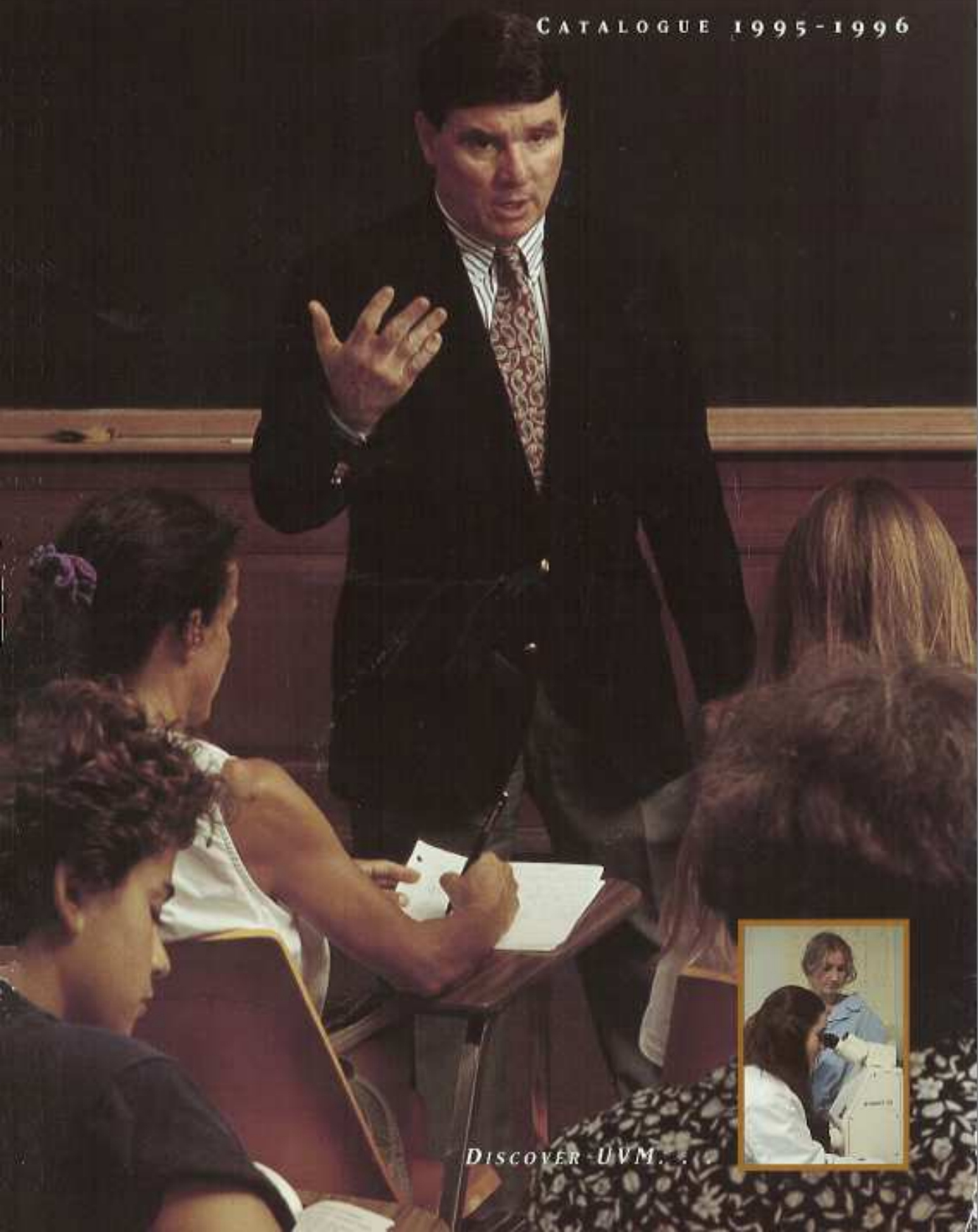


# THE UNIVERSITY OF VERMONT

CATALOGUE 1995-1996



DISCOVER UVM...





# Catalogue 1995-96

The University of Vermont  
Burlington, Vermont 05405

*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, fees, and regulations, and preemptions reserved herein on educational and financial considerations require, subject to, and consistent with established procedures and as demonstrated for making such change.*

*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 Vt. de Montis, University of the Green Mountains.*

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

## **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 race, color, religion, national or ethnic origin, age, sex, sexual orientation, marital status, or disability, on those areas not defined under applicable law, in admitting students to its programs and facilities and in administering its admissions policies, educational policies, scholarships and loan programs, athletics and other extracurricularly administered programs or activities made available to students at the University. The University also prohibits unlawful harassment defined in 16 V.S.A. § 112(2)(26) as verbal or physical mistreatment based on a person's race, creed, color, national origin, sex, sexual orientation, marital status, or disability and which has the purpose or effect of interfering with a student's educational performance or creating an intimidating, hostile, or offensive educational environment. Sexual harassment is more fully defined in the University's Policies and Procedures Governing Compliance of Discrimination and Sexual Harassment.

## **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 this policy. The University will extend equal access and hire from all persons qualified persons in light of job-related requirements, and will not unlawfully discriminate against applicants and employees in employment action on the basis of unlawful criteria, such as race, color, religion, national origin, sex, sexual orientation, disability, age or status as a disabled or Vermont City Resident, or those areas not defined under applicable laws, 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.

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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 Session, Evening Division, Regional Centers in Central Vermont and Brattleboro, Instructional Television Services and other distance education initiatives, Church Street Center, Conferences and Institutes, Program Development, Geographic Information Systems, and Lane Series)

The University of Vermont  
Burlington, Vermont 05405

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# Academic Calendar

## FALL 1995

Registration	August 28	Monday
Classes begin	August 29	Tuesday
Labor Day holiday	September 4	Monday
Fall recess	October 20	Friday
Preregistration	November 15-17	Wednesday-Friday
Thanksgiving recess	November 22-24	Wednesday-Friday
Classes end	December 6	Wednesday
Reading and exam period	December 7-15	
Reading days	December 7, 9, 10, 13	
Exam days	December 8, 11, 12, 14, 15	

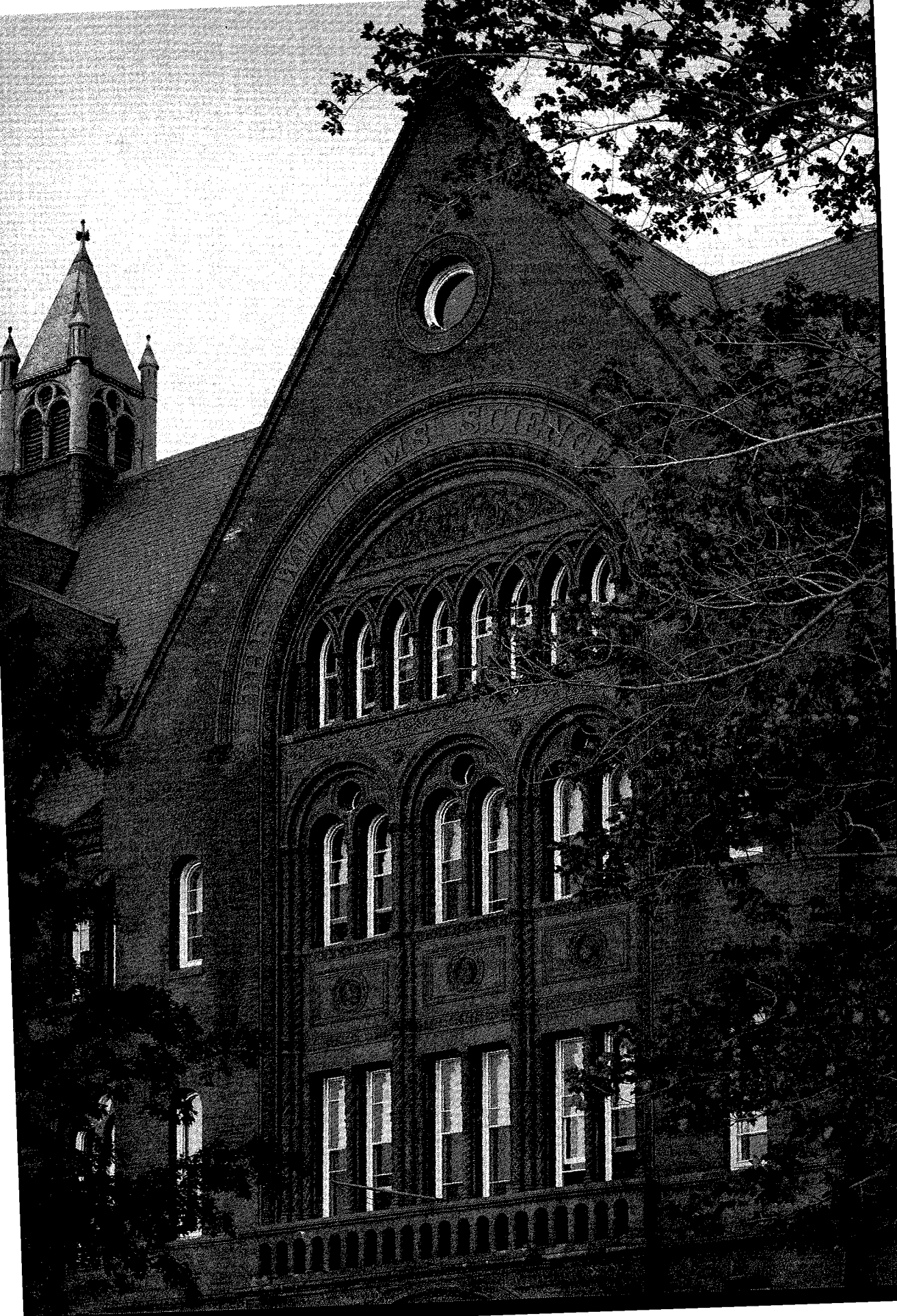
## SPRING 1996

Martin Luther King holiday	January 15	Monday
Registration	January 16	Tuesday
Classes begin	January 17	Wednesday
President's Day holiday	February 19	Monday
Town Meeting recess	March 5	Tuesday
Spring recess	March 18-22	Monday-Friday
Preregistration	April 17-19	Wednesday-Friday
Honors Day	April 19	Friday
Classes end	May 1	Wednesday
Reading and exam period	May 2-10	
Reading days	May 2, 4, 5, 8	
Exam days	May 3, 6, 7, 9, 10	
Commencement	May 19	Sunday

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

For informational purposes, the major Jewish holidays which occur during the academic year are listed below. Classes will meet as scheduled. Students who miss work because of religious observance will be permitted to make this work up at another time.

