequisite:* 141. Three hours.

146 Wave and Diffusion Analogies (3-0) Electromagnetic waves on lines and in space. Vibration of strings and membranes. Mechanical waves in fluids and solids. Electromechanical transducers. Thermal waves. Diffusion process. *Prerequisite:* 141. Three hours. Not offered 1998–99.

163 Solid State Physical Electronics I (4-0) Physical principles required to understand the operation of common

semiconductor devices. Physical models of p-n junctions, Schottky barriers, bipolar junction, and field-effect transistors. *Prerequisite:* Physics 42 with 22. Four hours.

164 Solid State Physical Electronics II (3-0) Physical principles of electronic materials and device design. Electronic structure of solids and carrier transport. Semiconductor, dielectric, magnetic, and superconducting materials and devices. *Prerequisites:* 163. Three hours.

171 Signals and Systems (4-0) Fundamentals of discrete and continuous signals and systems analysis. Input/output descriptions. Solutions to difference equations. Convolution, Fourier Analysis, Laplace transforms, and z-transforms. Application to design problems in signal processing, controls, and communications. *Prerequisites:* 4, Math. 121. Four hours.

174 Introduction to Communication Systems (3-0) General background. Coding and error correcting codes. Noise and topics in statistical communications. Data, computer, and secure communications. *Prerequisite:* 171. Three hours.

195 Special Topics *Prerequisite:* Departmental permission. Variable credit.

LABORATORIES

81 Sophomore Laboratory I (1-3) Electrical instruments; oscilloscope measurements; resistive, capacitive, and inductive components; nonlinear resistive elements; binary concepts and digital logic; transient response of RC circuits; three terminal networks. *Prerequisite:* Sophomore standing in EE. Two hours.

82 Sophomore Laboratory II (1-3) Transients in RLC circuits; steady state response in RLC circuits; network theorems, bridge measurement circuits; mutual inductance; spectrum analysis; diode circuits; DC power supply design. *Prerequisite:* 81. Two hours.

183 Junior Laboratory I (1-3) Characteristics of active devices; BJT and JFET amplifiers; MOSFET, UJT, and SCR applications; applications of operational amplifiers; semiconductor diode characteristics. *Prerequisite:* Junior standing in EE. Two hours.

184 Junior Laboratory II (1-3) Dielectric materials; current flow in volume conductors; photovoltaic cells; passive, active, and digital filters. *Prerequisite:* 183. Two hours.

185 Senior Laboratory I (0-3) AC and DC machines; power transformers; A/D and D/A conversion; design and construction of multivibrator and Schmitt trigger circuits; design project. *Prerequisite:* Senior standing in EE. One hour.

186 Senior Laboratory II (0-3) Open and closed loop control systems; electromagnetic waves on transmission lines; time domain reflectometry; microwaves; special topics; design project. *Prerequisite:* 185. One hour.

187 Senior Project Experimental or theoretical design project conducted under faculty supervision. Variable credit, usually three hours.

189 Digital Signal Processing Laboratory (0-3) PC-based evaluation model and associated development tools. High-level graphical and interactive design tools. Application in real-time implementation of signal processing algorithms. Same lab as in 275. May not be taken after 275. *Prerequisite:* 171. One hour.

193, 194 College Honors

ADVANCED UNDERGRADUATE AND GRADUATE COURSES

201 Linear System Theory (3-0) Basic concepts in system theory; linear algebra; state space representation; stability;

controllability and observability. Applications of these concepts. *Prerequisite:* 171 or graduate standing. Three hours.

209 Transient Phenomena (3-0) Study of complex variable basis of Laplace and Fourier Transforms; applications to transient behavior of lumped and distributed parameter systems, root locus. Nyquist criterion and two-dimensional field problems. *Prerequisite:* 4. Three hours. Not offered 1998-99.

210 Introduction to Control Systems (3-0) Analysis and design of continuous and discrete-time control systems; stability signal flow, performance criteria, classical and state variable methods, simulation design tools, computer-based realizations. *Prerequisite:* 171. Three hours.

221 Principles of VLSI Digital Circuit Design (2-3) The design, layout, and simulation of VLSI digital circuits. Emphasis on custom, laboratory design; typical topics will include memory, PLA, ALU, and elemental arithmetic circuits. *Prerequisites:* 131, 163, 121. Three hours.

222 Principles of VLSI Analog Circuit Design (3-0) The design, layout, and simulation of VLSI analog circuits. Emphasis on small signal models and circuits used in operational amplifiers. *Prerequisites:* 163, 121, instructor's permission. Three hours.

224 Principles of VLSI System Design (2-3) Survey of VLSI design. Architecture and partitioning of functions. Design for testability. Simulation including timing. Synthesis. Design verification; manufacturing interface. Required team project and report. *Prerequisite:* 221 or instructor's permission. Three hours.

227 Biomedical Measurements, Instrumentation, and Systems (3-0) Biomedical and clinical engineering in research, industry, and health care institutions. Measurement techniques and instrumentation. Integrated biomedical monitoring, diagnostic, and therapeutic systems. Three hours. *Corequisites:* 121, Molecular Physiology and Biophysics 101, instructor's permission. Alternate years.

228 Sensors (3-0) Sensor design, interrogation, and implementation. A wide variety of electrical, electronic, optical, mechanic, and cross-disciplinary devices. System designs, measurement techniques, and methodologies. *Prerequisite:* Senior standing in engineering or physics. Three hours.

231 Digital Computer Design I (3-0) Hardware organization and realization, hard-wired and microprogrammed control units, interrupt and I/O systems. Hardware design language introduced and used for computer design. *Prerequisites:* 131; either 134 or Computer Science 101. Three hours.

232 Digital Computer Design II (3-0) Memory designs, error control, high-speed addition, multiplication, and division, floating-point arithmetic, cpu enhancements, testing and design for testability. *Prerequisite:* 231. Three hours.

233 Microprocessor-Based Systems and Applications (3-3) Basic principles of mini/microcomputers; A/D; D/A; channels, magnetic devices, display devices, mechanical devices; interface designs of analog systems to mini/microcomputers; principles of microprogramming; bit-slice-based microcomputers. *Prerequisites:* Departmental permission, Computer Science 101 desirable. Four hours.

241 Electromagnetic Theory I (3-0) Maxwell-Lorentz theory emphasizing uniqueness and conservation laws. Potential theory with applications to boundary value problems, Green's function techniques, multipole expansions, and numerical methods. *Prerequisites:* 141; Math. 272 recommended. Three hours.

242 Electromagnetic Theory II (3-0) Macroscopic Maxwell theory, boundary conditions and dispersion relations

for spatio-temporal fields. Electromagnetic wave propagation, reflection and transmission, guided waves, radiation, scattering and diffraction phenomena. *Prerequisite:* 241 or instructor's permission. Three hours.

245 Lasers and Electro-Optical Devices (3-0) A theoretical description of light-matter interactions in photon emitting resonant cavities. A practical understanding of laser design and operation. *Prerequisite:* 142. Three hours.

246 Engineering Optics (3-0) Applications of optics to the solution of engineering problems. Optical signal processing, fiber optic sensors, integrated optics. *Prerequisite:* 245 or instructor's permission. Three hours.

250 Test Engineering (3-0) Parametric, structural, functional, characterization and stress testing of components and subsystems. Test methods, strategies, planning, and economics. Test equipment hardware and software. *Prerequisites:* 121, 131. Three hours.

251 Digital System Testing and Testable Design (3-0) Circuit failures, fault models, testing and test pattern generation, logic and fault simulation, design for testability, scan design, test interfaces, design for built-in self-test. *Prerequisite:* 131. Three hours. Alternate years.

261 Solid State Materials and Devices I (3-0) Energy band theory, effective mass, band structure and electronic properties of semiconductors. Transport of electrons and holes in bulk materials and across interfaces. Homojunctions, heterojunctions, and Schottky barriers. *Prerequisite:* 163. Three hours.

262 Solid State Materials and Devices II (3-0) Multijunction and interface devices. Heterostructure and optical devices. Dielectric and optical properties solids. High-frequency and high-speed devices. *Prerequisite:* 261. Three hours.

266 Science and Technology of Integrated Circuits (3-0) Science and technology of integrated circuit fabrication. Interaction of processing with material properties, electrical performance, economy, and manufacturability. *Prerequisites:* 163 or 261, concurrent registration in 164 or 262. Three hours.

270 Probability Theory and Stochastic Processes (3-0) (Same as Statistics 270.) Probability theory, random variables, and stochastic processes. Response of linear systems to random inputs. Applications in electrical engineering. Three hours. *Prerequisite:* 171 or equivalent.

271 Least Squares Estimation and Filtering (3-0) (Same as Statistics 271.) Foundations of linear and nonlinear least squares estimation, smoothing and prediction, computational aspects, Kalman filtering, nonlinear filtering, parameter identification, and adaptive filtering. *Prerequisites:* 201, 270. Three hours. Not offered 1998-99.

272 Information Theory (3-0) Introduction to probability concepts of information theory; entropy of probability models; theoretical derivations of channel capacity; coding methods and theorems, sampling theorems. *Prerequisite:* Statistics 151. Three hours. Not offered 1998-99.

274 Introduction to Wavelets and Filter Banks Continuous and discrete-time signal processing. Continuous wavelet transform. Series expansion of continuous and discrete-time signals. Perfect reconstruction, orthogonal and biorthogonal filter banks. Wavelets from filters. *Prerequisites:* 171, or instructor's permission. Three hours.

275 Digital Signal Processing and Filtering (3-3) or (3-0)* Sampling, aliasing, and windowing. Decimation and Interpolation. FIR and IIR filters. DFT and FFT. Digital simulation and implementation using real-time processors. *Prerequisites:* 171. Lab same as 189. Four hours.

*Students who have previously taken 189 may enroll in the lecture portion for three credits.

276 Image Processing and Coding (3-3) Image enhancement techniques by point and spatial operations. Data compression techniques to include scalar quantization, entropy coding, transform and sub-band coding. Labs on PC hardware; PC and Unix-based software. *Prerequisites:* 275; 270 recommended. Four hours.

277 Image Analysis and Pattern Recognition (3-0) Image, shape, and texture analysis. Statistical pattern recognition methods. Pattern recognition and computer vision techniques for machine parts recognition and automatic visual inspection. *Prerequisite:* 276. Three hours. Not offered 1998-99.

281 through 284 Seminars (1-0) Presentation and discussion of advanced electrical engineering problems and current developments. *Prerequisite:* Senior or graduate engineering enrollment. One hour.

285 Engineering Design Analysis and Synthesis (3-0) Advanced engineering problem solving, analytical techniques and simulations involving control systems, digital electronics, computer hardware and software; technical writing and documentation emphasized. *Prerequisite:* Graduate standing in EE or department permission. Three hours.

295 Special Topics Formulation and solution of theoretical and practical problems dealing with electrical circuits, apparatus, machines, or systems. *Prerequisite:* 4. Three hours.

Engineering (ENGR)

COLLEGE OF ENGINEERING AND MATHEMATICS

1 Introduction to Engineering An introduction to engineering and what engineers do. Design projects, guest lecturers and visits to engineering enterprises. S/U grading. One hour.

2 Graphical Communication Principles of computer-aided drafting/design; production of engineering drawings including: orthographic, auxiliary, section, pictorials and dimensioning, graphics and charts; applications in specific engineering disciplines. Two hours.

Engineering Management (EMGT)

ENGINEERING, MATHEMATICS, AND BUSINESS ADMINISTRATION

175 The Management of Technology (Same as Business Administration 175.) Role of technology in industry, the nature of technological change, strategies, management, research and development, forecasting, product service/project selection, development, management, transition to market, and evaluation. *Prerequisite:* Senior standing in engineering or business administration. Three hours.

176 Plant Planning and Design Analysis of facilities and services requirements, material handling, office and clean room layout, mathematical and computer techniques, safety and plant conservation. *Prerequisites:* Junior standing in engineering or business administration, or instructor's permission. Four hours.

185 Senior Project (0-9) Individual management engineering study designed to the particular interest of the student, utilizing and synthesizing the student's engineering management education experience. *Prerequisite:* Senior standing in EMBA. Three hours.

195 Special Topics Specialized or experimental course offered as resources permit.

English (ENG)

COLLEGE OF ARTS AND SCIENCES

Professors Bradley, Broughton, Eschholz, Fulwiler, Gutman (Chairperson), Huddle, Magistrale, Manchel, Poger, Rosa, Shepherd, Stephany, Thompson, Warhol; Associate Professors Dickerson, Edwards, Simone, Stanton, Sweterlitsch, Winter; Assistant Professors Barnaby, Baruth, Kete, Schnell, Welch, Won; Lecturer Moore.

Not all courses are offered every semester; for complete information, consult the Schedule of Courses printed each semester. The Department also publishes a booklet of extended course descriptions each semester.

Unless otherwise indicated, all courses in the Department of English carry three hours of credit.

1 Written Expression A course in writing with some selected readings as examples of style and writing strategies.

4 English for International Students Review of English grammar, practice in expository writing, vocabulary building, and improvement of speaking and listening skills. *Prerequisite:* Instructor's permission.

5, 6 First Year Seminar Students to write in a variety of forms, styles, and genres in response to selected texts of literary or cultural significance. Themes, texts, and writing assignments to vary by section. *Prerequisites:* First-year standing in College of Arts and Sciences. Three hours.

Courses numbered 11–26 are introductory literature courses. They are appropriate preparation for reading and writing about literature. Prospective English majors, see also English 85, 86.

11 Types of Literature Introduction to fiction, poetry, and drama — past and present, British and American.

12 Introduction to Drama Study of the play as a work of literature and as a dramatic experience. Continental, British, and American drama from all ages.

13 Introduction to Fiction Exploration of a variety of fictional forms, including the short story, the novella, and the novel.

14 Introduction to Poetry Examination of the forms of poetry, past and present, British and American. Provides a wide variety of perspectives on the poem.

21, 22 British Literature Survey of major figures in British literature such as Chaucer, Milton, Swift, Wordsworth, and Woolf.

23, 24 American Literature Survey of major American writers from the beginning of the 19th century to the present, such as Hawthorne, Melville, Dickinson, Twain, Hemingway, and Faulkner.

25, 26 World Literature Survey in comparative literature dealing with the great writers of the world, to include Virgil, Dante, Goethe, and similar major figures. Students may not take for credit both English 25 and 27; or both English 26 and 28.

27, 28 Literature of Western Tradition: Integrated Humanities Study of primary authors in the Western cultural tradition from Homer to the modern period with particular reference to history, religion, and philosophy. Students may not take for credit both English 25 and 27; or both English 26 and 28. *Prerequisites:* Concurrent enrollment in Religion 27, 28; History 13, 14; Integrated Humanities Program. Three hours. Simone, Stephany.

40 Science Fiction and Fantasy Literature Representative modern works of fantasy and science fiction, including works by Asimov, Tolkien, and Clarke. I, II. Stanton.

41 Detective Fiction A study of the historical development of American and British detective fiction from Poe to the present. Poger.

42 Women in Literature Survey of women's literary tradition in English. Focuses on the ways women have written, read, written about, and been represented in 19th and 20th century literature. Schnell, Warhol.

50 Expository Writing Writing and analysis of expository (nonfiction) essays. *Prerequisite:* Sophomore standing. Biddle, Edwards, Eschholz, Moore, Rosa, Sweterlitsch.

53 Writing: Poetry and Fiction Introductory course in techniques of writing poetry and short prose fiction. Classes organized around discussion of student work; weekly writing assignments. *Prerequisite:* Sophomore standing. Broughton, Edwards, Huddle.

61 Introduction to African Literature Readings in African literature, concentrating on major human and political themes and literary techniques.

65 Survey of Folklore Basic concepts of folklore; development of the discipline; defining the major genres; role of folklore in modern society. Sweterlitsch.

85 Texts and Contexts Close reading of several sets of texts in juxtaposition. Texts will come from various historical periods and genres and will represent a range of voices. No prerequisite, but recommended only for students with sophomore standing or first-year students with Advanced Placement. Required of all English majors.

86 Critical Approaches to Literature Several theoretical approaches to literary study applied to specific texts. No prerequisite, but recommended only for students with sophomore standing or first-year students with Advanced Placement. Required of all English majors.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

Unless otherwise indicated, the prerequisites for courses numbered 100–199 are three hours in English courses numbered 11–96 and sophomore standing.

(A) Language, Critical Theory, Writing

101 Structure of the English Language Descriptive study of modern American English.

102 History of the English Language Principles of historical linguistics and their application to English.

103 Old English The sounds, works, and structure of Old English; simple prose texts and selections from *Beowulf*.

104 Language Awareness Topics will include consideration of language as part of human behavior, history of the language, dialects of American English, lexicography, language acquisition, gender differences, and cultural diversity. *Prerequisites:* Sophomore standing, three hours of English. Three hours. Rosa, Sweterlitsch.

106 Critical Theories Topics vary by semester and by professor. Representative topic: "Feminist Criticism." May be repeated for credit with departmental permission.

110 Writing Literary Criticism Introduction to theory and practice of literary criticism. Students read and write about literary theories representing various approaches to selected works of literature. Warhol.

111 Studies in Composition and Rhetoric Topics vary by semester and by professor. Representative topic: "The Com-

posing Process." May be repeated for credit with departmental permission.

112 Personal Voice Examination of the authorial voice in nonfiction writing. Reading and writing assignments include work with both traditional and experimental styles, forms, and genres. Portfolio assessment. *Prerequisite:* 50 or 53. Fulwiler.

114 Reading and Writing Autobiography Study of the autobiographical literary tradition as well as practice writing within this tradition. *Prerequisites:* 50, permission of instructor. Dickerson, Edwards.

115 The Art of Nonfiction Theory, readings, and practice in literary nonfiction, including the essay and/or literary journalism. *Prerequisites:* 50, permission of instructor. Moore, Sweterlitsch.

117* Advanced Writing: Non-Fiction Students follow their own interests in the writing of non-fiction. *Prerequisites:* 50; instructor's permission. Dickerson, Fulwiler.

118* Advanced Writing: Fiction Students follow their own interests in the writing of fiction. *Prerequisites:* 53; instructor's permission. Baruth, Broughton, Huddle.

119* Advanced Writing: Poetry Students follow their own interests in the writing of poetry. *Prerequisites:* 53; instructor's permission. Broughton, Huddle.

120* Writers' Workshop An intensive two-week workshop with assignments designed to emphasize autobiographical aspects of poetry and fiction writing. Summer only. Broughton, Huddle.

**Courses numbered 117, 118, 119, 120 may be repeated for credit; no more than nine credit hours total in these courses will count toward fulfillment of major requirements.*

(B) Literature Before 1800

121 Bible as Literature Jewish and Christian scripture analyzed as literary documents. Stephany.

122 Dante's *Comedy* (Same as General Literature 173.) A study of Dante's *Comedy* in Modern English translation. Stephany.

124 Chaucer Study of the principal works of Chaucer, emphasizing Chaucer's literary scope, talents, and position in medieval literature. Stephany.

125 Medieval Literature Major works of medieval literature in translation, with some principal non-Chaucerian works in Middle English. Works by Dante and works in the Arthurian tradition will be included.

127 Shakespeare A survey of plays in all genres (comedy, history, tragedy, romance) covering the early, middle, and late stages of Shakespeare's career. Barnaby, Schnell, Simone.

128 Shakespeare and Renaissance Drama A survey of drama, including the work of William Shakespeare, from the 16th and early 17th centuries in England. Barnaby, Schnell, Simone.

129 Survey of Renaissance Literature English poetry, prose, and/or drama from the late 16th and 17th centuries. Barnaby, Schnell, Simone.

130 The Age of Milton *Paradise Lost*, *Paradise Regained*, *Samson Agonistes*, some minor poems, and selected prose works.

133 Restoration and 18th Century Prose, Poetry, and Drama Significant writers and dramatists from Dryden to Sheridan and Johnson. Baruth, Stanton.

134 18th Century British Novel Fiction from its origin through the 18th century. Stanton, Warhol.

(C) 19th Century Literature

141 Romantics Late 18th and early 19th century English literature including, for example, works by Wordsworth, the Shelleys, Keats. Occasional special topics. Stanton.

142 Victorian Prose, Poetry, and Drama Literature from 1832 to 1900, including, for example, Tennyson, Browning, Darwin, Wilde. Occasional special topics. Stanton.

143 19th Century American Poetry The poetry of Walt Whitman, Emily Dickinson, and their contemporaries. Gutman.

144 19th Century American Non-Fiction Essay, biography, autobiography, history, journals, and letters by such writers as Emerson, Thoreau, Douglass, Chestnut, Twain, Fuller, Parkman. Kete, Shepherd.

145 19th Century American Fiction Short stories, novels, and novels by such writers as Cooper, Poe, Hawthorne, Melville, Stowe, James, Chopin, Crane, Gilman. Shepherd.

146 19th Century British Novel British fiction of the 19th century. Stanton, Warhol.

147 19th Century Women's Writing Novels, short stories, and poetry by 19th century women from multiple cultures. Warhol, Winter.

(D) 20th Century Literature

151 Modern Poetry Survey of poetry from beginning of modern period to end of World War II, emphasizing poetry of Yeats, Eliot, Stevens, Auden, Frost, Williams, and others. Edwards, Gutman, Poger.

152 Modern British Drama British and continental plays of the 19th and 20th centuries, including plays by Ibsen, Pinter, and Beckett. Simone.

153 Modern British Novel British novelists since 1900, including Forster, Conrad, Lawrence, Woolf, and other more recent writers. Bradley, Stanton.

154 Modern Irish Literature Irish literature from 1890 to the present, emphasizing Joyce and Yeats. Bradley.

157 Canadian Literature The development of a national literature. Thompson.

158 Contemporary Canadian Literature Post-World War II Canadian poetry and fiction in English, including Atwood and Laurence. Thompson.

160 Literature of Vermont An exploration of Vermont writing from the narratives of the Allen brothers to the poetry and fiction of today. Eschholz.

161 Modern Short Fiction Late 19th and 20th century short fiction by such European and American writers as Chekhov, Kafka, Joyce, Lawrence, Hemingway, Faulkner, O'Connor, Welty, Cheever, and Carver. Bradley, Huddle, Magistrale, Moore, Shepherd.

162 Modern American Novel American novelists from 1915 to 1945. Magistrale, Shepherd, Winter.

163 Modern American Drama Recent and contemporary, including plays by O'Neill, Miller, and Williams.

166 Slavery and American Literature Examines connections between storytelling, bondage, and freedom. Focuses on the struggles of enslaved people to author free stories and free selves. Winter.

167 African American Literature Through the Harlem Renaissance A survey of the writing of African Americans from the early poetry and prose of Phillis Wheatley, Frederick Douglass, and Frances Harper through the works of such writers as Nella Larsen, Countee Cullen, and Jean Toomer. Dickerson.

168 African American Literature Since the Harlem Renaissance A survey of the writing of African Americans from the poetry and prose of Langston Hughes and Zora Neale Hurston through the works of such contemporaries as Amiri Baraka, Toni Morrison, and Audre Lorde. Dickerson.

170 Race and Ethnicity in Literary Studies: Intermediate Courses addressing "race" in literature and/or the contributions of ethnically diverse writers to American culture. Focus and readings vary by instructor. May be repeated for credit. Topics for 1998–99: Re-Orienting the Western Landscape. Won.

171 Pan-African Literature Experimental trends in 20th century Pan-African fiction, focussing on works by African, Caribbean, and African-American authors and their relationship to Western and other literary traditions.

172 Colonial and Post-Colonial World Literature Topics vary by semester and by professor. Representative topics: "African Theater" and "Contemporary Writing from the Non-Western World." May be repeated for credit with departmental permission.

175 Contemporary American Poetry American poetry since 1950. Edwards, Gutman.

176 Contemporary American Novel Significant American novelists since 1945. Shepherd.

Literary and Cultural Topics

In courses numbered 181–190, topics vary by semester and by professor, and may be repeated for credit if the subject matter is different. Sections that satisfy major requirements A, B, or C will be coded with the appropriate letter each semester in the department's extended course description booklet.

181 Literary Genre Representative topics: "Arthurian Literature;" "Medieval Drama;" "Women Writing Autobiography."

182 Historical Periods Representative topics: Literature of Civil Rights. Dickerson.

183 Major Writers The works of one or two writers. Representative topics: "Mark Twain," "Toni Morrison."

184 Popular Literature and Culture Representative topics: "Poe's Children: Detective Fiction and Horror;" "Having a Good Cry: The Sentimental Tradition in Literature, Film, and Television;" "Children's Literature."

186 Studies in Folklore Representative topics: "American Folklore;" "Folklore and Ballad."

187 American Studies Interdisciplinary approaches to American literature and culture. Representative topics: "American Literature and American Law;" "The Vietnam War in Literature;" "Jewish-American Literature."

190 Buckham Honors Seminar Topic and instructor varies. Each seminar includes the participation of a distinguished visiting scholar, such as Stephen Greenblatt, Barbara Johnson, Houston Baker, and James Clifford.

191, 192 Internship *Prerequisites:* Departmental permission, junior or senior standing. One to six hours.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings.

197, 198 Reading and Research Departmental permission required. Not to exceed three hours per semester.

Senior Seminars

Topics vary by semester and by professor and may be repeated for credit if the subject matter is different.

The prerequisites for courses numbered 200–298 are 85, 86, six hours at the intermediate level (100–199), and instructor's permission.

201, 202 Seminar in the English Language or Critical Theory Recent topics: "Origins and Development of the English Language;" "Re-disciplining the History of Literature and the Literature of History;" "Women's Texts."

211, 212 Seminar in Composition and Rhetoric Recent topics: "Writing the New Yorker;" "Writing Vermont Life;" "Editing and Publishing."

221, 222 Seminar in Literature to 1800 Recent topics: "Women in 17th Century English Poetry;" "Dante and the Experience of Reading;" "Orality and Textuality in Middle English Literature."

241, 242 Seminar in 19th Century Literature Recent topics: "Dickens;" "Reader, I Married Him: The Brontës;" "Love, Marriage, and Literary Criticism: Jane Austen;" "Reading Serially: The Victorian Novel;" "Invisible Man and 19th Century American Literature."

251, 252 Seminar in 20th Century Literature Recent topics: "The Beat Generation;" "Literature and Society in Modern Ireland;" "Dostoevsky's Influence on 20th Century American Literature."

281, 282 Seminar in Literary Themes, Genres, and Folklore Recent topics: "Spiritual Journeys;" "Murder, He Said: Detective Fiction;" "Chekhov to Cheever: The Short Story."

290 Seminar for Prospective Teachers of English Approaches to teaching composition, literature, and the English language in secondary school. This course does not satisfy the seminar requirement for English majors. *Prerequisites:* 50 or 53; 85 and 86; 101 or 102. Eschholz.

297, 298 Reading and Research Departmental permission required. Not to exceed three hours per semester.

FILM (FILM)

5 Development of the Motion Picture I An overview of the technological, artistic, economic, and sociological history of the cinema from its inception through the 1920s. Manchel.

6 Development of the Motion Picture II An overview of the cinema's technological, artistic, economic, and sociological history from 1929–1960. Manchel.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

107 Film Criticism Intensive analysis of films to develop appropriate critical methods and standards. Possible approaches are sociological, psychological, aesthetic, and journalistic. Organized either historically or topically. *Prerequisite:* 5 or 6. Manchel.

161 Contemporary Cinema A survey of the artistic trends, important personalities, economic and social factors that have shaped the past 25 years of narrative feature film history. *Prerequisite:* 5 or 6. Manchel.

162 American Film Genres An investigation of the circumstances surrounding the production of American film genres, especially between the years 1930–1960. *Prerequisite:* 5 or 6. Manchel.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

271, 272 Seminar in Film Selected topics in film. Recent topics: "The Films of Charlie Chaplin;" "The Films of Stanley Kubrick;" "Hollywood and the Jewish Connection;" "Hollywood and the Vietnam War." Topic for spring: "Films of Robert Altman." May be repeated with departmental permission. *Prerequisite:* Six hours of film courses, including 107. Manchel.

HONORS – ARTS AND SCIENCES

220, 221 Honors/English See page 64 and contact Department for specific requirements. Three hours each.

Environmental Sciences (ENSC)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES
SCHOOL OF NATURAL RESOURCES

Participating Faculty: Barrington (Botany), Berkett (Plant and Soil Science), Bramley (Animal and Food Sciences), DeHayes (Natural Resources), Donnelly (Natural Resources), Foss (Animal and Food Sciences), Hayden (Civil and Environmental Engineering), Hughes (Natural Resources), McIntosh (Natural Resources), Olson (Civil and Environmental Engineering), Morrissey (Natural Resources), Ross (Plant and Soil Science), Scherbatskoy (Natural Resources), and Watzin (Natural Resources).

1 Introduction to Environmental Sciences Emphasizes the impacts of human activity on the environment. Attention to resources at risk and pollutant fate and effects on ecosystems. Three hours. McIntosh.

101 Pollutant Movement Through Air, Land, and Water Physical, chemical, and biological aspects of pollutant behavior from source to ultimate fate. Laboratory methodologies for measuring pollutants and predicting their transport, behavior, and fate. *Prerequisites:* 1; Biology 1, 2; Chemistry 31, 32; Math. 19, 20; co-requisite Chemistry 42. Four hours. Hayden, Ross, Scherbatskoy.

130 Global Environmental Assessment Assessment of human impacts on the global environment. Hands-on application of satellite remote sensing and geographic information systems to address key environmental issues. *Prerequisites:* Biology 1 or Botany 4; Chemistry 23 (or equivalent); Math. 19. Three hours. Morrissey.

195 Internship Professionally-oriented field experience under joint supervision of faculty and business or community representative. *Prerequisites:* Proposal and permission of ENSC Director; junior standing; good academic standing. Maximum of six hours; three can be applied to elected concentration with Director's permission.

196 Independent Research Special study and research activity under the directory of a faculty member. *Prerequisite:* Proposal and permission of ENSC Director; junior standing; good academic standing. Up to six hours; three can be applied to elected concentration with Director's permission.

201 Recovery and Restoration of Altered Ecosystems Role of stress and disturbance and the natural process of recovery in aquatic and terrestrial ecosystems. Human efforts to modify, restore, and remediate altered ecosystems. *Prerequisites:* Natural Resources 103 or an intermediate-level ecology course; or instructor's permission. Environmental Sciences 101 strongly recommended. Three hours. Hughes, Watzin.

202 Ecological Risk Assessment Approaches used to identify, measure, and manage ecological risk. Problem formulation, characterization, uncertainty analysis, and risk management. Case studies. *Prerequisites:* 201; Natural Resources 140 or Statistics 141; senior standing or instructor's permission. Three hours. McIntosh.

222 Pollution Ecology Impacts of pollutants on the structure and function of ecosystems. Examination of how air, land, and water influence ecological fate and effects of pollutants. *Prerequisites:* Biology 1; Chemistry 23, Natural Resources 103 or equivalent ecology course. Three hours. McIntosh, Scherbatskoy. (Not offered for graduate credit.)

Environmental Studies (ENVS)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES
COLLEGE OF ARTS AND SCIENCES
COLLEGE OF EDUCATION AND SOCIAL SERVICES
SCHOOL OF NATURAL RESOURCES

Professors: Reidel, Worley; *Associate Professors:* Hudspeth, Kaza, King, McArthur, Richardson; *Adjunct Professor:* Eddy; *Lecturers:* Libby, Paradis, Poleman, Quinney.

1 Introduction to Environmental Studies Survey of environmental studies examining ecological, socioeconomic, aesthetic, and technological influences determining quality of life on earth. *Prerequisite:* First-year or sophomore standing, or instructor's permission. Four hours. Reidel, Richardson.

2 International Environmental Studies A multidisciplinary analysis of the interaction of global and local variables in understanding and solving pervasive environmental problems. *Prerequisite:* First-year or sophomore standing. Four hours. King, McArthur.

7 Environmental Awareness Selected current environmental issues from evolving political, religious, scientific, and social perspectives. For non-majors. Cannot receive credit for both 1 and 7. Three hours.

95 Introductory Special Topics Introductory courses of current areas of interest which vary each semester. Topics have included environmental health, energy, regional planning, international studies, literature, ethics, and natural areas management.

100 Environmental Theory Comparative analysis of emerging concepts of human/environment relationships; the history, philosophy, and theoretical framework of environmental studies. *Prerequisites:* 1, 2. Three hours. Worley.

151 Intermediate Environmental Studies Individual investigation of interdisciplinary areas of environmental studies with emphasis on academic and career choices and preparation for senior thesis/project. *Prerequisites:* Major in Environmental Studies; 1, 2; permission. Three hours. Kaza, Reidel, Worley.

175 International Nutrition Factors contributing to malnutrition in developing countries. Topics: food insecurity; nutrient deficiencies; population dynamics; infant feeding; international assistance. *Prerequisites:* 1, 2, or Nutritional Sciences 43, or instructor's permission. Three hours. McArthur.

176 Food and the Consumer Environmental factors in nutrition, chronic diseases, and food practices in the United States. *Prerequisites:* 1, 2, or one Nutritional Sciences course, or instructor's permission. Three hours. McArthur.

177 Introduction to Landscape Restoration Introduction to the history, philosophical foundations, and approaches to restoration of natural landscapes damaged by human activity and neglect. Case studies of selected local sites. *Prerequisites:* 1, Natural Resources 1, or permission. Three hours. Paradis.

178 Environmental Ethics Current approaches and problems in environmental ethics drawing on philosophy and case studies in animal rights, land ethics, deep ecology, wilderness protection, and human rights. *Prerequisites:* One environmental course, junior standing. Three hours. Worley.

179 Ecofeminism Investigation of the parallel dominations of women and nature, through analysis and reflection on ecofeminist theory, activism, and spirituality. *Prerequisites:* 1, 2 or Women's Studies 73, sophomore standing. Three hours. Kaza.

180 Radical Environmentalism Survey of radical environmental philosophy and activism from a liberation ethics perspective. Includes deep ecology, ecofeminism, environ-

mental justice, and ecological resistance movements around the world. *Prerequisites:* 1, 2, sophomore standing. Three hours. Kaza.

181 Strategic Environmental Leadership Theory and analysis of strategic environmental leadership as it varies with culture, ethnicity, and gender. *Prerequisites:* 1, 2, junior standing, permission of instructor. One hour. Richardson.

190 Workshops in Environmental Skills Workshops to develop applied skills useful for environmental work and/or research. Topics vary by semester. *Prerequisites:* 1, 2. One to three hours.

191 Environmental Practicum Individual readings and research, internship, or field-based learning experience under direction of a faculty member or environmental practitioner. Credit arranged. *Prerequisite:* Permission of course coordinator.

194 Teaching About the Environment Methods and materials in the teaching of complex interdisciplinary environmental studies based upon seminar discussion, reading, and concurrent practical teaching experience. *Prerequisites:* 1, 2, junior standing, permission of instructor; concurrent undergraduate teaching assistant in environmental course. One to three hours.

195, 196 Special Topics Intermediate courses of current areas of interest which vary each semester. Topics have included environmental health, energy, regional planning, international studies, literature, ethics, and natural area management. *Prerequisites:* One environmental course, sophomore standing.

197 Student-Designed Course Student-taught courses beyond the scope of existing formal courses in environmental studies. Developed according to Program guidelines, with sponsorship by interested faculty. *Prerequisites:* 1, 2, permission. One to three hours.

201 Research Methods Planning, design, and methods for the required senior thesis or project. Includes literature review and proposal writing. *Prerequisites:* 151, junior standing. Three hours. (Not offered for graduate credit.) Richardson, Worley.

202 Senior Project and Thesis Senior level project or thesis under faculty direction. *Prerequisites:* 201, permission of Environmental Program. Credits arranged. (Not offered for graduate credit.)

203 Senior Project and Thesis (Honors)

204 Seminar in Environmental Studies Review and discussion of current environmental research and literature. *Prerequisites:* 1, 2, junior or senior standing. One to three hours. (Not offered for graduate credit.)

285 Mind in Nature With particular emphasis on language and culture, this course traces the evolution of our perception of nature from prehistoric humans through Medieval/Renaissance culture, into our own time. *Prerequisites:* 1, 2, junior standing. Three hours. Eddy. (Not offered for graduate credit.)

289 Environmental Economics (See Resource Economics 289) Application of economic theory and methods to environmental problems and policies. Includes cost-benefit analysis and economic incentives as tools for environmental problem solving. *Prerequisites:* 1, three hours intermediate economics. For students in Arts and Sciences: Economics 11-12, intermediate course in ENVs. Three hours. King.

290 Environmental Policy Public policy dimensions of natural resource management and environmental protection; U.S. historical context; policy analyses of contemporary

issues; administration of environmental resource institutions. *Prerequisites:* Six hours of intermediate or advanced courses in ENVs or related areas. Three hours. Reidel. (Not offered for graduate credit.)

291 Advanced Environmental Practicum Individual readings and research, internship, or field-based learning experience at the advanced level, under direction of faculty member or environmental practitioner. *Prerequisite:* 1, 2; senior or graduate standing.

293 Environmental Law Principles of environmental law, including legal research methods, threshold issues, case law, trial procedure, and international comparisons in aspects of air, land, and water law. *Prerequisite:* Junior standing. Three hours. Richardson.

294 Environmental Education Philosophy, concepts, and strategies of environmental education, emphasizing integration of environmental concerns into formal and nonformal educational programs for youth and adults. *Prerequisite:* Six hours of intermediate or advanced courses in environmental studies or related areas. Three hours. Hudspeth.

295, 296 Advanced Special Topics Advanced courses of current areas of interest which may vary each semester. Topics have included environmental health, energy, regional planning, international studies, literature, ethics, and natural area management. *Prerequisites:* One environmental course at 100 level, junior standing.

HONORS – ARTS AND SCIENCES

260, 261 Honors/Environmental Studies See page 64 and contact Department for specific requirements. Three hours each.

European Studies

COLLEGE OF ARTS AND SCIENCES

Prof. Mahoney, Interim Director.

The following courses are among the course offerings; see department for specific course description. Also see Area and International Studies for special topics listings.