Rosh Hashanah (New Year)	September 25-26	Monday-Tuesday
Yom Kippur (Atonement)	October 4	Wednesday
Succot (Tabernacles, Beginning)	October 9-10	Monday-Tuesday
Sh'mini Atzeret (Tabernacles, Concluding)	October 16	Monday
Simchat Torah	October 17	Tuesday
Pesach (Passover)	April 4-5	Thursday-Friday
Pesach, Concluding	April 10-11	Wednesday-Thursday



# 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 ten percent of the total operating budget of \$257 million. The largest single share (about 32.5 percent) is obtained from student tuition and fees. Grants and contracts account for about 27.6 percent of the budget and the remainder comes from alumni and other private philanthropy, endowment, sales, services, and auxiliary enterprises.

During 1994-95, 7,496 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 1,124 were enrolled in the Graduate College and 374 in the College of Medicine. In addition, 1,158 students enroll in courses offered by Continuing Education.

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. 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, 332 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, 335 Waterman.

## Continuing Education

The student years at UVM open a gateway to a lifetime of learning. Continuing Education provides on-going access to University resources to UVM graduates and their peers who are part of an expanding audiences of adult students throughout Vermont and the nation, by offering innovative and current credit and noncredit programs. During their years at UVM, undergraduate and graduate students may 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 several undergraduate degrees on campus in the evening. Noncredit offerings include community education offerings from the Church Street Center as well as a full range of seminars, workshops, and conferences on topics of current interest to academicians and other business and professional people. The Lane Series presents concerts and theatre productions for an audience of students, faculty, staff, and the community at large. Instructional Television Services provide educational television programming and support to students, credit courses, and noncredit programs.

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

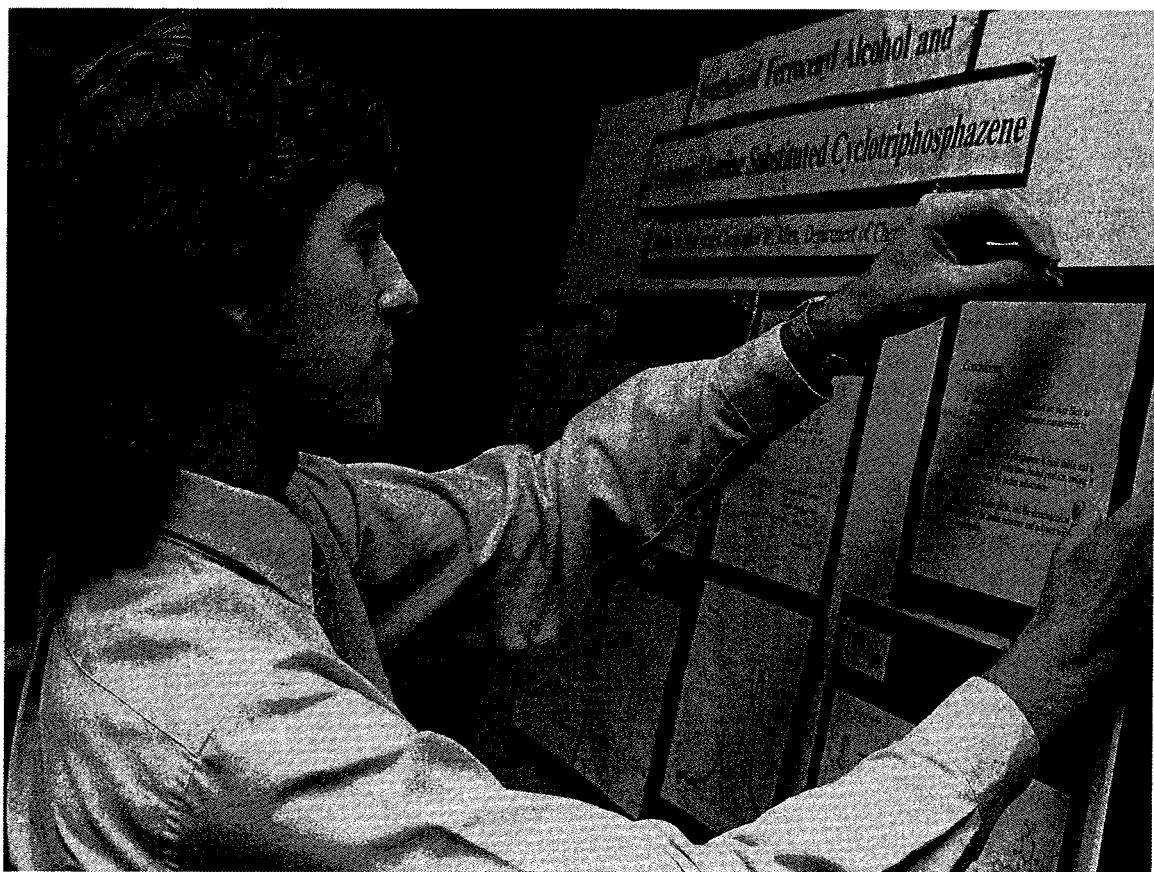
The UVM College of Medicine is one of the oldest and most respected medical schools in the nation, providing significant value to the State and region. Since its establishment in 1822, the College's mission has been the education

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 quality patient care, and community/public service. Over 400 graduates of the UVM College of Medicine practice in 79 different Vermont communities; graduates comprise almost half of the physicians practicing in Vermont.

## The Robert Hull Fleming Museum

The Fleming Museum houses an important collection of more than 18,000 works: paintings, sculpture, graphics, costumes, and decorative arts representing the full range of world cultures. Highlights include paintings by such American and French masters as Winslow Homer and Jean Baptiste Camille Corot; 19th- and 20th-century American and European prints; American decorative arts and costumes; and outstanding ethnographic collections from the Native Americas and Africa. A reinstallation of the permanent collection will begin this year to create long-term displays of African, Ancient Egyptian, Near Eastern, European, and American Art; next year will see the creation of a new Pre-Columbian and Native American gallery. In addition, changing exhibitions are scheduled throughout the year.

This year's special exhibitions include: installations by artists Michael Oatman and Suzanne Bocanegra; a collection of multiple-state prints by Pablo Picasso from the collection of Drs. Irene and Peter Ludwig of Aachen, Germany (a fol-



low-up to our spring 1995 blockbuster); prints by acclaimed 20th-century artist Robert Rauschenberg; the little known paintings of Zelda Fitzgerald; and *Healing Legacies*, a collection of art by women with breast cancer. Exhibition-related lectures, free to UVM students, faculty, and staff are held on alternating Wednesdays throughout the academic year. Special events include a community family day, lectures, workshops, films, performances, and exhibition openings.

Recognizing the importance of the Museum's connection with the University's academic programs, the Fleming provides access to the use of the collections and exhibitions for study and research. The Wilbur Room, which contains several thousand art volumes, operates as a noncirculating reference library open to the University and to the public on Wednesday afternoons, or by appointment with the Museum Educator. Undergraduate students have interned at the Museum in art, history, English, education, and anthropology.

Graduate and undergraduate students have curated exhibitions and have received academic credits for developing and conducting a series of art classes for children. Work-study students have opportunities in areas of art education, public relations, 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.

### University Extension System

Extension System faculty and program staff throughout Vermont simplify and quickly spread the knowledge of UVM and other land-grant university resources and research directly to Vermonters so the latest findings can be put to work.

This "grassroots" approach which reaches nearly all Vermont residents has triggered rapid advances in sustainable agricultural and natural resource systems, rural citizen and community development, and enhancing Vermont's human capital through healthy youth and informed volunteers.

### 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 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 1994-95 Kroepsch-Maurice award recipients were Barry E. Guitar, Professor of Communication Sciences; E. Lauck Parke, Associate Professor of Business Administration; Doris L. Bergen, Assistant Professor of History; Patricia J. Ferreira, Lecturer in English; and John F. Sharp, 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 1995 Kidder Award recipient was Robert W. Detenbeck, Professor of Physics.

### 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 1995-96 are Mark E. Bouton, Professor of Psychology; Kenneth I. Gross, Professor of Mathematics; Joseph J. Schall, Professor of Biology; and Alan P. Wertheimer, McCullough Professor of Political Science.

## 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.

The Howard Professorship of Natural History and Zoology was established in 1881 by John Purple Howard, a Burling-

ton 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. Anthony S. Campagna, 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.

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. Ralph H. Orth, 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.

## ACCREDITATIONS

The University of Vermont is accredited by the New England Association of Schools and Colleges, Inc., a non-governmental, 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, Mass. 01890, (617) 729-6762.

Specific academic program accreditations are listed below:

#### AGRICULTURE

Occupational Education—National Council for Accreditation of Teacher Education

#### ALLIED HEALTH SCIENCES

Dental Hygiene—American Dental Association

Medical Technology—National Accrediting Agency for Clinical Laboratory Sciences

Physical Therapy—American Physical Therapy Association

Radiologic Technology

Radiation Therapy Technology—Joint Review

Committee on Education in Radiologic Technology

Nuclear Medicine Technology—Joint Review

Committee on Educational Programs in Nuclear

Medicine Technology

#### ARTS AND SCIENCES

Chemistry—American Chemical Society

Speech-Language Pathology—American Speech-Language-Hearing Association

Music—National Association of Schools of Music

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

Vermont Department of Education—Teacher Education

Program Approval

#### 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

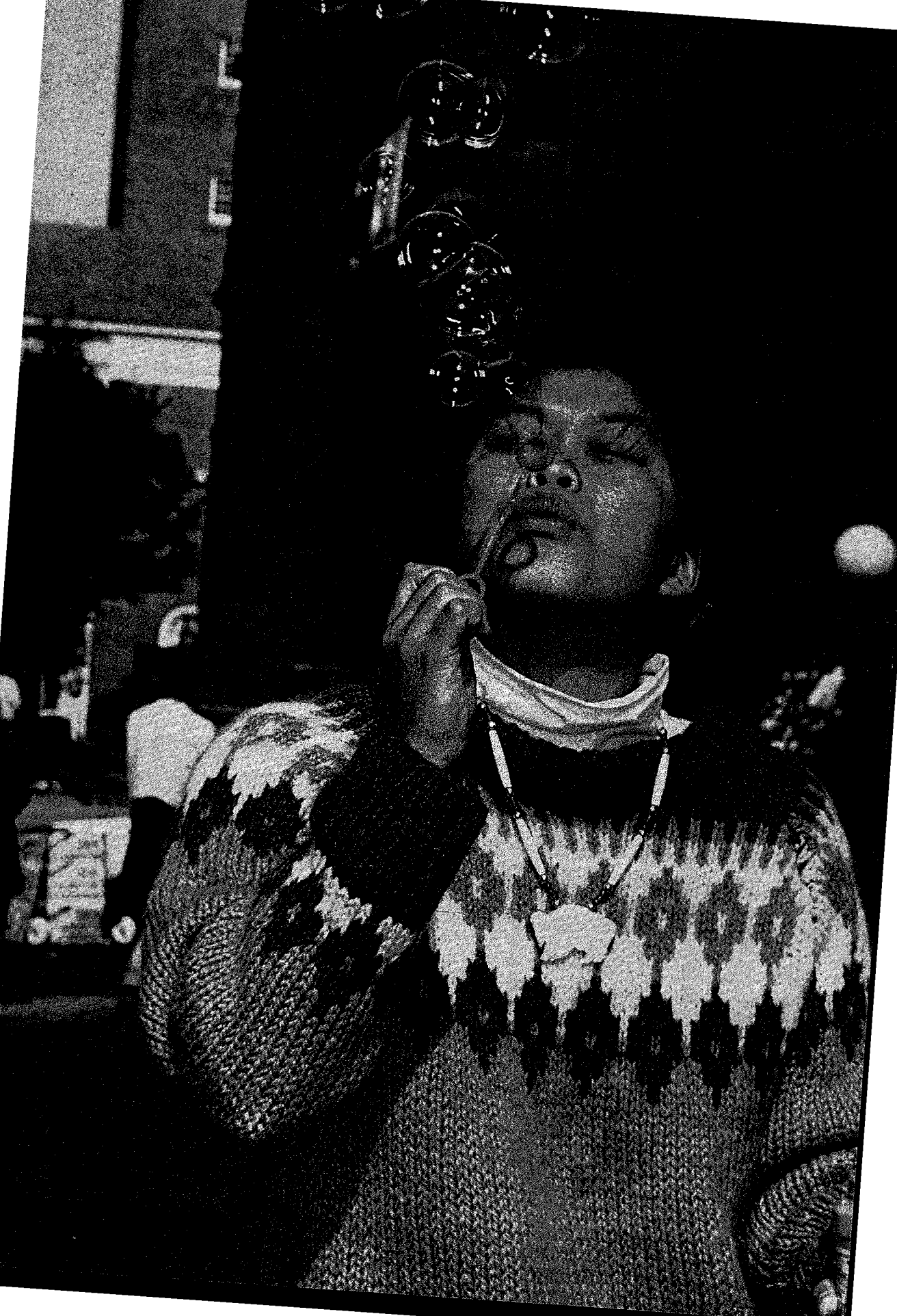
Forestry—Society of American Foresters

#### NURSING

Professional Nursing—National League for Nursing

Technical 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 10. 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

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.

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.

AREA	REQUIRED COURSES	RECOMMENDED COURSES
<b>ALL AREAS</b>	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	
<b>Agriculture and Life Sciences</b>	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)
<b>Allied Health Sciences</b>	For all majors: 1 year of biology 1 year of chemistry For physical therapy majors: 1 year of physics 4 years of mathematics, including trigonometry 1 year of biology 1 year of chemistry Transfer students must show proficiency in physics, mathematics through trigonometry, biology, and chemistry.	1 year of physics
<b>Arts and Sciences</b>		4 years of mathematics (including trigonometry) Continue foreign language, junior and senior years
<b>Business Administration</b>	4 years of mathematics, including one year of college preparatory/advanced math beyond Algebra II	1 additional year of science
<b>Education and Social Services</b>		1 year of biology
<b>Engineering and Mathematics</b>	For all engineering and mathematics majors: 4 years of mathematics, including trigonometry For engineering majors: 1 year of physics 1 year of chemistry	For all nonengineering majors: 1 year of physics 1 year of chemistry
<b>Environmental Program</b>	College preparatory curriculum	Additional humanities and science courses/computer use
<b>Nursing</b>	1 year of chemistry 1 year of biology	1 additional year of science in the senior year

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. 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 9). Admitted students frequently present more than the minimum requirements. The University reserves the right to change entrance requirements without prior notice.

**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.

## Admission for First-Year Candidates

### Fall Semester

	Deadline	Notification	Payment
Early Decision* (open to all first-year except those applying to Physical Therapy and Radiologic Technology)	November 1	Mid-December	January 15
Early Notification* (Vermont residents only except those applying to Physical Therapy and Radiologic Technology)	November 1	Mid-December	May 1
Vermont Scholars Program	November 1	Mid-December	May 1
General Admission	February 1	Mid-March	May 1
International	February 1	Rolling	Refer to information included in letter of admission. Payment is due within 20 days of the date of the letter of admission or by the first day of classes.
Evening Degree Program (first-year and transfer)	July 1	Rolling	Payment is due within 20 days of the date of the admission letter.

### Spring Semester

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

## Admission for Transfer Candidates

### Fall Semester

General Transfer Admission (all categories)	April 1	By June 1	Payment is due within 20 days of the date of the admission letter.
Physical Therapy and Radiologic Technology Applicants*	February 1	Mid-March	(Same as above)

### Spring Semester

General Admission	November 1	Mid-December	(Same as above)
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\*All applicants for Physical Therapy and Radiologic Technology will be reviewed after the February 1 deadline.

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.

**Application 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.

## 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 mid-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 Early Decision may not reapply for the fall semester.

**Early Notification** Vermont residents who apply for fall first-year status by November 1 will learn of their admission status by mid-December. Candidates admitted under Early Notification have until May 1 to pay an Acceptance Fee and Advance Tuition Deposit and are not making a commitment to attend the University by acceptance in the Early Notification program.

Early Notification applicants are judged qualified for admission based on three years of high school performance. If a candidate's three-year record is inconclusive, the Admissions Office will defer its decision and request midyear grades.

**The Vermont Scholars Program** Each year the University awards 15 full-tuition scholarships to academically excellent Vermont residents entering with first-year status. To qualify, candidates must rank in the top ten percent of their graduating class at the end of the junior year and present scores on the Scholastic Assessment Test (SAT I) in the 80th percentile or above on national norms. Comparable ACT scores are acceptable. The class valedictorian and salutatorian are eligible to compete for the scholarship even if their combined SAT I scores fall below the recommended level. Prospective candidates can sit for the November SAT I and use those results to qualify.

Candidates for the competition are asked to apply for admission by the Early Notification deadline of November 1 and to check the Vermont Scholars box on the application. The Admissions Office evaluates Vermont Scholar eligibility

and notifies candidates if they are eligible to compete in late December, shortly after the admissions notification. A Vermont Scholar Application is sent to eligible candidates.

A committee of faculty and admissions counselors review applications by region. The committee evaluates academic excellence, community leadership, and written and oral communication skill as evidenced in the Application for Admission. Scholarship winners are notified by mid-April. The 15 winners are selected by geographic region, with three winners from each of five areas of the state.

Scholarship recipients receive full tuition and required fees, guaranteed enrollment in classes, preference in residence hall selection, and are regarded as campus academic leaders. Awards are renewable up to four full years provided a 3.0 grade-point average is maintained and normal progress is maintained toward earning a degree.

**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 1995-96 academic year are:

Canadian Studies to residents of CT, MA, NH, RI  
Dairy Foods to residents of ME, MA, NH, RI

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** The Guaranteed Admission Program provides an avenue of entry to The University of Vermont for students who are not yet ready to enter a 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; (5) SAT or ACT as appropriate.

**UVM Evening University** Beginning in the fall of 1995, 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, Civil Engineering, English, Psychology, and Sociology. 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 work full-time jobs.

The UVM Evening University will be backed by evening support services for students, including advising, registration, financial aid, and other administrative services. Evening University students will be able to conduct all the business of learning at the most convenient time of day for them.

The application deadline for the fall semester 1995 is July 1, 1995; for the spring semester 1996, the deadline is November 1, 1995.

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.

#### **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 10 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 either at the time of admission to SMC or early enough in their study at 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.
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 at least eight credits of UVM engineering courses, including Mechanical Engineering 2 or Civil Engineering 2, with an overall minimum GPA of 3.0 in these courses.
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 once UVM becomes their host institution.
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.

#### **Vermont Technical College and UVM Articulation Agreement**

The University of Vermont will guarantee the acceptance of Vermont Technical College graduates who have a grade-point average of 3.0 or better from the following programs: Civil Engineering Technology, Electrical and Electronics Engineering Technology, and Mechanical Engineering Technology.

Vermont Technical College (VTC) and The University of Vermont established in the fall of 1993 an articulation agreement in engineering. Upon completion of the Associate in Engineering degree and recommendation of VTC's dean, a student will spend a minimum of two years at The University of Vermont and complete the major course requirements that will lead to a baccalaureate degree from UVM.

This articulation agreement provides students with a structured sequence of courses at VTC that, if completed successfully, guarantees their acceptance as transfer students in UVM's College of Engineering and Mathematics and allows qualified students to bridge their applied engineering courses with a professional engineering degree.

The counseling, admission, and transfer of students into this articulation agreement will be carried out through the application of the following procedures and policies:

1. Initial application for admission to the program should be made to VTC, where candidates will be subject to the admission requirements of that institution.
2. Students should indicate the desire to enroll in the articulation program either at the time of admission to VTC or early enough in their program at VTC to permit them to complete all prerequisite courses.
3. At the end of the first semester of the second year, students may be considered for transfer into the articulation program recommended by VTC if they have maintained a 3.00 cumulative grade-point average.
4. Applicants to the articulation program will be subject to the same admissions deadlines as other transfer applicants to the University. The application for fall admissions and supporting credentials should be received by the Undergraduate Admissions Office at UVM no later than April 1. Students should indicate on the application that they wish to formally matriculate at UVM.
5. All information and correspondence pertaining to student enrollment or transfer in this articulation agreement will be channeled through UVM's Admissions Office and the appropriate institutional representatives in the College of Engineering and Mathematics.
6. A student accepted under the auspices of this agreement will be eligible to enroll in the College of Engineering and Mathematics.
7. A student may be required to register for additional courses.

#### **MATRICULATION STATUS FOR FIRST-YEAR STUDENTS**

The Admissions Office accepts either a **secondary school diploma** or 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 page 10, 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.

## 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 10) 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+) average 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 provisional credit. To receive provisional credit, a course must have been taken at an accredited college or university, 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 some 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 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 are encouraged to 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.



## ADMISSION OF INTERNATIONAL STUDENTS

The University welcomes the applications of international students. The Admissions Office has a separate international application form.

**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.

**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 on page 14 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 must present scores from either the Scholastic Aptitude Test (SAT) 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.

**English as a Second Language (ESL) Programs** 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 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 Center for International Programs, 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 Office of International Educational Services, B 161 Living/Learning Center, University of Vermont, Burlington, VT 05405 USA.