Area and International Studies 291 (European Studies Seminar); **Art:** 5, 6, 148, 149, 155, 158, 161, 164, 165, 170, 172, 174, 177, and 179 or 282 when the content is European; **Classics:** 24, 35, 37, 42, 153–159; **Economics:** 170, 275, 281; **English:** 21, 22, 25–28, 85, 86, 102, 103, 121, 122, 124, 125, 127, 128, 129, 130, 133, 134, 141, 142, 146, 152, 153, 154, 221, 222; **Film:** 5, 6, 107, 161; **French:** 155, 156, 225, 226, 235, 245, 246, 247, 255, 256, 265, 266, 275, 276, 290, 291, 292; **General Literature:** 24, 35, 37, 72, 131, 141, 153–156, 161, 162, 173, 181; **Geography:** 55, 155, 158; **German:** 104, 121, 122, 155, 156, 201, 213, 214, 225, 226, 237, 238, 247, 248, 251, 252, 263, 264, 271, 273, 275, 276, 278, 279, 281, 282; **Greek:** all courses above 100 level; **History:** 13, 14, 21–27, 85, 86, 90, 120–126, 128–136, 139, 185, 186, 190, 191, 221, 222, 224–228, 285; **Italian:** 121, 122, 157, 158; **Latin:** all courses above 100 level; **Music:** 11, 12, 111–114; **Philosophy:** 101, 102, 105, 107, 133, 140, 151, 160, 260; **Political Science:** 141, 142, 146, 171, 257, 276, 287; **Religion:** 22, 111, 116, 122, 124, 155, 173, 224, 226, 228, 280; **Spanish:** 155, 156, 235, 236, 245, 246, 265, 276, 277, 291, 292; **Theatre:** 136, 137, 138.

Forestry (FOR)

SCHOOL OF NATURAL RESOURCES

Professors Bergdahl, DeHayes, Donnelly, Hannah, Newton (Program Chair), Reidel; Associate Professors Forcier, Hughes, Wang; Extension Associate Professors Bousquet, McEvoy; Lecturers Shane, Turner; Adjunct Associate Professor Tritton; Adjunct Assistant Professor Schaberg; Research Assistant Professor Scherbatskoy.

1 Forest Conservation Introduction to the ecology and management of American forests: forest distribution, ownership, and ecological factors, species interactions, multi-resource management goals, and silvicultural practices. Three hours. Donnelly.

3 North American Trees (2-3) Survey of principal forest trees of North America; their identification, silvics, and major uses. Primary emphasis directed toward trees of eastern U.S. Three hours. Not offered 1998–99.

21 Dendrology (3-4) Classification, silvical characteristics, and identification features of native and introduced trees and shrubs. Four hours. Shane.

73 Small Woodland Management (2-4) Concepts of forest ecology, resource inventory, cultural practices, and multiple use management for small woodland areas. Three hours. Turner.

81 Forestry Seminar Readings and discussions introducing current issues in forestry. *Prerequisite:* First or second year standing in Natural Resources. One hour. Newton.

120 Forest Ecology Forest environment and its effects on the development and distribution of forest communities. Introduction to population dynamics, systems and analysis, diversity, stability, ecosystem disturbances, and succession. *Prerequisite:* Natural Resources 1, or another introductory biological science course. Three hours. Not offered 1998–99.

121 Forest Ecology Laboratory Application of ecological principles in the analysis of forest communities. *Prerequisite:* Natural Resources 25, a course in tree identification, and previous or concurrent enrollment in Natural Resources 103. Two hours. Shane.

122 Forest Ecosystem Analysis An integrated field course to investigate, through quantification and interpretation, the flora, fauna, and abiotic components (soils, physiography, water, and microclimate) of a selected forest ecosystem. *Prerequisite:* Knowledge of plant identification, land measurements, and statistics recommended. Twenty days during Summer Session. Four hours. Donnelly, Turner.

123 Silviculture (3-4) Principles of regeneration, production, and culture of forest stands. *Prerequisites:* Natural Resources 25, 103. Four hours. Hannah.

124 Forest Genetics Concepts in general, population, and quantitative forest genetics and their application to the improvement of trees for artificial regeneration purposes. *Prerequisites:* Biology 1, 2. Three hours. DeHayes. Alternate years, 1998–99.

126 Forest Ecology Field Trip Assessment of southeastern forest ecosystems including Smoky Mountain communities, and upland and bottomland forests of the Georgia Piedmont and South Carolina Coastal Plain. Field trip at end of spring semester. *Prerequisites:* A course in plant identification, a course in ecology, instructor's permission. Two hours. Donnelly, Hannah.

132 Forest Fire Behavior and Management Forest fire ecology, behavior, weather, cause and effects, danger measurement, prevention, detection, management, prescribed fire in land management, smoke management, and wildland/urban interfaces. *Prerequisite:* A course in plant ecology or concurrent enrollment. Three hours. Bergdahl. Alternate years, 1998–99.

133 Forest Entomology (See Plant and Soil Science 107.) Three hours.

134 Forest Pathology (2-4) A survey of principal diseases of forest and shade trees emphasizing identification, morphology, ecology, epidemiology, and integrated disease management. *Prerequisites:* Biology 1, 2. Four hours. Bergdahl.

146 Remote Sensing of Natural Resources (Same as Natural Resources 146.) Identification, interpretation, measurement, and mapping of natural resources from aerial photographs and satellite imagery. Labs include air photo interpretation and digital image analysis. *Prerequisites:* Junior standing. Three hours. Morrissey. Alternate years, 1998–99.

152 Forest Resources Values (Same as Recreation Management 152, Resource Economics 152.) History, methods, and current issues associated with the nonmarket and market values of forest-based resources, including aesthetics, wildlife, recreation, water, and timber. *Prerequisites:* Economics 12 or Community Development and Applied Economics 61. Three hours. Gilbert, Newton.

153 Forest Finance Forestry investment analyses. Return on investment, net present value, land expectation value, sinking funds, and amortization schedules. Valuation based on anticipated net incomes. Managerial accounting. *Prerequisite:* A course in economics. One hour. Newton.

155 Forest Taxation Federal, state, and local taxation of forest properties. Income taxes, capital gains, and property taxes including various state laws on taxation based on current-use assessment. *Prerequisite:* A course in economics. One hour.

157 Trade and Marketing of Forest Products World trade and marketing of forest products. Consumer behavior, employment and productivity in forest products, appraisal of standing timber, marketing standing timber, and commodity markets. *Prerequisite:* A course in economics. One hour.

162 Properties and Uses of Wood (2-4) Properties, uses, and identification of commercial woods of the U.S. Manufacture of major wood products. *Prerequisite:* A course in tree identification. Three hours. Bousquet. Alternate years, 1998–99.

163 Timber Harvesting, Planning, and Management Private forest emphasis; impacts of alternative techniques on cultural and natural resources; preharvest inventory, prescription, layout, contracts, bookkeeping; postharvest operations. Three hours. Turner. Alternate years, 1999–00.

176 Urban Forestry (2-4) Value of trees in the urban environment; selecting, planting, and maintaining landscape trees; diagnosis and control of disease, insect, and injury problems. *Prerequisite:* A course in tree identification. Three hours. Hannah. Alternate years, 1998–99.

182 Advanced Forestry Seminar In-depth examination of contemporary issues in forestry. *Prerequisite:* Junior or senior standing in Forestry. Credit arranged.

185 Special Topics Readings, investigations, and lectures in selected forest resource subjects. *Prerequisite:* Instructor's permission. Credit arranged.

191 Forestry Practicum Supervised work experience in forest resource area. *Prerequisite:* Instructor's permission. Credit arranged.

205 Mineral Nutrition of Plants (See Botany 205.) Three hours.

221 Forest Soils and Site Relations (2-4) Forest soils from an ecological perspective. Profile development, physical properties, roots, water relations, nutrient cycling, topographic factors, site quality, and the potential to produce biomass. *Prerequisites:* Natural Resources 103, Plant and Soil Science 161, permission. Three hours. Hannah. Alternate years, 1998–99.

222 Advanced Silviculture (2-4) Scientific basis and contemporary status of silviculture practices. *Prerequisites:* 123, permission. Three hours. Hannah. Alternate years, 1998-99.

225 Tree Structure and Function (2-3) Basic anatomy and physiology of trees and other woody plants, emphasizing their unique structural and physiological adaptations to the environment. *Prerequisites:* Permission. Three hours. Scherbatskoy.

228 Ecosystem Ecology Examination of the structure and function of terrestrial ecosystems using a systems approach. Laboratory sessions involve modeling and data analysis. *Prerequisites:* Biology 1, 2, Chemistry 23, an intermediate ecology course, Natural Resources 140, Math. 19, Physics 11 or equivalent. Two hours. Wang.

229 Water Relations of Plants (Same as Plant and Soil Science 207.) Concept of water potential as it pertains to plant-soil-water relations. Absorption, transport, and transpiration. Hydraulic architecture. Development and impacts of plant water deficits. *Prerequisite:* 225 or Botany 104 or equivalent. Three hours. Alternate years, 1998-99.

231 Integrated Forest Protection Integration of concepts of forest protection using a holistic ecological approach to forest pest management. Detection, population dynamics, evaluation, prediction, and pest management considerations. *Prerequisites:* 133, 134 or instructor's permission. Three hours. Bergdahl. Alternate years, 1999-00.

242 Advanced Forest Biometry (2-4) Advanced principles of estimation, prediction, inventory, and evaluation of forest resources. Use of system analysis techniques in natural resource management. *Prerequisite:* Permission. Three hours. Newton. Alternate years, 1999-00.

251 Forest Policy and Administration History of natural resource use and management in the U.S.; analysis of contemporary forest policy; organizational administration of forestry and related natural resource instructions. *Prerequisites:* Senior standing in Natural Resources or permission. Three hours. (Not offered for graduate credit.) Not offered 1998-99.

254 Advanced Natural Resource Policy Advanced seminar in natural resource policy, emphasizing current issues in forest policy. *Prerequisites:* Graduate or advanced undergraduate standing; 251 or instructor's permission. Three hours. Reidel.

272 Forest Resources Management Application of mathematical programming, growth and yield forecasting, and economic analysis to the planning and organization of forests for multiple-use sustained yield production. *Prerequisites:* 123, 153. Four hours. Newton.

275 Forest Watershed Management (2-4) Concepts of forest hydrology and forest watershed management; emphasis on natural processes and impacts of quantity, quality, and seasonal distribution of flow from watersheds. *Prerequisite:* Natural Resources 102, junior standing or permission. Three hours. (Not offered for graduate credit.)

285 Advanced Special Topics Advanced special topics courses or seminars in forestry beyond the scope of existing formal courses. *Prerequisites:* Graduate or advanced undergraduate standing, instructor's permission. Credit as arranged.

291, 292 Senior Research Work on research problem under direction of a staff member. Findings submitted in written form as prescribed by department. *Prerequisites:* Senior standing, permission. Three hours. (Not offered for graduate credit.)

299 Forestry Honors Honors project dealing with the biology and/or management of forest ecosystems. *Prerequisite:* By application only; see program chair. Three to six hours.

General Literature (GLIT)

COLLEGE OF ARTS AND SCIENCES

24 Myths and Legends of the Trojan War (See Classics 24.) Three hours. R. Rodgers.

35 The End of the Roman Republic (See Classics 35.) Three hours. B. Saylor Rodgers.

37 Early Roman Empire: Literature in Translation (See Classics 37.) Three hours. R. Rodgers.

72 Romance Literature in Translation Selected topics in romance literature. No knowledge of romance languages required. *Prerequisite:* One year course in any literature. Three hours.

131 French Literature in Translation Selected topics in French literature. Readings and discussion of representative works in English translation. No knowledge of French required. *Prerequisites:* Sophomore standing, one course in any literature. Three hours.

132 Francophone Literature in Translation Selected topics in the literature of the French-speaking world (excluding France). Readings and discussion of representative works in English translation. No knowledge of French required. *Prerequisites:* Sophomore standing, one course in any literature. Three hours.

141 Spanish Literature in Translation Selected topics in Spanish literature. Readings and discussion of representative works in English translation. No knowledge of Spanish required. *Prerequisites:* Sophomore standing, one course in any literature. Three hours.

142 Spanish-American Literature in Translation Selected topics in Spanish-American literature. Readings and discussion of representative works in English translation. No knowledge of Spanish required. *Prerequisites:* Sophomore standing, one course in any literature. Three hours.

143 Latino Writers in the U.S.: Contemporary Perspectives Study of texts written by Latinos since the 1960s. Topics: construction of "ethnic identities," representation of race/gender relations; writers and their communities. *Prerequisite:* Sophomore standing. Three hours.

151, 152 Development of Prose Fiction First semester: Latin, Spanish, French. Second semester: 1700 to present; French, Russian, English, and/or German. *Prerequisite:* Sophomore standing. Three hours.

153 Greek Drama (See Classics 153.) Three hours. Ambrose.

154 Greek Historians (See Classics 154.) Three hours. B. Saylor Rodgers.

155 Ancient Epic (See Classics 155.) Three hours. Schlunk.

156 Greek and Roman Satiric Spirit (See Classics 156.) Three hours. R. Rodgers.

157 Greek Feminism (See Classics 157.) Three hours. Ambrose.

159 Roman Historians (See Classics 159.) Three hours. B. Saylor Rodgers.

161, 162 German Literature in Translation Topics such as German author(s), genre, literary movement, or theme, such as Goethe, proverbs, Expressionism, Faust, Holocaust, or the German film. *Prerequisite:* Sophomore standing. Three hours.

171, 172 Chinese Literature in Translation Selected topics in Chinese literature. Reading and discussion are in English. No knowledge of Chinese language is required. *Prerequisite:* one course in literature or Asian Studies concentrating on East Asia. Three hours.

173 Dante's Comedy (Same as English 122.) Three hours. Stephany.

181 19th Century Russian Literature in Translation Survey of major 19th century authors and genres. Close readings supplemented by lectures and discussions. Particular attention to literary and social institutions in Russia. Three hours. McKenna, Nalibow.

182 20th Century Russian Literature in Translation From Russian modernism to the present. Close readings supplemented by lectures and discussions. Attention to both official and unofficial texts from the Soviet period. Three hours. McKenna, Nalibow.

183 Topics in Russian Literature in Translation Study of topics such as Russian author(s) (e.g. Dostoevsky and Tolstoy), genre (e.g. the Russian novel), literary school (e.g. Russian Formalism). Three hours. McKenna, Nalibow.

251, 252 Study of Movement, Genre, or Topic Precise content of course announced before registration period, chosen from among the following (or similar) topics: Women in Literature; The Comic Spirit; The Grotesque in Modern Literature; Politics in Modern Literature; Existentialism; The Enlightenment. *Prerequisite:* Any 100-level literature course in any of the cooperating departments. Three hours.

Geography (GEOG)

COLLEGE OF ARTS AND SCIENCES

Professors Bodman, Gade; Associate Professors Barnum, Seager (Chairperson); Assistant Professors Carmody, Dupigny-Giroux, Elder, Hannah.

Note: The normal introductory sequence is 1, 2 although 3, 2 is a recommended alternative especially for students in Economics and Business Administration.

1 Introduction to Geography Basic geographic concepts. The cultural diversity among people as it affects the organization and use of the environment. Three hours.

2 World Natural Environments The patterns of the natural environment with particular attention to landforms, climate, soil, vegetation, and water resources. Three hours. Dupigny-Giroux.

3 Geography of Global Economy Distribution of global economic activity and power. Processes of uneven development and globalization including industrialization, the "global assembly line," trade, investment, and migration. Three hours. Bodman, Carmody, Seager.

43 Weather and Climate Elements of weather and climate and their interaction to produce world climate patterns. Daily weather analysis to facilitate understanding of various climatic systems. Three hours. Dupigny-Giroux.

51 to 58 The regional courses numbered 51 to 58 listed below each concern the character and development of the contemporary cultural, economic, and political patterns of the area against the background of its physical and resource base. Three hours each.

51 Africa Carmody, Elder, Gade.

52 Canada Seager.

55 Europe Barnum.

56 Latin America Gade.

57 The United States Hannah.

60 Geography of Race and Ethnicity in the U.S. Examination of the ways in which spatial and locational processes shape and are shaped by ethnic and racial identities, struggles, and relationships. Three hours. Hannah, Seager.

61 Vermont in New England Physical, economic, and cultural patterns of Vermont in the context of New England. Evolution of the Vermont landscape; problems of land use planning and development. Three hours.

74 Geography of Wine Spatial and environmental aspects of wine production and consumption; types of wine and wine regions of the world. *Prerequisite:* Junior or senior standing. Three hours. Gade.

81 Geotechniques Introduction to cartography, geographic information systems (GIS), and remote sensing. Map design and analysis using topographic/satellite data, air photo interpretation, digitizing, and Internet resources. Three hours. Carmody, Dupigny-Giroux.

85 Introduction to Remote Sensing Geographic analysis and evaluation of aerial imagery produced by remote sensors and its relationship to environmental problems in the social and physical sciences. Three hours. Dupigny-Giroux.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

99 First-Year Seminar Intensive survey of geography as a systematic discipline. Focus on processes producing spatial patterns in the natural and human environment. By departmental invitation. Three hours.

142 Physical Geography Patterns and processes in the interactions between the earth, atmosphere, hydrosphere, and biosphere; effects of human intervention in environmental systems. *Prerequisite:* 2. Three hours.

143 Climatology Analysis of regional and local climatic data with special reference to climatic controls; special laboratory projects. *Prerequisite:* 43. Three hours. Dupigny-Giroux.

144 Geomorphology (3-3) (See Geology 151.) *Prerequisite:* Geology 1 or 55. Four hours. Bierman.

146 Physical Geography of North America Physical environment and natural resources of the U.S. and Canada. Emphasis on landform regions and mineral and water resource development and problems. *Prerequisite:* 2, or Geology 1. Three hours.

155 Historical Geography of Europe (Same as History 120.) European geography within a framework of past times; the historical development and distribution of settlement, economic, and political patterns. *Prerequisite:* 55. Three hours. Barnum.

158 Mediterranean Lands Unity and diversity in the regions, countries, and landscapes of Southern Europe, North Africa, and Western Asia. Emphasis on environmental history. *Prerequisite:* 1 or 55 or History 21. Three hours. Gade.

162 Geography of Place Names Investigation and interpretation of the names found on maps of Vermont, North America, and Europe. *Prerequisite:* Three hours in geography. Three hours. Barnum.

170 Historical Geography of the U.S. (Same as History 170.) Physical setting of American historical development emphasizing the sequence of peoples and cultures which have occupied the land and their varied appreciation of its resources. *Prerequisite:* 57 or History 11 or 12. Three hours. Hannah.

171 Cultural Geography Distribution of race, ethnicity, language, and religion at different geographical scales and how these factors contribute to world and regional events. *Prerequisites:* 1 or Anthropology 21 or Sociology 1. Three hours. Gade.

173 Industrial Location and Regional Development Classical and contemporary theories of location and measure-

ment of spatial change. Locational planning in developed and developing areas. Problems of regional disequilibrium and growth strategies. *Prerequisite:* 3 or Economics 11. Three hours. Bodman.

174 Agricultural Geography World, national, and local rural land use patterns. Landscape elements as they reflect prevailing and historic agricultural patterns. Ecologic and social problems of modern agriculture. *Prerequisite:* 1, 2, or 3, or Community Development and Applied Economics 2 or 61, or Plant and Soil Science 11. Three hours.

175 Urban Geography Analysis of the morphology and function of cities. Consideration of urban growth and development, methods of classification, distribution, and theories of location. *Prerequisite:* 1, 3. Three hours. Bodman, Elder.

177 Political Geography (Same as Political Science 161.) Location, resources, and distributional relationships of the variety of human factors as they bear on the structure and functioning of political units. Relationship between geopolitics and political geography. *Prerequisite:* 1 or 3, or Political Science 51 or 71. Three hours. Bodman, Elder.

179 Cultural Ecology (Same as Anthropology 179.) Interrelationships of social groups and their natural environments and resource bases, with primary emphasis on nonindustrial cultures, examined from the perspectives of anthropology and geography. *Prerequisite:* 1 or Anthropology 21. Three hours. Pastner (Anthropology), Gade.

181 Computer Cartography Computer graphics as an alternative and supplement to manual cartography; advanced concepts in cartographic design; applications of computer mapping in planning and resource management. *Prerequisite:* 81. Three hours. Carmody.

182 Introduction to Geographic Information Systems (Same as Natural Resources 143.)

191 Geography Internship Supervised internship in applied geography working with a local public agency or private firm. Individually arranged. *Prerequisites:* Junior or senior standing, departmental permission. One to six hours. Barnum.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

202 Research Methods A systematic overview of the art and science of geographical inquiry. Examination of key research and methodological approaches in the discipline. *Prerequisite:* Junior or senior standing; nine hours in geography. Three hours.

203 Contemporary Geographic Thought in Context A survey of paradigms and issues in contemporary geography. Attention paid to the social and historical contexts of geographic thought. *Prerequisites:* Nine hours in geography or permission of instructor. Three hours.

210 Special Topics in Regional Geography Specialized study of a particular region. *Prerequisites:* Junior, senior, or graduate standing with at least 12 hours in geography, instructor's permission. Three hours.

216 Biogeography Processes and patterns of distribution, domestication, and human utility of plant and animal species and communities in varying environmental and historical contexts. *Prerequisite:* Nine hours in geography or biology. Three hours. Gade.

233 Rural Planning (Same as Community Development and Applied Economics 233, Civil Engineering 233.) Study of rural, regional water, and natural resource planning concepts and principles. Field exercises in plan evaluation, car-

rying capacity, agricultural land protection, growth control. *Prerequisite:* 61 or equivalent. Three hours.

242 Problems in Physical Geography *Prerequisite:* Senior or graduate standing with at least 12 hours in geography. Three hours. Dupigny-Giroux, Gade.

261 Problems in Vermont Geography *Prerequisite:* Senior or graduate standing with at least 12 hours in geography. Three hours.

270 Problems in Human Geography *Prerequisite:* Senior or graduate standing with at least 12 hours in geography. Three hours.

278 Gender, Space, and Environment (Same as Women's Studies 270.) Examination of the ways in which human relationships to both the built and the natural environment are mediated by gender. *Prerequisites:* Junior, senior, or graduate standing; nine hours in geography or women's studies. Three hours. Seager.

281 Problems in Cartography Special laboratory projects. *Prerequisites:* 81, junior, senior, or graduate standing with at least 12 hours in geography. Three hours. Carmody.

285 Remote Sensing and Environmental Problems Research projects in remote sensing; application of multispectral data for environmental studies. *Prerequisite:* 85, Civil Engineering 210, or Forestry 146. Three hours.

287 Spatial Analysis Analysis of spatial pattern and interaction through quantitative models; introduction to measurement, sampling, and covariation in a spatial framework. *Prerequisite:* Junior, senior, or graduate standing with at least 12 hours in geography or graduate standing in planning. Three hours. Bodman.

295, 296 Advanced Special Topics Advanced courses or seminars beyond the scope of existing departmental offerings. Three hours.

297, 298 Readings and Research

HONORS - ARTS AND SCIENCES

224, 225 Honors/Geography See page 64 and contact Department for specific requirements. Three hours each.

Geology (GEOL)

COLLEGE OF ARTS AND SCIENCES

Professors Mehrtens, Stanley; *Associate Professors* Bucke, Doolan (Chairperson), Drake; *Assistant Professors* Bierman, Lini, Rushmer; *Lecturer* Wright; *Adjunct Professors* Jaffe, Stein, Wright; *Adjunct Lecturer* Massey.

1 Introductory Geology (3-3) Process, agents, and their effects on materials, structures, and morphology of earth's crust. Laboratory includes field trips, study and interpretation of rocks, minerals, and maps. Four hours. Bucke.

3 Fire and Ice Introduction to volcanoes/plate tectonics ("fire") and glaciers/climate change ("ice") using lectures, slides, discussion, and field trips. Considers Vermont and world-wide geological examples. Three hours.

5 Ecology and Geology of the Lake Champlain Basin Introduction to the principles and processes of ecology and geology applicable to the Lake Champlain basin. A topical, project-oriented format rather than a comprehensive overview. Priority to first-year students. Four hours. Drake, Worley.

10 Oceanography (2-2) Characteristics and development of the oceans, their basins and shorelines, including plate tectonic history and basic physical, chemical, and bio-

logical processes. *Prerequisite:* 1 or introductory science course. Three hours. Bucke.

55 Environmental Geology (3-3) Introduction to geologic processes and materials pertinent to environmental problems: ground water movement, supply, and contamination, waste disposal, flooding, subsidence, and landslides. Local field trips. Designed for intended natural science majors. Four hours.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

101 Field Geology (0-12) Geological evolution of western Vermont as seen through actual field mapping in the Burlington area. Specifically designed for sophomores majoring or minoring in geology or related sciences. *Prerequisite:* 1 or instructor permission. Four hours. Stanley, Wright.

102 Plate Tectonics and the Evolution of Earth Tectonic processes on Earth related to the origins of continents and oceans following concepts of Plate Tectonics. Laboratory sessions examine earth materials and geologic processes. *Prerequisite:* Any introductory Geology course. Four hours. Doolan.

112 Mineralogy and Optical Crystallography Crystallography, crystal, chemistry, and identification of rock-forming minerals. Analytical techniques include optical mineralogy and X-ray diffraction analyses of selected minerals. *Prerequisite:* 102 or concurrent enrollment. Four hours. Drake.

121 Geologic History of Life (2-3) Survey of origin, preservation, and diversification of ancient life. Interaction of organisms with their environment and the effect that organisms have had on the evolution of earth. *Prerequisite:* 1, 10, or Biology 1, or equivalent. Senior Biology majors by permission only. Three hours. Hunt.

131 Igneous, Metamorphic, and Sedimentary Petrology (3-3) Description, classification, and genesis of igneous and metamorphic rocks. Introduction to petrogenetic models of the earth's crust and mantle. *Prerequisites:* 110, 112. Four hours. Drake.

151 Geomorphology (3-3) (Same as Geography 144.) Examines, using lectures, labs, and field-based independent study research projects, processes which change Earth's surface and the history of landscape development. Considers fundamental geologic constraints on environmental problems. *Prerequisite:* 1 or 55. Four hours. Bierman.

153 Stratigraphy and Sedimentary Petrology (3-3) Properties of physical sedimentation, principles of stratigraphy and basin analysis, and comparison of modern and ancient environments. Lab includes description and classification of sedimentary rocks. *Prerequisite:* 112. Four hours. Bucke.

155 Fluvial Geology A discussion of fluvial systems including hydrology, sedimentation, geomorphology, water chemistry, and human impacts. *Prerequisite:* Instructor's permission. Three hours. Drake, Mehrtens.

172 Regional Geology Discussion of the geology of a selected region of North America. A four-week summer field trip to the area in question. *Prerequisites:* one other Geology course or permission.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Research in Geology Supervised research and readings in a selected field of geology. Students from allied sciences, mathematics, and engineering may elect a research problem that combines their major field of study and geology. *Prerequisite:* Consultation with staff. Three hours.

201 Advanced Field Geology (1-6) Advanced field mapping techniques, analysis of field data, preparation of geological maps and reports. *Prerequisite:* 260. Three hours.

210 Systems Dynamics and Earth Science Analysis of generic systems with examples from physical and natural sciences. Geological systems emphasized. Laboratories involve computer analysis of system structure and behavior over time. *Prerequisites:* A major or minor in science, mathematics, natural resources, engineering, or permission of instructor. Three hours. Stanley.

230 Advanced Igneous and Metamorphic Petrology (3-3) Application of phase equilibria, elemental and isotopic data, and textural interpretations to problems in igneous and metamorphic petrology, stressing modern theories of tectonics and petrogenesis. *Prerequisite:* 131. Four hours. Doolan, Rushmer.

233 Environmental Isotope Geochemistry Course focuses on stable isotope geochemistry of low temperature processes occurring on and near the earth surface through lecture, laboratory, and seminar. *Prerequisite:* Introductory chemistry. Three hours. Lini.

234 Global Biogeochemical Cycles Integrated perspective on biogeochemical cycles describing the transformation and movement of chemical substances in the natural environment, as seen on the global context. *Prerequisite:* Introductory chemistry. Three hours. Lini.

235 Geochemistry of Natural Waters Basic concepts of chemical equilibria applied to natural waters, including thermodynamics, pH, oxidation-reduction, weathering, and solution equilibria. *Prerequisites:* 110, Chemistry 1, 2. Three hours. Drake.

240 Tectonics Applications of igneous and metamorphic petrology to problems in tectonophysics, including petrochemistry of the earth's crust and upper mantle and the internal structure of orogenic belts. *Prerequisite:* 101, 102. Three hours. Doolan, Rushmer.

241 Clastic Depositional Systems Selected readings and field studies emphasizing the interpretation of clastic sedimentary deposits including transportation, processes of sedimentation, and geomorphology of ancient and recent sedimentary environments. *Prerequisites:* 153. Three hours. Mehrtens. Alternate years.

243 Clastic Petrology Laboratory Study of clastic rocks in hand specimen and thin section. *Prerequisite:* Concurrent enrollment in 241. One hour. Mehrtens.

245 Carbonate Depositional Environments Paleoenvironmental analysis of carbonate rocks including selected readings, field investigations, and petrographic studies. *Prerequisite:* 153. Three hours. Mehrtens. Alternate years.

247 Carbonate Petrology Laboratory Study of carbonate rocks in hand specimen and thin section. *Prerequisite:* Concurrent enrollment in 245. One hour. Mehrtens.

255 Geohydrology (3-3) Field-based projects address hydrologic processes in geological context; precipitation, runoff, ground water flow, river behavior, and hillslope stability. Stresses data analysis, writing, and practical approaches to water-related environmental problems. *Prerequisite:* Major in science or engineering or permission. Four hours. Bierman.

260 Structural Geology (3-3) Rock deformation, description, and geometry of structural types, and the interpretation of structures of all sizes in terms of finite strain and causal stress fields. *Prerequisites:* 101, 110, Physics 11 or permission. Four hours. Stanley.

273 Geology of the Appalachians Origin of mountain belts; the Appalachian mountain system discussed in terms of tectonics and geologic processes active in modern conti-

mental margins. *Prerequisites:* 101, 131. Three hours. Doolan.

278 Principles of Aquatic Systems (See Natural Resources 278.) Three hours.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

HONORS – ARTS AND SCIENCES

226, 227 Honors/Geology See page 64 and contact Department for specific requirements. Three hours each.

German (GERM)

COLLEGE OF ARTS AND SCIENCES

Professors Mieder (Chairperson), Mahoney, Scrase; Associate Professor Schreckenberger; Lecturer Wood.

The first two semesters of a foreign language are excluded from the 45-hour limit on courses from a single department that can be counted toward the 122 hours required for the Bachelor of Arts degree.

1, 2 Elementary German An introduction to all aspects of contemporary standard German: Speaking, listening, reading, writing. Cultural components include topics such as: music, art, literature, and current events. No previous knowledge of German needed for 1. Four hours each course.

51, 52 Intermediate German Comprehensive review of German grammar, vocabulary-building skills, development of reading strategies and compositional abilities, study of contemporary German culture through literary texts. *Prerequisite:* 1, 2 or equivalent for 51; 51 for 52. Three hours.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

103 Composition and Conversation An intensive language course concentrating on more advanced syntax, vocabulary building, and idiomatic expression through written compositions, translations, and oral presentations. *Prerequisite:* 52 or equivalent. Three hours. Wood.

104 German News Media Analysis of journalistic style and content in news coverage of contemporary events as reported in newspapers, magazines, radio, and television in German-speaking countries. *Prerequisite:* 52 or equivalent. Three hours. Mahoney, Schreckenberger.

121 Culture and Civilization to 1900 Historical, intellectual, and artistic developments of German culture and civilization from Roman times through the 19th century, stressing written and oral work. *Prerequisite:* 52 or equivalent. Three hours. Mahoney, Schreckenberger.

122 20th-Century Culture and Civilization Social, cultural, and political developments in the German-speaking countries since the turn of the century, stressing written and oral components. *Prerequisite:* 52 or equivalent. Three hours. Wood.

155 Survey of German Literature to 1830 Selected prose, drama, and poetry from Medieval through Baroque literature, in-depth readings and analyses of major works by Lessing, Goethe, Schiller, and the Romantics. *Prerequisite:* 52 or equivalent. Three hours. Mahoney.

156 Survey of German Literature from 1830 Major literary and intellectual movements and figures of the period through in-depth analyses of works by Büchner, Mann, Kafka, and Brecht. *Prerequisite:* 52 or equivalent. Three hours. Schreckenberger, Scrase.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

201 Methods of Research and Bibliography Introduction to tools and methods of research, including major bibliographical sources, reference works, dictionaries, editions, and journals concerned with German literature, language, and folklore. *Prerequisite:* Two 100-level courses. Three hours. Mieder.

202 Expository Writing Improvement of writing skills through work with authentic texts from different content areas (literature, media, science, business). Emphasis on stylistic development and sophisticated vocabulary-building. *Prerequisite:* Two 100-level courses. Three hours. Mieder, Schreckenberger.

For all courses numbered 213 to 296 the *prerequisite* is 155 or 156 and one other 100 level course.

213 History of the German Language Historical and linguistic development of the German language from Indo-European to the present, emphasizing sound shifts, the 16th century, and the modern age. Three hours. Mieder.

214 Middle Ages Analysis and discussion of several "Minnesang" poets (esp. Walther and Neidhart), the *Nibelungenlied*, the courtly epics *Erec*, *Parzival*, and *Tristan*, and the satirical epic *Helmbrecht*. Three hours. Mieder.

225 Goethe Study of Goethe's accomplishments in poetry, drama, and the novel during major phases of his literary career: "Sturm und Drang," Classicism, and Romanticism. Three hours. Mahoney.

226 Schiller Major attention will be paid to Schiller's development as a dramatist (from *Die Räuber* to *Wilhelm Tell*) as well as to his contributions to German Classicism. Three hours. Mahoney.

237 19th-Century Prose Literary and stylistic analysis of prose works by Tieck, Kleist, Stifter, Gotthelf, Droste-Hülshoff, Storm, Keller, and Hauptmann with emphasis on Romanticism, Poetic Realism, and Naturalism. Three hours. Mieder.

238 19th-Century Drama Analysis of plays by Tieck, Kotzebue, Kleist, Büchner, Grillparzer, Nestroy, Hebbel, and Hauptmann. Consideration of traditional Viennese "Volks theater" and the period's major literary movements. Three hours.

247 German Literature from 1890 to 1945 Naturalism, Symbolism, Expressionism and subsequent trends through readings of authors such as Hauptmann, Rilke, Kaiser, Kafka, Mann, and Brecht. Three hours. Schreckenberger, Scrase.

248 Contemporary German Literature Literary movements and their major representatives from 1945 to the present, including relevant sociopolitical, intellectual, and cultural aspects. Three hours. Schreckenberger, Scrase.

251 German Folklore Verbal folklore genres (fairy tales, legends, folk songs, and proverbs) treated in their relation to literature, mass media, and popular culture. Three hours. Mieder.

252 Faust Focus on one of the major themes of world literature. Readings include the "Volksbuch" of 1587, and works by Marlowe, Goethe, and Thomas Mann. Three hours.

263 German Romanticism Study of major works by authors such as Friedrich Schlegel, Novalis, Brentano, Hoffmann, and Eichendorff in their literary, artistic, philosophical, and sociopolitical contexts. Three hours. Mahoney.

264 German Lyric Poetry The lyric genre and the historical development of German poetry from the age of Goethe to the present. Three hours. Scrase.

271 Proverbs Diachronic and synchronic survey of German proverbs, proverbial expressions, and wellerisms, emphasizing their use and function in literature, art, mass media, advertisements and oral communication. Three hours. Mieder.

273 German Intellectual Movements A survey of developments in art, music, philosophy, and social thought from the Enlightenment to 1945, with particular attention to their impact on German literature. Three hours. Mahoney.

275 Fin-de-Siècle Prevalent literary and intellectual movements at the turn of the 20th century in their historical, sociopolitical, and cultural contexts. Study of Nietzsche, Freud, Rilke, Hofmannsthal, Schnitzler, and Mann. Three hours. Schreckenberger.

276 Brecht and the Modern Drama Brecht's revolutionary concept of "epic theatre" in theory and practice and its influence on subsequent dramatists, including Dürrenmatt, Frisch, Handke, Hochhuth, Müller, and Weiss. Three hours.

278 GDR Fiction GDR fiction in its literary, historical, and social contexts, with reference to major developments in the GDR from 1949–89. Three hours. Scrase.

279 The German Short Story after 1945 Aesthetic and thematic evolution of the short story and its relation to historical, political, and cultural developments from 1945 to the present. Three hours. Schreckenberger.

281 Seminar on Literary Genre, Period, or Theme Study of a literary genre, period, or theme through close readings of representative texts supplemented by lectures and reports on sociocultural context. May be repeated. Three hours.

282 Seminar on a Particular Author or Authors Study of author(s) through close readings of representative texts supplemented by lectures and reports on the works' socio-cultural context. May be repeated. Three hours.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

GENERAL LITERATURE

161, 162 German Literature in Translation (See course description under General Literature.)

HONORS – ARTS AND SCIENCES

228, 229 Honors/German See page 64 and contact Department for specific requirements. Three hours each.

Hebrew (HEBR)

COLLEGE OF ARTS AND SCIENCES

Lecturer Lewin.

1, 2 Elementary Hebrew The spoken language of everyday use with oral, aural, and written practice in speaking, reading, and comprehension. Four hours. Lewin.

51, 52 Intermediate Hebrew Reading, translation, and discussion in Hebrew of texts selected to show the development of Hebrew culture from Biblical times to the present. *Prerequisites:* 1, 2 or equivalent for 51; 51 for 52. Three hours. Lewin.

Historic Preservation (HP)

COLLEGE OF ARTS AND SCIENCES

Associate Professor Visser (Interim Director).

201 Architecture, Landscape, and History (Same as Art 201, History 201.) An examination of methods for deciphering the underlying cultural and environmental forces that have shaped the nation's buildings, towns, cities, and rural landscapes. *Prerequisites:* One advanced course in one of the following areas: American history, architectural history, historical or cultural geography, archaeology, or by permission. Three hours.

202 Special Topics. Three hours.

203 Conservation Techniques for Historic Structures An overview of historic building technology including basic techniques of scientific field and laboratory investigations; seminars and demonstrations on preserving wood, plaster, paint, and masonry by nationally-recognized architectural and conservation specialists. *Prerequisites:* 201, familiarity with the building trade. Three hours. Visser.

204 Historic Preservation: Development Economics Survey of economic, financial aspects of real estate development pertaining to preservation and adaptive use of historic buildings (market studies, pro-formas). Field trips. Actual proposal development for underutilized properties. *Prerequisite:* 201. Three hours. Lang.

205 Historic Preservation Law Legal issues in conservation of the built environment. Basic legal techniques for protection of historic structures (historic districts, protective legislation, easements, covenants). Study of significant court decisions. *Prerequisite:* 201. Three hours.

History (HST)

COLLEGE OF ARTS AND SCIENCES

Professors Andrea, Grinde, Hutton (Chairperson), Overfield, B. Rodgers, Seybolt, Steffens, Stoler, Stout; Associate Professors Coleman, True, Visser, Youngblood; Assistant Professors Brown, Gustafson (Director of Graduate Studies), Huener, McIsaac; Visiting Assistant Professor Massell.