A Form I-20 is prepared for accepted international students by the Advisor 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.

**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.

## 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 1996 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 **March 1** 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.

## 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 \$225 made payable to The University of Vermont.

First-year students entering in the fall have a May 1, 1996, 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, 1996. 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 Office of Residential Life mails room and roommate assignments in August prior to entry or before the beginning of the spring semester.

Any transfer candidates who apply for housing prior to June 30 will be guaranteed on-campus housing. Although housing is not guaranteed after June 30, it will be available on a first-come, first-serve basis.



**Class Registration** The academic advisor at Orientation helps prepare the first semester class schedule. First-year students entering fall semester are mailed a course schedule by mid-August. 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 Student Health Center by June 30 of the year of entry.

## 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 and send the appropriate application fee. 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.

Anyone who has been a degree student at The University of Vermont and 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.

## 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

1. 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.
2. 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.
3. A residence established for the purpose of attending UVM shall not by itself constitute domicile.
4. 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.
5. 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.
6. 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).
7. 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.

8. 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.
9. 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.
10. 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

11. The student must submit with the application form all relevant information.
12. 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.
13. Testimony, written documents, affidavits, verifications, and/or other evidence may be requested.
14. The student's failure to produce information requested may adversely affect the decision for in-state status.
15. A student or others furnishing information may request the deletion from documents of irrelevant private data.

#### In-State Status Classification Appeals

16. 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

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

#### Re-Examination of Classification Status

19. 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 10 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 31** 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 15** 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 1995-96. 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 \$225 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.

	Resident	Nonresident
Tuition .....	\$6,468	\$16,164
Housing (Double Room) .....	3,242	3,242
Meals (Minimum Plan) .....	1,390	1,390
Inter-Residence Association Fee ....	16	16
Library and Athletic Bond Fees ...	92	92
Student Health Fee .....	185	185
Student Accident & Sickness Insurance (Optional) .....	542*	542*
Student Government Ass'n Fee ....	80	80
Books and Supplies .....	510*	510*
Student Center Fee .....	22	22
Transportation Fee .....	46	46
Total, excluding personal and miscellaneous costs .....	\$12,593	\$22,289

\*Estimated

### TUITION

**Vermont Residents:** \$269.50 per credit hour through 11.5 hours. From 12-18 credit hours — \$3,234 per semester plus \$269.50 per credit hour for each hour in excess of 18 hours.

**Nonresidents:** \$673.50 per credit hour through 11.5 hours. From 12-18 credit hours — \$8,802 per semester plus \$673.50 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 \$2,632 for triple occupancy, \$3,242 for double occupancy, and \$3,698 for a single room.

The minimum University meal plan is \$1,390 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, 1995, 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 \$16 per year (\$8 per semester) fee is charged to each resident to be used for activities within the residence hall system.

### LIBRARY BOND 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 assessed in accordance with the requirement of the indenture, covering the construction of the addition to the Bailey/Howe Library.

### 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 \$185 per year (\$92.50 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 \$46 per year (\$23 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 \$80 per year (\$40 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	\$44
5	50
6	56
7	62
8	68
9 to 11.5	74

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 \$510 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 \$600 for an instrument kit in the first year that will be collected during the first week of the fall semester.

Radiologic Technology students should add about \$85 for lab coats and other related expenses.

Technical Nursing students should add about \$100 for uniforms and other related expenses in the beginning of the first year. Professional Nursing students should add about \$100 for uniforms and other related expenses in the second semester of the sophomore year and about \$125 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.

### 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 two weeks before classes begin). Advanced payments are accepted; checks should be made payable to The University of Vermont. Any checks or pay-

ments 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 Accounts Receivable Office as soon as possible before the due date. Students who are allowed a Deferred Payment Plan or a postponement of all or a portion of their financial obligation may be charged a \$50 Deferred Payment service charge.

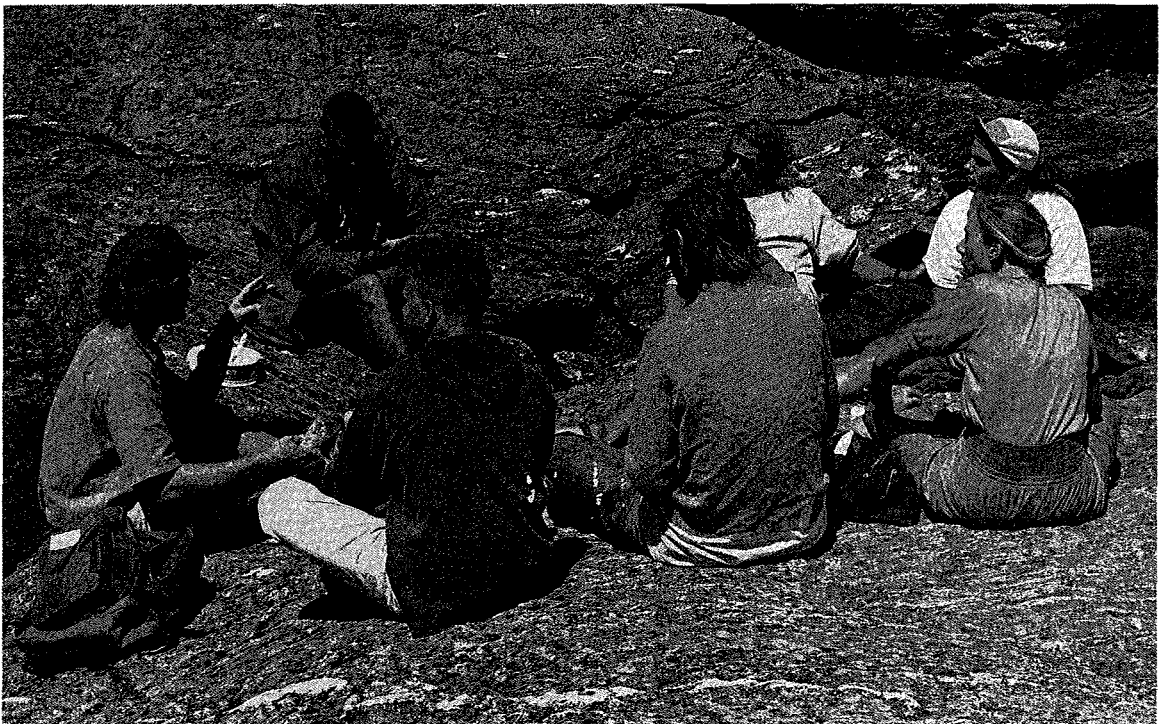
Students who have not satisfactorily completed financial arrangements by the announced due date will have their enrollment cancelled. Disenrollment will automatically place a registration hold on a student's account that will prevent re-enrollment until the student has contacted Accounts Receivable to 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 and other costs and charges necessary for the collection of this debt will be added to the outstanding balance.

## BUDGETED PAYMENT

The University offers payment plans (administered by the Knight College Resource Group) to parents who desire to budget annual costs in monthly installments. Specific information is mailed to parents of incoming students in the spring by the Accounts Receivable 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 \$225 payment (acceptance fee of \$115 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.
- 40% tuition and fees credit adjustment prior to the end of the fifth week of classes.
- No adjustment after the fifth 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 of the student's dean/director receives such notification in writing. The dean/director 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 prorated 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 cannot 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 1996 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, 1996; 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, all 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. 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.

### **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.

### **1995-96 IN-STATE AND OUT-OF-STATE EDUCATIONAL COSTS**

Standard student budgets used for calculating financial aid eligibility for the 1995-96 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 19 (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	\$6,468	\$16,164
Fees	441	441
Books/Supplies	550	550
Room	3,242	3,242
Board	1,790	1,790
Personal/Miscellaneous	908	889
Loan Fees	171	171
Total	\$13,570	\$23,247

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.

## THE UNIVERSITY LIBRARIES AND MEDIA SERVICES

In the Bailey/Howe Library, the main unit of the University libraries, are located the services and collections relating to the humanities, social sciences, and many of the sciences. This library holds 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 United States and Canadian government publications. The Special Collections Department includes the Wilbur Collection of Vermontiana, rare books, literary and historical manuscripts, and the papers of many individuals associated with the state and the federal government. A separate Chemistry and Physics Library is located in the Cook Physical Sciences Building. Collections in medicine and the health sciences are located in the Dana Medical Library. The University Archives in the Waterman Building contain the permanent, official records of the University. Audiovisual materials are located in the Media Resources Department of the Bailey/Howe Library and in the Dana Medical Library. Effective use of UVM's library system demands working knowledge of the on-line public catalogue, *Library User Information System (LUIS)*. Electronic search systems to access off-campus bibliographic databases are also available in UVM's libraries through Sage, the Libraries' gateway to electronic information resources.

## COMPUTING AND INFORMATION TECHNOLOGIES

Computing and information technologies play a vital role in supporting the instructional, research, and service needs of the University. Several units, departments, and colleges provide related services and resources.

The Division of Computing and Information Technology (CIT) offers a wide range of computing services and resources:

- Public microcomputer labs equipped with Macintosh and DOS/Windows systems and software for word processing, spreadsheets, statistics, scientific visualization, and design are available in several locations on campus. All labs are networked, allowing access to UVM's host systems as well as to national and international resources available through the Internet.

- Electronic mail is freely available and widely used, and network connections are available in the residence halls.

- An Academic Resource Facility (the ARF) provides high-end Macintosh, Intel, and Unix workstations, flatbed and slide scanners, laser disks, CD-ROMs, and other specialized hardware for exploring, testing, and developing computing, visualization, and multimedia applications.

- Microcomputers from major vendors can be purchasing through CIT's reseller program at substantial educational discounts.

- CIT offers free publications, workshops, tutorials, and telephone support, and maintains an active role promoting and supporting information technology on campus.

- CIT supports a variety of host systems, including several IBM AIX (UNIX) systems, a DEC Alpha OSF system, two DEC VAX/VMS hosts, and an IBM VM/CMS host.

Many other units of the University provide specialized computing resources. The Division of Engineering, Mathematics, and Business Administration's computing facility includes Sun servers, Silicon Graphic multiprocessor servers, two labs of SGI Indigo and IBM AIX workstations, as well as several Intel-based teaching labs. The College of Medicine has SGI host computers as well as an instructional multimedia lab. Other specialized resources include facilities in Arts and Sciences, Agriculture and Life Sciences, IMF and Research Facilities, the Language Lab, the Graduate Study Area of Bailey/Howe Library, and of course the Libraries' information gateway (SAGE on UNIX).

## COUNSELING AND TESTING

Over a thousand students use the services of the Counseling and Testing Center each year for personal growth work and mental health counseling. An agreement is made by the student and the counselor regarding goals and number of sessions, based on a "focused counseling" model. All contacts with C&T are confidential; the names of clients are not available without the student's signed permission. Our staff consists of women and men of varying backgrounds, ethnicity, ages, and abilities and all students are welcome.

Although individual and couples' counseling are traditional services, experience shows that group work is often the most helpful and effective. Topics are designed to meet current issues ranging from relationship concerns, self esteem, alcohol, eating disorders, confidence building, academic success, and support groups. C&T also provides outreach workshops to groups on campus, mediation, skill training, stress reduction, and consultation. National testing programs such as the Graduate Record Exam are administered through the Center, and individual, career, and personality tests are available in conjunction with counseling.

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

## DISABLED STUDENT SERVICES

The Office of Specialized Student Services works closely with students who have physical or learning disabilities, securing solutions to problems encountered in their university experience. This includes providing assistance with necessary tasks (e.g. readers, interpreters, mobility aides, notetakers); academic, vocational, and personal counseling to encourage optimal independence and eventual employability; educational diagnostic services; course accommodations; and a support system and structure where students can begin to effect changes in campus, community, and personal issues. Fees for educational diagnostic services may be charged.

Prospective students with disabilities may contact the staff in the Office of Specialized Student Services for assistance

in making decisions and assessing their needs for future schooling. Incoming students should contact the OSSS in planning for housing, classroom, and mobility needs. Current documentation of disability should be provided. Brochures describing the services at UVM for students with physical or learning disabilities are available from the Office of Specialized Student Services, A-170, Living/Learning Center, (802) 656-7753; TTY (802) 656-3865 (telecommunications for the deaf); (802) 656-2625 (UVM Information Office TTY).

## THE LEARNING COOPERATIVE

The Learning Cooperative provides academic support to students in all disciplines by offering individual tutoring in writing, reading, study skills, English as a Second Language, 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 DEVELOPMENT

The Center for Career Development provides UVM students with comprehensive assistance in exploring and implementing their career goals. There are three major components in this effort: understanding one's own strengths and career needs, discovering related work and educational options, and pursuing a specific goal.

To learn more about oneself, the Center staff offers two options: individual counseling appointments and group workshops. The focus can be on choice of major, graduate study, or career. Assistance is available by appointment throughout the year. Students are encouraged to visit the Center to learn more.

Investigating work and/or education options, the second component, can be accomplished through a wide variety of programs. Information on internship, part-time, and summer employment opportunities is available to students attempting to gain experience in potential careers. For students interested in more structured in-depth experi-

ences, the Cooperative Education Program allows students to alternate full-time paid employment with periods of classroom education. Co-op students are usually computer science, mathematics, engineering, or business majors and may work as close to campus as Burlington and as far away as Boston, Minnesota, and Florida.

Students will also find the Career Resource Library helpful in developing their goals. The library contains literature on various fields, occupational trends, salary surveys, government opportunities, and literature describing current career opportunities in both large and small corporations in the public and private sector. The library also contains a complete guide to all graduate, medical, and law programs in the country and a selection of graduate school catalogues from other universities. This information is expanded and updated continuously.

Additionally, career center programs and staff assist students with the third component, implementing goals. Workshops are held each semester to teach students job search skills such as resume writing, interviewing, and developing a job search strategy. To provide students with access to employers, the Center has an active on-campus interviewing program which brings local, regional, and national organizational representatives to campus. The UVM Alumni Career Network and the UVM Connection are just two more of the many services offered in this area.

Students are encouraged to make use of the Center for Career Development early in their college experience.

The Center for Career Development is located in E Building, Living/Learning Center, (802) 656-3450.

## Preprofessional/Graduate School Advising

The Center for Career Development provides assistance and support to all students preparing to enter graduate programs. Intended to supplement faculty advising, general counseling, advising, and referral services are available to students with academic and nonacademic questions and concerns.

The counseling staff work with students interested in preprofessional programs such as law, medicine, dentistry, optometry, podiatry, and osteopathy, and with students pursuing graduate school.

Registration materials for the required graduate and preprofessional examinations and application services are available at the Center as is a resource library containing reference materials which rate schools, index funding sources, and explain application procedures.

## Service Learning

Service-Learning provides opportunities for academic credit-bearing, experiential learning within the context of community service. Through these programs students may develop personal, professional, and leadership skills as well as make a significant difference in the lives of others.

Through the **Vermont Internship Program's** credit-bearing, service-learning internships, students fill real needs in the community and link their experience with a structured academic program. Typical placement opportunities include health and human services, law and justice, governmental, legislative, arts, environmental, and educational organizations. These experiences can be part- or full-time, one semester or summer in duration, or longer, and may be in Vermont, out-of-state, or in an international setting. Students may earn academic credit through the Center or through an appropriate academic department. Informa-

tional interviews are conducted to assist students in locating an internship site and organizing a structured internship plan. The Center's staff provide coordination and support services throughout the students' experience.

The **Workstudy/Service Link** allows eligible students to earn their Workstudy allocation through participation in community service activities. The Center's staff assist students in building workstudy relationships with community agencies.

## MULTICULTURAL AFFAIRS

The mission of the Office of Multicultural Affairs is twofold: to meet the academic, sociocultural, and quality of life needs of students of color; and, to promote awareness among the University community which facilitates development of a just multiracial campus climate.

Academic support is provided for students of color through the Supplemental Academic Advising Program. OMA participates in the Admissions Office Spring Visitation Program for students of color who have been accepted for admission. Prior to beginning full-time study in the fall, students of color can enroll for the Summer Enrichment Scholarship Program. The University provides at no cost up to six academic credits, live in on-campus housing with full room and board, and books.

Quality-of-life issues for students of color are central concerns of the OMA staff because of the profound effects such matters have on students' academic progress. Personal advising services are offered to any student on an informal, pressure-free basis by qualified professional staff with full assurance of confidentiality.

The facilities of the Office of Multicultural Affairs are located in the Center for Cultural Pluralism at Blundell House on the University's Redstone Campus. 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 very 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, etc.

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



# Student Life

Participation in activities is a vital part of a student's education. The benefits derived from participation in challenging and stimulating out-of-class activities is not only helpful but necessary to shape one's overall educational experience. 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.

## CENTER FOR CULTURAL PLURALISM

The Center develops and promotes programs to enhance cultural awareness on campus and within the local community. Student involvement in the planning and facilitation of such programs is a primary goal. Programs range from educational colloquia and cultural dinners to sponsored campus/community-wide ethnic weeks. Guest speakers, films, and cultural performances help bring campus attention to the African-American, Asian-American, Latino-American, and Native-American portions of our past and present day American society. Past programs have included dance troupes and speakers such as Attallah Shabazz, Cornel West, bell hooks, Kevin Locke, Benito Torres, KRS-1, Chuck D, Elizabeth Martinez, Daruba bin-Wahad, Angela Davis, Henry Cisneros, Dith Pran, Uri Kochiama, Tanaquil Jones, Reverend Ralph Abernathy, Russell Means, Spike Lee, Benjamin Hooks, Dick Gregory, and Shirley Chisholm.

The Center serves as a gathering place for members of the academic community to meet and share their cultural heritage through a variety of social, cultural, and educational events.

The Center for Cultural Pluralism also provides a place where students can come to relax and study. Typewriters, television, VCR, computer facilities, and even a kitchen are available. By providing special programs to increase cultural awareness and appreciation on campus and within the community, the Center serves an important mission of being "a place of sharing."

The Center for Cultural Pluralism is located in the Blundell House on Redstone Campus, (802) 656-3819. Visitors are welcome.

## STUDENT ACTIVITIES

The Student Activities Office assists students in developing educational and cultural programs and in managing the operations of their organizations. The department offers a comprehensive leadership program that encourages not only individual growth, but organizational development.

### Community Service

Volunteer programs provide many ways for students to become involved on campus and in the community. Individual students may choose to work several hours per week at a local agency or make a year-long commitment with a campus or community organization. They may participate in one-time events such as **Hunger Clean Up** or **Make a Difference Day (MADD)**. **Volunteers in Action (VIA)** is the umbrella group for 13 student-run, student-coordinated, volunteer projects including **Big Buddies**, **Adopt-a-Grandparent**, **Special Olympics**, **Vermont Children's Magazine**, **Volunteers for Youth**,

the **Prison Project**, **Habitat for Humanity**, **LEARN** (Literacy Education for Adult Reading Needs), **Food Salvage**, the **Tutoring Project**, **Pets Helping People**, **ACTIONS** (an AIDS awareness and education project), and one-time events.

**Alternative Spring Break** provides the opportunity for small groups of students to increase their social awareness through a week of intensive service in a culturally or economically different environment away from Vermont. Reflection and examination of the experience are built into the program. **Community Service Trek** is a week-long experience for incoming first-year students that involves them in the greater Burlington community prior to the first week of classes.

## Fraternities and Sororities

The Greek system is an integral part of campus life. Fourteen fraternities and six sororities, representing both national and local organizations, maintain active communities at UVM.

## 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.

## BILLINGS CAMPUS CENTER

Billings Campus Center houses a number of student organizations and provides space for meetings, lectures, films, and other programs.

The Student Activities Office, the Student Government Association Office, and the other student organizations are located in Billings Center.

## INTER-RESIDENCE ASSOCIATION (IRA)

The Inter-Residence Association represents the students living in UVM residence halls. The council, consisting of an executive board and committees, provides leadership for residence hall students, representing their interests to other constituencies within the University community and greater Burlington area. IRA involves itself in all aspects of residence hall life, constantly seeking new ideas and avenues for the promotion and development of these ideas 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 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 64). The local chapter was the first in Phi Beta Kappa to initiate women into membership.

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.

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; 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, gymnastics/combatative sports, and multipurpose building were completed in early 1982 and the ice hockey facility was recently renovated.

Athletic eligibility is determined by the Director of Athletics. 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. They must receive appropriate clearance from the UVM Student Health Center prior to participating in team activities including practice, pre-season conditioning, and contests.

The athletic policies of the University are developed by the Athletic Council, an advisory board to the President composed of faculty, students, and alumni. Athletic relations are maintained with NCAA, ECAC, NECAC, and North Atlantic Conference.

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 for both men and women include basketball, skiing, swimming, gymnastics, and indoor track. A hockey program for men is also included in the winter. 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.

Club sports provide the opportunity for a group of students to participate in a wider variety of competitive activities. All full-time undergraduate students are eligible to participate in any club. Emphasis is placed on student leadership and, within each club, members have the opportunity to become involved in the organization, administration, and supervision of the club's activities. Active club sports include: cheerleading, crew, cycling, figure skating, gymnastics, women's ice hockey, judo, karate, men's rugby, women's rugby, tae kwon do, men's and women's ultimate frisbee, men's volleyball, and wrestling.