History course numbers are designed to indicate method of instruction and expected preparation level of students, as follows:

9–96 Introductory Courses Open to all students, but designed primarily for first-year students and students beginning the study of history. The courses teach skills and methods as well as subject matter.

120–199 Intermediate Courses Intended primarily for juniors and seniors, these courses all have prerequisites. Requirements include independent research projects.

200–299 Advanced (Seminar) Courses Advanced work in interpretation, research, and writing. Seminar format, limited enrollment. Primarily for students majoring in history (or related disciplines) and graduate students. Substantial prerequisites.

9 Global History to 1500 The development and cross-fertilization of civilizations in Eurasia, Africa, and the Americas from about 3500 B.C.E. to A.D. 1500. Three hours. Andrea.

10 Global History Since 1500 Character, development, and emerging interdependence of the world's major civilizations since 1500. Three hours. Overfield, True, Youngblood.

11, 12 History of the U.S. Survey from the pre-Revolutionary period to the present. First semester: to 1876; second semester: 1876 to present. Three hours. Brown, Coleman, Grinde, Gustafson, Stoler, Stout.

13, 14 Ideas in the Western Tradition: Integrated Humanities Great books of Western civilization in their historical setting. First semester: Greece and Rome. Second semester: Renaissance to Existentialism. Credit will not be given for History 14 and History 25 or 26. *Prerequisites:* Concurrent enrollment in English 27, 28; Religion 27, 28; Integrated Humanities Program. Three hours. Hutton.

19 Western World since 1945 Comparative history of European nations and the United States since 1945. Three hours. Huener, Hutton, Youngblood.

21 Classical Greek Civilization (See Classics 21.)

22 Classical Roman Civilization (See Classics 23.)

23 The Birth of Europe Survey of history of Western Europe from the late Roman Empire to the stabilization of Medieval Civilization around A.D. 1000. Three hours. Andrea.

24 High and Later Middle Ages: A.D. 1000–1500 The stabilization and expansion of Western European civilization in the Age of the Crusades; the crisis of the 14th century; 15th century recovery. Three hours. Andrea.

25 European Civilization to 1815 Introduction to political, social, and intellectual movements which have shaped the foundations of Western civilization from the Renaissance to the French Revolution. Three hours. Overfield, Steffens.

26 Europe, 1815–1945 Europe from the fall of Napoleon to the end of World War II, focusing on political, social, economic, and intellectual developments. Three hours. Huener, Steffens, Youngblood.

27 Modern Eastern Europe Eastern Europe since 1772, especially areas comprising present-day states of Bosnia-Herzegovina, Croatia, the Czech Republic, Hungary, Macedonia, Poland, Slovakia, Slovenia, and Yugoslavia. Focus on politics and culture of nationalism. Three hours. Youngblood.

40 Introduction to African History Lecture survey: traditional Africa, the European impact, colonial rule, African nationalism and independence. Three hours.

45 Introduction to Middle East History Survey of the Middle East from the emergence of Islam to the present, emphasizing political, cultural, social, and economic developments. Three hours.

50 China and Japan to 1800 Historical development of the politics, economics, social structure, philosophy, religion, and the arts in East Asia from neolithic times to 1800. Three hours. McIsaac, Seybolt.

51 China and Japan since 1800 Continuity and change in the politics, economics, society, and culture of China and Japan in the 19th and 20th centuries. Three hours. McIsaac, Seybolt.

60 Birth of the Americas Origins of the complex and culturally diverse societies in the Americas created by Indians, Africans, and Europeans in the Western Hemisphere between 1492 and 1763. Three hours. True.

61 Introduction to the Modern History of Latin America Latin American history concentrating on the post-independence period. Selected national histories. Three hours. True.

65, 66 Canadian History Canada from earliest French exploration and settlement to present, concentrating on Amerindian European contact, New France, British North America, political development, international relations, and cultural diversity. First semester: to 1867. Second semester: 1867 to present. Three hours. Massell.

68 History of U.S. Peoples of Color Comparative survey of historical experiences of African-Americans, Latinos, Asian-Americans, and Native Americans in U.S. Racism, conquest, slavery, exploitation, civil rights, militancy, liberation movements, and cultural renaissance. Three hours. Grinde.

85, 86 History of Science Survey of the history of the physical and biological sciences from antiquity to the present. Stresses science as an intellectual activity within the contemporary context of philosophy, religion, and social organization. Three hours. Steffens.

95, 96 Introductory Special Topics Courses on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

120 Historical Geography of Europe (Same as Geography 155.) Three hours.

121 History of Greece (See Classics 121.)

122 History of Rome (See Classics 122.)

123 The Crusades: 1095–1291 The evolution of western Europe's crusading ideal and the impact of the movement on Latin, Byzantine, Muslim, and Jewish societies. *Prerequisite:* 23 or 24. Three hours. Andrea.

124 The Medieval Papacy The development of Western European civilization seen through the perspective of the history of the Roman papacy: A.D. 100–1517. *Prerequisite:* 23 or 24. Three hours. Andrea.

125 The Renaissance European society from the 14th to early 16th century, emphasizing the transition from medieval to "modern" society and the roots of Renaissance Italy's cultural and artistic brilliance. *Prerequisite:* 9 or 10 or 14 or 25 or 26. Three hours. Overfield.

126 The Reformation European society from the Renaissance to mid-17th century. Emphasis on religious struggles growing out of Protestant Reformation and their impact on the social, political, economic, and cultural movements of era. *Prerequisites:* 10 or 14 or 25. Three hours. Overfield.

127 European Culture and Society, 1914–1945 Survey of European high modernism, focusing on the avant-garde, Stalinism, fascism, and popular culture. *Prerequisite:* 26 or 128 or three hours history. Three hours. Youngblood.

128 European Society and Culture, 1880–1920 European society and culture before and during "The Great War." Transitions in the arts, philosophy, science and technology, industry, dance, theatre, attitudes, and diplomacy. *Prerequisite:* 26. Three hours. Steffens.

129 European Intellectual History to 1800 Emphasis upon ideas in the relation to major political and social movements. *Prerequisite:* 25. Three hours. Overfield, Steffens.

130, 131 Modern European Intellectual History Intellectuals and intellectual movements in the context of 19th century European culture. *Prerequisite:* 26. Three hours. Hutton.

132 Modern Irish History Ireland 1600 to present. English subjugation of Ireland, Anglo-Irish, emergence of Irish nationalism, Irish Literary Renaissance, Irish Free State, and ongoing problem of Northern Ireland. *Prerequisite:* 25 or 26. Three hours.

135 France 1700–1851 An introduction to French civilization. Principal themes: Absolutism, Enlightenment, French Revolution, 19th Century Society and Culture. *Prerequisite:* 14 or 25 or 26 or work in French or permission. Three hours. Hutton.

136 France in the Contemporary World Politics, society, and culture of France since 1870. *Prerequisite:* 14 or 26, or 135. Three hours. Hutton.

137 History of Russia Russian political, social, and intellectual history from Kievan Rus' to the Revolutions of 1917, focusing on the Imperial period (1700–1917). *Prerequisite:* 10 or 26. Three hours. Youngblood.

138 History of the Soviet Union Soviet political and social history, 1917–1991, centering on the Stalin era and on efforts of post-Stalin regimes to deal with the Stalinist legacy. *Prerequisite:* 10, 26 or 137. Three hours. Youngblood.

139 Modern Germany Political development and changing social and economic structure of Germany during the Bismarckian empire, the Weimar Republic, the Nazi dictatorship, and the post-war period. *Prerequisite:* 14 or 26 or work in German. Three hours. Huener.

140 History of Modern Africa Topics include African response to European penetration (collaboration vs. resistance), theories and practices of colonial rule, ideologies and organizational forms of African nationalism, and problems of development in present-day Africa. *Prerequisite:* 40. Three hours.

145 Middle Eastern History to 1800 Political, social, and economic study of the Middle East from Muhammad to the end of the 18th century, emphasizing origins and achievements of the Islamic age. *Prerequisite:* 45 or permission. Three hours.

146 Modern Middle East Political, social, and economic study of the modern Middle East from the late 18th century to the present, emphasizing the rise of modern nation states. *Prerequisite:* 45 or permission. Three hours.

149 History of the Ancient Near East (See Classics 149.)

150 China: The 19th and 20th Centuries China from the late Qing Dynasty to the present, with particular attention to the influence of Western imperialism, the process of revolution, and the Communist era. *Prerequisite:* Six hours of history, 50 recommended. Three hours. McIsaac, Seybolt.

151 Modern Japan Transition from tradition to modernity in Japan from the Meiji Restoration, 1868 to the present. *Prerequisite:* Six hours of history, 50 recommended. Three hours. McIsaac, Seybolt.

152 The Chinese Revolution Examination of the ongoing process and significance of the Chinese Revolution of the 20th century, emphasizing the socio-economic and cultural aspects of the changes it wrought. *Prerequisite:* Six hours of history, 51 recommended. Three hours. McIsaac.

157 Greek Feminism (See Classics 157.)

161 Topics in the History of Modern Latin America Topics include plantation economy, slavery, race relations, immigration, militarism, economic development, *indigenismo*, and influence of U.S. Classroom emphasis on dialogue and question-asking. *Prerequisite:* 61. Three hours. True.

162 History of Mexico Mexico's national history, including an intensive study of its 20th century revolution. Introduces students to Mexican culture and nationality. *Prerequisite:* 61 or permission. Three hours. True.

165 Canadian-American Relations Canada's relationship with the U.S. from the Revolutionary War to the present, emphasizing diplomatic, economic, social, and environmental relations in the 19th and 20th centuries. *Prerequisite:* Three hours in U.S. or Canadian history. Three hours. Massell.

168 Native American History A survey of North American Indian history from European contact to the present. Cultural and military conflicts, resistance movements, accommodation, and cultural adaptation within the U.S. *Prerequisite:* Three hours history. Three hours. Grinde.

169 History of Native American Thought An examination of Native American philosophies, spiritualities, political theories, and ecological perspectives. Traditional Native American thought, intellectuals and intellectual movements, and contemporary resistance and reform movements. *Prerequisite:* Three hours. Three hours. Grinde.

170 Historical Geography of the U.S. (Same as Geography 170.) Three hours.

171, 172 Social History of the U.S. Selected topics in history of American society, including community structures, family life, work patterns, value systems, social class, and mobility. *Prerequisites:* For 171: 11 or 182; for 172: 12 or 182. Three hours. Gustafson.

173, 174 History of U.S. Foreign Relations The domestic and international contexts of U.S. relations with the rest of the world. First semester: 1776–1914. Second semester: 1914–present. *Prerequisites:* For 173: 10 or 11; for 174: 10 or 12. Three hours. Stoler.

175, 176 Intellectual History of the U.S. An examination of the interaction between intellectuals, the public, and social institutions, as a means to understanding how ideas relate to the social and institutional needs of particular historical periods. The effects of movements such as Puritanism, democracy, Darwinism, progressivism, and the search for self, on past and present, are discussed. *Prerequisites:* For 175: 11; for 176: 12. Three hours. Gustafson.

177 American Revolution Survey of the Revolutionary Era, 1760–1791. Causes of the Revolution, War for Independence, establishment of the Constitution. *Prerequisite:* Six hours of history or other social sciences of which History 25 is highly recommended. Three hours. Stout.

178 The U.S. in the Age of Industrialization Chronological survey of U.S. history from 1876 to 1914. *Prerequisite:* 12. Three hours. Gustafson.

179 U.S. History Since 1960 Topical review of U.S. history since 1960, emphasizing problems of interpreting and reconstructing the recent past. *Prerequisite:* 12. Three hours. Gustafson, True.

181 Seminar in Film and History Topics in the history of American and European cinema and society, focusing on the filmmaker as historian and the film as historical artifact. *Prerequisite:* Three hours history or film. Youngblood.

182 History of Women in the U.S. (Same as Women's Studies 161.) Survey of the origins and changes in images, status, and roles of women in American society since the colonial period. *Prerequisite:* Three hours in history (11 or 12 recommended), or Women's Studies minor. Three hours. Gustafson.

183 U.S. Military History Development of the U.S. military establishment within the framework of U.S. history from the Colonial era to the present. *Prerequisite:* 10 or 11 or 12. Three hours. Stoler.

184 Vermont History Survey of Vermont history from early times to the present. *Prerequisite:* 11 or 12. Three hours. Brown.

185 Science and Culture Science as an integral part of 20th-century culture, emphasizing works of leading scientists, mathematicians, and humanists. *Prerequisite:* 86 or six hours of European history, or science major. Three hours. Steffens.

186 The Scientific Revolution Interrelationship between European scientific activity and social change during 16th and 17th centuries. Emphasis on philosophical, religious, artistic, and social context of the times. *Prerequisite:* 85 or six hours of European history or science major. Three hours. Steffens.

187, 188 African American History Economic, social, political, and intellectual developments in U.S. history as they have affected and been affected by African-Americans. First semester: 1619 to Civil War. Second semester: Civil War to present. *Prerequisite:* Three hours history. Three hours each. Coleman.

189 History of African-American Women An exploration of the experiences of women of African descent from their arrival in America to contemporary times. *Prerequisites:* Any one of the following: History 11; 12; 182, 187, 188; Women's Studies 73; 174, 235, 273. Three hours. Coleman.

190 The Holocaust Study of the background, events, and aftermath of the Holocaust in Nazi Germany and Europe under German control. *Prerequisite:* 10 or 26 or instructor's permission. Three hours. Huener.

191 World War II Causes, conduct, and consequences of global war from 1931–1945, including social, economic, political, and diplomatic as well as military aspects. *Prerequisite:* 10 or 12 or 26 or 51. Three hours. Stoler, Seybolt.

192 Special Methods in Secondary Education for the Social Studies (Same as Education 179.) Social studies curricula and selected social studies topics. (Not acceptable toward fulfilling Arts and Sciences College major requirements.) *Prerequisite:* Acceptance in teacher certification program. Three hours.

195, 196 Intermediate Special Topics Intermediate courses on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. *Prerequisites:* Junior or senior standing, six hours of history. Three hours.

197, 198 Readings and Research *Prerequisites:* May be prescribed by an individual instructor; junior or senior standing. Three hours.

199 Internship in History Supervised cooperative internship work in history in archives, museums, libraries, etc. To be individually arranged for each student. *Prerequisite:* Junior or senior standing, department permission. Three to six hours.

Prerequisites for Seminar Courses (all following courses): Enrollment limited to juniors, seniors, and graduate students who have taken at least 12 hours of work in History. Individual instructors will prescribe specific prerequisites appropriate for their seminars. Students who wish to enroll in seminars should check the current Schedule of Courses for these prerequisites.

201 Architecture, Landscape, and History (Same as Historic Preservation 201; Art 201.)

209, 210 Seminar in Global History Selected topics on the nature and results of interactions among the world's peoples. 209: to 1500. 210: since 1500. *Prerequisites:* Junior, senior, or graduate standing; 12 hours of history including 9 or 10. Three hours. Andrea, Overfield.

221, 222 Seminar in Ancient History (See Classics 221, 222.)

224 Seminar in Medieval Europe Selected topics on Europe from the Fall of Rome to the Renaissance. *Prerequisites:* Twelve hours of history including 23 or 24; junior, senior, or graduate standing. Three hours. Andrea.

225 Seminar in Early Modern Europe Selected topics on European history from the Renaissance to the French Revolution. *Prerequisites:* Junior, senior, or graduate standing and 12 hours of history. Three hours. Overfield.

226, 227 Seminar in Modern Europe Selected topics on European history from 1815 to present. *Prerequisites:* Junior, senior, or graduate standing; 12 hours history. Three hours. Huener, Hutton.

228 Seminar in Popular Culture History of the attitudes of ordinary people towards every day life in European soci-

ety from the Middle Ages to the present. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours. Hutton.

237 Seminar in Russian History before 1917 Selected topics in Russian intellectual, social, and cultural history focusing on the period 1825–1917. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history including 137. Three hours. Youngblood.

238 Seminar in Soviet History Selected topics in Soviet social and cultural history from the Bolshevik Revolution to the death of Stalin (1917–53). *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history including 138. Three hours. Youngblood.

245 Islamic Intellectual History In-depth study of Islam, focusing on ideas rather than events. Topics include law, Sufism, art, philosophy, and resurgent Islam. *Prerequisite:* 145 or permission. Three hours.

246 Seminar on Modern Middle East Historical analysis of the major conflicts in the region, emphasizing the roles of nationalism, religion, foreign influences, and wars. *Prerequisite:* Junior, senior, or graduate standing; 12 hours history, including 146 or permission. Three hours.

250 Seminar in East Asian History Topics in the history of East Asia. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours. McIsaac, Seybolt.

252 Seminar on China Selected topics on the history of China. *Prerequisites:* Junior, senior, or graduate standing; 12 hours of history, including 150 or equivalent. Three hours. McIsaac, Seybolt.

261, 262 Seminar in Latin American History Selected topics in Latin American history. 261: Early Latin America; 262: Modern Latin America. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours. True.

265 Seminar in Canadian History Topics in 19th and 20th century Canadian history; national development, regionalism, multiculturalism, and international relations. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours. Massell.

271, 272 Seminar in U.S. Social History Topics in U.S. Social History. 271: to the Civil War; 272: Civil War to the present. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours. Gustafson.

273, 274 Seminar in Modern U.S. History Selected topics in U.S. history, among them foreign relations, the role of the presidency, World War II, and the Cold War. *Prerequisites:* Junior, senior, or graduate standing; 12 hours of history. Three hours. Stoler.

277 Colonial Origins of American Society How European patterns of life and systems of belief eroded in 17th and 18th century America and evolved into a distinctly American society. *Prerequisites:* Junior, senior, or graduate standing, two courses in the social sciences, at least two courses in history (25 or 177 recommended), at least one from anthropology, economics, geography, religion, or sociology. Three hours. Stout.

278 Colonial Origins of U.S. Government (Same as Political Science 231). Evolution of government (local to national levels) from English background through establishment of the U.S. Constitution, emphasizing political and constitutional aspects of the American Revolution. *Prerequisites:* Two courses in the social sciences, one political science course, two courses in history (at least one course above 100; 177 or 277 recommended). Three hours. Stout.

284 Seminar in Vermont History Topical approach to Vermont history through original research utilizing primary sources available at UVM, the Vermont Historical Society, and the Vermont State Archives. *Prerequisites:* Jun-

ior, senior, or graduate standing; 12 hours history, including 184 or permission. Three hours. Brown.

285 Seminar in History of Science Selected topics in the history of science. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours. Steffens.

287 Seminar in Historiography Topics and methods in contemporary historical writing. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours. Hutton, Youngblood.

295, 296 Special Topics Seminar Seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours.

HONORS – ARTS AND SCIENCES

232, 233 Honors/History See page 64 and contact Department for specific requirements. Three hours.

Honors – Arts and Sciences (HON)

COLLEGE OF ARTS AND SCIENCES

Students enrolled in the College of Arts and Sciences who wish to undertake a College Honors project must contact the specific academic department for criteria and admission requirements. College Honors credit will be counted toward the 45-hour limit (50-hour limit for B.S. candidates) in the major. Additional information may be found on page 64.

100 Knowledge and Theory Using selected examples of knowledge from across the arts and sciences, this course inquires into the production of knowledge and theoretical models in different fields. *Prerequisite:* Admission to the John Dewey Honors Program. Three hours.

Individually Designed Majors (IDM)

COLLEGE OF ARTS AND SCIENCES

264, 265 Honors/Individually Designed Majors See page 64 and contact program for specific requirements. Three hours each.

Integrated Humanities (HUMN)

COLLEGE OF ARTS AND SCIENCES

Professors Dickerson, Hutton, Martin, Rodgers, Simone, Sugarman (Director).

195 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing offerings. See Schedule of Courses for specific titles.

Also see course descriptions for English 27, 28, History 13, 14, and Religion 27, 28.

Japanese (JAPN)

COLLEGE OF ARTS AND SCIENCES

1, 2 Elementary Japanese An introduction to spoken and written Japanese through aural-oral drills and grammar presentation. The three writing systems of Japanese

(*hiragana*, *katakana*, and *kanji*) are introduced. *Prerequisite:* No prior knowledge for 1; 1 or equivalent for 2. Four hours each. Hayashi.

51, 52 Intermediate Japanese A continuation of 1, 2 designed to enable the student to converse in everyday Japanese and to read and write simple texts. *Prerequisites:* 1, 2, or equivalent. Four hours each. Hayashi.

101, 102 Advanced Japanese Further development of oral proficiency and advanced study of grammatical structure of modern Japanese, supplemented by audiovisual materials and authentic written texts of several kinds. *Prerequisites:* 51, 52 or equivalent. Three hours each. Hayashi.

201, 202 Studies of Japanese Texts Directed reading of authentic texts and guided practice of conversational skills in multiple social contexts. Courses can be repeated with different content. *Prerequisites:* 102 or equivalent. Three hours. Hayashi.

Latin American Studies

COLLEGE OF ARTS AND SCIENCES

Prof. McCann, Director

The following courses are among the course offerings; see department for specific course description. Also see Area and International Studies for special topics listings.

Anthropology 161; Area and International Studies 195, 196, 197, 198; Geography 56; History 61, 161, 162; Political Science 174; Spanish 185, 186, 281, 285, 286, 293.

Linguistics (LING)

COLLEGE OF ARTS AND SCIENCES

101, 102 Linguistics Introductory course to acquaint student with the methods and theory of systematic observation and explanation of language phenomena (linguistics). *Prerequisite:* 101 or 102. Three hours.

Mathematics (MATH)

COLLEGE OF ENGINEERING AND MATHEMATICS

Professors Archdeacon, Aleong, Ashikaga, Burgmeier, Cooke (Associate Chairperson), Costanza, Dinitz, Dummit, Foote, Golden, Gross, Haugh, Lakin (Chairperson), Son, Wright; Associate Professors Bentil, Mickey, Sands, Wilson, Yu; Assistant Professors Buzas, Yang; Lecturers Badger, Johansson, Karstens, Kost, Lawlor, Low, MacPherson, Morency, Puterbaugh, Read, Weaver.

The Mathematics and Statistics Department provides instruction for students throughout the University. The following lists of courses, grouped according to their prerequisites, are provided for the information of students seeking a first course in mathematics. Consultation is available at the Department office.

Minimal background one year of high school algebra:

Math. 1, Elementary College Algebra (evenings and summers only)

Two years of high school algebra and one year of geometry:

Math. 2, Plane Trigonometry

Math. 9, College Algebra

Math. 10, Precalculus Mathematics

Math. 17, Applied Finite Mathematics

Math. 19, Fundamentals of Calculus I

Four years or more of college preparatory mathematics in high school:

Math. 17, Applied Finite Mathematics

Math. 19, Fundamentals of Calculus I

Math. 21, Analytic Geometry and Calculus I

Students entering with Advanced Placement in Calculus may take Math. 20, 22, or 121 as their first mathematics course at UVM.

1 Elementary College Algebra Review of fundamental operations and a more extensive study of fractions, exponents, radicals, linear and quadratic equations, ratio, proportion, variation, progressions, and the binomial theorem. Topics normally included in intermediate algebra in high school. Students who have satisfactorily completed two years of high school algebra, or the equivalent, receive no credit for this course. Offered only in Evening Division and Summer Session. *Prerequisite:* One year of high school algebra. Three hours.

2 Plane Trigonometry Trigonometric functions, their graphs and other properties, solution of triangles, trigonometric equations and identities, and inverse trigonometric functions. May not be taken for credit concurrently with, or following receipt of, credit for any mathematics course numbered 20 or above. Credit not given for both 2 and 10. *Prerequisite:* 1 or 9. Three hours. Offered only in Evening Division and Summer Session.

9 College Algebra Sets, relations, and functions with particular attention to properties of algebraic, exponential, and logarithmic functions, their graphs and applications. May not be taken for credit concurrently with, or following receipt of, credit for any mathematics course numbered 19 or above. Credit not given for both 9 and 10. *Prerequisites:* Two years of secondary school algebra, one year of secondary school geometry. Three hours.

10 Precalculus Mathematics Skills in working with numerical, algebraic, and trigonometric expressions are developed in preparation for 21. May not be taken for credit concurrently with, or following receipt of, credit for any mathematics course numbered 19 or above. Credit not given for both 2 and 10 nor 9 and 10. *Prerequisites:* Two years of secondary school algebra, one of secondary school geometry. Three hours.

11 Technical Calculus[†] Introduction to calculus of functions of one variable, emphasizing techniques and applications of differentiation and integration. *Prerequisites:* 10, or 9 and 2, or strong background in secondary school algebra and trigonometry and an associates degree in engineering. Dual credit not given for 11 and 21. Three hours.

12 Technical Calculus II^{††} Transcendental functions, techniques of integration, polar coordinates, sequences, series and vectors. *Prerequisites:* 11 or 21; associates degree in engineering. Dual credit not given for 12 and 22. Three hours.

13 Calculus Via Modeling I Introduction to mathematical modeling and differential calculus with a graphical, problem-solving approach. Requires graphic calculator. *Prerequisite:* Three years high school math, or Math. 9. Credit not given for both Math. 13 and 19. Three hours.

14 Calculus Via Modeling II Further modeling and an introduction to integral and multivariate calculus with a graphical, problem-solving approach. Requires graphing calculator. Credit not given for both 14 and 20. *Prerequisite:* 13. Three hours.

15, 16 Fundamental Concepts of Elementary School Mathematics Comprehension of operations with real numbers, measurements, and informal geometry provide background for algebra, number theory, statistics, probability, compass and ruler constructions, and problem solving.

Prerequisite: 15 for 16. Open only to students in elementary education. Three hours.

17 Applications of Finite Mathematics Introduction to mathematics of finite systems with applications, such as probability, statistics, growth and symmetry, graph theory, fair division and apportionment problems, voting systems. *Prerequisite:* Two years of secondary school algebra or 9 or 10. Three hours.

19 Fundamentals of Calculus I Introduction to limits and differential calculus with a wide variety of applications. Students interested in intensive use of mathematics should take 21. Credit not given for more than one of the courses 19, 21 unless followed by 22. *Prerequisite:* 9, 10, or sufficiently strong background in secondary school algebra and geometry. Three hours.

20* Fundamentals of Calculus II Introduction to integral calculus with a wide variety of applications. A student who completes 20 may be admitted to 22; however 19, 21, 22 is preferable to 19, 20, 22. *Prerequisite:* 19.* Three hours.

21 Calculus I[†]** Introduction to calculus of functions of one variable including: limits, continuity, techniques, and applications of differentiation and integration. Credit not given for more than one course in the pair 19, 21. *Prerequisite:* 10; or 9 and 2; or strong background in secondary school algebra and trigonometry. Four hours.

22 Calculus II^{††} Techniques and applications of integration. Polar coordinates, Taylor polynomials, sequences and series, power series. *Prerequisite:* 21. Four hours.

31 Elementary Numerical Methods Computer-aided problem-solving techniques including root-finding, interpolation, approximation, numerical integration, and systems of equations. *Prerequisite:* Computer Science 16. *Corequisite:* Math. 22. Not applicable toward the requirements for a major in mathematics. Three hours.

51 Fundamentals of Mathematics I Introduction to algorithms, mathematical language, logic, induction, functions and numerical methods, with computer programming used to support concepts presented. *Corequisite:* Math. 21. Four hours.

52 Fundamentals of Mathematics II Fundamental mathematical concepts and techniques, emphasizing proofs and algorithms, are investigated within the context of topics such as number theory and graph theory. Credit not given for both 52 and 104. *Prerequisite:* 51. Three hours.

95 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. *Prerequisite:* Instructor's consent. Hours variable.

104 Fundamentals of Mathematics of Computation Introduction to mathematical theory and techniques underlying computer science. Set theory, graph theory, game theory, semi-groups, free monoids, and finite groups. *Prerequisite:* 22. Three hours.

111 Technical Calculus III^{†††} Calculus of functions of several variables, partial derivatives, gradient, divergence, curl, multiple integrals. *Prerequisites:* 12 or 22; associates degree in engineering. Dual credit not given for 111 and 121. Three hours.

*Math 21 may be accepted as the prerequisite for Math. 20 with permission of department.

**Those who are deficient in high school mathematics for their chosen curriculum are urged to attend summer school prior to their first semester in college. For A&S math major requirements, 19 and 20 may be substituted for 21 with departmental approval. Four hours may be counted toward math requirements.

[†]Credit may be received for only one of 11, 19, 21.

^{††}Credit may be received for only one of 12, 22.

^{†††}Credit may be received for only one of 111, 121.

121 Calculus III^{†††} Vectors, vector-valued functions. Calculus of functions of several variables: partial derivatives, gradient, divergence, curl, multiple integrals, line integrals, Stokes' and Green's theorems. *Prerequisite:* 22. Four hours.

124 Linear Algebra Matrices, linear dependence, vector spaces, linear transformations, characteristic equations and applications. *Co-requisite:* Math. 22 or instructor's permission. Three hours.

161 The Development of Mathematics Historical development of mathematical sciences emphasizing interrelations among them. Individual assignments correspond to background and interests of students. *Prerequisite:* Nine hours of college mathematics. Three hours.

162 Geometry for Elementary and Middle School Teachers An informal, investigative approach to geometry. Extensive use of discovery experiences through inductive procedures as opposed to the traditional emphasis on deductive process found in high school geometry. Credit not given for Math. majors in EM. *Prerequisite:* 15 or a teaching certificate. Three hours.

173 Basic Combinatorial Theory Introduction to basic combinatorial principles emphasizing problem-solving techniques. Enumeration, Generating Functions, Fibonacci Numbers, Pigeonhole Principle, Inclusion-Exclusion, and Graph Theory. *Prerequisite:* 52 or 104. Three hours.

179 Teaching Secondary School Mathematics Contemporary secondary school mathematics curricula, their content from an advanced standpoint, unifying mathematical concepts and their implications at various levels, and introduction of selected mathematical topics. Intended only for students with an interest in teaching secondary school mathematics. Not acceptable as part of any mathematics requirement for a degree. *Prerequisites:* Education 178, acceptance to teacher education, or instructor's permission. Three hours.

191, 192 Special Topics An approved project under guidance of a staff member and culminating in a written report. Involvement with off-campus groups permitted. *Prerequisites:* Junior or senior standing, approval of department chairperson. One to three hours as arranged.

193, 194 College Honors

195 Special Topics

207 Probability Theory (Same as Statistics 251.)

221 Deterministic Models in Operations Research The linear programming problem. Simplex algorithm, dual problem, sensitivity analysis, goal programming. Dynamic programming and network problems. *Prerequisites:* 124; 121 desirable. Three hours.

222 Stochastic Models in Operations Research Development and solution of some typical stochastic models. Markov chains, queueing problems, inventory models, and dynamic programming under uncertainty. *Prerequisite:* 207 or Statistics 151, or instructor's permission. Three hours.

224 Analysis of Algorithms (Same as Computer Science 224.)

230 Ordinary Differential Equations Solutions of linear ordinary differential equations, the Laplace transformation, and series solutions of differential equations. *Prerequisite:* 121. *Corequisite:* 124 or instructor's permission. Credit not granted for more than one of the courses Math. 230 or 271. Three hours.

231 Real Analysis in One Variable Principles of analysis in one variable. Heine-Borel and Bolzano-Weierstrass theorems; rigorous development of differential and integral calculus infinite sequences and series of functions.* *Prerequisite:* 124. Three hours.

*This course is intended to be a terminal course in real analysis. Students interested in functions of several variables or in continuing on to 242 should choose Math. 241. No graduate credit for 231. Credit will not be given for both 231 and 241.

236 Calculus of Variations Necessary conditions of Euler, Legendre, Weierstrass, and Jacobi for minimizing integrals. Sufficiency proofs. Variation and eigenvalue problems. Hamilton-Jacobi equations. *Prerequisite:* 230. Three hours. Alternate years, 1997-98.

237 Introduction to Numerical Analysis Error analysis, root-finding, interpolation, least squares, quadrature, linear equations, numerical solution of ordinary differential equations. *Prerequisites:* 121; 124 or 271; knowledge of computer programming. Three hours.

238 Numerical Differential Equations Numerical solution of differential equations: initial-value and boundary-value problems; finite difference and finite element methods. *Prerequisite:* 237, either 230 or 271 recommended. Three hours.

240 Fourier Series and Integral Transforms Fourier series, orthogonal functions, integral transforms and boundary value problems. *Prerequisite:* 230 or 271. Three hours.

241 Analysis in Several Real Variables I Properties of the real numbers, metric spaces, infinite sequences and series, continuity. *Prerequisites:* 121, 124. Three hours.

242 Analysis in Several Real Variables II Differentiation in \mathbb{R}^n , Riemann-Stieltjes integral, uniform convergence of functions, Inverse and Implicit Function Theorems. *Prerequisite:* 241. Three hours.

243 Theory of Computation (Same as Computer Science 243.)

250 Groups and Rings An introduction to the basic concepts of abstract algebra emphasizing examples, including modular arithmetic, symmetric groups, cyclic groups, polynomial rings, homomorphisms, and isomorphisms.* *Prerequisite:* 124. Three hours.

*Students interested in a more comprehensive introduction of abstract algebra, including Galois Theory in Math. 252, should choose 251 instead of 250. No graduate credit for 250. Credit will not be given for both 250 and 251.

251 Abstract Algebra I Basic theory of groups, rings, fields, homomorphisms, and isomorphisms. *Prerequisite:* 124 or instructor's permission. Three hours.

252 Abstract Algebra II Modules, vector spaces, linear transformations, rational and Jordan canonical forms. Finite fields, field extensions, and Galois theory leading to the insolubility of quintic equations. *Prerequisite:* 251. Three hours.

255 Elementary Number Theory Divisibility, prime numbers, Diophantine equations, congruence of numbers, and methods of solving congruences. *Prerequisite:* 52 or 104. Three hours.

257 Topics in Group Theory Topics may include abstract group theory, representation theory, classical groups, Lie groups. *Prerequisite:* 251. Three hours. Alternate years, 1998-99.

260 Foundations of Geometry Geometry as an axiomatic science; various non-Euclidean geometries; relationships existing between Euclidean plane geometry and other geometries; invariant properties. *Prerequisite:* 52 or 104. Three hours.

264 Vector Analysis Gradient, curl and divergence, Green, Gauss, and Stokes Theorems, applications to physics, tensor analysis. *Prerequisite:* 121, 124 or 271. Three hours. Alternate years, 1998-99.

266 Chaos, Fractals, and Dynamic Systems Discrete and continuous dynamical systems, Julia sets, the Mandelbrot set, period doubling, renormalization, Henon map, phase

plane analysis and Lorenz equations. *Corequisite:* 271 or 230 or instructor's permission. Three hours.

268 Mathematical Biology and Ecology Mathematical modeling in the life sciences. Topics include population modeling, dynamics of infectious diseases, reaction kinetics, wave phenomena in biology, and biological pattern formation. *Prerequisites:* 124, 230; or instructor's permission. Three hours.

271 Applied Mathematics for Engineers and Scientists Matrix theory, linear ordinary differential equations. Emphasis on methods of solution, including numerical methods. *Co-requisite:* 121. Three hours. No credit for mathematics majors. Credit not granted for more than one of the courses Math. 230 and Math. 271.

272 Applied Analysis Partial Differential Equations of Mathematical Physics, Calculus of Variations, Functions of a Complex Variable, Cauchy's Theorem, integral formula. Conformal mapping. *Prerequisite:* 230 or 271. Three hours.

273 Combinatorial Graph Theory Paths and trees, connectivity, Eulerian and Hamiltonian cycles, matchings, edge and vertex colorings, planar graphs, Euler's formula and the Four Color Theorem, networks. *Prerequisite:* 52 or 104 or instructor's permission. Three hours.

274 Numerical Linear Algebra Direct and iterative methods for solving linear equations, least square factorization methods, eigenvalue computations, ill-conditioning and stability. *Prerequisite:* 237. Three hours.

275, 276 Advanced Engineering Analysis I, II (Same as Mechanical Engineering 303, 304; Civil Engineering 303, 304.) *Prerequisites:* 271 or 230; 275 for 276.

283 Junior-Senior Seminar Students required to give presentations on selected topics. *Prerequisite:* Instructor's permission. One hour.

293, 294 Undergraduate Honors Thesis Program of reading and research culminating in written thesis and oral presentation. Honors notation appears on transcript and Commencement Program. Contact department chairperson for procedures. Six to eight hours. (Not offered for graduate credit.)

295 Special Topics For advanced students in the indicated fields. Lectures, reports, and directed readings on advanced topics. *Prerequisite:* Instructor's permission. Credit as arranged. Offered as occasion warrants.

HONORS - ARTS AND SCIENCES

288, 289 Honors/Mathematics See page 64 and contact Department for specific requirements. Three hours each.

Mechanical Engineering (ME)

COLLEGE OF ENGINEERING AND MATHEMATICS

Professors Beliveau, Francis, Hermance, Hundal, von Turkovich; Associate Professors Durham, Huston (Interim Chairperson), Keller; Assistant Professors Chesler, Hitt; Adjunct Professor Japikse; Visiting Assistant Professors Sullivan, Straus; Adjunct Assistant Professor Golnazarian; Lecturer Rossi; Adjunct Instructor Jozefaciuk, Manock.

12 Dynamics (3-0) Kinematics and kinetics of particles and rigid bodies in two and three dimensions. Computer-aided analysis. *Prerequisites:* Civil Engineering 1, Math. 121. Three hours.

14 Mechanics of Solids (3-0) (Same as Civil Engineering 100.) Stress, strain, temperature relationships, torsion, bending stresses and deflections. Columns, joints, thin-walled cylinders. Combined stresses and Mohr's circle. *Pre-*

requisites: Civil Engineering 1, Math. 121, ME 12 or concurrent enrollment. Three hours.

40 Thermodynamics (3-0) Principles of engineering thermodynamics; applications of these principles to thermodynamic cycles. Credit not allowed for both 40 and 41. *Prerequisite:* Math. 22. *Corequisite:* Physics 31 with 21. Three hours.

42 Engineering Thermodynamics (3-0) Properties and processes of fluids; perfect gases, and approximate relationships for real gases; applications of thermodynamics, principles of combustion, mixtures, power cycles, gas compression, and refrigeration. *Prerequisite:* 40. Three hours.

44 Introduction to Heat Transfer Introductory treatment of heat transfer by conduction, convection, and radiation. *Corequisite:* 40. One hour.

82 Mechanical Engineering Laboratory I (0-3) Computational and experimental solids laboratory, parametric CADD, stress analysis, and measurement. *Prerequisite:* Civil Engineering 1. One hour.