Competitive sports are a desirable part of a student's education. The Recreational Sports Program offers over 30 intramural sports and special events throughout the academic year. All full-time undergraduate students, graduate students, and faculty/staff are eligible to participate in as many activities as they choose. Part-time and Continuing Education students must be enrolled in four credits or more to be eligible. 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, walleyball, tennis, and squash courts are available on a reservation basis, while basketball courts are used on a first-come, first-serve basis. In addition, students are free to use the pool, 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 takes place during the first week of classes, and the programs run for 12 weeks. 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.

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 de-

signed 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

The Lane Series features a carefully balanced season of classical music, dance, opera, the theatre, and jazz and/or folk music to provide a comprehensive program of the performance arts. Each year brings a variety of artists from established international favorites to promising, innovative new talent.

Serving as a link among many communities, the Lane Series finds its audience, volunteers, and advisors from students, faculty, and staff as well as the public at large. The Lane Series ensures direct interaction with the performers through master classes, workshops, 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, an integral part of Continuing Education, has offices at 30 South Park Drive in Colchester, (802) 656-4455. Its major ticket sales outlet is the Campus Ticket Store in the UVM Store on campus and accepts telephone/mail orders using MasterCard/VISA, (802) 656-3085.

## STUDENT HEALTH CENTER

The Student Health Center is available to all students (except those in the College of Medicine) for primary and preventive health care. A comprehensive program has been developed

to meet the needs of college students and includes medical and gynecological clinics; physical therapy and sports therapy programs; a wellness promotion program; a drug and alcohol education program; and some laboratory services. 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.

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

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.

## 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. All first-time, first-year, students are required to reside on campus for four matriculated semesters. Requests for an exception to this requirement must be received prior to June 30 for students living with parents or legal guardians within commuting distance, over the age of 21 before the residence halls open, married, or with dependent children. Housing for returning students is determined by a lottery held each spring. Second-year students who are pledges or actives within the Greek System and want to live in their sorority or fraternity 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 request to Residential Life by May 1.

Transfer students should contact Residential Life upon acceptance to the University (802) 656-3434.

## Residence Halls

The mission of the Department of Residential Life is to create an atmosphere within the UVM residence hall system which facilitates the growth and development of students. The department is committed to creating communities that are welcoming to all students regardless of race, ability, gender, age, national origin, color, religion, or sexual orientation.

The residence hall system is divided into three geographical areas: East, Main, and Redstone campuses. Each campus 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 campus fosters an environment in which students are provided opportunities to understand and celebrate diversity. Community councils complement the department's mission, represent students' opinions, and provide educational and social programs for their constituents.



Students living in the residence halls must have meal plan contracts. Contracts for the room and meal plan are binding for the full year unless cancelled for due cause with the approval of the Department of Residential Life. In August, new students will receive notification of a housing assignment and the opening day of the residence halls. 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.

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 residence areas.

Also see page 46 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 120 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 a shopping center, 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 laundry facilities and a large multipurpose room. There are three parking areas within this complex. Each apartment is furnished with an electric stove, refrigerator, water heater, kitchen cabinets, shelves, garbage disposal, and wall-to-wall carpeting.

The other complex, called Ethan Allen Apartments, is former military officers' quarters built between 1895 and 1933. There are 12 buildings with one to five apartments in each. Twenty-six apartments in this complex have two bedrooms, and five have three bedrooms. Many have basement or attic storage areas. These apartments have no carpeting, but stoves, refrigerators, and garbage disposals are provided. 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 either pay rent or provide services in lieu of 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 knowledge and observance of these 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 preregistration 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 dis-

position 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.

## CLASS ATTENDANCE

Students are expected to attend all regularly scheduled classes. This is a major responsibility of students toward themselves and toward the University. The primary penalty for nonattendance results in a lessened grasp of the subject matter of the course. It is the responsibility of the student to inform the instructor regarding reason for absence from class.

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,

without giving prior notification to the instructor, may be disenrolled. In such cases, the instructor shall notify the Registrar who will remove the student's name from the class list and the course from the student's schedule.

Each department is to inform all students in its classes at the beginning of each semester of its policy for handling absences and the penalties that may be imposed.

Failure to do any work for which a grade is given, if due to unexcused absence, may result in a failing grade for that particular work.

*Tardiness:* A student not present at the beginning of an exercise may be marked absent.

*Right of Appeal:* Students who believe that they have been unfairly treated in regard to absences may appeal to their academic dean.

*Medical Excuses:* The Student Health Center provides medical excuses by providing documentation to students who are hospitalized or who are advised by the Health Center staff to restrict their activities because of illness or injury. The student can then discuss excused class absence and course work with the faculty member who has final authority to excuse students from classes.

## RELIGIOUS HOLIDAYS

Students have the right to practice the religion of their choice. Faculty are asked to permit students who miss work for the purpose of religious observance to make this work up at another time.

## HOUR 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.
4. 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

1. The examination period at the end of each semester is set by the official University calendar.
2. 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.
3. 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.

4. In every course in which a final examination is given, every student shall take the examination unless excused by the instructor.
5. 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.
6. 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.
7. If the absence is not reported as provided above, or is not excused by the instructor, the examination is regarded as failed.
8. No student shall be required to take three or more final examinations in one 24-hour period.
9. 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.
10. 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.
11. 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:

AU Audit. See page 34 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:

1. 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 identifiable 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*.

## TRANSFER OF CREDIT

Students seeking to transfer academic credit from all institutions, national and international, may do so only for courses which are comparable in content, nature, and intensity to courses taught at The University of Vermont and are graded at the level of C or higher. To insure transferability of courses to be taken elsewhere, degree students must secure prior approval for each course in writing from Transfer Affairs. Specific 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 readmission 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 categories constitute such personal information.

- Category I Name, address, telephone number, dates of attendance
- Category II Class, previous institution(s) attended, major field of study, enrollment status, award, honors(including dean's list), degree(s) conferred (including dates)
- Category III Past and present participation in officially recognized sports and activities, physical factors (height, weight)
- Category IV Date and place of birth

Students who do not wish to have one or all of the above categories of 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

A student who is or has been a member of any college/school of this University may transfer to another college/school of the University only with the consent of the deans of the two colleges/schools concerned. 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 for 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 effective-



ness 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 presented 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). In general, students apply to an AMP during their junior year of study; thereafter, AMP participants and their faculty advisors design a program of study leading towards completion of the master's degree one year following receipt of the bachelor's.

## 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. Contact the Office of Transfer Affairs for the current policy regarding the five 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. 21 and Math. 22, 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. The average of the grades received in Math. 22 and Math. 121 is B or better, and
3. Received a B or better in Math. 121.

May receive credit for Math. 21 and Math. 22 provided the student:

1. Has not taken the advanced placement test in mathematics, and
2. Received a B or better in Math. 121.

## CREDIT FOR MILITARY SERVICE

Veterans or current military personnel who have been accepted into a degree program at The University of Vermont may have their military service record reviewed for possible transfer credit. Veterans should present form DD 214; active duty personnel should present form DD 295. Students should be sure that military course numbers appear on the documents presented for transfer credit review. Exemption from the 2.00 semester credit physical education requirement is given for active duty service of more than one year.

Transcripts of courses and examinations sponsored by the United States Armed Forces Institute (USAFI) or the Defense Activity for Non-Traditional Educational Support (DANTES) should be sent directly from the Contractor Representative to the Office of Transfer Affairs, 327 Waterman Building, University of Vermont, Burlington, VT 05405. Records completed prior to June 30, 1974, are available at no cost from: DANTES Contractor Representative,

2318 South Park Street, Madison, WI 53713. Transcripts of courses and examinations taken after July 1, 1974, are available at a nominal charge from: DANTES Contractor Representative, Educational Testing Service, P.O. Box 2819, Princeton, NJ 08540.

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.

## The Environmental Program

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. It is recommended that prospective students consult with the Environmental Program before making application for admission to the University.

The Environmental Program involves students and faculty from throughout the campus, 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.

While the Program serves a wide range of environmental interests, its primary mission is undergraduate education; its primary focus is the individual student. Each student plans an individualized program of studies, working closely with the faculty, which combines a broad, comprehensive understanding of the environment with depth in a specific discipline or profession.

Program offices 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 Arts in Environmental Studies is awarded through the College of Arts and Sciences.

The Bachelor of Science 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.

## 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, usually during the sophomore year.

## ENVIRONMENTAL STUDIES 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 studies directed toward newly-developing careers and graduate study programs. It is especially suited to the student seeking a broad liberal education with an environmental emphasis.

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.

### *Environmental Studies Core*

Required Courses:	Credit Hours
Introduction to Environmental Studies (ENVS 1)	4
International Environmental Studies (ENVS 2)	4
Environmental Theory (ENVS 100)	3
Seminar in Environmental Studies (ENVS 204)	3

### *Environmental Studies Major*

Intermediate Environmental Studies (ENVS 151)	3
Research Methods (ENVS 201)	3
Senior Project and Thesis (ENVS 202/203)	6-15
(Planned and designed in ENVS 201; credit arranged in consultation with senior thesis advisors)	
Individually-designed program of studies	6-24*
(Credit requirements vary, depending on college or school)*	
Electives and College or School Requirements	60+
Total Credits	120+*

**MINOR IN ENVIRONMENTAL STUDIES.\*** For students in several colleges and schools, this program offers a general course of studies with a traditional major.

In addition to the Environmental Studies Core and at least one intermediate or advanced ENVS course, 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 section of catalogue for the exact requirements of each college or school. See pages 57, 68, 86, 112.

**COORDINATE MAJOR IN ENVIRONMENTAL STUDIES.** Students in the College of Agriculture and Life Sciences may elect this special option. Students in academic units where a minor is not offered in environmental studies may elect this option as a cross-college minor. In addition to completing a major other than Environmental Studies, students must complete the Environmental Studies Core and at least three other environmentally-related courses chosen in consultation with an advisor from the Environmental Program (see page 57).