95 Special Topics (1-3) One to three hours with instructor's approval.

101 Engineering Materials (3-0) Atomic structure, crystalline structure, mechanical properties of metals; testing of materials, multicomponent systems, phase equilibria, processing metals, polymers, composite materials, ceramics and glass corrosion. *Prerequisite:* 14. Three hours.

111 System Dynamics (3-0) Modeling of systems with mechanical, electrical, fluid, and thermal elements. Linear systems analysis. Response of vibratory and feedback systems. Computer simulation. *Prerequisite:* Junior standing in engineering. Three hours.

114 Introduction to Engineering Mechanics (3-0) Introduction to statics, dynamics, fluid mechanics, strength of materials, thermodynamics. *Prerequisite:* Junior standing in engineering or physical sciences. Three hours.

123, 124 Mechanical Engineering Laboratory II, III (0-3), (0-3) Engineering measurements, data analysis and theory of experimentation. Experiments with fluids and material testing machines and instrumentation for dynamic measurements. *Prerequisite:* Junior standing in ME. Two hours.

143 Fluid Mechanics (3-0) Fluid pressure distributions; integral control volume systems; differential relations for a fluid particle; dimensional similarity; viscous flow in ducts; boundary layer flows; inviscid incompressible flows. *Prerequisite:* 42. Three hours.

144 Heat Transfer One- and two-dimensional steady and unsteady thermal conduction; natural and forced internal and external convection; thermal radiation; heat exchangers; boiling and condensation heat transfer. *Prerequisite:* 143. Three hours.

150 The Engineering Profession (3-0) Professional practice of engineering. Laws, ethics, engineering economy, liability, insurance, and contracts. *Prerequisite:* Senior standing or instructor's permission. Three hours.

161 Manufacturing Engineering I (3-0) Mechanical and thermal processing of metallic and nonmetallic materials; casting, forming, cutting, grinding, joining, high energy forming, EDM, ECM, Laser, and ultrasonic. *Prerequisite:* Senior ME standing. Three hours.

162 Manufacturing Engineering II (3-0) Machine tools engineering, flexible manufacturing systems, robotics in manufacturing, automatic factory, computer-aided manufacturing. Three hours.

164 Manufacturing Design Project (0-1) Projects involving "design for manufacturing" of a product. One hour.

170 Mechanical Design (4-0) Advanced mechanics of materials, stress strain, bending and torsion of slender members, energy methods, finite element modeling, and CAD topics including parametric and solid modeling. *Prerequisite:* 101. Four hours.

171 Design of Elements (3-3) Mechanical fatigue criteria, fatigue analysis and design of springs, bolted/welded joints, gearing, shafts, bearings, power transmission. Introduction to computer-aided design and analysis. *Prerequisites:* Junior standing, 14. Four hours.

172 Design of Systems (3-0) Design synthesis and optimization; probabilistic aspects in design; expert systems in design. *Prerequisite:* 171. Three hours.

174 Industrial Design Project (0-1) Design projects from industry. *Prerequisite:* 171. One hour.

183 Mechanical Engineering Laboratory IV (0-3) Advanced engineering experimentation and data collection and reduction techniques applied to several mechanical engineering areas. *Prerequisite:* Senior standing in ME. Two hours.

185, 186 Senior Project (0-6), (0-3) An individual engineering study designed to particular interest of the student, utilizing and synthesizing the student's total mechanical engineering educational experience. *Prerequisite:* Senior standing. Fall: two hours. Spring: one hour.

191 Thesis (0-9) Investigation of a research or design project under supervision of assigned staff member culminating in acceptable thesis. *Prerequisites:* Senior standing, departmental permission. Three hours.

193, 194 College Honors

195 Special Topics *Prerequisite:* Senior standing in Civil or Mechanical Engineering. One to three hours with instructor approval.

203 Machinery Analysis and Synthesis (3-0) Kinematic and kinetic analysis of two- and three-dimensional machines; kinematic synthesis, electromechanical and servo mechanisms; application to robotic mechanisms. *Prerequisite:* Senior standing in ME. Three hours.

207 Biomechanics I Introduction to the structure and mechanics of the musculoskeletal system. Application of mechanics to bone, tendon, ligaments, and other biological materials. *Prerequisite:* Senior or graduate standing in ME, or instructor permission. Three hours.

208 Biomechanics II Introduction to biomaterials and the mechanical behavior of bioviscoelastic fluids or solids. *Prerequisite:* 207 or instructor permission. Three hours.

234 Mechanical Vibrations Analysis, measurement, and control of mechanical vibrations; SDOF, MDOF, and rotating systems, forced, free, and random vibrations. *Prerequisites:* 111, or senior or graduate standing in engineering or physical sciences. Three hours.

235 Turbomachinery Vibration Analysis and Testing Vibration in rotating machines; vibration measurement techniques; machinery condition and degradation; condition monitoring and predictive maintenance; industrial vibration techniques including proximity probes, accelerometers, FFT analyzer. *Prerequisite:* 244. Two hours.

241 Combustion Processes (3-0) Combustion thermodynamics; chemical kinetics; laminar flames, premixed and diffusion; turbulent flames; ignition, explosion, and detonation; droplet combustion; flame spread; large scale fires; rocket combustion. *Prerequisite:* Senior or graduate standing. Three hours.

242 Advanced Engineering Thermodynamics I (3-0) Foundations of statistical mechanics. Gases and crystals. Chemical equilibrium. Irreversible processes. *Prerequisites:* Senior or graduate standing or permission. Three hours.

243 Fluid Dynamics (3-0) Inviscid incompressible flows; compressible flows; open-channel flows; turbomachinery. *Prerequisite:* 143. Three hours.

244 Introduction to Turbomachinery Analysis Fundamental turbomachinery principles of fluid mechanics, thermodynamics, and structural analysis; basic equations and computational techniques for analysis and design to model and evaluate turbomachinery. *Prerequisite:* 243, Math. 271. Two hours.

245 Advanced Heat Transfer I (3-0) Transient heat conduction; integral methods; convection; formulation and solution; boiling, condensation; radiant heat exchange in enclosures and with emitting-absorbing gases, advanced view factors. *Prerequisite:* Senior standing in ME or instructor's permission. Three hours.

246 Centrifugal Compressors Fluid dynamic and thermodynamic principles of centrifugal compressor design and design practice; limits of stable operation and instability prediction and control. *Prerequisite:* 244. Two hours.

247 Centrifugal Pumps Centrifugal pump design principles and practice; performance limits; cavitation; design tools and pump design optimization. *Prerequisite:* 244. Two hours.

248 Turbomachinery Special Topics Content in axial fans/compressors; axial, radial, or steam turbines; CFD, dynamics/rotordynamics, or materials for turbomachinery; power plant or refrigeration cycle developments; turbocharged and compound IC-engines. *Prerequisite:* 244. One or two hours.

252 Mechanical Behavior of Materials (3-0) Elastic and plastic behavior of single crystals; dislocations; approximate plastic analysis; anisotropic materials; hardness; fractures; fatigue; damping; creep and surface phenomena. *Prerequisite:* 101, permission. Three hours. Credit given for 252 or 272, not both.

253 Corrosion of Materials Corrosion principles: electrochemical, environmental, and metallurgical aspects. Corrosion testing. Corrosion prevention. Seawater corrosion. Biological corrosion. Material selection. *Prerequisite:* 101. Three hours. Credit given for 253 or 273, not both.

255 Advanced Engineering Materials (3-0) Phase diagrams. Thermodynamics of crystals, alloys. Defects. Phase transformations. Heat treatment of steels. *Prerequisites:* Senior or graduate standing, or instructor's permission. Three hours.

257 Composite Materials Fibers, matrices. Unidirectional and short fiber composites. Experimental characterization. *Prerequisite:* 101. Three hours. Credit given for 257 or 277, not both.

265 Integrated Product Development (See Business Administration 293.) *Prerequisite:* Senior standing. Three hours.

281, 282 Seminar (1-0) Presentation and discussion of advanced mechanical engineering problems and current developments. *Prerequisite:* Senior or graduate engineering enrollment. One hour.

283 Laboratory Techniques for Turbomachinery Development Instruments and transducers for performance, flow, and structural measurements in turbomachinery; the role of test data in design and development; experimental data acquisition and processing. *Prerequisite:* 244. Two hours.

295 Special Topics Content is dictated by expanding professional interest in newly developing, or recently developed, technical areas in which there is particular need or opportunity. *Prerequisite:* Senior or graduate standing. One to three hours with instructor approval.

Medical Laboratory Science

See Biomedical Technologies.

Microbiology and Molecular Genetics (MMG)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES
AND COLLEGE OF MEDICINE

Professors Albertini, Bramley, Burke, Fives-Taylor, Kurjan, Novotny, Schaeffer, Wallace (Chairperson); Associate Professors Gilmartin, Heintz, Johnson, Pederson, Tierney; Assistant Professors Franchlyn, Morrical, Stein, Ward; Research Associate Professors Bateman, Raper; Research Assistant Professors Bond, Froeliger, Hatahet, Heckman, Melamede, Meyer; Lecturers Silverstein, Tessmann.

65 Microbiology and Pathogenesis Overview of microbiology, emphasizing the relationships between the structure, metabolism, and genetics of microorganisms and their roles in nature and in pathogenesis. *Prerequisite:* One semester chemistry. Not intended for students who have completed Biology 1 and 2 or equivalent. Four hours. Schaeffer.

101 Biology of Microorganisms An introduction to the biology of microorganisms, encompassing their diversity, metabolism, pathogenesis, and ecology. *Prerequisites:* One semester of chemistry and biology, or equivalent, or instructor's permission. Four hours. Fives-Taylor.

102 Molecular Genetics Modern molecular genetics. Topics include: mechanisms of gene expression in prokaryotes and eukaryotes; retroviruses; cancer biology; human genetic diseases. Emphasis on experimental and conceptual aspects. *Prerequisite:* 101, Botany 132, or instructor's permission. Four hours. Kurjan.

195 Special Topics *Prerequisite:* Instructor's permission. Credits negotiable.

197, 198 Undergraduate Research Undergraduate honors students accommodated in individual research projects sponsored by department member. Arrangement with individual department member and department chairperson approval. Credits negotiable.

201 Molecular Cloning Lab Intensive advanced laboratory course in the fundamentals of recombinant DNA technology through the isolation and characterization of a unique gene. *Prerequisite:* 102 or equivalent. Three hours. Shields.

203 Mammalian Cell and Molecular Biology Lab The basic principles and techniques of mammalian cell culture, basic animal virology as well as somatic cell and mammalian molecular genetics. *Prerequisite:* Biochemistry, genetics and/or cell biology courses and instructor's permission. Four hours. Schaeffer. Alternate years, spring 1999.

211 Prokaryotic Molecular Genetics The organization, replication, and expression of genes in prokaryotes, focusing on the genetics of *Escherichia coli* and its viruses. *Prerequisite:* Introductory microbiology, biochemistry, genetics, and/or cell biology courses. Three hours. Novotny.

220 Environmental Microbiology The activities of microorganisms, primarily bacteria, in air, soil, and water. *Prerequisite:* A previous course in microbiology. Three hours. Alternate years, spring 2000.

222 Clinical Microbiology Comprehensive study of human pathogenic microorganisms and their disease states in humans. Pathogenic bacteriology, medical mycology, and virology. Laboratory sessions provide practice experience in

handling and identifying these pathogens. *Prerequisite:* 65 or 101 or equivalent. Immunology recommended but not required. Four hours. Tessmann.

223 Immunology Analysis of the immune response with respect to structure and function of immunoglobulins and the T-cell receptor, tolerance, innate and adaptive immunity, the Major Histocompatibility Complex, hypersensitivity states, transplantation, cancer, and AIDS. *Prerequisite:* Instructor's permission. Three hours. Silverstein. Alternate years, fall 1999.

225 Eukaryotic Virology An in-depth analysis of eukaryotic virus-mammalian cell interactions emphasizing mechanisms by which viruses modulate gene expression in infected cells. *Prerequisite:* 101 or 102 or equivalent. Three hours. Gilmartin, Silverstein. Alternate years, fall 1998.

254 Protein: Nucleic Acid Interactions Cellular, replication, recombination, repair, and transcription of DNA, and processing, transport, and translation of RNA occur in macromolecular assemblies. Structure, formation, and function of these nucleoprotein assemblies using examples from prokaryotes, yeast, viruses, and mammalian cells in culture. *Prerequisite:* 211 or equivalent, and Agricultural Biochemistry 201 or Biochemistry 301 and 302 or equivalent. Three hours. Pederson. Alternate years, spring 1999.

295 Special Topics Supervised investigations in microbiology and molecular genetics. *Prerequisite:* Instructor's permission. Credit as arranged.

Middle East Studies

COLLEGE OF ARTS AND SCIENCES

Professor Mierse, Chair.

See Area and International Studies for special topics course listings.

Military Studies (MSTD)

Professor: Lt. Col. Turgeon (Chairperson); Assistant Professors/Officers: Barr, Desjardins, Edmonds, Spencer; Instructors:/Non-Commissioned Officers: Boyles, Evick, Johnson, Kirby.

Note: Total allowable credit for Military Studies varies with college/school. Military Studies courses are open to all students, regardless of major or intentions to complete the full cadet program. A two-hour weekly leadership laboratory is required for all students enrolled in MSTD 5-9, and 101-204. Students interested in pursuing an officer's commission through the ROTC should contact the Department of Military Studies.

2 War and Society (2) War and military systems in historical perspective. Effects of society on war and of war on society; the military thinkers; issues in the control of military force. *Prerequisite:* 1. First-year or sophomore standing or departmental permission. Spring. Two hours.

6 Basic Leadership Skills I Introduction to the Army and basic soldier skills. Classroom work covering Army traditions, role of the Army, and leadership theory. Lab required. *Prerequisite:* First-year or sophomore standing or departmental permission. One hour.

7 Basic Leadership Skills II Classroom instruction including Army organization, advanced map reading skills, leadership, fitness. Laboratory work increases land navigation skills through terrain association and map reading. Lab required. *Prerequisite:* First-year or sophomore standing or departmental permission. Two hours.

8 Basic Leadership Skills III Designed to teach individual soldier skills required for survival in modern combat and the leadership roles required for the infantry team. Lab required. *Prerequisite:* First-year or sophomore standing or departmental permission. Two hours.

9 Basic Leadership Skills IV Examines the leader's role in directing and coordinating the individual soldiers, squad, and platoon. Emphasis on troop-leading procedures and operations orders. Lab required. *Prerequisite:* First-year or sophomore standing or departmental permission. Two hours.

11 Leadership Laboratory A two-hour practical exercise incorporating classroom instruction while developing unit cohesion and leadership techniques. No credit. *Prerequisite:* Enrollment in MS classes.

***14 Orienteering** (1 Physical Education Credit) Basic introduction to orienteering. Concentration in map, compass, and terminology concluding with a moderate level orienteering competition. Classroom instruction and outdoor practical exercises.

***17 Military Fitness** Physical training designed to provide a vigorous workout three days a week. Instructors use U.S. Army standard exercises which test both upper body strength and aerobic ability. (One Physical Education credit.)

***18 Backpacking** Basic introduction to backpacking. Instruction in various types of backpacking equipment, food preparation, trek planning, and "leave-no-trace" wilderness ethics. Classroom instruction and outdoor, overnight practical exercise. *Prerequisite:* First-year or sophomore standing or departmental permission. One hour. (One Physical Education credit.)

101 Special Studies (Academic credit as arranged) In-depth analysis of topics broached in 2, 6, or 7. Guided research. Student proposes topic. Two hours.

102 Special Studies (Continuation of 101) Two hours.

****201 Leadership and Management I (2)** Fundamentals of leadership and management. Introduction to counseling and communication skills. Military land navigation. Orientation to officer specialty fields. Military professionalism and ethics. *Prerequisite:* 4. Fall. Two hours.

****202 Leadership and Management II (2)** Development of leadership skills. Instruction and practical application of skills required of a military leader. Management of small organizations. *Prerequisite:* 201. Spring. Two hours.

****203 Leadership and Management III (2)** Study of the preparation, conduct, and evaluation of training. Investigates leadership and management dilemmas of ethics and morality. Analysis of the military as a profession. *Prerequisite:* 202. Fall. Two hours.

****204 Leadership and Management IV (2)** Study of the legal processes and logistics and garrison systems used by the officer to resolve leadership and management problems. Spring. Two hours.

*Also listed under Physical Education Activities.

**Leadership and management I-IV must be taken sequentially. Acceptance into Army ROTC Advanced Course or departmental permission. 200-level Military Studies courses are not offered for graduate credit.

Molecular Physiology and Biophysics (MPBP)

COLLEGE OF MEDICINE

Professors Evans, Low, Nelson, Osol, Patlak, Poehlman, Warshaw (Chair); Associate Professors Haeblerle, Stirewalt; Assistant Professors Berger, Posada, Schneider, Segal, VanBuren; Research Professor

Maughan; Research Associate Professor Mulieri; Research Assistant Professors Fujii, Mitchell, Rowner, White, Woodcock-Mitchell.

19-20 Undergraduate Human Anatomy and Physiology Two-semester course with credit given only upon completion of both semesters. Structure and function of human body using cadaver dissections, histological material, and physiological experiments. Required of Medical Technology, Nursing, Nutritional Sciences, Dental Hygiene, Radiologic Technology, and Physical Education; others with instructor's permission. *Prerequisite:* 19 for 20. Four hours.

101-102 Physiology and Biophysics (3-3) A comprehensive, in-depth presentation of the scientific basis of human function. Primarily for Physical Therapy students; a limited number of others may be admitted with permission. *Prerequisites or concurrent:* Chemistry 23 and 42 or equivalent, two semesters general physics, one semester mathematics, permission. Four hours per semester.

191, 192 Undergraduate Research Individual laboratory research under guidance of faculty member. *Prerequisite:* Departmental permission. Three or six hours.

Music (MUS)

COLLEGE OF ARTS AND SCIENCES

Professor J. Ambrose (Chairperson), Chapman, Neuwem, T. Read, Wigness; Assistant Professors Cosenza, Schneider, Toner; Lecturers Blair, Boyer, Brown, Brubaker, Fleming, Geoghegan, Janson, Klimowski, E. Metcalfe, Pacun, Parker, Parshley, E. Read, Salisbury, Schenawolf, Schoales, Soons, Webb.

Students in all music courses are required to attend a designated portion of major ensemble concerts, faculty recitals, and formal student recitals as part of the course requirements. Music majors in all degree programs are expected to regularly participate in ensembles. A reasonable division between large and small ensembles should be observed.

THEORY AND COMPOSITION

3 Introductory Music Theory Rudiments of notation, rhythm, melody, harmony, scales, form, and terminology. Non-majors only. Three hours.*

31, 32 Basic Musicianship Study of melody and elementary harmony, melodic and rhythmic dictation, sight singing. *Prerequisites:* Basic piano facility or concurrent enrollment in Music 5-6, Group Piano; 31 for 32 or instructor's permission. Three hours. Metcalfe, Parker, T. Read.

41 Basic Electronic Music Emphasis on understanding and working with digital electronic sounds through MIDI, using synthesizers, computers, sequencing software and tape recorders, including a history of electronic music. *Prerequisite:* Basic music literacy. Three hours. Wigness.

123 Theory and Practice of Jazz Improvisation I Repertoire, idiomatic usage, aural skills, theoretical constructs, and strategies for the jazz improviser. *Prerequisites:* Intermediate instrumental skill, ability to read music, previous study of traditional music theory. Three hours.

131, 132 Intermediate Theory: Music of the Tonal Era Contrapuntal and harmonic dictation; counterpoint, harmony, and form analysis. *Prerequisites:* 31, 32; 131 for 132, or instructor's permission. Three hours. Concurrent enrollment in 133, 134.

133, 134 Intermediate Theory Lab Sight singing, keyboard, score reading. Concurrent enrollment in 131, 132. One hour.

231 Advanced Theory: 20th Century Music Techniques and form analysis of post-tonal contemporary music. *Prereq-*

uisites: 132, 134, or instructor's permission. Three hours. Parker, T. Read.

232 Advanced Theory: Counterpoint Analysis of contrapuntal forms and techniques. Music principally of 16th–18th centuries. *Prerequisites*: 132, 134, or instructor's permission. Three hours. Parker, T. Read.

233 Arranging Characteristics of instruments; arranging for ensembles. *Prerequisite*: 132 or instructor's permission. Three hours.

234 Orchestration Studies in orchestral scoring. *Prerequisite*: 233 or instructor's permission. Three hours.

235 Fugal Composition Study of representative baroque, classical, and contemporary fugal procedures through analysis and composition. *Prerequisites*: 231 or instructor's permission. Three hours.

237, 238 Composition Creative work in free composition with instruction according to needs and capabilities of individual student. *Prerequisite*: 231, 235, or instructor's permission. Three hours. May be repeated for credit. T. Read.

240 Seminar in Musical Analysis Advanced study of musical forms. Comparison of standard approaches to harmonic, motivic, and rhythmic analysis. *Prerequisites*: 235, instructor's permission. Three hours.

241 Senior Project in Music Theory Advanced study focusing on a theoretical topic under direction of assigned staff member. *Prerequisite*: Senior standing as Theory major. Three hours.

297, 298 Advanced Reading and Research Studies in comparison or related special topic under direction of assigned staff member.

HISTORY AND LITERATURE

1 Introductory Music Listening A concise view of Western music from plainsong to the present. Involves both classroom and outside listening. Non-majors only. Three hours.*

4 The Experience of Music Explores the phenomenon "music" through aural examination of its composite elements: melody, rhythm, harmony, texture, form. Musical examples drawn from Western and non-Western folk, art, and popular musical repertoires. *Prerequisite*: Nonmajors only. Three hours.*

11, 12 Survey of Western Music Historical study of development of Western music. First semester: Earliest times through the baroque. Second semester: Classical period to the present. Involves both classroom and outside listening. Three hours.

15 World Music Cultures Survey of non-Western and non-European music primarily of the geographic areas of Australia, Indonesia, China, Japan, India, Black Africa, and Native American Indians. Three hours.*

42 Introduction to the History of Jazz Survey of New Orleans, Chicago, Swing, bebop, cool, funky, and free jazz styles through the work of important soloists and bands, 1915–1965. Three hours.*

44 Introduction to the Blues and Related Traditions Survey of performers, musical procedures, technical means, and traditional lyrics of songsters, jug bands, gospel, barrel house piano, and important blues styles to about 1955. Three hours.*

*Courses may not be used to fulfill the major or minor requirements.

111 Classical, Romantic Chronological, analytical study of representative examples of music literature from approximately 1750–1900; Mozart, Haydn, Beethoven, Schubert, Berlioz, Schumann, Chopin, Liszt, Brahms. *Pre-*

requisite: 1, 3, 11, 12 or permission, ability to read music. Three hours. Offered in alternate years.

112 Contemporary Music Development and style characteristics of 20th century music from the late romanticists to the experimentalists. Both European and American composers presented. *Prerequisites*: 1, 3, 11, 12, or permission, ability to read music. Three hours. Offered in alternate years.

113 Medieval, Renaissance Chronological, analytical study of music literature from approximately 600–1600: Gregorian chant, Notre Dame, Burgundian, English, and Netherlands schools. *Prerequisites*: 1, 3, 11, 12, or permission, ability to read music. Three hours. Offered in alternate years.

114 Baroque Music Chronological, analytical study of music literature from approximately 1600–1750: Roman and Venetian schools, beginnings of opera, culminating in works of Handel and J.S. Bach. *Prerequisites*: 1, 3, 11, 12, or permission, ability to read music. Three hours. Offered in alternate years.

115 Genre or Specific Area Courses American music; ethnomusicology. *Prerequisites*: Three hours from 1, 3, 4, 11, 12, or permission. Three hours.

195, 196 Special Topics *Prerequisites*: Junior or senior standing; Music 11, 12, 131, 132, 133, 134. Three hours.

211, 212, 213, 214, 215 Seminars in Music Literature Seminars will treat in detail topics surveyed in intermediate level music literature sequence. Subject matter determined by instructor. *Prerequisites*: 11, 12; 111 for 211, 112 for 212, 113 for 213, 114 for 214; 115 for 215. Three hours. Offered on irregular basis as required by major enrollment.

216 Bibliography Seminar Biographies and critical works, bibliographies, Festschriften, scholarly and performing editions of music and discography surveyed. *Prerequisites*: 11, 12, one additional music literature course at 100 or 200 level. Three hours.

221 Senior Project For the advanced music history student — an opportunity to work with a faculty member on a topic of mutual interest. All topics subject to departmental approval. *Prerequisites*: 11, 12, six hours of intermediate and/or advanced courses in music literature. Three hours.

PERFORMANCE

For the fees for instruction, see page 17.

For B.A. students with a concentration in performance and B.M. students, except theory majors, a senior recital is required. See repertoire lists in department office for differences in expectations for B.A. and B.M. students. Regular appearances in departmental recitals are required of all performance students. All students taking lessons for credit are required to take jury examinations at the end of each semester. At the end of the sophomore year, all prospective performance majors are required to pass a junior standing examination by faculty jury to determine whether they will be accepted as majors and may enroll in performance study at the 200 level.

All music majors in any curriculum are required to pass a piano proficiency examination before certification of graduation. Prospective music majors who lack sufficient background to pass this examination must enroll in Group Piano (Music 5–8, First- and Second-Year Piano) at the appropriate level as determined after consultation with the instructor. Majors with little or no facility in piano are strongly advised to begin piano studies as soon as possible. For the exam, students will be required to:

1. Play one piano piece prepared in advance of the exam.
2. Sight-read a hymn and transpose it at sight.
3. Harmonize simple folk songs with a variety of accompaniment styles. Examples will include songs with no harmonization provided, those with chord symbols given, and those with accom-

paniment already provided. All must be accompanied and transposed at sight.

4. Sight-read a simple four-part SATB open score.

5. Sight-read a simple piano piece.

B.A. students electing a concentration in piano must take two semesters of accompanying (171); B.M. students majoring in piano will take four semesters of accompanying (171).

Each hour of credit in performance study requires a minimum of one hour's practice per day.

2 Introductions to Performance Study Group lessons at elementary level in various instruments and voice. Lab fee. One hour. May be repeated for credit.

5-8 Performance Study Group lessons in piano. *Prerequisites:* Ability to read music or proficiency on another instrument or voice. One hour. Metcalfe, Parker.

51-58 Performance Study Private instruction in an instrument or voice for nonmajors. Subject to availability of staff. Lab fee required. Contact department office for placement. Not open for credit to music majors or minors. One or two hours.

151-158 Performance Study Private instruction in an instrument or voice for music majors and minors at the first-year and sophomore levels. Lab fee required. Variable hours.

251-253 Performance Study Private instruction in an instrument or voice for majors at junior and senior levels. Lab fee required. Variable hours.

256 Performance Study Private instruction in voice or an instrument in the semester of senior recital. Lab fee required. Variable hours.

257 Performance Pedagogy Methods of teaching voice, strings, woodwinds, brass, percussion, or keyboard instruments including repertoire suitable for use at various levels of ability. Significant literature of all historical periods in major field. *Prerequisites:* Senior standing in performance, consent of instructor. Variable hours. (Not offered for graduate credit.)

259 Conducting Technique of the baton, score reading, laboratory practice. Preparation and performance of selected scores, including rehearsal procedures. Selected students may conduct University major ensembles. *Prerequisites:* 132, 134. Three hours.

PERFORMING ENSEMBLES

Large Ensembles Attendance at all rehearsals and public performances is required. *Prerequisite:* Audition. One hour. May be repeated for credit.

161 Band

162 Concert Choir

163 Choral Union

164 Orchestra

165 Vermont Wind Ensemble *Prerequisite:* Concurrent enrollment in 161.

Small Ensembles Study and performance of masterworks for small groups. Attendance at all rehearsals and public performances required. Outside practice required. *Prerequisite:* Audition. Variable hours. May be repeated for credit.

171 Accompanying

172 Brass Ensemble

173 Contemporary Ensemble

174 Catamount Singers

175 Opera Workshop

176 Percussion Ensemble

177 Small Ensemble

178 Jazz Ensemble

179 Trombone Choir

Pedagogy Classes Primarily for Education majors; others accepted with departmental permission. One hour.

81, 82 Brass Class

83, 84 String Class

85, 86 Voice Class

87, 88 Woodwind Class

89 Percussion Class

181 Music for Elementary Teachers Development of musical skills, understandings, and attitudes pertinent to teaching of music in elementary classroom. *Prerequisite:* Junior standing. Three hours.

184 Instrument Repair Laboratory for music education students in minor repair and adjustment of string, woodwind, brass, and percussion instruments. *Prerequisites:* String, woodwind, brass, and percussion classes or concurrent enrollment, departmental permission. One hour. Offered on occasional basis only.

186 Piano Repair – Tuning Basic knowledge of piano construction, tuning, and repairing. Departmental permission. One hour. Offered on occasional basis only.

265 Vermont Wind Ensemble Study and performance of masterworks for wind ensemble and concert band. Attendance at all rehearsals and concerts required. *Prerequisite:* Audition. One hour. May be repeated for credit. Toner.

281 Elementary Music Education Methods (Same as Education EDMU 281). *Prerequisite:* Junior standing in Music Education. Three hours. Cosenza.

282 Secondary Music Education Methods Methods and materials in the teaching of vocal and instrumental music in secondary schools. Five hours classroom observation per week required. *Prerequisite:* Junior standing in Music Education. Three hours. Cosenza.

HONORS – ARTS AND SCIENCES

240, 241 Honors/Music See page 64 and contact Department for specific requirements. Three hours each.

Natural Resources (NR)

SCHOOL OF NATURAL RESOURCES

Professors Cassell, DeHayes, Donnelly, Hannah, Manning, McIntosh, Newton, Reidel; Associate Professors Forcier, Hughes, King, Wang; Assistant Professors Ginger, Levine, Morrissey; Lecturer Turner.

1 Natural History and Field Ecology Introduction to the dynamics of the natural world. Basic concepts of biological, chemical, physical, and ecological sciences and the application and interpretation of quantitative measurements are presented within a natural history context. Four hours. Hughes, Hannah.

2 Nature and Culture Introduction to natural resources and the environment from a social/cultural perspective. Emphasis on environmental history, values, and ethics with application to natural resource and environmental policy. Three hours. Manning.

6 Race and Culture in Natural Resources Introduces the first-year student to issues of race and culture from a variety of disciplinary perspectives. One hour.

25 Elementary Natural Resource Measurements and Mapping Introduction to surveying, mapping, aerial photo measurements, and interpretation for natural resource planning and management. *Prerequisites:* A course in high school or college trigonometry; permission required of nonmajors. Four hours. Turner.

51 Environmental Aesthetics and Planning Examines historical changes in perceptions of natural and built landscapes, the issues involved in the appearance of landscapes today, and techniques for enhancing landscape beauty. Three hours. Not offered 1998–99.

73 Understanding Water Quality Introduction to water quality and water pollution in streams, lakes, wetlands, and ground water. Provides foundation for knowledgeable citizen participation in management of public waters. Credit not allowed for both 73 and 102. Three hours. Not offered 1998–99.

102 Water as a Natural Resource Characteristics of watersheds, lakes, rivers, and wetlands; discussion of the management of these ecosystems; effects of society on the water resource. *Prerequisites:* Biology 1; Zoology 9 or Botany 4 or equivalent; Chemistry 31, 23, 26, or 42 or equivalent. Three hours. Marsden.

103 Ecology, Ecosystems, and Environment Major ecological concepts and their application. Analysis of form, structure, and function of organisms, populations, communities, ecosystems, and landscapes. *Prerequisites:* 1; concurrent enrollment in 104 and 105 required. Three hours. Wang.

104 Social Processes and the Environment Social science theories and their application to environmental issues. Analysis of issues using theories of government, economics, and social movements. Emphasis on integrating frameworks to analyze environmental issues. *Prerequisite:* 2 and concurrent enrollment in 103 and 105 required. Three hours. Ginger.

105 Environmental Problem Analysis Examination of interdisciplinary dimensions of natural resource and environmental problems. Emphasis on social and ecological aspects of environmental issues and interdisciplinary teamwork. *Prerequisites:* 1, 2 and concurrent enrollment in 103 and 104. One hour.

130 Global Environmental Assessment (See Environmental Sciences 130.) Three hours. Morrissey.

140 Natural Resources Biostatistics Introduction to applied statistical methods for typical natural resources biological problems. Descriptive statistics, hypothesis testing, regression, and sampling design. Emphasis on problem formulation and solution. *Prerequisites:* Sophomore standing, two years of high school algebra. Four hours. Newton.

143 Introduction to Geographic Information Systems Understanding and application of computer-based, geographically-referenced information systems. *Prerequisites:* Junior standing; Computer Science 3 or 11. Three hours. Morrissey.

146 Remote Sensing of Natural Resources (See Forestry 146.) Three hours. Morrissey.

155 Fluvial Geology (See Geology 155.) Three hours. Drake, Mehrtens.

170 Introduction to Dynamic Simulation Elementary principles of dynamic simulation modeling and use of the STELLA II dynamic simulation software. Example simulations of natural environmental systems. *Prerequisite:* Sophomore standing. One hour. Cassell.

176 Water Quality Analysis (Same as Geology 176.) Selected aspects of elementary water chemistry and bioassay as related to surface and ground waters. Five laboratory ex-

periences. *Prerequisite:* 176. Three hours. (2.5 hours lecture per week and 20 hours lab per semester.)

185 Special Topics Special topics in natural resources beyond the scope of existing formal courses. Variable credit.

189 Student-Designed Course Work in Natural Resources Student-taught course work beyond the scope of formal courses in natural resources. Developed according to SNR guidelines with sponsorship by interested faculty. Variable credit, one–three hours.

205 Ecosystem Management: Integrating Science, Society, and Policy Integration of natural and social science into ecosystem management and policy. Consideration of ecosystem integrity, ecosystem degradation, human needs and values, and the application of management principles within a holistic context. *Prerequisites:* 1, 2, 103, 104. Three hours. Watzin. (Not offered for graduate credit.)

206 Environmental Problem Solving and Impact Assessment Group dynamics, impact assessment, risk assessment, and decision making. Emphasis on the process of solving complex environmental problems, interdisciplinary team work, and the National Environmental Policy Act. *Prerequisites:* 1, 2, 103, 104, 205, and statistics. Four hours. Donnelly. (Not offered for graduate credit.)

220 Landscape Ecology Study of pattern, process, and dynamics in the landscape. Considers the role of landscape pattern in determining habitat quality and ecosystem function. *Prerequisites:* One biology, one ecology course; senior standing. Two hours. Capen, Wang. Alternate years, 1998–99.

222 Pollution Ecology (See Environmental Sciences 222.) Three hours. McIntosh, Scherbatskoy.

224 Conservation Biology Conservation of biological diversity at genetic, species, ecosystem, and landscape levels. Emphasis on genetic diversity, population viability, endangered species, critical habitats, international implications. *Prerequisites:* Biology 1, 2; a 100-level ecology course. Three hours. Capen, DeHayes. (Not offered for graduate credit.)

228 Ecosystem Ecology (See Forestry 228.)

235 Legal Aspects of Planning and Zoning Comparison of Vermont planning and zoning law with that of other states. Case studies in planning, zoning, and land use controls. *Prerequisite:* Senior standing. Three hours.

236 Geochemistry (See Geology 235.) Three hours. Drake.

240 Wilderness and Wilderness Management (See Recreation Management 240.) Three hours. Manning.

250 Limnology Ecology of lakes and reservoirs, including their origin, physics, chemistry and biology, and the effects of anthropogenic perturbations. *Prerequisites:* An ecology course; a college-level chemistry course. Three hours. Levine.

251 Limnology Laboratory Field and laboratory experience in limnology, including sampling techniques, physical measurements and analysis of chemical and biological samples. *Prerequisite:* Previous or concurrent enrollment in 250. One hour. Levine.

252 Visual Resource Planning and Management Investigates the theories and principles of aesthetics related to landscape perception, and their applications to visual impact assessment and scenic resource planning. *Prerequisite:* Senior standing. Three hours.

253 Recent Sedimentation (See Geology 251.) Three hours. Hunt.

254 Advanced Natural Resource Policy (See Forestry 254.) Three hours. Reidel.

255 Field Methods in Water Resources Techniques used in field assessment of water quality in rivers and lakes. Case studies on the LaPlatte River and Lake Champlain. Sampling

strategies, field measurements, and data evaluation. Extensive field work. *Prerequisite:* 102 or equivalent basic course in water. Three hours. McIntosh.

260 Wetlands Ecology and Management Structure, dynamics and values of natural and artificial wetlands; wetlands management and issues. *Prerequisites:* Biology 1 and 2, and an upper-level ecology course. Three hours. Levine.

262 International Problems in Natural Resource Management Discussion of problems associated with the management of natural resources which have international implications. Topics may include deforestation, desertification, fisheries, wildlife, refuges, fuelwood, pollution. *Prerequisites:* Senior standing, permission. Three hours. Hudspeth.

270 Toxic and Hazardous Substances in Surface Waters The fate of toxic and hazardous pollutants, including trace elements and organics, in surface waters; effects on human health and aquatic biota. *Prerequisites:* Biology 1, Chemistry 23, 42; 102 or equivalent; senior standing. Three hours. McIntosh.

275 Natural Resource Planning: Theory and Methods Investigates theoretical development of natural resource planning. Studies planning methods appropriate to protection and use of scenic, recreational, forest, agriculture, and historic resources and ecologically sensitive areas. *Prerequisite:* Senior standing. Three hours. King.

276 Water Quality Analysis and Interpretation Selected aspects of water chemistry and bioassay as related to surface and ground waters. Laboratory analysis of water quality parameters and data interpretation. *Prerequisite:* One course in chemistry, calculus, statistics; senior standing. Three hours. Cassell.

278 Principles of Aquatic Systems Study of physical, chemical and biological principles as related to natural aquatic systems. Modelling dynamic behavior of aquatic systems using system simulation techniques. *Prerequisites:* Math. 19, Physics 11, Chemistry 23, 26 or equivalent, 170 or equivalent (or as a co-requisite) senior standing. Three hours (two hours lecture and three hours laboratory per week). Cassell.

279 Watershed Management Hydrology Fundamental elements of hydrology and contaminant transport in watersheds. Application of dynamic simulation techniques. Discussion of new technologies for watershed management. *Prerequisites:* 170 or equivalent (or as a co-requisite), Math. 20, Physics 11, Chemistry 23, 26 or equivalent, senior standing. Three hours. Cassell.

280 Stream Ecology Physical, chemical, and biological aspects of stream ecosystems. Impacts of human activities such as agriculture, forestry, and water withdrawal. Bioassessment techniques using macroinvertebrates and fish. *Prerequisites:* 102 or 250; one year biology, one year chemistry. Three hours.

285 Advanced Special Topics in Natural Resource Planning Advanced special topics in natural resource planning beyond the scope of existing formal courses. *Prerequisites:* Graduate or senior standing, instructor's permission.

299 Natural Resources Honors Honors project dealing with aquatic resources, terrestrial ecology, or integrated natural resources. *Prerequisite:* By application only; see program chair. Three to six hours.

Nuclear Medicine Technology

See Biomedical Technologies.

Nursing (NURS)

SCHOOL OF NURSING

Professors Hamel-Bissell, Winstead-Fry (Interim Dean); Associate Professors Cohen, Green-Hernandez, Murray, Welch; Assistant Professors Botter (Interim Associate Dean), Carr, Ettlinger, Kusserow, Morris, Sowan; Clinical Associate Professor Johnson; Clinical Assistant Professor Melvin; Lecturers Clements, Kasprisin, Laferriere, Sande, Whitney. (Adjunct faculty found in list of Faculty at the end of this catalogue.)

FOR NONMAJORS

15 Personal Power in Health Explores consumer power in health care. Addresses how an individual can influence personal health as well as health of community. Three hours.

20 Aging: Change and Adaptation (Same as Early Childhood and Human Development 20/Home Economics 20 and Sociology 20). Individual and social meanings of aging and old age; physical, physiological, psychological, and sociological changes accompanying aging; individual family, community, and societal adaptations to aging. Three hours.

96 Visions Exploration of educational preparation and roles of professional nurse in today's society. Includes on-site observations. Open to first-year majors and others with department permission. One hour.

100 Biology of Aging (Same as Early Childhood and Human Development 152) Human aging examined emphasizing biological and nonpathological physiological changes and their effects on the functioning of elders. *Prerequisites:* Biology 4 or Anatomy and Physiology 9, 10 or 19-20 or permission. Three hours.

135 Health Issues in Developing Countries Discussion of status and practice issues in developing countries including several Black African countries and Peoples' Republic of China. Historical, sociocultural, religious, political perspectives. Three hours.

140 Issues in Women's Health Exploration of psychosocial, biophysical needs of women as health care consumers/providers. Considers pros and cons of stereotypical, theoretical, clinical approaches utilized in treating women. *Prerequisites:* Introductory psychology, human development, or sociology; junior standing or department permission. Three hours.

195, 196 Special Topics

PROFESSIONAL NURSING MAJOR (PRNU)

Note: All courses limited to students majoring in Nursing.

110 The Art and Science of Nursing (3-0) Exploration of ways of knowing in nursing that lead to understanding of the human experience of health. Content includes: theory, professional role development, ethics, and legal aspects of nursing practice. *Prerequisites:* Chemistry 23, 26; Sociology; Psychology 1; Environmental Studies; Early Childhood and Human Development 5; English 1. Three hours.

111 Research in Nursing (2-0) An introduction to the research process and its relationship to theory and nursing practice. Knowledge and skills essential for understanding and utilization of research are presented. *Pre- or corequisite:* 110 (Generic students only), 112, Statistics 111 or 141. Two hours.

112 Introduction to Nursing Informatics (.5-1) An introduction to the knowledge and skills necessary for the areas of Informatics and information management that are an important part of effective practice and research in nursing. One hour.

113 Assessment and Promotion of Health of Individuals, Families, and Communities (3-6) Through classroom and

practicum, students learn to holistically assess and differentiate health from at-risk findings of clients in a variety of settings. *Pre- or corequisites:* 110, 111, 112; *Anatomy and Physiology* 20. *Prerequisites:* *Anatomy and Physiology* 19, *Micro. and Mol. Gen.* 65, *Nutritional Sci.* 43. Five hours.

120 Influences on Experiences of Health (2-0) Focus on the influences of the health care system on human experiences of health. Health care system critically examined from the perspectives of clients, nurses, other health care providers, health care organizations, and the government. *Prerequisite:* 113. Two hours.

121 Transitions Across the Lifespan (2-0) Developmental, situational, and health-illness transitions which occur across the lifespan. Theories, characteristics, and human experiences associated with transitions are explored. *Pre- or corequisite:* 120. Two hours.

122 Caring for Healthy Children (1-3) Focus on human experiences of healthy children and families. Through classroom and practicum students learn to holistically care for healthy children and their families in a variety of settings. *Pre- or corequisites:* 120, 121, 124, 128. Two hours.

123 Caring for Childbearing Woman (1-3) Focus on the human experiences of healthy childbearing. Through classroom and practicum in a variety of settings, students have opportunities to learn holistic nursing care for the childbearing family. *Pre- or corequisites:* 120, 121, 128. Two hours.

124 Caring for Health Adults and Elders (1-3) Focus on the human experience of being a healthy adult and elder. Through classroom and practicum students learn to holistically care for healthy adults and elders within the context of family in a variety of settings. *Pre- or corequisites:* 120, 121, 122, 128. Two hours.

128 Nursing Implication of Drug Therapy (3-0) Examination and application of knowledge of pharmacotherapeutic principles to nursing practice. *Prerequisite:* 113. Three hours.

131 Experiences of Alteration in Health I (3-0) Focus on the human experience of alteration in health for individuals and their families. Content addresses individual and family responses to disease processes from a holistic perspective. *Prerequisites:* 122, 123, 124; *Pathology* 101. Three hours.

132 Caring for Children with Alterations in Health (2-3) Focus on children experiencing alteration in health. Through classroom and practicum students learn to holistically care for children experiencing alterations within the context of family, in a variety of settings. *Pre- or corequisite:* 131. *Corequisite:* 134. Three hours.

133 Caring for Childbearing Women with Alterations in Health (1-0) Focus on women experiencing alterations in health related to pregnancy or desired pregnancy. Impact on fetal well being will be discussed. Family implications of these alterations also explored. *Pre- or corequisite:* 131. One hour.

134 Caring for Adults and Elders with Alterations in Health I (2-9) Focus on adults and elders experiencing alterations in health. Through classroom and practicum students learn to holistically care for adults and elders experiencing alterations within the context of family, in a variety of settings. *Pre- or corequisite:* 131. *Corequisite:* 132. Five hours.

231 Experiences of Alterations in Health II (3-0) The second of a two-course sequence focusing on the human experience of alteration in health for individuals and their families. Content addresses individual and family responses to disease processes from a holistic perspective. *Prerequisites:* 132, 133, 134. Two hours.

234 Caring for Adults and Elders with Alterations in Health II (2-9) The second course of a two-course sequence focusing on adults and elders experiencing alterations in health. Through classroom and practicum students learn to holistically care for adults and elders experiencing alterations within the context of family, in a variety of settings. *Pre- or corequisite:* 231. Five hours.

235 Caring for Individuals with Alterations in Mental Health (2-6) Focus on individuals experiencing alterations in mental health. Through classroom and practicum students learn to holistically care for individuals experiencing alterations in mental health in a variety of settings. *Pre- or corequisite:* 231, *Psychology* 152 (effective Class of 1998). Four hours.

240 Contemporary Issues and Leadership in Professional Nursing (3-0) Current issues and leadership in the nursing profession. Prominent issues in nursing are explored from a historical, political, and futuristic perspective. Strategies dealing with issues are formulated using theories of change and leadership. *Pre- or corequisites:* 234, 235. Three hours.

241 Health Care Issues for Populations at Risk (3-0) Focus on populations at risk and pertinent health care issues. The role of the nurse as leader and provider of care to groups and communities is addressed. *Pre- or corequisite:* 240. Three hours.

242 Caring for Clients and Populations at Risk Through seminar and practicum the student will understand the continuum of care required by populations at risk. The role of the nurse as leader and provider of direct care is emphasized. Students with assistance of faculty select the primary practicum site. *Pre- or corequisite:* 241. Six hours.

REGISTERED NURSE ALTERNATE TRACK (PRNU)

Note: All courses limited to RN students majoring in nursing.

150 Health Assessment and Promotion of Individuals, Families, and Communities (5-3) Assessment of health, prevention of illness with the individual, family, and community as client. Examination of the role of environment in health. Through classroom and practicum, students holistically assess and promote the health of clients in a variety of settings. Eight hours.

250 Clients and Populations at Risk (4-4) The role of the nurse within a multidisciplinary team. The application of change/leadership theory emphasized. Through classroom and practicum, students plan and provide care for populations at risk in a variety of clinical settings. *Prerequisites:* 111, 112, 150; *Chemistry* 23, 26; *Anatomy-Physiology* 19, 20; *Micro. and Molecular Genetics* 65, *Nutritional Sci.* 43, *Statistics* 111, *Psychology* 1, *Sociology* 1, *English* 1, *Early Childhood and Human Dev.* 5, *Environmental Studies* 1. Eight hours.

Nutrition and Food Sciences (NFS)*

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Professors Carew, Chamberlain, C. Donnelly, Kindstedt, Poehlman, Tyzbir (Chairperson); Associate Professors Chen, Johnson, McArthur, Pintauro, Ross, Sheard; Assistant Professor Clark; Extension Associate Professor Harvey-Berino; Lecturers Gagne, Geiger, Pritchard; Adjunct Assistant Professor S. Donnelly; Adjunct Instructors Kaskoun, Lyons.

**Note: Department name change pending final approval by Board of Trustees.*

43 Fundamentals of Nutrition (3-0) Comprehensive study of specific nutrients in terms of their availability, function, and utilization in mammalian species. *Prerequisites:* High school chemistry and biology. Three hours. Carew. Fall / Spring.

44 Survey of the Field: Nutrition and Food Sciences (1-0) Introduction to the professional field and career opportunities in human nutrition and foods. Required of all first-year and transfer students. One hour. Ross. Fall.

53 Basic Concepts of Foods (3-0) Study of the scientific aspects of food emphasizing reasons for procedures used and phenomena occurring in food preparation. Three hours. Ross. Spring.

54 Basics Concepts of Foods Laboratory (0-3) Developing comprehension of scientific principles of food preparation through modification of standard recipes, manipulation of ingredients and techniques, and evaluation using sensory and objective methods. *Prerequisite:* 53 or concurrent registration in 53 or permission. One hour. Ross. Spring.

63 Obesity, Weight Control, and Fitness (3-0) Introduction to the causes, consequences, and reputed cures of obesity which includes: evaluation of body composition and modification of eating and exercise behaviors in weight control. Three hours. Tyzbit. Fall / Spring.

104 Sensory Evaluation of Foods (2-3) Nature of sensory responses to aroma, taste, and texture of foods; relation of sensory data to instrumental measurements; statistical analysis and interpretation of sensory data. *Prerequisite:* A course in Statistics. Three hours. Chen. Alternate years, Fall 1999. (not offered for graduate credit)

123 Methods in Nutrition Education (3-0) Planning and presenting of appropriate methods, media, and materials for audiences in community, school, and institutional settings emphasizing interpersonal communication and group process skills. *Prerequisite:* 43. Three hours. Chamberlain. Fall.

124 Professional Presentations (3-0) Techniques of effective oral presentations including theory and practice. *Prerequisite:* 123 recommended. Three hours. Chamberlain. Fall/Spring.

143 Nutrition in the Life Cycle (3-0) Nutritional needs of people throughout the life cycle. Physiological and environmental factors which affect nutritional status. Designed for nutrition majors. *Prerequisites:* 43. Three hours. Johnson. Fall.

150 Quantity Food Production and Service (3-4) Principles and techniques of food accounting, recipe and menu planning/costing, preparation and service including equipment, sanitation, and time motion studies. *Prerequisite:* 53. Four hours. Geiger. Fall.

163 Sports Nutrition (3-0) Emphases basic nutritional concepts, energy expenditure during resistance and endurance exercise, diet during training, timing and composition of pre- and post-competition meals, use of nutrient supplements and ergogenic aids, and special needs of various athletic groups. Three hours. Tyzbit. Fall/Spring.

165 Management of Eating Disorders (3-0) Examines the causes, diagnosis, and treatment of body image disorder, anorexia nervosa, bulimia nervosa, binge eating, and obesity. Information is provided through readings, lecture, discussion, and speakers. *Prerequisite:* Psychology 1 or Sociology 1 or permission. Three hours. Ross. Spring.

175 International Nutrition (3-0) Analyzes the economic, social, political, and environmental forces that contribute to the current nutritional problems (e.g. chronic and acute hunger, protein-energy malnutrition, micronutrient deficiencies, breast feeding vs. bottle feeding) in developing countries. Students are required to write three papers. Three hours. McArthur. Spring.

176 Food and the Consumer (3-0) Examines dietary trends and traditions of various demographic groups in society, a historical overview of food safety and consumer

protection, the health food movement, and the influence of food advertising on consumer behavior. *Prerequisite:* Sophomore standing. Three hours. McArthur. Fall.

195 Special Topics Lectures, laboratories, readings, or projects relating to contemporary areas of study. Credits negotiable. Enrollment may be more than once, maximum of 12 hours in 195 and 295 combined. *Prerequisite:* Departmental permission.

196 Field Experience Professionally-oriented field experience under joint supervision by faculty and business or community representative. Credits negotiable, maximum of 15 hours in 196 and 296 combined. *Prerequisite:* Departmental permission.

197,198 Undergraduate Research Individual laboratory or community research in food or nutritional sciences under the guidance of a faculty member. Arrangement with faculty member and department chair permission. Credits negotiable up to three hours per semester.

201 Fermented Dairy Foods (3-3) Fundamental processes involved in the manufacture of domestic and imported cheese varieties and other cultured dairy foods. Acquired knowledge of manufacturing procedures applied at pilot plant level. *Prerequisites:* A course in organic chemistry, Ag. Biochem. 201, or permission. Four hours. Kindstedt. Alternate years, spring 2000.

203 Food Microbiology (3-3) Desirable and undesirable activities of bacteria in foods. Mechanisms of food-borne infection and intoxication. Laboratory methods to enumerate and identify microorganisms associated with food. *Prerequisites:* A course in biochemistry. Four hours. S. Donnelly.

204 Industrial Microbiology (3) Microbiological processes, procedures, and technology of economic importance are discussed. Emphasis on principles of biotechnology and applied molecular genetics. *Prerequisites:* 203 or Micro. and Molecular Genetics 65, 101. Three hours. S. Donnelly.

206 Principles of Food Engineering (3-3) Engineering fundamentals involved in food industry. Conservation of mass and energy; thermodynamics; fluid mechanics; conduction, convection, and psychometrics; and drying. *Prerequisites:* Math 19 or instructor's permission. Four hours. Chen. Alternate years, spring 1999.

220 Observation and Participation in Public Schools Required for licensure. Exploration of education careers in a variety of Family and Consumer Sciences related areas and in different types of schools and programs.

221 Management of School Youth Organizations (2-0) The role of a youth organization advisor, particularly FHA/HERO. Emphasis on service learning and use of advisory councils. Includes observation and participation in school-related activities. Two hours. Chamberlain. Fall/Spring. (Not offered for graduate credit.)

222 Curriculum Development in the Human Sciences (3-0) Basic principles of curriculum development applied to human sciences education. Unique characteristics and contributions of human science education as related to educational, economic, and sociological trends. Three hours. Chamberlain. Spring (odd number years).

223 Methods of Education in the Human Sciences (3-0) Planning and presenting of appropriate methods, media, and materials for audiences in community, school, and institutional settings emphasizing interpersonal communication and group process skills. Three hours. Chamberlain. Fall.

224 Evaluation Techniques in the Human Sciences (3-0) Test, questionnaire, and interview schedule construction and other non-testing means of evaluation. Usability,

objectivity, validity, reliability, and discrimination of evaluation instruments. Selected sociometric techniques and evaluation in affective domain. Three hours. Chamberlain. Spring (even numbered years).

225 Teaching Practicum in the Human Sciences Teaching in middle or secondary schools under guidance of cooperating teacher and college supervisors. *Prerequisite:* Twelve hours in education courses. Credits variable up to 15 hours per semester. Chamberlain. Fall/Spring. (Not offered for graduate credit.)

243 Advance Nutrition (3-0) Study of nutrients and their specific functions in metabolic process integrating cellular physiology, biochemistry, and nutrition. *Prerequisites:* 43, Ag. Biochem. 201 or equivalent, Anatomy and Physiology 19 or equivalent; junior standing. Three hours. Sheard. Spring.

249 Nutrition Seminar (1-0) Review of recent developments in nutrition research. *Prerequisites:* 242, instructor's permission. One hour. Pintauro. Fall/Spring.

250 Food Service Systems Management (3-0) Organization and administration of food service systems including principles of production, accounting management decisions, communications, and legal responsibilities specific to quantity food production. Emphasis on problem solving. *Prerequisites:* 150, Business Admin. 120, or permission. Three hours. Geiger. Spring. (Not offered for graduate credit.)

253 Food Safety and Regulation (3-0) Comprehensive study of the relationships between food processing and preservation, food toxicology, and the scope, applicability, and limitations of U.S. food laws. *Prerequisites:* Ag. Biochem. 201 or equivalent. Three hours. Pintauro. Spring.

260 Diet and Disease (3-2) Examination of the physiologic, biochemical, and psychosocial basis of several disease states with application of the normal and therapeutic food and nutrition principles associated with treatment. *Prerequisites:* 53, 123, 143, 243. Four hours. Ross. Fall.

261 Clinical Nutrition (3-0) Applications of clinical nutrition including practice experiences in interviewing, nutritional assessment and counseling, case studies, and in-depth discussions of current controversies in the dietary management of specific diseases. *Prerequisites:* 260, and concurrently enrolled. Three hours. Sheard. Fall.

262 Community Nutrition (3-0) Analysis of current programmatic and policy approaches addressing the major nutrition-related health problems in the U.S. Emphasis on program planning, marketing, and evaluation of community nutrition services. *Prerequisites:* 260, senior standing. Three hours. Johnson. Spring.

263 Nutritional Biochemistry (3-0) Comprehensive study of metabolism of carbohydrates, lipids, and protein emphasizing hormonal control, nutritional and metabolic interrelationships, and dietary abnormalities (e.g. starvation and obesity). *Prerequisites:* 243 or instructor's permission. Three hours. Tyzbir. Spring.

273 Clinical Practicum Professional field experience providing preventive and therapeutic nutritional information and education to individuals or groups under the direct supervision of a Registered Dietitian. Credit negotiable but not to exceed three. *Prerequisite:* Instructor's permission. Gagne. Fall/Spring. (Not offered for graduate credit.)

274 Community Practicum Professional field experience providing community nutrition information and service under the direct supervision of a Registered Dietitian. Credit negotiable but not to exceed three. *Prerequisite:* Instructor's permission. Harvey-Berino. Spring. (Not offered for graduate credit.)

290 Research Methods in Nutritional Sciences (1-6) Advanced research methods, including grant proposal preparation, Institutional Review Board requirements, data analysis and presentation, and selected laboratory techniques in advanced nutritional biochemistry. *Prerequisites:* Agricultural Biochemistry 201, 202, senior/graduate student standing or instructor's permission. Four hours. Pintauro. Spring.

295 Special Topics Lectures, laboratories, readings, or projects relating to contemporary areas of study. Credits negotiable. Enrollment may be more than once, maximum of 12 hours in 195 and 295 combined. *Prerequisite:* Departmental permission.

295 Nutrients as Medicine (3-0) An examination of the effectiveness of nutrients and other dietary components in disease prevention and treatment, including consideration of the biochemical and physiological mechanisms involved. *Prerequisites:* Ag. Biochem. 201 or equivalent. Three hours. Pintauro. Fall.

296 Field Experience Professionally-oriented field experience under joint supervision of faculty and business or community representative. Credit negotiable. Maximum of 15 hours in 196 and 296 combined. *Prerequisite:* Departmental permission.

Pathology (PATH)

COLLEGE OF MEDICINE

Professors Bovill (Chairperson), Craighead, Hardin, Howard, Korson, Mossman, Pendlebury, Stark, Tracy, Trainer, Winn, Yandell; Associate Professors Heintz, Huber, Lunde, MacPherson, Morrow, Taatjes, Tindle, Waters, Weaver; Assistant Professors Adams, Allen, Cook, Drejet, Gibson, Harmon, Janssen-Heininger, Mattia, Mount, Tang, Trask, Tutschka, Zarka.

101 Introduction to Human Disease (2-3) Elementary course in human pathology designed for Allied Health students. First portion deals with general mechanisms of disease, followed by disorders of specific organs. *Prerequisites:* College biology, anatomy, and physiology. Three hours.

305 Molecular Mechanisms of Disease Introductory course on molecular and cellular pathways of disease induction and development. Emphasis on environmental diseases. For graduate students and postdoctoral fellows and undergraduates with permission of course director (Mossman). Alternate years. Three hours.

306 Pathology Environmental Disease Computer-assisted basic pathology series with emphasis on skin, lung, brain, and digestive tract. Alternate years with 305. One hour.

375 Special Topics in Molecular Pathobiology Five independent, rotating one-semester modules concerning: Atherosclerosis (Dr. R. Tracy), DNA Replication (Dr. Heintz), Human Genetics (Dr. Yandell), Cell Imaging Techniques (Dr. Taatjes), and Cell Signalling in Differentiation and Apoptosis (Drs. Janssen, Timblin). Each course based on critical review of the primary literature. *Prerequisites:* Biochemistry 301, 302 or instructor's permission. Open to undergraduates with instructor's permission. Two hours. Heintz, Janssen, Taatjes, Timblin, Tracy, Yandell.

395 Special Topics in Pathology: Immunopathology In-depth analysis of the role of the immune system in disease processes. Discussions center on current and controversial areas of immunopathology. *Prerequisites:* Immunology (Microbiology 223) desirable. Two hours. Alternate year course with 305.

Pharmacology (PHRM)

COLLEGE OF MEDICINE

Professors J. Bevan, Brayden, Hacker, McCormack, Nelson (Chair), Scollins; Associate Professor Shreeve; Assistant Professors Damon, Dostmann, Lounsbury; Research Assistant Professors Bhushan, Bigelow, Bonev, Heppner; Visiting Professors Dustan, Lederer, Standen; Visiting Associate Professor Hescheler; Visiting Assistant Professor Laher; Adjunct Professor Tritton; Adjunct Assistant Professors Bress, Freilich.

190 Pharmacology for Physical Therapy Basic pharmacology and classes of drugs which may alter the responsiveness of patients to physical therapy. *Prerequisites:* Physiology and Biophysics 101–102, Pathology 101. Two hours. Damon.

272 Toxicology The biology of environmental intoxicants and of drug abuse. Ecologic and physiologic consequences of the dissemination of agricultural, industrial, and medicinal chemicals. *Prerequisites:* Organic chemistry, background in biology. Three hours. Hacker.

290 Topics in Molecular and Cellular Pharmacology Focuses on basic principles, drug interactions with receptors, membranes, synapses, neurotransmitters, macromolecules, cytoskeleton, ion channels and pumps, and mechanisms of drug resistance. *Prerequisites:* Introductory course in organic chemistry, background in physiology or health sciences. Three hours. Hacker.

302, 303 Pharmacological Techniques Experiments conducted under supervision in the areas of drug metabolism, modes of drug action, physicochemical properties of drugs, bioassay, and toxicology. Open to undergraduates with instructor's permission. Two hours, by arrangement.

328 Introduction to Medicinal Chemistry Important classes of drugs are surveyed. Emphasis on relationships between physicochemical properties and pharmacologic activity; synthetic aspects considered. *Prerequisites:* Chemistry 131–132. Open to undergraduates with instructor's permission. Three hours. McCormack.

Philosophy (PHIL)

COLLEGE OF ARTS AND SCIENCES

Professors Christensen, Guignon, Hall, Kornblith, Mann, Pereboom (Chairperson); Associate Professors Kuflik, Loeb; Assistant Professors Chan, Miller.

Indications about the frequencies with which courses are offered are in some cases only estimates. Students should consult the department for further information.

1 Introduction to Philosophy: Selected Problems Introduction to philosophy through such fundamental problems as the existence of God, the basis of morality, and the possibility of knowledge. Contemporary and historical readings. Three hours. Offered every semester. Guignon, Hall, Kornblith, Loeb, Miller, Pereboom.

3 Introduction to Philosophy: East and West Introduction to the historical dialectic of philosophy by comparisons and contrasts between Chinese and Western traditions of philosophy. Three hours. Offered every semester. Chan.

4 Introduction to Philosophy: Ethics Introduction to philosophy through an analysis of the principal problems and theories of ethics. Three hours. Offered every semester. Kuflik, Loeb.

Note: Credit will not be given for more than one of 1, 3, 4, 95, 96.

13 Introduction to Logic Study of the basic principles of deductive inference. Three hours. Christensen, Kornblith, Mann.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing department offerings. See Schedule of Courses for specific titles. Three hours.

101 History of Ancient Philosophy Study of the works of the Pre-Socratics, Plato, Aristotle, and their successors. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Fall. Hall, Mann.

102 History of Modern Philosophy Study of works of the major philosophers of the 17th and 18th centuries: Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, Kant, and others. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Spring. Pereboom.

105 History of Medieval Philosophy Study of works of such major philosophical figures as Augustine, Anselm, Abelard, Aquinas, Duns Scotus, and William of Ockham. *Prerequisite:* 101 is recommended. Three hours. Alternate years. Mann.

107 19th Century Philosophy Study of works of such philosophers as Hegel, Fichte, Schopenhauer, J. S. Mill, Kierkegaard, Nietzsche, and Marx. *Prerequisite:* 102 is recommended. Three hours. Alternate years. Hall.

110 Nature of Mind Examination of philosophical issues raised by influential psychological views of the nature of the human mind. *Prerequisite:* 1, 3, 4, 95, 96 or one course in psychology. Three hours. Fall. Kornblith, Pereboom.

112 Philosophy of Science Introduction to major philosophical problems raised by science. Typical topics: the nature of scientific inference, the structure of theories, causation, explanation, and scientific change. *Prerequisite:* One course in philosophy or one course in history of science or six hours in any natural science. Three hours. Fall. Christensen.

121 Chinese Philosophy I Study of the Classical Schools of Chinese thought, including Confucianism, Taoism, Mohism, and Legalism. *Prerequisite:* One course in philosophy, religion, or Asian studies. Three hours. Offered two out of every three semesters. Chan.

122 Chinese Philosophy II Chinese thought from the Han Dynasty to Mao Zedong's thought. *Prerequisite:* 121. Three hours. Alternate years. Chan.

130 Philosophical Foundations of Education Critical examination of the aims of education and the most appropriate means of achieving those aims. Readings from historical and contemporary sources. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Alternate years. Miller.

133 Marxism Survey of the philosophy of Karl Marx and the Marxist tradition on such topics as historical materialism, human nature, alienation, freedom, social change, and revolution. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Miller. Alternate years.

135 Philosophy of Religion Typical topics: the nature of religion, the concept of God, the grounds for belief in God, mortality, truth, and revelation. Historical and contemporary sources. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Offered once a year. Hall, Mann.

140 Social and Political Philosophy Analysis of such fundamental theories and problems in social and political thought as political obligation, rights, and justice. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Offered once a year. Hall, Kuflik, Loeb.

142 Philosophy of Law I (Same as Political Science 143.) Analysis of the nature of law, the relation between law and morality, obligation to obey the law, the judicial decision, responsibility in law, legal ethics. *Prerequisite:* 1, 3, 4, 95, 96 or Political Science 41. Three hours. Offered once a year. Hall, Kuflik, Loeb; Wertheimer (Political Science).

143 Philosophy of Law II (Same as Political Science 144.) Problems of liberty, e.g. freedom of expression, pri-

vacy, paternalism; scope and limits of the criminal law; philosophy of punishment; selected problems in criminal justice, e.g. plea bargaining; preventive detention. *Prerequisite:* 1, 3, 4, 95, 96 or Political Science 41. Three hours. Offered once a year. Kuflik, Loeb; Wertheimer (Political Science).

144 Philosophical Problems in Medicine Critical and intensive examination of such problems as abortion, euthanasia, dying and death, the ethics of organ transplantation, and the ethics of genetic engineering. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Offered once a year. Kuflik, Loeb.

151 Philosophical Ideas in Literature Philosophical themes as exemplified in literature. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Alternate years. Guignon, Hall.

152 Philosophy of Art A consideration of some leading theories of art, and their application to problems of art as they appear in music, literature, painting, and in the general criticism of the arts. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Offered once a year. Hall.

153 Philosophy and Film An examination of style in film from the perspective of philosophical aesthetics, and of the ways film style can be used to express philosophical themes. *Prerequisite:* 1, 3, 4, 95, 96. Three hours. Pereboom.

160 Recent Continental Philosophy Survey of 20th century continental philosophy, including phenomenology, hermeneutics, critical theory, structuralism, and poststructuralism. Readings from Husserl, Heidegger, Sartre, Saussure, Wittgenstein, Habermas, and Foucault. *Prerequisites:* 1, 3, 4, 95, 96 or instructor's permission. Three hours. Guignon.

170 Feminism: Theories and Issues Theories of libertarianism, liberalism, and egalitarianism; application to the analysis and evaluation of social issues of contemporary interest, such as abortion and affirmative action. *Prerequisite:* One course in philosophy. Three hours. Chan.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

201 Theory of Knowledge Critical examination of nature and sources of knowledge; belief, truth, evidence, perception, memory, and induction. *Prerequisite:* 102 or 112. Three hours. Offered every fall semester. Kornblith.

202 Metaphysics Critical examination of such topics as the nature of space and time, the concept of change, the identity of the self, the nature of the world and man's place in it. *Prerequisites:* 101, 102 or 110. Three hours. Offered every spring semester. Christensen, Kornblith, Mann.

210 Philosophy of Mind Major philosophical theories of the mind and its relation to the physical world, the nature of sensation, desire, and belief, and the relation between thought and action. *Prerequisite:* 102 or 110. Three hours. Alternate years. Kornblith, Pereboom.

217 Philosophy of Language Philosophical study of the nature of language. *Prerequisite:* Linguistics 101, 102. Three hours. Alternate years. Christensen, Kornblith.

221 Topics in Chinese Philosophy Detailed examination of a classical Chinese philosophical text or school. *Prerequisite:* 121 or 122. Three hours. Alternate years. Chan.

235 Topics in the Philosophy of Religion Advanced study of such issues as the metaphysics of religion, the epistemology of religious belief, philosophy and faith, religion and science, and religion and ethics. (May be repeated for credit when topic is significantly different and with departmental approval.) *Prerequisites:* 101, 102 or 135. Three hours. Mann.

240 Contemporary Ethical Theory Analysis of the ideas of contemporary moral philosophers in normative ethics and metaethics. *Prerequisite:* 140, 142, 143 or 144. Three hours. Alternate years. Kuflik, Loeb.

241 Contemporary Social and Political Philosophy An analysis of the ideas of contemporary philosophers in social and political philosophy. *Prerequisite:* 140, 142, 143, or 144. Three hours. Alternate years. Kuflik, Loeb.

242 Justice and Equality (Same as Political Science 241.) An examination of contemporary normative theories of distributive justice and equality. *Prerequisite:* 140, 142, 143, or 144. Three hours. Offered once a year. Kuflik, Loeb; Wertheimer (Political Science).

260 Topics in Continental Philosophy Study of a central issue in current continental philosophy, e.g. social theory, psychoanalysis, or aesthetics. Readings from Nietzsche, Heidegger, Gadamer, Ricoeur, Habermas, Derrida, and Foucault. *Prerequisites:* 107, 160, or instructor's permission. Three hours. (May be repeated for credit when topic is significantly different.) Guignon. Alternate years.

265 American Philosophy The thought of such leading American philosophers as Peirce, James, Royce, Santayana, Dewey, and Whitehead. *Prerequisites:* 101, 102. Three hours. Alternate years. Miller.

271, 272 Seminar: Major Philosophical Author or School Study of major philosophical texts by a single author or school of thought. May be repeated for credit when different authors are studied. *Prerequisite:* An appropriate 100-level course in philosophy. Three hour. Offered once a year.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

297, 298 Readings and Research Independent study with an instructor on a specific philosopher or philosophical problem. *Prerequisite:* An appropriate 200-level course in philosophy.

HONORS – ARTS AND SCIENCES

242, 243 Honors/Philosophy See page 64 and contact Department for specific requirements. Three hours each.

Physical Therapy (PT)

SCHOOL OF ALLIED HEALTH SCIENCES

Associate Professors Hall, Held (Chair), Reed, Zimny; *Assistant Professors* Henry, Wu; *Clinical Associate Professors* Nelson, O'Rourke; *Clinical Assistant Professors* Cromwell, Menendez, O'Brien, Orest, Sands; *Clinical Instructors* Currier, Dye, Lawrence.

41 Introduction to Physical Therapy Profession Aspects of practice management skills; the medical, ethical, legal, and cultural aspects of practice. Clinical assignments provide opportunity for observation of concepts in practice. *Prerequisites:* Sophomore standing; Anatomy 201 corequisite. Three hours. Held, Nelson.

120 Musculoskeletal Bases for Practice of Physical Therapy Principles of structure and function of the musculoskeletal system related to static and dynamic elements of movement. Practice of basic tests and measurements used by physical therapists to identify abnormalities of musculoskeletal system. *Prerequisites:* Anatomy and Neurobiology 201, Physics 11. Six hours. Henry, Wu.

121 Musculoskeletal Evaluation and Management Procedures Principles of assessment and management of musculoskeletal dysfunction. Observational, manual, and profes-

sional skills necessary to collect, organize, integrate, and interpret patient data for making clinical decisions. *Prerequisite:* Junior standing in PT; 120, Anatomy and Neurobiology 201. Four hours. Zimny.

122 Sensory-Motor Development Sensory-motor provisions for posture and movement at all ages, including neuroanatomical substrates, simple reflex patterns, and complex motor sequences of movement. Basic physiological changes throughout the life cycle. *Prerequisites:* Junior standing in PT, Anatomy and Neurobiology 202, Early Childhood and Human Development Studies 5. Three hours. O'Rourke.

124 Modalities Theory and application of physical agents including heat, cold, light, water, sound, electricity, massage, traction, pneumatic pressure, and biofeedback. Selected clinical topic areas. *Prerequisites:* Junior standing in PT; Physics 11, 12, Physiology and Biophysics 101-102. Five hours. Reed.

125 Performance Physiology Cellular and systemic aspects of physiology of exercise applied to theory and practice of physical therapy. *Prerequisites:* Senior standing in PT; Physiology and Biophysics 101-102. Two hours. Reed.

126 Neuromuscular Treatment Skills Clinical theory and practice of neuromuscular treatment skills, as applied in patients with primary musculoskeletal conditions (laboratory discussion). *Prerequisites:* Junior standing; Anatomy 201, 202. One hour. Reed, Zimny.

127 Neurophysiological Bases and Practice of Physical Therapy Advanced concepts in the neurophysiological basis of normal and abnormal movement control as a context for therapeutic intervention in neurologically impaired individuals. *Prerequisites:* Senior standing in PT, Anatomy and Neurobiology 202. Five hours. Held, O'Rourke.

131 Clinical Medicine I Introduction to diagnosis and medical/surgical management of orthopaedic disorders including the physical therapist's role in identifying these problems. Two hours. Zimny.

132 Clinical Medicine II Introduction to the diagnosis and medical/surgical management of general medical disorders including the physical therapist's role in identifying these problems. Two hours. O'Brien.

133 Clinical Medicine III Introduction to the diagnosis and medical/surgical management of neurologic, pediatric, and psychological disorders including the physical therapist's role in identifying these problems. Three hours. O'Rourke.

142 Professional Communications Development of the written and verbal skills of professional communication emphasizing legal and ethical ramifications. Preparation to fulfill communication responsibilities of clinical practice. *Prerequisite:* 41. One hour. Nelson.

143 Educational Methodology for Physical Therapy Practice Introduction to learning theory and methods as they apply to the various teaching roles of the physical therapist. *Prerequisites:* Junior standing in PT; 41, 142. One hour. Sands.

144 Health Care Systems Administration and Organization in Physical Therapy An overview of health care in the U.S. emphasizing the social, cultural, economic, regulatory, and political systems as they affect patients and the delivery of care. *Prerequisites:* 41, 142, 143. Two hours. O'Brien.

145 Practice Issues in Physical Therapy An integration of social, cultural, economic, regulatory, political, and ethical factors and systems as they influence the practice of physical therapy. Emphasis on contemporary issues. *Prerequisites:* Senior standing in PT; 41, 142, 143, 144. Two hours.

156-158-160 Clinical Education I, II, III Students assigned to approved clinical centers throughout the U.S. but focused in the Northeast. Students begin with supervised observation and progress to fully participate in evaluation and treatment of patients. Learning experiences are designed to meet objectives of University and clinical facility for clinical competency. (Three full-time, eight-week periods; May-July of junior year, and January-April of senior year.) I: four hours; II: six hours; III: six hours. *Prerequisite:* Satisfactory completion of all departmental courses. Nelson, Sands.

175 Independent Study Selection and development of topic for investigation using assigned faculty member as preceptor. Seminar sessions for guidance and problem solving on related issues. One to three hours, variable.

177 Scientific Inquiry Clinical inquiry presented as a methodology. Student defines problem, reviews literature, designs study, and identifies appropriate statistical tools for analysis. Plans for clinical inquiry and methods of dissemination of information are explored. *Prerequisite:* A statistics course. Three hours.

Physics (PHYS)

COLLEGE OF ARTS AND SCIENCES

Professors Arns, Rankin, Smith, Wu (Chairperson); Associate Professors Anderson, Clougherty, Spartialian; Assistant Professor Yang.

5 Introductory Astronomy Survey of astronomy and astrophysics from broad scientific and cultural perspective. Stellar and galactic astronomy. Limited use of algebra and geometry. Three hours.

6 Introductory Astronomy Survey of astronomy and astrophysics from broad scientific and cultural perspective. Planetary and extragalactic astronomy, relativity, and cosmology. Limited use of algebra and geometry. Three hours.

9 Energy and the Environment (2-3) Forms of energy as defined in physics; sources, uses, and transformations of energy: introductory seminar and laboratory will place emphasis on environmental issues. Limited use of algebra. Three hours.

11, 12 Elementary Physics (4-0) Survey of principles of classical and modern physics without calculus, appropriate for students concentrating in life or health sciences. Accompanying labs: Physics 21, 22. *Prerequisites:* 11 or 31 for 12; secondary school algebra and trigonometry. Four hours.

21 Introductory Laboratory I (0-3) *Prerequisite:* Concurrent enrollment or credit in 11 or 31. One hour.

22 Introductory Laboratory II (0-3) *Prerequisite:* Concurrent enrollment or credit in 12 or 42. One hour.

23 Astronomy Laboratory (0-3) *Prerequisite:* Concurrent enrollment in 5 or 6. One hour.

31 Introductory Physics (4-0) Mechanics including oscillations, waves, heat, and kinetic theory. Recommended for students in engineering, natural sciences, premedical programs. Accompanying lab: 21. *Prerequisites:* Math. 21, secondary school trigonometry. Four hours.