**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 page 84).

## Home Economics (Family and Consumer Sciences Education) Program

The Home Economics (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 prepared to teach in public schools in Family and Consumer Sciences (home economics) fields such as family living, child development, consumer education, food and nutrition, housing and interiors, and resource management found in middle, junior, and high school programs. 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
<b>FIRST YEAR</b>		
Agric. 91	1	—
Sociology	—	3
Early Childhd. & Hum. Dev. 80,81	3	3
English 1	3	—
Math. 9	—	3
Biology	4	—
Chemistry	—	3
Comm. Dev. & Applied Ec. 15	—	3
Nutritional Sciences	3	—
Phys. Ed.	1	1
	15	16
	1st SEMESTER	2nd SEMESTER
<b>SOPHOMORE YEAR</b>		
Economics 11	—	3
Psychology	3	—
Humanities electives	—	3
Chemistry	3	—
Nutritional Sciences	3	4

Computer Sciences	—	3
Education	3	3
Early Childhd. & Hum. Dev. 65	3	—
	15	16

Additional home economics-related courses and electives to meet college and concentration requirements including specific state and requirements for licensure, to be selected with the approval of the student's advisors.

## 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. Landscape design and contracting, urban forestry, park supervision, and garden center management are some of the professions in this field.

The interdisciplinary program is jointly offered 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. A committee of faculty from both units coordinates the program and advises students.

Options in this program are offered by the College of Agriculture and Life Sciences (page 60) and the School of Natural Resources (page 113).

## Reserve Officers' Training Corps ARMY

Army ROTC offers programs for men and women leading to a commission as a Lieutenant in the United States Army. Graduates choose from among 26 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 rappelling, orienteering, and backpacking.

The offices of the Department of Military Studies are located at 56 Colchester Avenue, (802) 656-4998.

**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 six-week summer camp at Fort Bragg, NC, 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 \$296 per month in wages and allowances for participation in both programs.

**SCHOLARSHIPS** Two-, three-, and four-year scholarships are available paying up to \$12,000 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.

**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 \$850.

**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 SEMESTER	2nd SEMESTER
FIRST YEAR	MSTD 6 MSTD 2*	MSTD 7 MSTD 4*
SOPHOMORE YEAR	MSTD 8 MSTD 3*	MSTD 9 MSTD 1*
JUNIOR YEAR	MSTD 201	MSTD 202
SENIOR YEAR	MSTD 203	MSTD 204

\*Optional

## 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 arrange 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 GPA 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 pro-

grams. Such individuals are encouraged to consult with their individual deans' offices regarding the 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 or Jennifer Huwiler, Department of English, 219 Old Mill (656-8546).

## UVM EXCHANGE PROGRAMS

UVM participates in a number of exchange programs with institutions around the world. In an exchange program, UVM participants pay the tuition, fees, room, and board charged at their home institution and exchange places with a student from a foreign institution. Exchange programs are an especially good value for those students paying UVM in-state tuition or receiving tuition remission. 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. Sussex students will attend The University of Vermont for mainly American Studies and political science courses. 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 Program:** This newly formed exchange is with the Universitat Augsburg, Bavaria, Germany. The UVM student needs to have an adequate command of the German language and be pursuing German or European Studies. Augsburg students will be pursuing studies in English and American Literature. For more information, contact Professor Dennis Mahoney, Department of German and Russian, or the Office of International Educational Services.

**The New England/Quebec Student Exchange Program:** The New England/Quebec Student Exchange Program offers options to study in both French and English depending on which Canadian university is selected. Some of the partici-

pating French-speaking universities are Université de Montreal, the Université du Quebec, Ecole Polytechnique, Montreal, and the English-speaking institutions of McGill University, Concordia University, and Bishop's University. For more information, contact Professor William Metcalfe, Canadian Studies, or the Office of International Educational Services.

**International Student Exchange Program (ISEP):** This program enables UVM students to exchange places with students from Europe, Asia, Australia, Canada, Africa, and Latin America. For more information, contact the Office of International Educational Services.

**Kansai Gaidai:** 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 Alan Andrews, Department of Religion, or the Office of International Educational Services.

**American Collegiate Consortium for East-West Cultural and Academic Exchange:** This consortium sponsors exchanges between students from its member institutions in the U.S. with students enrolled in participating institutions of higher education in the former Soviet Union. For more information, contact the Department of German and Russian or the Office of International Educational Services.

## STRONGLY RECOMMENDED 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.

**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.

**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, 209 Kalkin Hall.

**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. Veronica Richel, Department of German and Russian.

**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 the Office of International Educational Services.

**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 Australia, Austria, England, the Czech Republic, France, Germany, Spain, Italy, Japan, Mexico, and Russia.

**Institute of European Studies/Institute of Asian Studies:** This nonprofit organization sponsors programs in Spain, Mexico, Austria, Germany, France, England, Japan, Italy, China, Australia, Russia, and Singapore. Semester, year, and summer options are available. For more information, contact the Office of International Educational Services.

## 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, pre-

school, 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.

### THE EVENING DIVISION/ACADEMIC YEAR

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 several undergraduate degrees in the evening. Call Continuing Education for specific majors available. Registration occurs at the beginning of each semester. Courses are announced in the Continuing Education catalog, FOCUS, which is available at sites all over campus.

### SUMMER SESSION

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 Session courses provide students with opportunities to get ahead, catch up, focus on pre-med requirements, participate in an internship, and explore new topics. In addition, Summer Session 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 Session also provides students with a financial advantage through lower tuition rates. A Summer Session Preview is available in January and the complete FOCUS catalog of courses is available in February.

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 about Evening Division and Summer Session: (802) 656-2085 or toll free (800) 639-3210.

*Note:* Regularly enrolled 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.

## CONTINUING EDUCATION REGIONAL OFFICES

In response to the changing needs of many Vermonters, Continuing Education maintains several satellite programs and three regional offices located in Central Vermont, Brattleboro, and Colchester. In addition, courses are offered each semester in more than 60 communities around the state. Additional communities are reached through Vermont Interactive Television and other distance education initiatives.

The **Computer Lab** in the Colchester Business Park is the site of a variety of computer applications workshops as well as highly specialized training programs for Geographic Information Systems. For more information about the Computer Lab and the programs: (802) 656-2088 or (800) 639-3188.

In both the **UVM Central Vermont Education Center in Central Vermont** and the **UVM Southern Vermont Education Center in Brattleboro**, Continuing Education and the UVM Extension System share facilities. At both sites the Continuing Education coordinator works with organizations and individuals to match specific needs with UVM resources through both credit courses and noncredit programs. For more information: Central Vermont (802) 223-0388 or (800) 870-0388; Brattleboro (802) 257-3004.

## CHURCH STREET CENTER FOR COMMUNITY EDUCATION

The UVM Church Street Center provides an educational link between the community and the University. The Center offers 500 noncredit courses annually on a wide variety of topics (art, business, computers, dance, recreation, culture/language, personal growth, and writing) in one- to eight-week formats. The Center also offers three certificates (graphic design, photography, and computer applications). A catalogue of programs is published three times a year. For more information call Continuing Education: (802) 656-2088 or toll free (800) 639-3188.

## NONCREDIT 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, 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.

## ADVISING

The advising services offered by Continuing Education are often used as an introduction to UVM. 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, the advisors provide career counseling to potential students who need assistance determining their future direction. 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 a number of 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 re-enter 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 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 Programming**

The Department of Computer Science and Electrical Engineering and Continuing Education jointly offer a Programming 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-Med 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 or dentistry 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 can receive individual advisement through Continuing Education for guidance along the path to a career in the wide ranging field of medicine.

## **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.

# The College of Agriculture and Life Sciences

The College of Agriculture and Life Sciences performs four public functions: teaching, conducting research, disseminating information to the public, and performing related services. These four areas of work are performed by the resident instruction division, the research division (Agricultural Experiment Station), the extension division (University of Vermont Extension System), and the Related Services Division.

The curricula of the instructional division prepare students for professional careers in business, management, specialized services, sales, education, government service, and research.

The evolution of society is characterized by continual progress and change. The challenge of preparing students to excel now, yet adjust to future changes, is met through programs which give a foundation in the social sciences and the humanities as well as provide a fundamental technical education.

Certain courses are prescribed in each area of study with an allowance made for the election of additional courses. This provides a well-balanced and integrated educational program and insures reasonable concentration. Faculty advisors counsel students in selecting elective courses and solving educational problems. The normal semester program includes 15 to 18 credit hours of courses.

The College of Agriculture and Life Sciences welcomes applications from international students. The specific procedures and requirements are listed on page 15. Students who need to increase their proficiency in English can apply to Saint Michael's College in Winooski for admission to their English As a Second Language Programs. Students enrolled in Saint Michael's College have access to advising by faculty in the College of Agriculture and Life Sciences.

The offices of the Dean of the College are located in Morrill Hall and 601 Main Street.

## ORGANIZATION

The College's resident instruction division consists of seven departments: Agricultural Biochemistry; Animal and Food Sciences; Botany; Community Development and Applied Economics; Nutritional Sciences; Microbiology and Molecular Genetics; Plant and Soil Sciences; and one interdepartmental program in Biological Sciences.

## DEGREE PROGRAMS

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

- Animal Sciences – concentration in:
  - Dairy Production
  - Equine Studies
  - General
  - Preprofessional Science
- Biochemical Science
- Biological Sciences
- Botany

- Community Development and Applied Economics – concentration in:
  - Consumer Economics
  - International Development and Agricultural Economics
  - Small Business
- Dairy Foods – concentration in:
  - Dairy and Food Science
  - Dairy Production and Foods
  - Preprofessional Science
- Dietetics
- Environmental Studies
- Home Economics (Family and Consumer Sciences) Education
- Microbiology and Molecular Genetics
- Nutritional Sciences – concentration in:
  - Nutrition Education
  - Nutritional Science
- 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 leading to the Bachelor of Science degree 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 (Computer Science 2 or Community Development and Applied Economics 85) 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 ful-

fill 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.

## 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 and awards are added to the student's transcript.

## PREPROFESSIONAL PREPARATION

Students striving for admission to professional colleges, such as dentistry, medicine, 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 an upperclass peer advisor and 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

with calculus

Physics 11/21, 12/31

Physics 31/21, 42/31

Mathematics (requirement varies)

Math. 19. 20

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, feeds and feeding, and livestock production.