42 Electromagnetism and Modern Physics (4-0) Electricity, magnetism, optics, modern physics. Recommended for students in natural sciences, premedical programs. Accompanying lab: 22. *Prerequisite:* 31, Math. 22. Four hours.

125 Electromagnetism and Optics (3-2) Electricity, magnetism, electromagnetic waves, optics. With lab. Recommended for students of engineering, physical sciences.

Credit not allowed for both 42 and 125. *Prerequisites:* 31; Math. 22, concurrent enrollment in Math. 121. Four hours.

128 Waves and Quanta (3-0) Classical and electromagnetic waves, physical optics, wave-particle phenomenology, wave mechanics, and applications of the Schrödinger equation. *Prerequisites:* 42, Math. 121. Three hours.

130 Introductory Laboratory III (0-2) *Prerequisite:* Concurrent enrollment or credit in 128. One hour.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. *Prerequisite:* 128, department permission.

197, 198 Readings and Research *Prerequisite:* 128, department permission.

201, 202 Experimental Physics (1-3) Experiments in classical and modern physics. May be entered at beginning of either semester and repeated for credit up to a maximum of four semesters. *Prerequisites:* 42 or 128, Math. 121, junior standing. Three hours.

211 Mechanics Newtonian dynamics of particles and systems of particles, with applications to problems of special importance, such as driven and coupled harmonic oscillators and central field trajectories. *Prerequisites:* 42 or 125, Math. 121. Three hours.

213 Electricity and Magnetism Fundamental principles of electricity and magnetism; electrostatic fields, and magnetic fields of steady currents. Electric and magnetic properties of matter and electromagnetic energy. *Prerequisites:* 42 or 125, Math. 121. Credit not given for more than one of 213 or Electrical Engineering 141. Three hours.

214 Electromagnetism Introduction to time dependent electromagnetic fields. Maxwell's equations in vacuum and in matter. Electromagnetic waves and radiation. *Prerequisite:* 213. Three hours. Credit not given for more than one of 214 or Electrical Engineering 142. Alternate years, spring 2000.

222 Biological Physics Physical laws, processes, and interactions pertaining to biological systems. *Prerequisites:* 12 or 42, Math. 121. Three hours.

242 Introduction to Solid State Physics Introduction to crystal structures, reciprocal lattices, lattice vibrations. Thermal properties of solids and free electron theory of metals and semiconductors. Elementary band theory and introduction to electronic transport theory. *Prerequisite:* 128. Three hours.

257 Modern Astrophysics Stellar structure and evolution, compact objects, the interstellar medium, galactic structure, gravitational theory, and cosmology, the formation of our solar system and terrestrial life. *Prerequisite:* One 100-level course in physical science or engineering. Three hours. Rankin.

258 Relativity Development of Einstein's theory of special relativity. Lorentz transformation, time dilation, length contraction, mass variation, relative velocities. Introduction to four-dimensional space. Concepts of general relativity. Applications selected from astrophysics, elementary particles, etc. *Prerequisite:* 128. Three hours.

264 Nuclear and Elementary Particle Physics Introduction to theoretical and experimental aspects of nuclear and elementary particle physics. *Prerequisites:* 128, junior standing. Three hours.

265 Thermal Physics Thermodynamics, kinetic theory, statistical mechanics. *Prerequisites:* 42; Math. 121. Three hours.

273 Quantum Mechanics I Introduction to nonrelativistic quantum mechanics. Schrödinger equation and applications to simple systems. *Prerequisites:* 128, 211. Three hours.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

HONORS - ARTS AND SCIENCES

244, 245 Honors/Physics See page 64 and contact Department for specific requirements. Three hours each.

Plant and Soil Science (PSS)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Professors Aleong, Boyce, Magdoff, Murphy, Parker; Assistant Professor Starrett; Extension Professors Berkett (Chairperson), Gotlieb, Perry; Extension Associate Professors Bosworth, Jokela; Extension Assistant Professor Garcia; Research Associate Professor Brownbridge; Research Assistant Professors Harper, Ross, Skinner.

10 Home and Garden Horticulture Planning, selecting, and maintaining shrubs, trees, flowers, lawns, fruits, and vegetables around the home. Designed primarily for non-agricultural students. Three hours. Starrett.

11 Principles of Plant Science Principles and practices involved in the culture, management, and utilization of economically important horticulture and agronomic crops. Three hours. Starrett.

106 Insect Pest Management (3-2) Survey of the major insect orders, and methods for controlling injurious species. *Prerequisite:* 11. Four hours.

107 Forest Entomology (2-2) Ecology and population dynamics of insects affecting forests and forest products. Insect control by silvicultural, biotic, and chemical means. *Prerequisite:* Junior standing in Forestry or Urban Forestry and Landscape Horticulture. Three hours. Parker.

122 Small Fruit Crops (2-2) Principles of small fruit production, including propagation, culture, management, and harvesting. *Prerequisite:* 11 or permission. Three hours. Garcia.

123 Garden Flowers and Indoor Plants (2-3) Identification, growth habit, use, care, environmental tolerances, and problems of outdoor herbaceous plants and indoor flowering and foliage plants. Considered from professional viewpoint. *Prerequisite:* 10 or 11 or Botany 4 or permission. Three hours. Alternate years, 1999-00. Perry

124 Vegetable Crops (2-2) Principles and practices of commercial vegetable production, including seed production, tillage, cultural practices, nutrition value, storage, and processing. *Prerequisite:* 11 or permission. Three hours. Alternate years, 1998-99.

125 Woody Landscape Plants (3-3) Identification, climatic requirements, cultural management, and use of ornamental plant materials in landscape planting. *Prerequisite:* 11 or Botany 4 or permission. Four hours. Starrett.

131 Landscape Design I (2-4) A studio course emphasizing theory of landscape design and its application to actual landscape design problems. Graphic communication techniques included. *Prerequisite:* 11 or permission. Three hours.

132 Landscape Design II (2-4) Advanced techniques in landscape design. Grading, construction details, graphic techniques, site analysis as well as various design problems. *Prerequisites:* 125 or 131, or Recreation Management 138 or permission. Three hours.

138 Commercial Plant Propagation (3-2) Principles and practices involved in propagating herbaceous and woody plants by seeds, division, layering, cuttings, budding, grafting, and aseptic culture. *Prerequisite:* 11 or permission. Four hours. Starrett.

141 Forage Crops (2-3) Identification, establishment, and management of crops grown for hay, pasture, and silage. *Prerequisite:* 11 or permission. Three hours. Murphy. Alternate years, 1999–00.

145 Turfgrass Management (2-3) Establishment, maintenance, and utilization of turf for lawns, parks, athletic fields, airports, cemeteries, roadsides, golf courses, and ski slopes. *Prerequisite:* 11 or Botany 4 or permission. Three hours. Alternate years, 1998–99. Bosworth.

152 Agroecology An ecosystem approach to agriculture. Ecological thinking in agriculture, plant/soil ecosystems, ecological design principles and specific sustainable systems (permaculture, biodynamics, agroforestry, organic). *Prerequisite:* Three credits in a basic biological or ecological science or permission. Three hours. Harper.

154 Composting Ecology and Management Examines the ecological principles and practical management of on-farm composting process. Students focus on independent term research projects to understand the composting process. *Prerequisite:* Three credits in a basic biological or ecological science or permission. Three hours. Harper. Alternate years, 1998–99.

161 Fundamentals of Soil Science (3-3) Biological, chemical, and physical properties of the dynamic soil system as related to plant growth and environmental problems. *Prerequisite:* Inorganic chemistry or permission. Four hours. Harper.

162 Soil Fertility and Management An agroecological analysis of soil fertility management including nutrient supply and uptake, rhizosphere-microbial interactions, fertility evaluations, and management techniques. *Prerequisite:* 161 or permission. Three hours. Harper.

197 Undergraduate Special Topics Lectures, laboratories, readings, field projects, surveys, or research designed to provide specialized experience in horticulture, agronomy, soils, or plant environment. *Prerequisite:* Permission. One to three hours; up to 15 hours may be arranged through department chairperson for approved off-campus project.

205 Mineral Nutrition of Plants (See Botany 205.) Alternate years, 1998–99.

210 Soil Erosion and Conservation (2-4) General hydrologic processes involved in surface runoff and resultant soil erosion land management techniques for controlling soil and sediment pollution. Two field trips by arrangements. *Prerequisites:* 161, Math. 2 or 9, Chemistry 3, permission. Three hours. Alternate years, 1999–00.

215 Weed/Crop Ecology Weed identification, reproduction, ecological relationships with crops, and integrated management. *Prerequisite:* 11, 161 or permission. Three hours. Murphy. Alternate years, 1998–99.

217 Pasture Production and Management Physiological and ecological relationships of pasture plants, effects of grazing livestock on them; grazing management effects on livestock and pastures; emphasis on French Voisin system. *Prerequisites:* 11, 161 or permission. Three hours. Murphy.

221 Tree Fruit Culture (2-3) Theory and practice of modern commercial fruit science. Nutrition and cultural responses to various management practices. *Prerequisites:* 11, 161 or permission. Three hours. Alternate years 1998–99. Garcia.

232 Biological Control of Insect Pests (2-2) Survey of the biological agents used in controlling insects and related arthropods, and their application and limitations. *Prerequisite:* An intermediate course in entomology. Three hours. Alternate years, 1998–99.

261 Soil Morphology Classification and Land Use (2-4) Field techniques that describe soil properties and clas-

sification; the principles and processes of soil genesis; land use classification systems; and the challenges of competing land uses. *Prerequisite:* 161 or permission. Three hours. Harper. Alternate years, 1998–99.

264 Chemistry of Soil and Water (3-3) An environmentally-oriented study of the colloidal chemistry of soil and its interfaces with roots, water, and air. *Prerequisites:* 161, two semesters chemistry or permission. Four hours. Ross. Alternate years, 1998–99.

266 Soil Water Movement (2-3) Mathematical and physical principles of the soil-water-plant interaction and its relationship to environmental and agricultural issues. *Prerequisites:* 161, one semester of physics or permission. Three hours. Alternate years, 1999–00. Ross.

269 Soil and Water Pollution and Bioremediation Examines key issues in pollution of soil and water. Topics include type of pollutants, their reactions in soil and water, pollution prevention and bioremediation. Three hours. Magdoff. Alternate years, 1999–00.

281 Seminar Presentation and discussion of papers on selected topics of current interest by students and staff. Spring semester. *Prerequisite:* Senior standing. One hour.

297 Special Topics Lectures, laboratories, readings, field projects, surveys, or research designed to provide specialized experience in horticulture, agronomy, soils, entomology, and integrated pest management. *Prerequisite:* Senior standing and/or permission. One to three hours.

Political Science (POLS)

COLLEGE OF ARTS AND SCIENCES

Professors Ball, Burke, Cooper, Elliott, Moyser (Chairperson), Nelson, Ventriss, Wertheimer; Associate Professors Bryan, Burgin, Feldman, Forrest, Gause, Gierzynski, Kaufman, Neal, Stavarakis, Taylor, Zheng; Assistant Professors Kingstone, Smith, Steele.

The following courses (21, 41, 51, 71) may all be taken without prerequisite. Each course introduces students to a different subfield of political science.

21 American Political System Institutions, processes, and problems of American government. Three hours.

29 American Civil Rights Movements Examination of American racial discrimination; emphasis on strategies and actions of NAACP, SCLC, SNCC, Black Panthers, Nation of Islam, to end racial discrimination. Three hours.

41 Introduction to the Problems of Political Thought Examination of basic problems in political philosophy, e.g. morality and law; punishment; freedom; equality; obligation and disobedience. Three hours.

51 Introduction to International Relations Examination of the basic theoretical concepts in international relations. Introduces the student to systemic, domestic, and individual levels of analysis for assessing foreign policy decisions. Three hours.

71 Comparative Political Systems Examination of political behavior, political structures, and political processes from a cross-national perspective. Three hours.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. Three hours.

All courses numbered 121–198 require sophomore standing and the appropriate core course.

121 Law and Politics Examination of the U.S. courts focusing on the legal and political factors that influence court action, and judicial action that affects public policy. *Prerequisite:* 21. Three hours.

122 Constitutional Law: Governmental Powers Emphasis on developing skills of legal analysis. Historical origins and general principles of constitutionalism. *Prerequisite:* 21. Three hours.

123 The Vermont Political System Analysis of the political processes and institutions of governance in Vermont in the context of the federal system and other American states. *Prerequisite:* 21. Three hours.

124 The Presidency The functions and activities of the President and staff. *Prerequisite:* 21. Three hours.

125 Political Parties Analysis of political parties with special emphasis upon party realignment and reform, campaign techniques for nomination and election, and comparative party systems. *Prerequisite:* 21. Three hours.

126 Introduction to Public Administration Introduction to study of public administration emphasizing such matters as organization, management, personnel, financial administration, and policy making in modern bureaucracies. *Prerequisite:* 21. Three hours.

127 The Congressional Process Organization, procedure, and behavior of the chambers of the U.S. Congress. *Prerequisite:* 21. Three hours.

128 Issues of Public Policy Analysis of selected problems of public policy, e.g. welfare, macroeconomic policy, regulation, energy, and housing. *Prerequisite:* 21, 41; Economics 11-12 strongly recommended. Three hours.

129 Constitutional Law: Civil Rights in America Critical examination of role of judiciary in enforcing 14th Amendment's "Equal Protection Clause." *Prerequisite:* 21. Three hours.

131 Political Leadership Methods of identifying leaders, their relationships with nonleaders and with one another, their impact on public policy, and their personalities and social backgrounds. *Prerequisite:* 21. Three hours.

132 The U.S. Supreme Court: Process and Policy The U.S. Supreme Court as one of the three major political institutions, including the selection process, intracourt politics, and dynamics of court decision making. *Prerequisite:* 21. Three hours.

133 Public Opinion and Political Participation Theories and the empirical study of public opinion and political participation. Topics include: public opinion polling methodology, the origins of political outlooks, ideology, authoritarianism, generational politics, public opinion on race, voting behavior. *Prerequisite:* 21. Three hours.

135 Women in American Politics Examines the intersections of race, gender, and class in shaping women's participation in American politics and their approaches to public policy issues dealing with sex and gender. *Prerequisite:* 21 or one course in Women's Studies. Three hours.

137 Politics and the Media The role of the media in politics, including how media presentation and interpretation of events affect public opinion, political institutions, and public policy. *Prerequisites:* 21. Three hours.

138 Constitutional Law: Civil Liberties Investigation of the Supreme Court's interpretation of the First Amendment, rights of the accused, and the right to privacy. *Prerequisite:* 21. Three hours.

141, 142 History of Political Thought First semester: Development of Western political thought from Plato to Aquinas. Second semester: Modern political thought from Machiavelli to Nietzsche. *Prerequisite:* 41. Three hours.

143 Philosophy of Law I (Same as Philosophy 142.) Analysis of the nature of law, the relation between law and morality, obligation to obey the law, the judicial decision, responsibility in law, legal ethics. *Prerequisite:* 41 or Philosophy 1 or 3 or 4. Three hours.

144 Philosophy of Law II (Same as Philosophy 143.) Problems of liberty, e.g. freedom of expression, privacy, paternalism; scope and limits of the criminal law; philosophy of punishment; selected problems in criminal justice. *Prerequisite:* 41 or Philosophy 1 or 3 or 4. Three hours.

146 Marxist Political Theory Intellectual foundations of Marx's thought, the development of Marx's social and political theory, and the major strains and developments in Marxist political thought. *Prerequisite:* 41. Three hours.

149 Intermediate Political Theory Intermediate courses on topics in political theory beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. *Prerequisite:* 41 or instructor's permission. Three hours.

151 American Foreign Policy Overview of the United States' involvement with the world. Focuses on the domestic political, institutional, and ideological influences on the formation of policy. *Prerequisite:* 51. Three hours.

154 International Political Economy Examination of the major theories in international political economy. Specific topics include trade, finance, development, foreign direct investment, and the multinational corporation. *Prerequisite:* 51 or Economics 11. Three hours.

155 Theories of International Relations Examination of current debates in international relations: domestic/international interactions, conflict between the goals of security and the pursuit of wealth; coping with a changing world. *Prerequisite:* 51. Three hours.

156 War, Ethics, and Social Change Examination of views of war and the conduct of war over time. State practices analyzed in light of international legal/normative perspectives and technological changes. *Prerequisite:* 51. Three hours.

Courses numbered 157-179 may be taken by Area and International Studies majors without political science prerequisite if the student has the appropriate area studies background.

157 International Politics of the Middle East Formation and operation of the state system in the 20th century Middle East. Emphasis on Great Power involvement, Arab-Israeli issues, regional conflict, transnational ideologies. *Prerequisite:* 51. Three hours.

161 Political Geography (See Geography 177.) *Prerequisite:* 51 or 71 or Geography 1 or 3.) Three hours.

168 Middle East Politics State formation in the Middle East and problems it has occasioned. Review of modern history and examination of contemporary politics of several countries. *Prerequisite:* 71. Three hours.

170 Politics and Social Change in India The evolution of democratic government in India and its capacity to address problems arising from colonialism, social diversity, and economic inequality. *Prerequisite:* 71. Three hours.

171 Western European Political Systems A comparative examination of the British, German, and French political systems. *Prerequisite:* 71. Three hours.

172 Politics and Society in the Russian Federation Examines the nature of politics and the development of post-Soviet social and economic institutions in Russia. *Prerequisite:* 71. Three hours. Stavakis.

173 Canadian Political System Institutions, process, and problems of the Canadian polity. *Prerequisite:* 71. Three hours.

174 Latin American Politics Comparative examination of selected Latin American political systems. *Prerequisite:* 71. Three hours.

175 Government and Politics of China Institutions, processes, and problems of government of China. *Prerequisite:* 71. Three hours.

177 Political Systems of Tropical Africa Development of differing political systems in African countries located south of the Sahara and north of South Africa. *Prerequisite:* 71, or one course in African Studies. Three hours.

179 Women, the State and Development An examination of the impact of national development on women in Third World countries with attention to the relationship between class and gender. *Prerequisite:* 71. Three hours.

181 Fundamentals of Social Research (Same as Sociology 100.) Introduction to research methods in social science. Includes examination of research design, measurement, data collection, data analysis, and the presentation and theoretical interpretation of research findings. *Prerequisite:* One core course. Four hours.

191, 192 Internships

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

All courses numbered 222–298 require: (1) junior or senior standing, (2) completion of at least three core courses including the specified core course, (3) completion of three hours at the 100 level or a specified 100-level course; or instructor's permission.

222 Constitutional Law II Selected topics in constitutional law. *Prerequisite:* 122. Three hours.

223 The American Bureaucracy An examination of the history, current structure, politics, behavior, reform, and accountability of the American federal bureaucracy. *Prerequisite:* 126. Three hours.

224 State Administration Problems in planning, policy development, and program coordination. *Prerequisite:* 126. Three hours.

225 Intergovernmental Relations Problems of the federal system. National-state-local cooperative administration of selected public functions. *Prerequisites:* 21, three hours at 100 level. Three hours.

226 Topics on the Presidency Further study of the executive branch and its operations. Selected topics, e.g. presidential decision making. White house staffing and operations, congressional-executive relations. *Prerequisite:* 124. Three hours.

227 Topics in Public Administration The political problems of the administrative state. *Prerequisite:* 126. Three hours.

228 Congress and Foreign Policy Congress's role in foreign policy making, emphasizing congressional action in the post-Vietnam period. *Prerequisites:* 21, three hours at 100 level. Three hours.

229 Seminar in American Politics Three hours.

231 Colonial Origins of U.S. Government (Same as History 278). *Prerequisites:* 21, three hours of political science at the 100 level, six hours in history, at least three hours at the 100 level (177 or 277 recommended).

232 Comparative State Politics Politics, policy, and institutions of state governments of the U.S.; techniques for comparative analysis of these aspects of politics. *Prerequisite:* 21, three hours at 100 level. Three hours.

233 Big Business and Democracy The role of big business in American democracy. Reading of great works in

democratic theory and works on business politics. *Prerequisite:* 21, 100-level course in Political Science. Three hours.

241 Justice and Equality (Same as Philosophy 242.) Examination of contemporary normative theories of distributive justice and equality. *Prerequisites:* 41, or Philosophy 1 or 3 or 4, three hours at 100 level. Three hours.

242 American Political Thought American political thought from the colonial period to recent times. *Prerequisites:* 41, three hours at 100 level. Background in American history recommended. Three hours.

243 Democratic Theory The nature of democracy. Both contemporary debates within democratic theory and the classical sources of democratic theory are examined. *Prerequisites:* 41, three hours at 100 level. Three hours.

249 Seminar in Political Theory Three hours.

250 Evolution of the International System Examines the effects of technological changes on both economic and security issues leading to the evolution of the structure of the international system over time. *Prerequisites:* 51 or three hours at the 100 level. Three hours.

251 Foreign Policy of the Newly Independent States Examines the development of foreign relations of post-Soviet states, with a special focus on Russia and the post-Communist era. *Prerequisites:* 51, or three hours at 100 level. Three hours. Stavakis.

257 Politics of European Integration Survey of the European Union including historical development, public opinion, governmental institutions, internal policies, external relations, and future prospects. *Prerequisites:* 51, or 71 plus three hours at the 100 level; or appropriate International Studies background. Three hours.

258 Causes of War Examination of various theories explaining the outbreak of war, with applications to historical cases. *Prerequisites:* 51, three hours at the 150 level. Three hours.

259 Seminar in International Relations Three hours.

260 War, Strategy, and Politics The domestic, international, and geopolitical factors determining states' choice of strategies and tactics in interstate conflicts and confrontations. Contemporary and historical examples. *Prerequisites:* 51, three hours at the 150 level. Three hours.

261 Topics in American Foreign Policy In-depth examination of selected topics related to the making and implementation of U.S. foreign policy. *Prerequisites:* 51, three hours at the 150 level. Three hours.

263 Third World Foreign Policy The particular security and political economic challenges facing states in the process of nation-building in Latin America, Africa, Middle East, South Asia, Southeast Asia. *Prerequisites:* 51, three hours at the 150 level. Three hours.

264 U.S.-China Relations Examination of the historical context and various causes of the recurring tensions and unresolved issues in U.S.-China relations since 1945. *Prerequisites:* 51, one 100-level course. Three hours.

265 East Asian Political Economy Examination of the historical, political, economic, and international factors for the rise of East Asia since the Second World War. *Prerequisites:* 51 or 71, one 100-level course. Three hours.

272 Eastern European Political Systems Examination of Eastern European political systems with emphasis on the role of ethnic conflict and Marxist-Leninist ideology. *Prerequisites:* 71, three hours at 100 level. Three hours.

276 British Politics Topics include the role of the citizenry; the character of political and governmental institutions; and policy making in particular fields. Northern Ireland is also covered. *Prerequisites:* 71 plus three hours at

the 100 level; or appropriate International Studies background. Three hours.

277 Comparative Ethno-Nationalism Ethnicity and nationalism in Europe, Asia, and Africa. Political, historical, social, and economic factors are examined comparatively. *Prerequisites:* 71, three hours at the 100 level. Three hours.

278 The Politics of Church and State Relationships between church and state in the western Christian tradition. Case studies from Europe and North America are examined to analyze different constitutional-political patterns. *Prerequisite:* 71, a 100-level Political Science course. Three hours.

279 Seminar in Comparative Politics Three hours.

284 Public Opinion: Theory and Research I (Same as Sociology 241.)* *Prerequisite:* 181 or Sociology 100. Three hours.

285 Public Opinion: Theory and Research II (Same as Sociology 242.)* *Prerequisite:* 284 (Sociology 241). Three hours.

*Credit not given for both 284 and Sociology 241 or both 285 and Sociology 242.

293 Senior Honors Seminar I Examination of major contemporary research topics in political science. *Prerequisite:* Admission by invitation only. Three hours. (Not offered for graduate credit.)

294 Senior Honors Seminar II Tutorial format centered on individual student research projects and a comprehensive examination. *Prerequisite:* 293. Three hours. (Not offered for graduate credit.)

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

297, 298 Readings and Research For advanced undergraduate and graduate students. Three hours.

HONORS – ARTS AND SCIENCES

246, 247 Honors/Political Science See page 64 and contact Department for specific requirements. Three hours each.

Psychology (PSYC)

COLLEGE OF ARTS AND SCIENCES

Professors Emeriti Albee, Ansbacher; *Professors* Achenbach, Bickel, Bond, Bouton, Bronstein, J. Burchard, Compas, Crockenberg, Gordon, Guilar, Higgins, Howell, Hughes, Joffe (Chairperson), Kapp, Lawson, Leitenberg, Miller, Musty, Rosen, Rothblum, L. Solomon; *Associate Professors* S. Burchard, Hasazi, Kessler, Leff, Yadav; *Assistant Professors* Falls, Gorman, S. Solomon. In addition, there are clinical, research, and adjunct faculty affiliated with the program.

1 General Psychology Introduction to the entire field, emphasizing the behavior of the normal adult human being. Three hours. Joffe, Rosen.

15 Improving Memory, Motivation, and Cognitive Skills Theory and research on learning and memory, motivation, and cognitive skills. Emphasis on the application of principles to everyday life. *Prerequisite:* 1 or instructor's permission. Three hours. Gordon, Mansfield, Musty.

109 Psychology Research Methods I Basic course in principles of research methodology, including design, statistical procedures, and reporting. Prepares students to understand and evaluate psychological research in a variety of areas of psychology. Laboratory/discussion experiences. *Prerequisite:* 1. Four hours.

110 Psychology Research Methods II More advanced methodology course for majors in psychology. Prepares stu-

dents to conduct and report research in psychology, with special attention to experimental procedures in learning and cognition. Laboratory experiences. *Prerequisite:* 109. Four hours.

111 Psychology of Decision Making Introduction to the study of individual and group decisions. Focus on "how," "how best," and "how reasonably" to decide. Attention to tricks and traps in the process. *Prerequisite:* 1. Three hours. Gordon. Summer only.

119 History of Psychology Review of major theoretical and empirical developments in psychology, including schools of psychology that have influenced contemporary models of psychology. *Prerequisites:* 1, junior or senior standing. Three hours. Lawson.

121 Biopsychology Biological bases of behavior: classical and contemporary issues, including introduction to nervous system, behavioral effects of drugs, chemical bases of behavioral disorders. *Prerequisite:* 1 or Biology 1. Three hours. Kapp, Musty.

130 Social Psychology An introduction to concepts and methods used to study the behavior of individuals in various social situations. *Prerequisite:* 1. Three hours. Leff, Miller.

132 Environment and Behavior Introduction to Environmental Psychology. Major subareas of this field are discussed as they relate to the interaction between the behavior of individuals and the environment. *Prerequisite:* 1 or course in environmental studies. Three hours. Summer only.

139 Social Psychology Application and Facilitation Explores and builds on cognitive, motivational, and group process foundations of the approach used in 130 for applying academic content. *Prerequisite:* 130, permission of department. Intended for group facilitators for 130. Three hours. Leff.

152 Abnormal Psychology Describing and defining abnormal behavior; models of etiology; research evidence for biological and social models; methods of intervention and prevention. *Prerequisite:* 1. Three hours. Rothblum, Solomon.

161 Developmental Psychology: Childhood Survey of research and theories on child development from conception to adolescence emphasizing experimental analyses of early social and cognitive development. *Prerequisite:* 1. Three hours. Bond, Burchard, Gorman.

163 Psychology of Mass Communication Survey of theory and research concerning mass media effects in children's socialization, information diffusion, and in shaping values, behaviors regarding health, politics, consumer choices, and environment. *Prerequisite:* 1 or instructor's permission. Three hours. Yadav.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Research Individual research under staff direction. *Prerequisite:* Departmental permission. Three to six hours.

205 Learning Analysis of theory and research on the basic learning process and behavior. *Prerequisite:* 109. Three hours. Bouton.

206 Motivation Theory and research on motives, including hunger, fear, sex drive, and addiction, their influence on behavior, relationship to other psychological processes, and biological correlates. *Prerequisite:* 109. Three hours. Musty.

207 Thinking Survey of cognitive psychology, examining theory and research on perception, memory, language, cognition, and their interactions. *Prerequisites:* 109. Three hours. Gordon.

208 Cognition and Language (See Communication Sciences 208.)

215 Cognition and Aging (See Communication Sciences 215.)

220 Animal Behavior Behavior of animals under controlled experimental conditions and in their natural environments. Consideration of evolution, development, function, and control of behavior. *Prerequisite:* 109 or Biology 102. Three hours. Bouton, Musty.

221 Physiological Psychology I Structure and function of mammalian nervous system, emphasizing neurological correlates of sensory experience and perception. Individual laboratory experience. *Prerequisite:* 109. Four hours. Kapp.

222 Selected Topics in Behavioral Neuroscience Selected topics examining the role of the central nervous system in determining behavior, including innate behaviors, arousal, motivation, learning, and memory. *Prerequisite:* 121 or 221. Three hours.

223 Psychopharmacology Effects of drugs (both medical and recreation) on behavior. Topics such as drug effects on learning, memory, motivation, perception, emotions, and aggression. *Prerequisites:* 109, 121 or 222. Three hours. Musty.

230 Advanced Social Psychology Advanced survey of current research on the behavior of individuals in social situations. *Prerequisite:* 109 or 130. Three hours. Miller.

231 Psychology of Women Psychological theories about women and research on women's roles. Biological, personality, cognitive, and developmental factors considered. *Prerequisite:* One psychology course at the 100 level. Three hours. Bond, Rothblum.

233 Psychology of Experience and Creativity Enhancement Explores psychological processes for developing creative thinking and for enhancing the quality of conscious experience. Emphasizes personal growth as well as theoretical understanding. *Prerequisite:* Advanced background in at least one relevant field (such as psychology, environmental studies, art, or education). Three hours. Leff.

234 Psychology of Social and Environmental Change Examines psychological foundations for beneficial changes in social and physical environments. Emphasizes action strategies and projects as well as utopian visions. *Prerequisite:* Advanced background in psychology or in environmental studies or a social science. Three hours. Leff.

236 Theories of Human Communication Study of the role of perception, human information processing, language, nonverbal codes, meaning, cognition, and interpersonal and sociocultural context in human communication process. *Prerequisite:* 109 or 130. Three hours. Yadav.

237 Cross-Cultural Communication Study of cultural factors, cognitive processes, communication patterns, and problems in cross-cultural communication; role of communication in development and social change in third world countries. *Prerequisites:* 109 or 130 or 230; other advanced background in education or a social science. Three hours. Yadav.

239 Advanced Social Psychology Application and Facilitation Explores psychological foundations of approach used in 130 for applying academic content. Involves research and readings beyond work for 139. *Prerequisite:* 139, or 12 hours of psychology and department permission. Intended for 130 group facilitators with advanced psychology background. Three hours. Leff. (Not offered for graduate credit.)

240 Organizational Psychology Study of the psychological impact of macro and micro features of organizations upon leadership, decision making, workforce diversity, group process, conflict, and organizational performances.

Prerequisites: 109, or instructor's permission. Three hours. Lawson.

241 Organizational Psychology: Global, Cultural, and Local Forces Study of global, cultural, and local dynamics upon organizational culture, leadership, workforce diversity, ethics and justice at work, and conflict resolution. Conduct applied organizational cultural analysis. *Prerequisites:* 109, or instructor's permission. Three hours. Lawson.

250 Introduction to Clinical Psychology Study of basic principles of interviewing, testing, assessment from life situations, and report writing. Examination of the most common approaches to psychotherapy. *Prerequisites:* 109, 152. Three hours. Bronstein, Compas, Kessler.

251 Behavioral Disorders of Childhood An overview of theory, research, and practice in developmental psychopathology from infancy through adolescence. The major disorders of social and emotional development reviewed. *Prerequisite:* 109 or 161 (109 may be taken concurrently). Three hours. Hasazi.

252 Psychology of Group Interaction Participants meet as an interactive group that examines its own dynamics and relationships through discussion, readings, and written assignments. *Prerequisites:* 152 or 250, junior or senior standing, and instructor's permission. Three hours. Bronstein, Kessler.

253 Advanced Behavior Modification Application of techniques for the modification of human behavior in a variety of educational and social situations involving the collection and analysis of behavioral data. *Prerequisites:* 109, 152. Three hours. J. Burchard.

254 Primary Prevention An examination of empirical approaches to prevention of mental and emotional disorders; history of public health methods; sources of support and opposition to prevention efforts. *Prerequisites:* 109, 152. Three hours. Gorman.

255 Introduction to Health Psychology Psychology of the cause, treatment, and prevention of physical illness and disability. Topics include: stress, health behavior, medical compliance, patient-provider relationships, coping with illness. *Prerequisite:* 109 or advanced standing in Allied Health Sciences. Three hours. Rosen, Solomon.

257 Personality The understanding of personality development and human behavior from a psychoanalytic, humanistic, trait measurement, and sociocultural perspective. *Prerequisites:* 109. Three hours. Bronstein.

258 Workshop in Primary Prevention Meet with specialists in primary prevention of psychological problems and promotion of mental health to examine research, theory, and preventive interventions promoting psychological well being. *Prerequisites:* Three psychology courses at 100 level or higher or related advanced professional training by permission of instructor. Three hours. Bond, Gorman. Summer only.

259 Chemical Dependency: Etiology and Treatment Development (self, family, trauma) and resolution of chemical dependency. Cognitive-behavioral, psychoanalytic, systemic, and eclectic orientations. Experiential psychotherapy techniques and project required. *Prerequisites:* Senior or graduate status or degree in clinical fields. Three hours. Quintiliani.

261 Cognitive Development Examination of research and theory concerning developmental changes in the human processing of information from infancy to adulthood centered around the work of Piaget. *Prerequisite:* 109 or 161 (109 may be taken concurrently). Three hours. Bond, S. Burchard.

262 Social Development Examination of theory and research concerning interpersonal development in humans

from infancy through adulthood. Relationships between language, cognition, and social development emphasized. *Prerequisite:* 109 or 161 (109 may be taken concurrently). Three hours. Crockenberg.

263 Disabilities of Learning and Development Seminar in etiology, treatments, prevention of developmental and learning disabilities within framework of current service and educational practices. Effectiveness, ethical, legal, psychological issues examined. *Prerequisite:* One 100-level psychology course or advanced standing in Psychology, Education, or Physical Therapy. Three hours. S. Burchard.

265 Infant Development Biological, cognitive, and social aspects of infant development in context; opportunities to evaluate and design research and apply knowledge to parenting, prevention, and social policy. *Prerequisites:* 109, 161 (may be taken concurrently), or comparable. Three hours. Bond, Crockenberg, Gorman.

266 Communication and Children Study of the role of communication, especially television, in cognitive and social development from preschool to adolescence. Relationship between television violence and abnormal behavior examined. *Prerequisite:* 109 or 161 or 163. Three hours. Yadav.

268 Psychology of Adult Development and Aging Psychological development in the final third of the life span emphasizing theory and research concerning social, cognitive, perceptual, and mental health transitions and support interventions. *Prerequisites:* 1; and Sociology/Nursing/Early Childhood and Human Dev. 20 or Early Childhood and Human Dev. 195/295 or permission. Three hours.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

HONORS - ARTS AND SCIENCES

248, 249 Honors/Psychology See page 64 and contact Department for specific requirements. Three hours each.

Public Administration (PA)

COLLEGE OF ARTS AND SCIENCES/DEPARTMENT OF POLITICAL SCIENCE/MASTER OF PUBLIC ADMINISTRATION PROGRAM

Professors: Ventriss; *Associated Campus Faculty:* Professors Burke, Cooper, Lawson, Wertheimer; *Deans:* Martin, Twardy; *Associate Professors:* Bryan, Parke (Executive Committee Chair), Patterson, Prelock, Tashman, Woolf; *Assistant Professor:* Gierzynski; *Visiting Professors:* Campbell, Coe, Saidel; *Adjunct Faculty:* Fox, Letcher, Meier, Salmon.

Contact the MPA Office, (802) 656-2606, for information on the Accelerated Masters Program in Public Administration (AMP-PA).

206 Introduction to Contemporary Public Affairs Contemporary policy issues including government and the economy, the role of leadership, ethical and moral issues in public policy, and other contemporary issues impacting society. *Prerequisites:* Economics 11, 12, or its equivalent recommended; permission. Three hours. Bryan, Ventriss.

295, 296 Intermediate Special Topic Current issues and new developments in public policy and public administration. *Prerequisite:* Permission. Three hours.

299 Fundamentals of Quantitative and Economic Analysis Development of analytical skills with application to economic analysis relevant to the field of public administration. *Prerequisite:* Permission. Three hours. Haupt, Tashman.

Radiation Therapy

See Biomedical Technologies.

Recreation Management (RM)

SCHOOL OF NATURAL RESOURCES

Professor: Manning (Program Chair); *Associate Professors:* Gilbert, Hudspeth; *Assistant Professor:* Kuentzel; *Lecturer:* Kaufman; *Adjunct Associate Professor:* More.

1 Introduction to Recreation Management Introduction to the broad field of outdoor recreation and tourism, including history, philosophy, current issues, career opportunities, and the Recreation Management Program. One hour.

30 National Parks of the U.S. The natural beauty and unique phenomena of our National Parks are emphasized. Historical development and current problems are cited. Credit not granted for both 30 and Natural Resources 2. Three hours.

50 Tourism Planning Examination of tourism including its economic, environmental, and social effects. Emphasis on planning to maintain the integrity of tourist regions. Three hours. Kuentzel.

138 Park and Recreation Design Recreation design methodology applied to the design of public and private recreational facilities. Four hours.

152 Forest Resources Values (See Forestry 152, Resource Economics 152.)

153 Recreation Administration and Operations Administration and operation of outdoor recreation agencies and businesses. Special emphasis on recreation administrative structures, personnel management, and maintenance of parks and outdoor recreation areas. *Prerequisites:* Junior or senior standing. Three hours.

157 Ski Area Management An analysis of current management problems affecting private ski areas in Vermont and the Northeast. *Prerequisites:* Junior or senior standing. Three hours. Gilbert. Alternate years, 1998-99.

158 Resort Marketing and Management Study of the management of year-round resort facilities. Emphasis on resort marketing, internal support functions, and associated recreational facilities. *Prerequisites:* Junior or senior standing. Three hours. Kaufman.

160-161 Parks and People I, II A Living/Learning Center Program. Consideration of impacts of recreation on the environment. Discussion of the operation of the Vermont State Park System. Credit for 160 will not be granted until 161 has been successfully completed. Two hours.

181 Junior Recreation Seminar Seminars on current issues in the field of public and private outdoor recreation management. *Prerequisites:* Junior standing in Recreation Management. One hour.

188 Special Topics Independent study. *Prerequisites:* Junior standing, permission. One-half to three hours.

191 Recreation Management Practicum Supervised field experience in national, state, urban, or private park and recreation operations. *Prerequisite:* Junior or senior standing in Recreation Management. One to six hours.

230 Ecotourism Study of nature-based travel emphasizing international destinations. Examination of ecotourism as a tool for preservation and economic development. *Prerequisites:* Junior or senior standing. Three hours. Kuentzel. (Not offered for graduate credit.)

235 Outdoor Recreation Planning Planning large land areas for outdoor recreation use. Emphasis on the planning process relative to the leisure time use of natural resources. *Prerequisites:* Advanced standing in Recreation Management or permission. Four hours.

240 Park and Wilderness Management History, philosophy, and management of wilderness, national parks, and related areas. *Prerequisite:* Junior or senior standing in Recreation Management. Three hours. Manning.

255 Environmental Interpretation Philosophy, principles, and techniques of communicating environmental values, natural history processes, and cultural features to recreation visitors through the use of interpretive media. *Prerequisite:* Advanced standing in Recreation Management or permission. Four hours. Hudspeth.

258 Entrepreneurship in Recreation and Tourism Study of entrepreneurial theories, concepts, and practices and their application to recreation and tourism. Emphasis on preparation of individual business plans. *Prerequisites:* Junior or senior standing in Recreation Management or permission. Three hours. Kaufman. (Not offered for graduate credit.)

282 Senior Recreation Seminar Seminars on current issues in the field of public and private outdoor recreation management. *Prerequisites:* 182, senior standing in Recreation Management. One hour. (Not offered for graduate credit.)

299 Recreation Management Honors Honors project dealing with management of outdoor recreation and tourism. *Prerequisite:* By application only; see program chair. Three to six hours.

Religion (REL)

COLLEGE OF ARTS AND SCIENCES

Professors Brenneman, Martin, Paden (Chairperson); Associate Professors Clark, Sugarman, Trainor; Assistant Professor Walker.

Religion 20, 21, 22, 23, and 27 all address basic questions about the nature and interpretation of religion and about ways of understanding the religious expressions of other historical and cultural worlds. Credit will be given only for two courses at the introductory level (20–27). Credit will be given for only one from Religion 22, 23, 27.

20 Introduction to the Study of Religion: Comparative Study of patterns and differences in religious life; selected comparisons of Asian, Western, and tribal religions. Three hours. Martin, Paden, Trainor.

21 Introduction to the Study of Religion: Asian Traditions Study of the Hindu, Buddhist, and East Asian religious traditions as expressed in their basic symbolisms, writings, practices, and cultural forms. Three hours. Brenneman.

22 Introduction to the Study of Religion: Western Traditions Study of the basic motifs, mythic patterns, and historical transformations in religious life from the ancient Near East to the modern West. Three hours. Sugarman, Walker.

23 Introduction to the Study of Religion: Bible Study of religious expressions as exemplified in biblical and related texts. Three hours. Clark, Martin.

27, 28 Introduction to the Study of Religion: Integrated Humanities Study of religious and philosophical thought in Western culture from Hebraic and Greek antiquity to present. *Prerequisites:* Concurrent enrollment in Integrated Humanities Program, English 27, 28 and History 27, 28. Three hours. Sugarman.

80 Religion and Race in America Historical survey of forms of African-American religion in the U.S. in their relation to slavery, segregation, and civil rights; current issues in education and cultural diversity. Three hours. Walker.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

100 The Interpretation of Religion Examination of major theories and methods used in studying and interpreting religious phenomena. *Prerequisite:* Three hours in religion. Three hours. Brenneman, Paden, Trainor.

101 The Social Dimension of Religious Life Comparative study of communal forms of religious life, such as cosmic state, monasticism, sect, caste and denomination, from a variety of cultures—Eastern, Western, tribal, and modern—with a concern for their meanings as fundamental forms of religious expression. *Prerequisite:* Three hours in religion or sociology. Three hours. Martin.

104 Mysticism, Shamanism, and Possession Comparative study of ways in which the inward dimension of religious life finds expression. *Prerequisite:* Three hours in religion. Three hours. Brenneman, Paden.

106 Images of the Goddess Study of earth symbolism and its expression in goddess figures of various religious traditions. Attention paid to general feminine symbolism as expressed through goddess myths and cults. *Prerequisite:* Three hours in religion. Three hours. Brenneman.

108 Myth, Symbol, and Ritual Study of patterns and significance of myth and ritual as they appear in cross-cultural perspective, with reference to contemporary interpretations of symbol and language. *Prerequisite:* Three hours in religion. Three hours. Brenneman.

109 Ritualization: Religion, Body, and Culture A cross-cultural examination of ritual strategies for integrating personal and social experience, with attention to various theories and types of religious ritual. *Prerequisites:* Three hours in religion. Three hours. Trainor.

111 Foundations of Western Religious Thought Study of ways in which Western religious thinkers—in both Greek and Biblical traditions—have expressed and responded to philosophical-theological questions about human existence, world, and God. *Prerequisite:* Three hours in religion. Three hours. Sugarman.

114 Hebrew Scriptures Study of the history and writings of the Hebraic-Judaic religion to the first century B.C. *Prerequisite:* Three hours in religion. Three hours. Sugarman.

116 Judaism Investigation of sustaining rituals, customs, institutions, and beliefs of normative Judaism. *Prerequisite:* Three hours in religion. Three hours. Sugarman.

122 Christian Origins Historical study of the first four centuries of Christianity in its sociocultural context, including consideration of New Testament texts. *Prerequisite:* Three hours in religion. Three hours. Martin.

124 Christianity Historical study of the Christian tradition examining major religious movements of early, medieval, and Reformation Christianity, and the spirituality of Christians during these periods. *Prerequisite:* Three hours in religion. Three hours. Clark.

128 Religion in America Study of the relationship between religion, the cultural ethos, and identity in America. *Prerequisite:* Three hours in religion. Three hours. Walker.

131 Studies in the Hindu Tradition Selected writings, rituals, and developments in the Hindu tradition with reference to cultural assumptions of India. *Prerequisite:* Three hours in religion. Three hours. Trainor.

132 Buddhism in India and East Asia: Classical and Mahayana Texts and Teachings A study of early and Mahayana Buddhist thought and of some developments of Mahayana in China and Japan. *Prerequisite:* Three hours in religion. May be taken for credit after Religion 134 only with prior permission of instructor. Three hours.

134 Buddhism in Sri Lanka: Elite and Popular Interactions An examination of Theravada Buddhist belief and practice in the context of Sri Lankan culture, with attention to lay and monastic interaction. *Prerequisite:* Three hours in religion. May be taken for credit after Religion 132 only with prior permission of instructor. Three hours. Trainor.

141 Religion in Japan An examination of Japanese values as expressed in folk, Shinto, and Buddhist traditions, and in social structures, aesthetic pursuits, or business practices. *Prerequisite:* Three hours in religion. Three hours.

145 Religion in China Examination of Classical, Confucian and Taoist thought through texts in translation, developments in these traditions, and interactions with folk religion and Buddhism in the premodern period. *Prerequisite:* Three hours in religion. Three hours.

155 Celtic Myth and Ritual An examination of Celtic symbols, myths, and rituals focusing upon the Celts in Ireland, including their relationship to the Christian tradition in the 5th century A.D. *Prerequisite:* Three hours in religion. Three hours. Brenneman.

168 Contemporary Spiritual Life Study of human involvement with the spiritual as manifested in contemporary religious groups, or in modern theory and practice of meditation. *Prerequisite:* Three hours in religion. Three hours.

173 Studies in Gender and Religion Selected topics in the history of the Christian tradition focusing on the social and religious construction of gender and the shape of women's religious lives. *Prerequisite:* Three hours in religion. Three hours. Clark. May be repeated up to six hours.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research Variable credit.

201 Senior Seminar: Creative Hermeneutics Selected contemporary issues in theory and interpretation; group interpretations of common texts or phenomena; preparation and presentation of individual senior projects. *Prerequisites:* Twelve hours in religion, including 100 and six hours at the intermediate level, senior standing. Three hours. Spring.

214 Studies in Judaica Selected topics of concentration emerging out of and related to the study of normative Judaism, e.g. the prophetic faith, Rabbinic Judaism, Hasidism, and Jewish mysticism. *Prerequisite:* Nine hours in religion, with three hours at the intermediate level (116 recommended). Three hours. May be repeated up to six hours. Sugarman. (Not offered for graduate credit.)

224 Studies in Christianity Examination of selected issues, movements, periods, or individuals within the Christian tradition. *Prerequisites:* Nine hours in religion (122, 124, or 173 recommended). Three hours. May be repeated up to six hours. Three hours. Clark, Martin.

226 Studies in Hellenistic Religion Study of religion in the Mediterranean area during the period from the 4th century B.C. though the 4th century A.D. including Christian origins. *Prerequisite:* Nine hours in religion, with three hours at the intermediate level. Martin. (Not offered for graduate credit.)

228 Studies in Western Religious Thought Important figures, issues, movements, or texts examined. *Prerequisite:* Nine hours in religion, with three hours at the intermediate level. Three hours. May be repeated up to six hours. Clark, Sugarman. (Not offered for graduate credit.)

240 Studies in Asian Religions Concentrated studies in the history, life, or thought of a selected Asian religious tradition. *Prerequisite:* Three hours in religion at intermediate level in the same religious traditions. Three hours. Trainor.

259 Religion and Secular Culture Comparison of religious and secular systems of meaning, value, and practice. *Prerequisite:* Nine hours in religion, with three hours at the intermediate level. Three hours. Brenneman. (Not offered for graduate credit.)

280 Symbol and Archetype Study of the work of C.G. Jung and the Jungian circle as it bears upon the interpretation of religion and as it represents a 20th century religious quest. *Prerequisite:* Nine hours in religion, with six hours at the intermediate level. Three hours. Paden. (Not offered for graduate credit.)

291, 292 Topics in the History and Phenomenology of Religion *Prerequisites:* Nine hours in religion, with six hours at the intermediate level, junior standing. May be repeated up to six hours.

297, 298 Interdisciplinary Seminar Student-faculty workshop on a topic of current interest, employing resources from various disciplines. *Prerequisites:* Nine hours in religion, with six hours at the intermediate level, junior standing, instructor's permission. Three hours. (Not offered for graduate credit.)

HONORS - ARTS AND SCIENCES

250, 251 Honors/Religion See page 64 and contact Department for specific requirements. Three hours each.

Resource Economics (RSEC)

SCHOOL OF NATURAL RESOURCES

Associate Professors Gilbert (Program Chair), King.

121 Resource Economics Evaluation of the economic forces affecting resource allocation, tools of economic analysis, and economic implications of current resource utilization practices. *Prerequisite:* Economics 12 or Community Development and Applied Economics 61. Three hours. Gilbert. Alternate years, 1999-00.

152 Forest Resources Values (See Forestry 152, Recreation Management 152.)

222 Natural Resources Evaluation An analysis of economic procedures used in the evaluation of public natural resource developments, emphasizing benefit-cost analysis. *Prerequisite:* Economics 12, or Community Development and Applied Economics 61. Three hours. Gilbert. Alternate years, 1998-99.

255, 256 Special Topics in Resource Economics

289 Environmental Economics (See Environmental Studies 289.)

299 Resource Economics Honors Honors project dealing with resource economics. *Prerequisite:* By application only; see program chair. Three to six hours.

Romance Languages (FREN, ITAL, SPAN)

COLLEGE OF ARTS AND SCIENCES

Professors Carrard, Connor (Chairperson), Kuizenga, Senécal, Van Slyke, Whatley; Associate Professors Crichfield, Maura, Murad, Roof; Assistant Professors Escaja, Mazzoni, Senior, Whitebook; Lec-

urers Byerly, Drolet, Green, Jamieson, Murad, Provencher, Rubaud.

French, Italian, and Spanish language and literature courses are listed separately below by title and number. The language sequences are designed specifically to train students in the four skills of speaking, comprehension, reading, and writing. The sequence for the beginning levels of French, Italian, and Spanish is: 1-2-51-52. French 9 and Spanish 9 are optional courses which may be elected prior to French or Spanish 51, if the student's background warrants it. Students should enter the sequence at the point dictated by previous background, achievement, and/or consultation with the department. For placement in advanced language courses (100 or above), first-year students should consult with this department. Students may not take a language course lower than the level most recently attained except with the permission of the department. This stricture does not apply to literature or civilization courses.

The first two semesters of a foreign language are excluded from the 45-hour limit on courses from a single department that can be counted toward the 122 hours required for the Bachelor of Arts degree.

Native speakers of each language may not take courses numbered 1-52 in that language without departmental permission.

FRENCH LANGUAGE

1 Elementary I Fundamentals of French composition, comprehension, pronunciation, speaking, reading, writing. Structure of the basic French sentence. No prior knowledge expected. Four hours.

2 Elementary II Continuation of 1. *Prerequisite:* 1 or equivalent. Four hours.

9 Basic French Grammar Review Thorough review of French grammar in preparation for intermediate level. Considerable emphasis on written exercises. Three hours.

51 Intermediate Reading and Conversation I Designed to help students move from a basic knowledge of French to the ability to read, speak, and understand French better. Some grammar review and short compositions. *Prerequisite:* 2 or 9 or equivalent. Three hours.

52 Intermediate Reading and Conversation II Continues building on skills developed in 51. Less stress on grammar review. Reading selections and compositions are longer and more sophisticated than in 51. *Prerequisite:* 51 or equivalent. Three hours.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. Three hours.

102 Intensive Oral Expression Guided practice of oral-aural skills through vocabulary and pronunciation exercises, readings, and oral presentations. Writing exercises reinforce oral work. Three hours.

103 French for Mastery Improvement of functional skills: writing, listening, and speaking. Development of techniques to explain, elaborate, support opinions, convince, and persuade in both writing and speaking. *Prerequisite:* French 52 or equivalent. Three hours.

104 Reading French Culture Study of selected themes in French culture. Improvement of language skills; emphasis on reading, writing, and analysis of a variety of materials (literature, journalism, images). *Pre- or co-requisite:* 103, or permission of instructor. Three hours.

201 Advanced Composition and Conversation Course activities (discussions, exposés, written work, etc.) designed to lead to mastery of French oral and written expression. *Prerequisite:* 102 or 103. Three hours. (Not offered for graduate credit.)

209 Advanced Grammar Comparative grammatical study centered on the specific problems encountered by Anglophones in written and spoken French. *Prerequisite:* 103. Three hours. Carrard, Rubaud, van Slyke.

211 History of the French Language The development of French through sound and structure, from late Latin through the 12th century. Three hours. Whitebook.

215 Methods of Text Analysis Introduction to procedures and terminology used in analysis of texts of various genres. *Prerequisite:* 103. Three hours. Carrard.

216 Stylistics Study of idiomatic difficulties faced by people who learn French; translation; analysis of the various "levels of speech" in French, with their stylistic features. *Prerequisite:* 103. Three hours. Carrard.

ITALIAN LANGUAGE

1 Elementary I Fundamentals of Italian composition, comprehension, pronunciation, speaking, reading, writing. Structure of the basic Italian sentence. No prior knowledge expected. Four hours.

2 Elementary II Continuation of 1. *Prerequisite:* 1 or equivalent. Four hours.

51 Intermediate Reading and Conversation I Designed to help students move from a basic knowledge of Italian to the ability to read, speak, and understand Italian better. Some grammar review and short compositions. *Prerequisite:* 2 or equivalent. Three hours.

52 Intermediate Reading and Conversation II Continues building on the skills developed in 51. Less stress on grammar review. Reading selections and compositions are longer and more sophisticated than in 51. *Prerequisite:* 51 or equivalent. Three hours.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. Three hours.

SPANISH LANGUAGE

1 Elementary I Fundamentals of Spanish composition, comprehension, pronunciation, speaking, reading, writing. Structure of the basic Spanish sentence. No prior knowledge expected. Four hours.

2 Elementary II Continuation of 1. *Prerequisite:* 1 or equivalent. Four hours.

9 Basic Spanish Grammar Review Thorough review of Spanish grammar in preparation for intermediate level. Considerable emphasis on written exercises. Three hours.

51 Intermediate Reading and Conversation I Designed to help students move from a basic knowledge of Spanish to the ability to read, speak, and understand Spanish better. Some grammar review and short compositions. *Prerequisite:* 2 or 9 or equivalent. Three hours.

52 Intermediate Reading and Conversation II Continues building on the skills developed in 51. Less stress on grammar review. Reading selections and compositions are longer and more sophisticated than in 51. *Prerequisite:* 51 or equivalent. Three hours.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

101, 102 Composition and Conversation Writing practice, sentence structure, correct expression, and guided discussions in Spanish of assigned topics. A good command of basic grammar expected. Three hours each course.

105 Phonology Study of Spanish and Spanish-American phonemic systems. Contrast of Spanish and English

phonemes. Practical exercises with vowels, consonants, syllables, rhythm, intonation, and gestures. Second semester. Does not fulfill Arts and Sciences foreign language requirement, but does count toward Spanish major or as elective credit. *Prerequisite:* Spanish 51. Three hours. Weiger.

109 Spanish Grammar An intensive study of Spanish grammar. Topical approach. Three hours.

201 Advanced Composition and Conversation To improve both written and oral proficiency. Textbook supplemented by panel discussions, debates, translation, and a weekly composition. Three hours. (Not offered for graduate credit.)

202 Advanced Composition and Conversation Exercises in translation, conversation, debate; advanced study of syntax, usage, and style selections from literary texts or recent periodicals; weekly compositions. Three hours. (Not offered for graduate credit.)

211 History of the Spanish Language The evolution of the Spanish language from its origins to the present. *Prerequisites:* One 100-level literature course or equivalent. Three hours. Maura.

LITERATURE AND CIVILIZATION COURSES IN FRENCH, ITALIAN, AND SPANISH

While the literature and civilization courses in French and Spanish are divided chronologically, it is not essential that students adhere strictly to this order. In general, a 100-level literature course or its equivalent is the prerequisite for all more advanced literatures courses; exceptions can be made with the approval of the department.

Unless otherwise stated, all courses above the intermediate level will be conducted in the foreign language in question. Questions about the precise content of any literature course should be referred to the instructor listed for the course or to the department chairperson.

FRENCH LITERATURE AND CIVILIZATION

111 French Literature in Context I A study of significant texts in the history of French literature from the Middle Ages through the 18th century, in their historical and cultural contexts. *Prerequisite:* 104. Three hours.

112 French Literature in Context, II A study of significant texts in the history of French literature from the French Revolution to the present, in their historical and cultural contexts. *Prerequisite:* 104. Three hours.

191 French Culture Study of the fundamentals of French culture from historical and structural perspectives, including a review of socio-political institutions of contemporary France. *Prerequisite:* 104. Three hours.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research Permission of chair required.

All 200 level literature courses will have either French 111 or French 112 as prerequisite; both are recommended.

225 Medieval French Literature First semester: Old French language; 12th century epics, e.g. *La Chanson de Roland*, *Le Pèlerinage de Charlemagne*, Breton lays; Marie de France. Three hours. Whitebook.

226 Medieval French Literature Second semester: Romances: Chrétien de Troyes, Guillaume de Lorris and Jean de Meung; lyric poetry, Machaut; Pisan; Charles d'Orléans; farces and miracles. Three hours. Whitebook.

235 Literature of the French Renaissance Readings in fiction, poetry, and essays: Rabelais, the lyric poets Louise

Labé, Ronsard, and Du Bellay, the tales of Marguerite de Navarre; Montaigne. Three hours. Kuizenga, Whatley.

245 The Baroque Age 1600-1650 The literature after France's civil wars up to the triumph of classicism: religious, lyric, baroque drama; Pascal. Three hours. Whatley.

246 17th Century Prose Creation of the modern novel, evolution of psychological and ethical writing. Topics include women writers, the *moralistes*, memoirs, relationships between sociopolitical structures and literary production. Three hours. Kuizenga.

247 17th Century Theatre Works of Corneille, Molière, and Racine studied in the context of the evolution of 17th century thought. Three hours. Kuizenga.

255 18th Century Literature Writers of the early Enlightenment. Possible topics: the impact of the new science; the literary reflection of new social types; the "pursuit of happiness." Three hours. Whatley.

256 18th Century Literature Rousseau, Diderot, Laclos, Sade: the generation before the Revolution. Possible topics: the attempts to define "natural man;" the relationship between the arts and morality, between liberty and libertinism. Three hours. Whatley.

265 Romanticism, Symbolism, Decadence in 19th Century Literature Evolution of the idealist tradition: the Romantic movement (Staël, Chateaubriand, Sand, Hugo, Musset, Flaubert); the Symbolists (Baudelaire, Verlaine, Rimbaud, Mallarmé); fin de siècle Decadents (Huysmans). Three hours. Crichfield.

266 Revolution and Reaction in 19th Century Narrative Study of the representations of major social issues of the period, such as power, class, money, and women. Representative authors: Balzac, Flaubert, Sand, Stendhal, Zola. Three hours. van Slyke.

275, 276 20th Century Literature Selected topics dealing with poetry and/or narrative related either to an historical period or a literary movement. Three hours. Carrard.

279 Women's Autobiography Study of several autobiographies written by contemporary French/Francophone women. Representative authors include Colette, de Beauvoir, Sarraute, Duras, Emaux, Martin. Three hours. van Slyke.

285 Quebec Literature A study of contemporary (1960-1985) major works of fiction, poetry, and drama. Authors studied include Anne Hébert, Michel Tremblay, Jacques Godbout, Gaston Miron. Three hours. Senécal.

289 African Literature of French Expression Study of West African poetry, theatre, novel, and civilization as an expression of the Black experience in the language of the French colonizer. Three hours.

290 Contemporary French Thought: The Linguistic Model Study of the model of structural analysis established by Saussure and its adaptation to other domains of contemporary thought such as anthropology, psychoanalysis, and philosophy. Three hours. van Slyke.

292 Topics in French Culture In-depth study of a major aspect of French culture. See Schedule of Courses for specific offering. *Prerequisite:* 191, or History 135, or History 136, or permission of instructor. Three hours.

293 Quebec Culture Sociocultural study of the Francophone civilization of Canada. Three hours. Senécal.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

297, 298 Advanced Readings and Research Permission of chair required.

ITALIAN LITERATURE AND CIVILIZATION

121, 122 Italian Civilization and Culture Emphasis on increasing oral and written command of the language. Class discussions and written work are based on literary selections, newspaper and magazine articles, and film scripts. *Prerequisite:* 52 or equivalent. Three hours. Mazzoni, Senior.

157 Contemporary Masterworks A study of major authors and genres from 18th century to the present. *Prerequisite:* 52 or equivalent. Three hours. Mazzoni.

158 Medieval Masterworks A study of major authors and genres from the origins of Italian literature to the 18th century. *Prerequisite:* 52 or equivalent. Three hours. Senior.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles. Three hours each.

197, 198 Readings and Research Permission of department chair required. One to three hours.

SPANISH LITERATURE AND CIVILIZATION

155 Masterworks Representative novels, plays, and poetry of the period before 1800. Three hours.

156 Masterworks Representative plays, novels, and poetry since 1800. Three hours.

185 Readings in Spanish American Literature Survey of the literature of Spanish America from pre-Columbian times through the colonial period and Romanticism. Three hours.

186 Readings in Spanish American Literature Survey of the literature of Spanish America from *Modernismo* through *Vanguardismo*, *Realismo Mágico* to the present. Three hours. Murad.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research Permission of chair required.

235 Golden Age Drama and Prose The picaresque novel and the drama of the 16th and 17th centuries, emphasizing Lope de Vega, Calderón, Quevedo, Tirso de Molina. Three hours.

236 Golden Age Poetry The major poets (Garcilaso, Fray Luis, San Juan, Quevedo, and Góngora) and the poetic tradition of the 16th and 17th centuries. Three hours.

245, 246 Cervantes *Don Quijote*, the *Novelas Ejemplares*, and the theatre of Cervantes. Three hours.

265 19th Century Spanish Literature Romanticism and realism: (1) Romantic theatre; (2) the realist and naturalist novelists: Galdos and Leopoldo Alas. Three hours.

276 20th Century Spanish Poetry and Drama Vanguard vs. tradition from the Generation of 1898 to present. Three hours. Roof.

277 20th Century Spanish Prose Readings of novels, short stories, and essays from the Generation of 1898 to the present, with attention to questions of historical and cultural context. Three hours. Roof.

281 Spanish-American Prose Fiction of the 20th Century A study of representative works by major authors tracing the development of narrative forms from their roots in the last century to the present. Three hours. Murad.

285, 286 Spanish-American Literature of Social Protest Readings of major works tracing the various directions of social protest against the Spanish political system, local governments, imperialism. 286 stresses contemporary literature. Three hours each course. Murad.

287 Early Spanish Narratives of the Americas Readings and analysis of late 15th and 16th century narratives. Discussion of European and Native American perspectives, religious disputes, and the "Leyenda Negra" (Black Legend). Three hours. Maura.

291 Civilization of Spain Topical approach to the study of Spanish civilization through the 17th century, emphasizing ideas, art, and literature. Three hours. Maura.

292 Civilization of Spain Topical approach to the study of Spanish civilization from the 18th century to the present, emphasizing ideas, art, and literature. Three hours. Roof.

293 Latin American Civilization A study of the ideas, art, literature, and music of Latin America against the background of the history and culture of the region. Three hours.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

297, 298 Advanced Readings and Research Permission of chair required.

The following extra-departmental courses may not be taken for credit toward a major in the Department of Romance Languages except by special agreement with the department chair:

GLIT 72 Romance Literature in Translation

GLIT 131 French Literature in Translation

GLIT 132 Francophone Literature in Translation

GLIT 141 Spanish Literature in Translation

GLIT 142 Spanish-American Literature in Translation

GLIT 143 Latino Writers in the U.S.: Contemporary Perspectives

GLIT 173 Dante's Comedy

LING 101, 102 Linguistics

HONORS – ARTS AND SCIENCES

222, 223 Honors/French See page 64 and contact Department for specific requirements. Three hours each.

256, 257 Honors/Spanish See page 64 and contact Department for specific requirements. Three hours each.

Russian (RUSS)

COLLEGE OF ARTS AND SCIENCES

Associate Professors McKenna, Nalibow; Lecturer Gordon.

The first two semesters of a foreign language are excluded from the 45-hour limit on courses from a single department that can be counted toward the 122 hours required for the Bachelor of Arts degree.

1, 2 Elementary Russian An introduction to all aspects of contemporary standard Russian: speaking, listening, reading, writing. Cultural components include topics such as music, art, literature, and current events. No previous knowledge of Russian needed for 1. Four hours each course. Gordon, McKenna, Nalibow.

51, 52 Intermediate Russian Continued practical work in all language skills (speaking, listening, reading, writing), with more analysis of the structure of Russian. Continuation of cultural components. *Prerequisite:* 1, 2. Four hours each course. Gordon, McKenna, Nalibow.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

101 Phonology Practical work on Russian intonation, element order, and phonetics, using primarily Russian materials. Classroom and language laboratory work. May be taken together with 52. *Prerequisite:* 52 or concurrent enrollment in 52. Three hours. Nalibow.

121, 122 Composition and Conversation Continued practical work on all four language skills. Emphasis on oral and written self-expression. Presentations and compositions based on Russian-language media and literature. *Prerequisite:* 52. Three hours. McKenna, Nalibow.

141 Reading Comprehension Development of contextual strategies for reading authentic texts on a number of content areas, primarily expository texts from Russian newspapers, magazines, historical and scientific documents. *Prerequisite:* 52. Three hours. McKenna, Nalibow.

142 Listening Comprehension Intensive directed aural work with authentic Russian-language media (especially television, radio, and films), supplemented by work on vocabulary development and listening strategies. *Prerequisite:* 52. McKenna, Nalibow.

161 Russian Lexicology Study of Russian word roots and derivational morphology to increase vocabulary recognition and retention, building on correspondences with English/Latinic equivalent roots where possible. *Prerequisite:* 52. Three hours. McKenna.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

201 Survey of Russian Literature Readings and discussions about Russian literature to the rise of modernism. Particular attention to the social and historical context of the 19th century novel. *Prerequisites:* 52, GLIT 181 recommended. Three hours. McKenna, Nalibow.

202 Survey of 20th Century Russian Literature Readings and discussions about Russian literature from the rise of modernism to present. Particular attention to function of literature in Soviet society. *Prerequisites:* 52, GLIT 182 recommended. McKenna, Nalibow.

221 Culture and Civilization to the 1905 Revolution Social, cultural, and political institutions from the time of Peter the Great to the 1905 revolution. Particular attention to Russian music, art, and literature. *Prerequisite:* 52. Three hours. McKenna, Nalibow.

222 Culture and Civilization in the 20th Century Social, cultural, and political institutions from the 1905 revolution to the present. Particular attention to tensions between official and unofficial culture during the Soviet period. *Prerequisite:* 52. Three hours. McKenna, Nalibow.

251 Russian News Media Analysis of journalistic style and content in news coverage of contemporary events as reported in Russian newspapers and radio and television broadcasts. *Prerequisites:* 52, 141 or 142 recommended. Three hours. McKenna.

271 Slavic Linguistics The linguistic prehistory of Slavic. Linguistic history of the Russian language: introduction to Old Church Slavic and Old Russian, tracing Slavic declensional development. *Prerequisite:* One 100-level Russian course or instructor's permission. Three hours. Nalibow.

281 Seminar on a Selected Literary Genre or Period Study of a literary genre or period through close readings of representative texts supplemented by lectures and reports on sociocultural context. May be repeated. *Prerequisite:* One 100-level Russian course. Three hours. McKenna, Nalibow.

282 Seminar on a Selected Author or Authors Study of author(s) through close readings of representative texts

supplemented by lectures and reports on the works' socio-cultural context. May be repeated. *Prerequisite:* One 100-level Russian course. Three hours. McKenna, Nalibow.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

GENERAL LITERATURE

181 19th Century Russian Literature in Translation Survey of major 19th century authors and genres. Close readings supplemented by lectures and discussions. Particular attention to literary and social institutions in Russia. Three hours. McKenna, Nalibow.

182 20th Century Russian Literature in Translation From Russian modernism to the present. Close readings supplemented by lectures and discussions. Attention to both official and unofficial texts from the Soviet period. Three hours. McKenna, Nalibow.

183 Topics in Russian Literature in Translation Study of topics such as Russian author(s) (e.g. Dostoevsky and Tolstoy), genre (e.g. the Russian novel), literary school (e.g. Russian Formalism). Three hours. McKenna, Nalibow.

HONORS - ARTS AND SCIENCES

252, 253 Honors/Russian See page 64 and contact Department for specific requirements. Three hours each.

Russian and East European Studies

COLLEGE OF ARTS AND SCIENCES

Prof. Nalibow, Director.

The following courses are among the course offerings: **Economics** 11, 12, 185, 277, 281; **General Literature** 181, 182, 183; **History** 27, 137, 138, 237, 238; **Political Science** 172, 272; **Russian** 52.

Social Work (SWSS)

COLLEGE OF EDUCATION AND SOCIAL SERVICES

Professors Paolucci-Whitcomb, Witkin; Associate Professors Bishop, Roche; Assistant Professor Dewees; Research Assistant Professor Felicio; Lecturers Cass, Moroz, Pugh, Widrick.

2 Foundations of Social Work An introduction to the profession of social work, its functions, values, knowledge, and the problems it addresses. Three hours.

47 Human Behavior in the Social Environment I Introduction to life-span development from birth to death. There is a primary focus on the individual. *Prerequisites:* 2, 51, or instructor's permission. Three hours.

48 Human Behavior in the Social Environment II A systems approach to understanding various levels of social organization; for example, families, groups, organizations, and communities. *Prerequisite:* 47. Three hours.

51 Human Needs and Social Services Students provide volunteer service in a human service agency, relate observations to theory about clients, agency structure, programs, and operations, and assess their commitment to the profession of social work. *Prerequisite:* 2 or instructor's permission. Three hours.

55 Special Topics Designed so that its content and structure may accommodate special issues not especially appropriate within the boundaries of an existing course. Open to first-year students. Two to six hours.

165 Issues and Policy in Social Welfare I An introduction to economic, political, historical, and social forces that influence the development and implementation of social welfare policy. *Prerequisites:* Social Work major or permission. Three hours.

166 Issues and Policy in Social Welfare II In-depth examination of social welfare policy and accompanying social services in the U.S.; major policy analysis models presented and used. *Prerequisites:* Social Work major or permission; 165. Three hours.

167 Racism and Contemporary Issues Study of perception, conceptualization, and comprehension of racism. Strategies, techniques, and procedures to identify and decrease many facets of racism. Three hours.

168 Social Work Intervention I Social work theory and practice methods employed by social workers in providing services to individuals and small groups. *Prerequisite:* Social Work major or permission. Three hours.

169 Social Work Intervention II Social work theory and practice methods employed by social workers in providing services to families, organizations, and communities. *Prerequisites:* Social Work major or permission; 168. Three hours.

170 Field Experience Field experience under MSW supervision in social service agencies four days each week. Taken concurrently with 171. *Prerequisites:* 169, Social Work majors, senior standing. Twelve hours.

171 Field Experience Seminar Weekly integrative seminar; discussion of practice within field agency. *Prerequisite:* Concurrent enrollment in 170. Three hours.

194 Introduction to Social Work Research Introduction to models and methods of social research from a social work perspective. *Prerequisite:* Social Work major or permission. Three hours.

197 Readings and Research *Prerequisite:* Social Work major. Pre-arrangement only. Variable credit, one to four hours.

291 Senior Seminar Weekly seminar for social work majors to examine issues in social work practice. *Prerequisites:* Senior standing, SW majors. Three hours.

295 Laboratory Experience in Social Work Supervised field work designed to give students experience in specialized areas for their professional development. Pre-arrangement only. Credit as arranged.

Sociology (SOC)

COLLEGE OF ARTS AND SCIENCES

Professors Berkowitz, Cutler, Danigelis, Mintz (Chairperson), Sampson, Smith, Stanfield; Associate Professors Diouf, Fengler, Fishman, Kahn, Krymkowski, McCann, Schmidt (CALS) Streeter; Assistant Professors Fox, Moore, Strickler; Lecturer Cowan.

1 Introduction to Sociology Fundamental principles and problems in the sociological analysis of the structure and dynamics of modern society. Three hours.

11 Social Problems Introduction to sociology through detailed examination of a selected number of major structural problems characteristic of contemporary societies. Problems treated may vary. Three hours. Cowan, Fengler, Fox, Kahn, Krymkowski, Schmidt, Smith.

14 Deviance and Social Control Analysis of the causes and consequences of social behavior that violates norms. Examines patterns of deviant socialization and social organization and forms of deviance control. Three hours. Fishman, Fox, McCann, Stanfield.

19 Race Relations in the U.S. Analysis of racial prejudice, discrimination, and other dominant group practices directed toward Native, Asian-, and African-Americans and their social movements for integration, accommodation, and separatism. Three hours. Berkowitz, Danigelis, Diouf, Fishman, Moore.

20 Aging: Change and Adaptation (Same as Nursing 20 and Early Childhood and Human Development 20/Education) Individual and social meanings of aging and old age; physical, physiological, psychological, and sociological changes accompanying aging; individual, family, community, and societal adaptations to aging. Three hours. Cowan, Cutler.

29 Sex, Marriage, and the Family Description and analysis of contemporary patterns in American sexual, marital, and familial behavior; their historical development, variants, and the evolving alternatives to traditional normative forms. Three hours. Berkowitz, Cowan, Fengler, Kahn, Strickler.

31 Race and Ethnicity in Canada and the United States Comparison of Canadian and U.S. responses to issues of race and ethnicity for people of native, African, or Asian origin and for Spanish- or French-speaking people. Three hours. Berkowitz, Stanfield.

32 Social Inequality Introduction to structured class inequality in the U.S., causes and consequences. Focus on wealth, prestige, and power. Inequalities of age, gender, and ethnicity also examined. Three hours. Danigelis, Diouf, Krymkowski, McCann, Mintz, Sampson.

43 Survey of Mass Communication The historical development of the socioeconomic, political, educational, and religious impacts of the press, film, radio, and television in American society. Three hours. Streeter.

57 Drugs and Society Patterns of illicit drug distribution, use, abuse, and control in contemporary society. Examines the interaction of cultural, social, psychological, and physiological factors in prohibited drug-taking. Three hours. Fishman, Halnon, McCann, Stanfield.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

All courses numbered 100–199 require three hours of sociology, preferably Sociology 1, specified experience or work in another discipline as indicated, or the instructor's permission.

100 Fundamentals of Social Research (Same as Political Science 181.) Introduction to research methods in social science. Includes examination of research design, measurement, data collection, data analysis, and the presentation and theoretical interpretation of research findings. *Prerequisite:* Three hours of sociology or six hours in a related social science. Four hours. Berkowitz, Cutler, Danigelis, Krymkowski, McCann, Strickler.

102 Population, Environment, and Society Analysis of the causes and consequences of varying relationships among population size, distribution and composition, social organization, technology, and resource base. *Prerequisite:* Three hours of sociology. Three hours. McCann, Strickler.

103 Environmental Crises in Modern Society Examines global, national, and local ecological crises both empirically and theoretically. Emphasis on economic processes, political/legal aspects, and social activism. *Prerequisite:* Three hours of sociology. Three hours.

105 The Community Comparative examination of patterns of social interaction in social groups with common territorial bases in contemporary societies and the analysis of community structure and dynamics. *Prerequisite:* Three hours of sociology. Three hours. Diouf, Schmidt.

109 The Self and Social Interaction Analysis of the roles of sociocultural and situational factors in individual behavior and experience and the social genesis, development, and functioning of human personality. *Prerequisite:* Three hours of sociology or Psychology 1. Three hours. Fox, Halnon, Kahn, Sampson, Streeter.

115 Crime Analysis of the nature and types of behavior that violates law, the mechanisms for defining such behaviors as criminal and their causes and consequences. *Prerequisite:* Three hours of sociology. Three hours. Fishman, McCann, Stanfield.

118 Race, Crime, and Criminal Justice A comprehensive examination of race, gender, and class on racial minorities' participation in criminal activities and how individuals are treated by the criminal justice system. *Prerequisite:* Three hours of sociology or equivalent. Three hours. Fishman.

119 Race and Ethnicity (Same as Anthropology 187.) Description and analysis of ethnic, racial, and religious groups in the U.S. Examination of social/cultural patterns in the larger society and in these groups themselves. *Prerequisite:* Three hours of sociology. Three hours. Danigelis, Diouf, Mahler (Anthropology).

120 Aging in Modern Society Analysis of contemporary needs and problems of the elderly, including discrimination, poverty, health care, and loneliness, and the evaluation of services and programs for the elderly. *Prerequisite:* Three hours of sociology or professional experience working with the elderly. Three hours. Cutler, Danigelis, Fengler.

122 Women and Society Analysis of the changes in the role of women in contemporary society and their consequences for female socialization, the family, and the other major social institutions. *Prerequisite:* Three hours of sociology. Three hours. Fengler, Kahn, Mintz, Smith, Strickler.

132 Affluence and Poverty in Modern Society Examination of structured social inequality in contemporary American society with special attention to the distribution of wealth and its relationship to power, prestige, and opportunity. *Prerequisite:* Three hours of sociology. Three hours. Berkowitz, Danigelis, Diouf, Krymkowski, McCann, Mintz, Sampson, Smith.

141 Language and Society Examination of the relationship between languages, perception, thought, and the sociocultural contexts of meaning and communication. *Prerequisite:* Three hours of sociology. Three hours. Kahn, Streeter.

150 Popular Culture Analysis of social significance of a selected range of contemporary non-elite cultural forms in the U.S., such as rock music, television programming, and popular literature. *Prerequisite:* Three hours of sociology. Three hours. Streeter.

151 Sociology of Religion Analysis of the sociocultural organization of religions with special attention to the changing forms of religions in contemporary society and their relationships to other institutions. *Prerequisite:* Three hours of sociology or six hours of religion. Three hours. Kahn, Sampson.

154 Social Organization of Death and Dying Comparative examination of sociocultural adaptations to mortality with special attention to family, medical, legal, religious, and economic responses to fatal illness and death in contemporary society. *Prerequisite:* Three hours of sociology. Three hours. Cowan, Fengler, Kahn.

171 Social Change and Development Perspectives in the Third World The causes, functions, and consequences of social change: perspectives on development in the Third World. *Prerequisite:* Three hours in sociology. Three hours. Diouf, McCann.

178 The Development of Sociological Theory Major classical traditions in sociological theory and their contemporary research relevance. Includes detailed critical examination of the contributions of Marx, Spencer, Durkheim, Weber, Simmel, Pareto, and Mead. *Prerequisite:* Six hours of sociology or equivalent preparation in another social science with instructor's permission. Three hours. Danigelis, Diouf, McCann, Sampson, Schmidt.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

All courses numbered 200–299 are seminars or individual tutorials and require a minimum of six hours of sociology, three of which must be at the 100 or intermediate level, equivalent preparation as indicated or instructor's permission.

202 Population Dynamics Analysis of the factors affecting human population growth and distribution, migration patterns, and the relationship between economic activity and population trends. *Prerequisite:* Six hours of sociology or 1; an introductory course in biology, economics, geography, or zoology. Three hours. McCann, Strickler.

203 Advanced Environmental Sociology Examination of theoretical interpretations of environmental problems, sources, and solutions, focusing on the social conditions under which problems arise. Emphasis on writing and individual research projects. *Prerequisite:* Six hours of sociology. Three hours.

205 Rural Communities in Modern Society The changing structure and dynamics of rural social organization in context of modernization and urbanization. Emphasis on rural communities in the U.S. *Prerequisite:* Six hours of sociology. Three hours. Diouf, Schmidt, Smith.

206 Urban Communities in Modern Society The changing structure and dynamics of urban social organization in context of modernization and urbanization. Emphasis on cities and metropolitan areas in the U.S. *Prerequisite:* Six hours of sociology. Three hours. Sampson.

207 Community Organization and Development Communities as changing sociocultural organizational complexes within modern society. Special attention given to problems of formulation and implementation of alternative change strategies. *Prerequisite:* Six hours of sociology. Three hours. Diouf, Schmidt.

209 Small Groups Examination of the structure and dynamics of small groups and the interpersonal, informal network of relations that characterize the interaction of members. *Prerequisite:* Six hours of sociology. Three hours. Fox, Halnon, Kahn.

211 Social Movements and Collective Behavior Examination of origins, development, structure, and consequences of crowds, riots, crazes, rumors, panics, and political and religious movements and their relationships to cultural and social change. *Prerequisite:* Six hours of sociology. Three hours. Berkowitz, Danigelis, Diouf, Schmidt.

213 Women in Development in Third World Countries An examination of the meaning and measurement of development, sociodemographic characteristics, sex stratification, and effects of Colonialism and Westernization on women's issues in the third world. *Prerequisites:* Six hours of sociology. Three hours. Diouf, Kahn, McCann, Smith, Strickler.

214 Delinquency Analysis of the nature and type of juvenile behavior that violates law, the mechanisms for defining such behaviors as delinquent, and their causes and consequences. *Prerequisite:* Six hours of sociology. Three hours. Fishman, Stanfield.

216 Criminal Justice Analysis of the social structures and processes involved in the identification and labeling of individuals as criminal offenders: criminal law, its enforcement and the courts. *Prerequisite:* Six hours of sociology. Three hours. Fishman, McCann, Stanfield.

217 Corrections Analysis of the social structures and processes involved with individuals designated as offenders of criminal law: probation, prison, parole, and programs of prevention and rehabilitation. *Prerequisite:* Six hours of sociology. Three hours. Fishman, Stanfield.

219 Race Relations Examination of American racial subordination in social and historical perspective. Analysis of interracial contacts, racial subcultures and social structures, and responses to racial prejudice and discrimination. *Prerequisite:* Six hours of sociology. Three hours. Danigelis, Diouf, Moore.

220 Internship in Gerontology Supervised service or research internship integrating theoretical and practical gerontological issues. *Prerequisites:* 20, 120; 221 or 222; or equivalent gerontological preparation. Three hours. Cutler, Danigelis, Fengler. (Not offered for graduate credit.)

221 Aging and Social Change Examines effects of social changes on older persons on the aging process. Also analyzes how an increasing proportion of older persons in the population leads to social change. *Prerequisite:* Six hours of sociology. Three hours. Cutler, Fengler.

222 Aging and Ethical Issues Analysis of selected ethical issues posed by an aging society and faced by older persons, their families, health care and service providers, and researchers. *Prerequisite:* Six hours of sociology. Three hours. Cutler, Fengler.

223 Sociology of Reproduction Examines reproduction of cultural values in relation to social conduct of reproduction of human life (childbearing) under advanced capitalism. *Prerequisite:* Six hours of Sociology to include one of 29, 122, or 229. Three hours. Kahn.

225 Organizations in Modern Society Examination of basic classical and contemporary theory and research on the human relations, internal structures, environments, types, and general properties of complex organizations and bureaucracies. *Prerequisite:* Six hours of sociology. Three hours. Berkowitz, Fox, Mintz, Sampson.

229 The Family As a Social Institution Examination of the institution of the American family in cross-cultural and historical perspective. Theories and research on family continuity, change, and institutional relationships explored. *Prerequisite:* Six hours of sociology. Three hours. Cowan, Fengler, Kahn, Moore, Smith, Strickler.

232 Social Class and Mobility Comparative and historical analysis of causes, forms, and consequences of structured social inequality in societies. Examination of selected problems in contemporary stratification theory and research. *Prerequisite:* Six hours of sociology. Three hours. Berkowitz, Danigelis, Diouf, Krymkowski, McCann, Mintz, Sampson, Schmidt, Smith.

239 Women and Public Policy in Vermont A detailed analysis of the social processes involved in public policy formation in Vermont, and the consequences for women. *Prerequisite:* Six hours of sociology. Three hours. Smith.

240 Political Sociology Examination of the social organizations of power and authority in modern societies and the dynamics and institutional relationships of political institutions, interest groups, parties, and publics. *Prerequisite:* Six hours of sociology. Three hours. Berkowitz, Danigelis, Diouf, Mintz.

243 Mass Media in Modern Society Intensive examination of selected topics in the structure of media organiza-

tions and their relationships to and impacts upon the major institutions and publics of contemporary issues. *Prerequisite:* Six hours of sociology. Three hours. Streeter.

250 The Sociology of Culture The relations of cultural forms and subjective experience to social structure and power; in-depth applications of interpretive approaches in contemporary sociology. *Prerequisite:* Six hours of sociology. Three hours. Kahn, Streeter.

254 Sociology of Health and Medicine The social organization and institutional relationships of medicine in society and the role of sociocultural factors in the etiology, definition, identification, and treatment of illness. *Prerequisite:* Six hours of sociology. Three hours. Berkowitz, Fox, Kahn, Mintz, Strickler.

255 Sociology of Mental Health Analysis of the social structures and processes involved in the identification, definition, and treatment of mental illness and its sociocultural etiology and consequences. *Prerequisite:* Six hours of sociology. Three hours. Halnon.

258 Sociology of Law Analysis of the sociocultural structure of the legal institution and its relationships to other institutions: the social organization of the legal profession, lawmaking, and the courts. *Prerequisite:* Six hours of sociology. Three hours. Stanfield.

272 Sociology of African Societies Current social, cultural, political, and economic changes occurring in African societies, including issues of development, the state and civil society, social class, ethnonationalism, and democratization. *Prerequisite:* Six hours of sociology. Three hours. Diouf.

274 Research Seminar Principles of research design, data gathering, ethics, measurement, data analysis, and data presentation. Students will complete a research project. *Prerequisites:* 100 or equivalent with instructor's permission. Three hours. Danigelis, Fox, Krymkowski, Schmidt.

275 Methods of Data Analysis in Social Research Quantitative analysis of sociological data; includes table, regression, and path analysis, scaling and factor analysis, and the analysis of variance emphasizing multivariate techniques. *Prerequisite:* 100 or equivalent with instructor's permission. Three hours. Berkowitz, Danigelis, Krymkowski, McCann, Strickler.

279 Contemporary Sociological Theory Critical examination of contemporary functional, conflict, exchange, interactionist, and structural theoretical approaches. A number of other theoretical approaches selected by seminar participants also examined. *Prerequisite:* 178. Three hours. McCann, Sampson.

281, 282 Seminar Presentation and discussion of advanced problems in sociological analysis. *Prerequisites:* Twelve hours of sociology, instructor's permission. Three hours.

285, 286 Internship *Prerequisite:* Twelve hours of sociology including at least one 200-level course in substantive area relevant to field placement, departmental permission.

288, 289 Seminar: Research and Methods of Teaching Sociology The development and evaluation of the teaching of sociology. *Prerequisites:* Twelve hours of sociology, permission of department. Open only to students who serve concurrently as teaching assistants in the Department. Three hours.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

297, 298 Readings and Research

HONORS - ARTS AND SCIENCES

254, 255 Honors/Sociology See page 64 and contact Department for specific requirements. Three hours each.

Statistics (STAT)

COLLEGE OF ENGINEERING AND MATHEMATICS

Statistics Program Steering Committee: Professors Aleong, Ashikaga, Costanza, Haugh (Director), Gordon, Howell, Newton; Associate Professors Mickey, Son; Assistant Professor Buzas; Research Assistant Professor Callas; Lecturers Badger, Low, MacPherson, Weaver.

11 Introduction to Statistics via Microcomputers*

Various study designs considered. Graphical and analytic techniques for presenting results. Wide variety of applications surveyed. PC-based software used. Experience gained in sample survey work. *Prerequisite:* High school algebra. Three hours.

51 Probability with Statistics Introduction to probabilistic and statistical reasoning, including probability distribution models and applications to current scientific/social issues. Roles of probability, study design, and exploratory/confirmatory data analysis. *Prerequisites:* Two years H.S. algebra. Three hours. No credit for sophomores, juniors, or seniors in the mathematical and engineering sciences.

95 Topics in Statistics Lectures, reports, and directed readings at an introductory level. *Prerequisite:* As listed in course schedule. One to three hours as announced.

111 Elements of Statistics* Basic statistical concepts, methods, and applications, including correlation, regression, confidence intervals, and hypothesis tests. *Prerequisites:* Two years of high school algebra, sophomore standing. Three hours.

*A student may receive credit for only one of 11 and 111, unless special permission has been given by the Statistics Program.

140 Natural Resource Biostatistics (See Natural Resources 140.) Four hours.

141 Basic Statistical Methods* Foundational course for students taking further quantitative courses. Exploratory data analysis, probability distributions, estimation, hypothesis testing. Introductory regression, experimentation, contingency tables, and nonparametrics. Computer software used. *Prerequisites:* Math. 19 or 21, sophomore standing. Three hours.

*A student may receive credit for only one of 111, 140, 141, and 143 unless special permission has been given by the Statistics Program.

143 Statistics for Engineering Data analysis, probability models, parameter estimation, hypothesis testing. Multifactor experimental design and regression analysis. Quality control, SPC, reliability. Engineering cases and project. Statistical analysis software. *Prerequisites:* 20 or 22, sophomore standing. Three hours.

151 Applied Probability Foundations of probability, conditioning, and independence. Business, computing, biological, engineering reliability, and quality control applications. Classical discrete and continuous models. Pseudo-random number generation. *Prerequisites:* Math. 22 or 20 with instructor's permission. Three hours.

191 Special Projects Student-designed special project under supervision of a staff member culminating in a report. *Prerequisites:* Junior standing, permission of Program Director. One to four hours as arranged.

195 Special Topics For Undergraduate Students Lectures, reports, and directed readings. *Prerequisite:* As listed in course schedule. One to three hours as arranged.

200 Medical Biostatistics and Epidemiology (Same as Biostatistics 200.) Introductory design and analysis of medical studies. Epidemiological concepts, case-control and cohort studies. Clinical trials. Students evaluate statistical aspects of published health science studies. *Prerequisite:* 141 or 143; or 211. Three hours.

201 Statistical Analysis Via Computer (Same as Biostatistics 201.) Intensive coverage of computer-based data processing and analysis using statistical packages, subroutine libraries, and user-supplied programs. Students analyze real data and prepare a comprehensive report. *Prerequisites:* 111 with instructor's permission, or 141, or corequisite 211. Three hours.

211 Statistical Methods I (Same as Biostatistics 211.) Fundamental concepts and techniques for data analysis and experimental design. Descriptive and inferential statistics, including classical and nonparametric methods, regression, correlation, and analysis of variance. *Prerequisite:* Junior standing. Three hours.

221 Statistical Methods II (Same as Biostatistics 221.) Multiple regression and correlation. Basic experimental design. Analysis of variance (fixed, random, and mixed models). Analysis of covariance. Computer software usage. *Prerequisites:* 141 or 143; or 211. Three hours.

223 Applied Multivariate Analysis (Same as Biostatistics 223.) Multivariate normal distribution. Inference for mean vectors and covariance matrices. Multivariate analysis of variance (MANOVA), discrimination and classification, principal components, factor analysis. *Prerequisites:* Any 200-level Statistics course, 221 or 225 recommended, matrix algebra recommended. Three hours.

224 Statistics for Quality and Productivity (Same as Biostatistics 224.) Statistical process control; Shewhart, cusum and other control charts; process capability studies. Total Quality Management. Acceptance, continuous, sequential sampling. Process design and improvement. Case studies. *Prerequisites:* 141 or 143; or 211. Three credit hours.

225 Applied Regression Analysis (Same as Biostatistics 225.) Simple linear and multiple regression models; least squares estimates, correlation, prediction, forecasting. Problems of multicollinearity and influential data (outliers). Selected statistical computer programs utilized. *Prerequisite:* 141 or 143 or 211; or 111 with instructor's permission. Three hours.

227 Statistical Methods for the Behavioral Sciences (Same as Psychology 341.) *Prerequisite:* 211 with computer experience or Psychology 340.

229 Survival Analysis (Same as Biostatistics 229.) Probabilistic models and inference for time-to-event data. Censored data, life tables, Kaplan-Meier estimation, logrank tests, proportional hazards regression. Specialized applications (e.g. clinical trials, reliability). *Prerequisites:* Any 200-level Statistics course, one year of calculus. Three hours.

231 Experimental Design (Same as Biostatistics 231.) Randomization, complete and incomplete blocks, cross-overs, Latin squares, covariance analysis, factorial experiments, confounding, fractional factorials, nesting, split plots, repeated measures, mixed models, response surface optimization. *Prerequisites:* 211; 221 recommended. Three hours.

233 Survey Sampling (Same as Biostatistics 233.) Design and data analysis for sample surveys. Simple random, stratified, systematic, cluster, multistage sampling. Practical issues in planning and conducting surveys. *Prerequisites:* 211; or 141 or 143 with instructor's permission. Three hours.

235 Categorical Data Analysis (Same as Biostatistics 235.) Measures of association and inference for categorical and ordinal data in multiway contingency tables. Log linear and logistic regression models. *Prerequisite:* 211. Three hours.

237 Nonparametric Statistical Methods (Same as Biostatistics 237.) Nonparametric and distribution free methods; categorical, ordinal, and quantitative data; confidence

intervals; rank and chi-square hypothesis tests; computer-intensive procedures (bootstrap, exact tests). *Prerequisites:* 211; or 141 or 143 with instructor's permission. Three hours.

241 Statistical Inference (Same as Biostatistics 241.) Introduction to statistical theory: related probability fundamentals, derivation of statistical principles, and methodology for parameter estimation and hypothesis testing. *Prerequisites:* 151 or 251; a course in statistical methods recommended; Math. 121. Three hours.

251 Probability Theory (Same as Math. 207.) Distributions of random variables and functions of random variables. Expectations, stochastic independence, sampling and limiting distributions (central limit theorems). Concepts of random number generation. *Prerequisite:* Math. 121, Statistics 151 recommended. Three hours.

252a Applied Discrete Stochastic Process Models Markov chain models for biological, social, and behavioral systems models. Random walks, transition and steady-state probabilities, passage and recurrence times. *Prerequisite:* 151 or 251. One hour.

252b Applied Continuous Stochastic Process Models Queueing models for operations research and computer science systems analysis. Birth-and-death processes with applications. Exponential, Erlang, and Poisson distributions. Monte Carlo simulation. *Prerequisite:* 151 or 251. One hour.

253 Applied Time Series and Forecasting (Same as Biostatistics 253.) Autoregressive moving average (Box-Jenkins) models, autocorrelation, partial correlation, differencing for nonstationarity, computer modeling. Forecasting, seasonal or cyclic variation, transfer function and intervention analysis, spectral analysis. *Prerequisite:* 211 or 225; or 141 or 143 with instructor's permission. Three hours.

256 Neural Computation (See Computer Science 256.)

261, 262 Statistical Theory I, II (Same as Biostatistics 261, 262.) Point and interval estimation, hypothesis testing, and decision theory. Application of general statistical principles to areas such as nonparametric tests, sequential analysis, and linear models. *Prerequisites:* For 261: 151 with instructor permission or 251; for 262: 241 with instructor permission or 261. Three hours each.

265 Integrated Product Development (Same as Business Administration 293.)

270 Stochastic Theory in Electrical Engineering (See Electrical Engineering 270.)

271 Least Squares Estimation and Filtering of Time Series (See Electrical Engineering 271.)

281 Statistics Practicum Intensive experience in carrying out a complete statistical analysis for a research project in substantive area with close consultation with a project investigator. *Prerequisites:* Any one of 200, 201, 221 through 237; or 253; some statistical software experience. No credit for graduate students in Statistics or Biostatistics. One to four hours.

293, 294 Undergraduate Honors Thesis A program of reading, research, design, and analysis culminating in a written thesis and oral defense. Honors notation appears on transcript and Commencement Program. Contact Statistics Program Director for procedures. Six to eight hours.

295 Special Topics in Statistics For advanced students. Lectures, reports, and directed readings on advanced topics. *Prerequisite:* As listed in course schedule. One to four hours as arranged.

Theatre (THE)

COLLEGE OF ARTS AND SCIENCES

Associate Professors Modereger, Schenk, Snider, Thaler (Chairperson) Tkatch; Assistant Professors Carleton, Greeley; Lecturer Houden, Robison.

1 Introduction to Theatre Overview of general theatre practices and theories, emphasizing script analysis, character development, and communicative skills directed toward a modern audience. Three hours. Greeley.

5 Oral Interpretation of Literature Performance of literature that is traditionally nondramatic. Three hours. Offered Summer Session only.

10 Acting I: Introduction to Acting Exercises to increase self-awareness and heighten perceptions of human behavior. Basics of script analysis and development of vocal and physical skills through practice and performance. Three hours. Carleton, Tkatch.

15 Fundamentals of Scenery A hands-on introduction to the theory and practical application of the scenic elements involved in play production (drawing, building, and painting techniques). Three hours and lab. Modereger.

20 Fundamentals of Lighting Primary course in the area of stage lighting design and execution. Three hours. Schenk.

40 Fundamentals of Costuming Primary course in area of costume design and construction. Three hours and lab. Thaler. Fall.

41 History of Costume (Same as Community Development and Applied Economics 117.) Overview of period costume and its adaptation for the stage. Three hours. Thaler. Alternating fall semesters.

42 Fundamentals of Theatrical Make-up Focus on the development of drawing, painting, and sculpture skills as they relate to the creation of a dramatic character for the stage. *Prerequisite:* 40. Three hours. Thaler. Alternating fall semesters.

110 Acting II: Contemporary Scene Study Continuation of Acting I. Development of acting techniques through intensive scene work: refining script analysis and performance skills using contemporary scenes. *Prerequisites:* 10, permission for non-theatre majors and minors. Three hours. Carleton, Tkatch.

111 Acting III: Voice and Speech for the Actor Study of the basics of voice production and Standard American Speech; exercises and practice focusing on freeing the voice and developing good vocal habits. *Prerequisites:* 10 or permission for non-theatre majors and minors. Three hours. Tkatch.

112 Acting IV: Stage Movement Development of physical freedom and articulate physical expression through techniques promoting relaxation, flexibility, strength, creative spontaneity, and purposeful movement. Techniques applied to short movement performances. *Prerequisite:* 10, or permission for non-theatre majors and minors. Three hours. Carleton.

115 Scene Design A practical application of the elements, principles, and styles of theatrical stage design through research, sketching, and rendering techniques. *Prerequisite:* 15. Three hours. Modereger. Spring.

116 Scene Painting Concepts and Applications Lab course to study practical application of painting technique used in theatres. *trompe l'oeil*. Develops skills introduced in 15. *Prerequisites:* 15, 115, and either 20 or 40. Three hours. Modereger. Alternating fall semesters.

120 Lighting Design Explores, through classroom instruction and projects, the development of lighting designs for a variety of live performance situations. *Prerequisite:* 20. Three hours. Schenk. Fall.

135 Dramatic Analysis Examination of structural characteristics of the basic forms and styles of drama and the manner in which they affect theatrical representation. *Prerequisite:* Three additional hours in theatre. Three hours. Greeley. Fall.

136 Classical and Medieval Theatre A study of the earliest dramatic rituals, the stage conventions of classical Greece, Rome, and the Middle Ages. *Prerequisite:* Three additional hours in theatre. Three hours. Greeley.

137 Renaissance, Baroque, and Neo-Classical Theatre An examination of the theatrical and dramatic innovations of the 16th, 17th, and 18th centuries. *Prerequisite:* Three additional hours in theatre. Three hours. Greeley.

138 19th and 20th Century Theatre Backgrounds, theatrical conventions, and dramas representative of Romanticism, Realism, and the revolts against Realism. *Prerequisite:* Three additional hours in theatre. Three hours. Greeley.

140 Costume Design Elements, principles, and styles of design applied to the visual creation of a dramatic character. *Prerequisites:* 40; 41 highly recommended. Three hours. Thaler. Spring.

141 Advanced Costume Construction: Draping and Flat Pattern Explores the methods of creating period shapes. Students develop a sloper, fit it to a human body, create a researched and completed period costume. *Prerequisite:* 40. Three hours. Thaler. Spring, every fourth year.

142 Advanced Costume Construction: Period Undergarments Focuses on techniques for creating artificial understructures that support period silhouettes. Corsets, hoop skirts, petticoats, etc., are researched, fit on the human body, and constructed. *Prerequisite:* 40. Three hours. Thaler. Spring, every fourth year.

143 Advanced Costume Construction: Millinery Explores methods of hat construction, including work in various media. Methods of shaping, covering, and trimming are researched, leading to the completion of hats. *Prerequisites:* 40. Three hours. Thaler. Spring, every fourth year.

144 Advanced Costume Construction: Tailoring Explores traditional methods of tailoring as well as practical adaptations for the stage. Research, discussion, and demonstration lead to completion of a period suit. *Prerequisite:* 40. Three hours. Thaler. Spring, every fourth year.

160 Stage Management Theory and practice for stage managing in the non-commercial theatre. *Prerequisites:* Two of 10, 15, 20, 40; 135. Three hours. Schenk. Spring.

190 Theatre Practicum Students actively involved in current department productions may earn credit for work on stage or backstage. Project proposals must be approved by department faculty and be of significant scope to qualify for credit. *Prerequisite:* Variable, see department chair or advisors. Variable hours, one-half to three.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

197, 198 Readings and Research

Note: 200-level Theatre courses are not offered for graduate credit.

210 Acting V: Shakespeare Scene Study Refining and developing script analysis and performance skills using Shakespeare, ancient Greek, Molière, or other stylized texts. *Prerequisite:* 10. Three hours. Tkatch. Fall.

215 Advanced Scene Design An in-depth study of the realization process for a stage design. A combination of script analysis, sketching, model making, rendering, and paint elevations, all as forms of communication. *Prerequisites:* 15, 115. Three hours. Modereger. Alternating fall semesters.

250 Directing I Theory of theatrical directing, including script analysis; approaches to audition, rehearsal, and performance; coaching actors. *Prerequisites:* 10, 15, 20, 40, 135; either 115 or 140, either 136, 137, or 138. Three hours. Robison. Fall.

251 Directing II Development of skills and aesthetic values through the direction of a complete theatrical event. Not offered as performance opportunity. Enrolled students may not perform as actors in their own projects. *Prerequisites:* 250, and declared Theatre majors only. Three hours. Carleton. Spring.

283, 284 Seminar

297, 298 Senior Readings and Research

SPEECH (SPCH)

Speech credits will not count toward a Theatre major or toward fulfillment of the College of Arts and Sciences fine arts distribution requirement.

11 Effective Speaking Fundamentals course in effective, informative, and persuasive public speaking and critical listening. Includes theory and practice. Three hours. Hovden.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

111 Persuasion Human motivation, attitudes, emotion, stereotypes, attention and audience psychology as applied in the speaking situation. *Prerequisite:* 11. Three hours. Snider.

112 Argument and Decision Inductive, deductive, causal, and analogical reasoning as applied to the speaking situation. *Prerequisite:* 11. Three hours. Snider.

214 Issues in Public Address Each semester emphasizes analysis of specific speakers, movements, theses, and strategies encompassed by a selected topic of public address. *Prerequisite:* Nine hours of related courses, of which three must be at the 100 level. Three hours. Snider.

283, 284 Seminar Seminar topics include: Nonverbal Communication, Rhetorical Criticism, Advanced Argumentation, Advanced Persuasion, Debate, Interpersonal Communication in Group Interaction, Communication in Conflict Management. *Prerequisite:* Six hours of speech, of which at least three hours must be at the 100 level. Three hours. Snider.

HONORS – ARTS AND SCIENCES

258, 259 Honors/Theatre See page 64 and contact Department for specific requirements. Three hours each.

Vermont Studies (VS)

COLLEGE OF ARTS AND SCIENCES

Prof. Paul A. Eschholz, Director

52 Introduction to Vermont Survey of Vermont's geography, history, politics, social issues, ethnic populations, culture, and environment. Special emphasis on an interdisciplinary approach to the study of Vermont. Three hours. Eschholz.

The following courses are among the course offerings; see department for specific description.

Anthropology 164, English 160, Geography 61, Geology 55, History 184, Political Science 123.

Wildlife and Fisheries Biology (WFB)

SCHOOL OF NATURAL RESOURCES

Associate Professors Capen, Hirth (Program Chair), Watzin; Assistant Professor Marsden; Research Associate Professor Parrish.

74 Wildlife Conservation Historical and contemporary values of wildlife; impacts on habitats and populations; strategies for conservation, allocation, and use. Nonmajors only. *Prerequisite:* Basic understanding of biological terms and concepts. Three hours.

130 Ornithology Taxonomy, classification, identification, morphology, physiology, behavior, and ecology of birds. *Prerequisites:* Biology 1, 2 or equivalent. Three hours. Capen.

131 Field Ornithology Identification and field studies of birds, emphasizing resident species. Two weeks in summer. *Prerequisite:* 130; preference to WFB majors. Two hours. Capen.

150 Wildlife Habitat and Population Measurements Field methods for measuring habitat variables and estimating population parameters. One week in summer. *Prerequisites:* 131, Forestry 21 or Botany 109, Natural Resources 140. One hour. Capen, Hirth.

161 Fisheries Biology and Management Introduction to freshwater fish, habitats, and life histories. Overview of fishery management techniques and principles, including sampling and assessment methods, stocking, population and habitat manipulation, and regulations. *Prerequisites:* Biology 1, 2 or equivalent. Four hours. Marsden.

174 Principles of Wildlife Management Application of ecology and sociology to the management of wildlife populations and habitat; integration of wildlife management with demands for other resources; consideration of game species, endangered species, and biological diversity. *Prerequisites:* Natural Resources 103 or Biology 102 or Botany 160. Three hours. Capen.

175 Wildlife and Society Investigates how people's attitudes, institutions, policies, and behaviors have affected wildlife across the North American landscape. Three hours. Kuentzel.

176 Florida Ecology Field Trip Major ecosystems and associated wildlife, ranging from north Florida flatwoods to south Florida Everglades. Field trip over spring recess. *Prerequisites:* 130, 174; permission. Two hours. Hirth. Alternate years, 1998–99.

177 Texas Wildlife Field Trip Major ecosystems and associated wildlife of south Texas, including Gulf coast, coastal prairies, lower Rio Grande Valley, and Chihuahuan desert. Field trip over spring recess. *Prerequisites:* 130, permission. Two hours. Hirth. Alternate years, 1999–00.

185, 186 Special Topics

187, 188 Undergraduate Special Projects Individual projects supervised by a faculty member. Projects may involve independent field, laboratory, or library investigations. Formal report required. *Prerequisites:* Junior standing, submission of a project prospectus for permission. One to five hours.

191 Wildlife and Fisheries Practicum Supervised work experience in the wildlife and fisheries area. *Prerequisite:* Instructor's permission. Credit as arranged.

232 Ichthyology Biology of fishes. Focus is on form and function, morphology, physiology, behavior, life history,

and ecology of modern fishes. *Prerequisites:* Biology 1, 2 or equivalent; junior standing. Three hours. Alternate years, 1999–00. Marsden.

271 Wetlands Wildlife Breeding biology, behavior, habitat management, and population ecology of wetland wildlife with emphasis on waterfowl. *Prerequisites:* 174, Natural Resources 103. Two hours. Hirth. (Not offered for graduate credit.)

272 Wetlands Ecology and Management Laboratory Qualitative and quantitative assessment of marsh habitats and wildlife populations, emphasizing management of waterfowl and furbearers. *Prerequisites:* Previous or concurrent enrollment in 271 or Natural Resources 260. One hour. Hirth.

273 Terrestrial Wildlife Integration of ecological principles, wildlife biology, land use, and human dimensions in wildlife. Emphasis on development and maintenance of terrestrial wildlife habitat, and population regulation of terrestrial species. *Prerequisite:* 174. Three hours. Hirth.

274 Terrestrial Wildlife Laboratory Laboratory and field experience related to terrestrial species and management of their habitat. Field project required. *Prerequisite:* Previous or concurrent enrollment in 273. One hour. Hirth.

275 Wildlife Behavior Behavior and social organization of game and nongame species as they pertain to population management. *Prerequisites:* One year of biology, an ecology course, 74 or 174 recommended. Three hours. Hirth.

279 Marine Ecology Structure and function of major marine communities, including open ocean, benthos, coral reefs, and estuaries. Emphasis on unique ecological insights gained in the marine environment. *Prerequisites:* Biology 1 and 2, an ecology course, or instructor permission. Three hours. Watzin.

285, 286 Advanced Special Topics

287, 288 Advanced Special Projects Advanced readings and discussions or special field and/or laboratory investigations dealing with a topic beyond the scope of existing formal courses. *Prerequisite:* Senior standing or permission. Credit arranged. (Not offered for graduate credit.)

299 Wildlife and Fisheries Biology Honors Honors project dealing with wildlife or fisheries biology. *Prerequisite:* By application only; see program chair. Three to six hours.

Women's Studies (WST)

COLLEGE OF ARTS AND SCIENCES

Professors J. Ambrose, Z. Ambrose, Bond, Elliott, Kuizenga, Mintz, Rankin, Rothblum, J. Smith, Warhol; Associate Professors A. Clark, Coleman, Dickerson, Fenger-Stephany, Fishman, C. Lewin, McCrate, Schreckenberger, Seager, van Slyke; Assistant Professors Balaghi, N. Brooks, Chan, Escaja, Gorman, Gustafson, R.P. Kahn, Kaza, Kete, Mahler, McIsaac, V. Moore, Schnell, Seguino, Strickler, N. Welch, Winter.

73 Introduction to Women's Studies Survey of feminist theory and its application to specific areas of inquiry, including analysis of the intersections among race, class, and gender. Three hours.

76 Women in Literature (See English 42.) Three hours. Schnell, Warhol.

95, 96 Introductory Special Topics Introductory courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

84 Mothers and Daughters Interdisciplinary exploration of historical, social, and cultural definitions of the mother/daughter experience informed by contemporary feminist perspectives. Three hours.

101 Women and Society (See Sociology 122.) *Prerequisite:* 73 or three hours of sociology. Three hours. Kahn, Mintz, Smith, Strickler.

111 Women's Spirituality: A Challenge to Institutional Religion Women's experience of the sacred and the self in Eastern and Western religious traditions. Analysis of political and cultural structures alienating women from their experience. Three hours.

115 Studies in Gender and Religion (See Religion 173.) *Prerequisite:* Three hours in religion or instructor's permission. Clark.

121 Literary Genre: Women Writing Autobiography (See English 181.) *Prerequisite:* Three hours in English or Women's Studies. Three hours. Dickerson.

122 19th Century Women's Writing (See English 147.) *Prerequisite:* Three hours in English or Women's Studies. Three hours. Kete, Warhol, Winter.

131 Contemporary Feminist Art Feminist visual art from 1970s to present. Theories of the body and the gaze, gender construction and essentialism, performance art, racism, art and activism, post-modernism. Three hours.

141 Gender and Law Feminist jurisprudence and legal theory. Topics include economic consequences of reproduction, sexuality, divorce, custody; sexual harassment, employment discrimination; surrogate motherhood, domestic violence, rape, pornography, prostitution. Three hours.

151 Feminism: Theories and Issues (See Philosophy 170.) *Prerequisite:* One course in philosophy or instructor's permission. Three hours. Chan.

157 Greek Feminism (See Classics 157.)

161 History of Women in the U.S. (See History 182.) *Prerequisite:* History 11 or 12, or three hours in Women's Studies. Three hours. Gustafson.

165 Women, Society, and Culture (See Anthropology 172.) *Prerequisite:* Anthropology 21 or instructor's permission. Three hours. Lewin.

172 Women and Depression The exploration of the impact of gender socialization, sexual oppression, discrimination, self-esteem, and body image on women's mental health in our society. Three hours. Gleeson.

174 Women, Science, and Nature The position of women in relation both to science and nature is considered historically, culturally, and in terms of current feminist perspectives. Three hours. Rankin.

179 Ecofeminism (See Environmental Studies 179.) *Prerequisite:* 73 or Environmental Studies 1, 2. Sophomore standing. Kaza.

181 Women in American Politics (See Political Science 135.) *Prerequisite:* Political Science 21 or three hours in Women's Studies. Three hours. Elliott.

182 Women and Development (See Political Science 179.) *Prerequisite:* Political Science 71 or Women's Studies 73. Three hours. Elliott.

185 Women in the U.S. Economy (See Economics 130.) *Prerequisite:* Economics 12 or instructor's permission. Three hours. McCrate, Seguino.

191, 192 Internship Approved programs of learning outside the classroom. Students work at local women's agencies, in consultation with faculty sponsors. *Prerequisites:* A contract must be obtained from and returned to the Women's Studies Program office during registration; permission of Director of Women's Studies. Three-six hours.

195, 196 Intermediate Special Topics Intermediate courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

201 Sociology of Reproduction (See Sociology 223.) *Prerequisite:* Six hours of sociology to include one of 29, 122, or 129; or instructor's permission. Three hours. Kahn.

205 Women in Development in Third World Countries (See Sociology 213.) *Prerequisite:* Six hours of sociology or instructor's permission. Three hours. Diouf, Kahn, McCann, Smith, Strickler.

270 Gender, Space, and Environment (See Geography 278.) *Prerequisite:* Junior, senior, or graduate standing; nine hours in geography or Women's Studies. Three hours. Seager.

271 Psychology of Women (See Psychology 231.) *Prerequisite:* One psychology course at the 100 level or instructor's permission. Three hours. Bond, Rothblum.

273 Seminar in Feminist Theory An interdisciplinary examination of theories accounting for women's position in culture and society. Special emphasis on the relationship between gender, race, class, ethnicity, and sexuality. *Prerequisites:* 73, six additional hours in Women's Studies, and admission to the Women's Studies major or minor program. Three hours.

295, 296 Advanced Special Topics Advanced courses or seminars on topics beyond the scope of existing departmental offerings. See Schedule of Courses for specific titles.

297, 298 Independent Study in Women's Studies Selection and development of topic for investigation using assigned faculty member as preceptor. *Prerequisites:* 73, approval of Director of Women's Studies. Three hours.

HONORS - ARTS AND SCIENCES

262, 263 Honors/Women's Studies See page 64 and contact program for specific requirements. Three hours each.

Additional Women's Studies courses are offered through individual departments. See Schedule of Courses for specific titles.

Zoology (ZOOL)

See Biology.

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Carolyn S. Kehler, B.A., M.A.	<i>Woodstock, Vermont</i>
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Term Ending March 2004

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Hill, H. Charles, D.D.S. (1972)	<i>Interim Dean, School of Allied Health Sciences</i>
Martin, Rebecca R., Ph.D. (1990)	<i>Dean of Libraries</i>
Sesnowitz, Michael, Ph.D. (1995)	<i>Dean, School of Business Administration</i>
Smith, Joan M., Ph.D. (1990)	<i>Dean, College of Arts and Sciences</i>
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- Allen, Sinclair T., Jr., M.D.
Professor of Medicine
- Alpert, Norman R., Ph.D.
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- Anderson, Richard L., Ph.D.
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Associate Professor of Professional Nursing
- Bartlett, Richmond J., Ph.D.
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