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

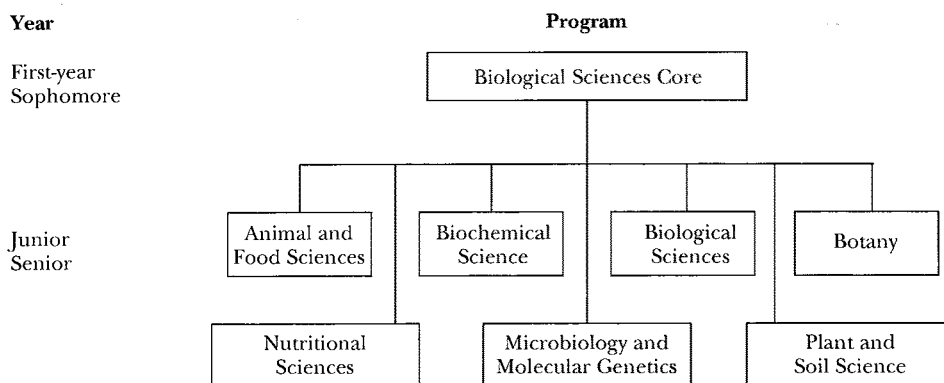
Students applying to the College of Agriculture and Life Sciences who express an interest in medicine or preveterinary medicine should present evidence of high performance in high school level science and mathematics courses, plus additional supporting documentation such as high SAT scores, strong letters 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 and Food Sciences, Terrill Hall, UVM, Burlington, VT 05405. Email: [jbramley@clover.uvm.edu](mailto:jbramley@clover.uvm.edu); or Dr. Donald Foss, Biological Sciences Program, Adams House, 601 Main Street, Burlington, VT 05401. Email: [dfoss@clover.uvm.edu](mailto:dfoss@clover.uvm.edu).

## 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 and Food Sciences, Botany, Nutritional 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 by academic regulations or tradition.

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. Students will be advised by a peer advisor and a faculty academic advisor.

## MAJORS: DEPARTMENTAL REQUIREMENTS

### Agricultural and Resource Economics

See Community Development and Applied Economics.

### Animal and Food Sciences

Domestic animals play a major role in our lives through agriculture, recreation, biomedical science, and companionship. The mission of the Department of Animal and Food 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, education, or use their degree as an excellent first step in career development. 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 and Food 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 and Food 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 and Food Sciences offers majors in Animal Sciences and Dairy Foods. Participation in undergraduate research, internships, and study abroad is actively encouraged. Exciting programs provide "hands-on" animal experience and training, e.g. the CREAM program in which students manage their own dairy herd and EQUUS in which equine science and management is the focus. By combining classroom, laboratories, and practical experience students maximize their performance in a friendly environment and develop responsibility for and control over their education.

**ANIMAL SCIENCES** The program deals with a range of options from basic sciences 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 if a more nontraditional career goal is desired. Requirements are minimal so that students select a combination of the 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:
  - Intro. Animal and Food Sciences
  - Fundamentals of Nutrition
  - Animal Biology (141, 142)
  - Animals in Society/Animal Welfare
  - Animal Genetics and Breeding
  - Principles of Animal Feeding
  - Senior Seminar
- Two additional Animal Sciences courses
- Biology 2
- A semester of inorganic chemistry (Chemistry 23 or 31)
- A semester of organic chemistry (Chemistry 26, 42, 141)
- A computer course (Computer Science 2 or 11 or Vocational Education and Technology 85)
- Math. 9, 10 or 19
- A statistics course (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 and Food Sciences	4
Microcomputer Applications	3
Written English	3
Biology	4
Electives*	0-6

Sophomore Year	Hours
Organic Chemistry	8
Biology	4
Statistics	3
Animal Physiology/Anatomy	8
Fundamentals of Nutrition	3
Electives*	4-10

Junior Year	Hours
Animal Welfare	3
Animal Feeding	4
Biochemistry	4
Microbiology	4
Physics	8
Speech	3
Electives*	4-10

Senior Year	Hours
Clinical Veterinary Med.	2
Animal Health	4
Physiology of Reproduction or Endocrinology	4
Biochemistry	4
Senior Seminar	1
Animal Genetics and Breeding	4
Electives*	11-17

\*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 and Food 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 Physiology and Anatomy	8
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
Intro. 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
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 and Food Sciences	4
Inorganic Chemistry	4
Written English	3
Biology 2	4
Organic Chemistry	4
Mathematics	3
Microcomputer Applications	3
Electives**	3-6

Sophomore Year	Hours
Animal Physiology and Anatomy	8
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
Practical Equine Management	3
Forage Crops	3
Horse in Health and Disease	3
Seminar	1
Animal Genetics and Breeding	4
Electives**	16-20

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

**DAIRY FOODS** Vermont has the only Dairy Foods program in New England and this qualifies students for the New England Regional Student Program that offers New England residents tuition privileges (see page 11). This comprehensive program deals with the handling, processing, and manufacture of fluid milk and milk products along with the basic elements of food science such as microbiology, food engineering, and food chemistry. The Department collaborates with Cornell University as part of the Northeast Dairy Foods Research Center and has extensive ties with industry. The Center is involved in research on food safety, functional properties of food, new product research and development, and in the market testing of products. Many undergraduates have the opportunity to take part in the research program in their junior and senior year. There is considerable flexibility in the program and opportunities for undergraduates to build the program that suits their career goals with the help of a specialist faculty advisor. Our links with industry allow the development of internships and provide excellent job opportunities in the food industry. The options commonly available are:

**Preprofessional Science:** This program is designed for the student wishing to specialize in dairy foods and attain the academic requirements for entry to a graduate or professional school. It is possible also to acquire qualifications for veterinary school admission in this program.

**Dairy Production and Foods:** In this option, the student will combine courses required for the dairy foods major with courses related to dairy production and farm management.

**Dairy and Food Science:** Under this option, dairy foods courses are combined with other food science courses and with offerings from other departments, such as Nutritional Sciences or Community Development and Applied Economics. The core courses which all Dairy Foods majors must take are:

Intro. Animal and Food Sciences
Fundamentals of Nutrition
Sensory Evaluation of Dairy Foods
Processing Frozen and Fluid Dairy Foods
Fermented Dairy Foods
Food Microbiology
Principles of Food Engineering
Senior Seminar
A semester of inorganic chemistry (Chemistry 23 or 31)
A semester of organic chemistry (Chemistry 26, 42, or 141)
Math. 19, 21 or 22
A computer course (Computer Science 2, 11 or
Community Development and Applied Economics
A statistics course (Statistics 111, 141, or 211)

An example of a four-year curriculum for the Dairy and Food Science option is shown below:

First Year	Hours
Agricultural Orientation	1
Cultural Diversity	1
Intro. Animal and Food Sciences	4
Inorganic Chemistry	4-8
Economics	3
Mathematics	3-6
Microcomputer Applications	3
Electives*	7-13

Sophomore Year	Hours
Fundamentals of Nutrition	3
Microbiology	4
Statistics	3
Sensory Evaluation of Dairy Foods	3

Processing Frozen and Fluid Dairy Foods	3
Organic Chemistry	4-8
Economics	3
Electives*	6-12

Junior Year	Hours
Food Microbiology	4
Fermented Dairy Foods	4
Physics	4
Business courses	8
Food Safety and Regulation	3
Electives*	7-13

Senior Year	Hours
Business courses	6
Internship or Undergraduate Research	4-8
Food Engineering	4
Senior seminar	1
Industrial Microbiology	3
Electives*	12-18

\*Include courses to satisfy College and University requirements and advanced courses for specific options.

## Biochemical Science

The Department of 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 and all majors meet or exceed the undergraduate requirements needed for admission to professional colleges, such as medicine, dentistry, veterinary medicine, and graduate school in biochemistry or any related biological sciences.

The department faculty believes that excellence in teaching and student advising are a priority and all department courses are taught by faculty regardless of professional rank. In addition, the faculty is deeply committed to generating new knowledge through research and discovery and demonstrating to students the relevance of this research to our understanding of biochemistry and to the improvement of the quality of life for individuals in our society. 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.

The study of biochemistry is critical to an understanding of modern medical, biological, and agricultural sciences and students interested in careers in these areas are well advised to major in biochemistry during their undergraduate years. 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	Written Expression
Speech 11 (or equivalent)	Effective Speaking
- 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	Beginnings
----------------	------------
- F. Cultural Diversity
- G. Physical Education:
 

Two credits
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#### II. Biochemical Science Core Requirements for All Majors:

- A. Biochemical Science:
 

Ag. Biochem. 10	Introductory Biochemistry
Ag. Biochem. 201, 202	General Biochemistry plus laboratory
Ag. Biochem. 220, 221	Molecular Biology plus laboratory
Ag. Biochem. 230, 231	Advanced Biochemistry plus laboratory
One additional elective	Ag. Biochem. course:
Ag. Biochem. 191	Biochemistry of Nucleic Acids <i>or</i>
Ag. Biochem. 210	Quantitative Biochemistry <i>or</i>
Ag. Biochem. 250	Plant Biochemistry
- B. Chemical Science:
 

Chemistry 31, 32	Introductory Chemistry
Chemistry 141, 142	Organic Chemistry
- C. Biological Science:
 

Biology 1, 2	Principles of Biology
Micro. & Mol. Gen. 101	Introductory Microbiology
A genetics course:	
Biology 101	Genetics <i>or</i>
Botany 132	Principles of Genetics
- D. Physics and Mathematical Science:
 

Physics 31, 42	Intro. Physics and Electromagnetism and Modern Physics (recommended for premedical programs) <i>or</i>
Physics 11, 12	Elementary Physics (advisor's permission required)
Physics 21, 22	Physics Lab
Math. 19, 20	Fundamentals of Calculus I, II <i>or</i>
Math. 21, 22	Calculus I, II
Comm. Dev. & Appl. Econ.	Microcomputer Applications in Agricultural and Life Sciences <i>or</i>
Computer Sci. 2 or equivalent	Computers and Their Application

#### 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, Biochemistry of Nucleic Acids; Botany 257, Physiology of Plant Cell; Biology 103, Cell Structure and Function; Zoology 223, Developmental Biology.

**B. Molecular Biology:**

Suggested courses: Ag. Biochemistry 191, Biochemistry of Nucleic Acids; Botany 252, Molecular Genetics II; Regulation of Gene Expression in Eukaryotes; Microbiology and Molecular Genetics 211, Molecular Genetics II.

**C. Mammalian Biochemistry:**

Suggested courses: Ag. Biochemistry 191, Biochemistry of Nucleic Acids; Biochemistry 212, Biochemistry of Human Disease; Biology 223, Developmental Biology; Animal Sciences 141, 142, General Physiology; Animal Sciences 216, Endocrinology; Microbiology and Molecular Genetics 203, Lab II; Mammalian Cell and Molecular Biology; Pharmacology 272, Toxicology, Nutritional Sciences 242, Advanced Nutrition, Nutritional Sciences 245, Nutritional Biochemistry.

**D. Student Designed Biochemistry Option (in consultation with faculty advisor):**

Three 100-level science courses.

Biology 2	–	4
English 1	3 or	3
Nutrition 43	–	3
Microcomputer Applications	3	–
Elective*	0-3	0-3

	1st	2nd
<b>SOPHOMORE YEAR</b>	<b>SEMESTER</b>	
Organic 141, 142	4	4
Biology 1	4	–
Botany 132	3	–
Micro. and Mol. Genetics 101	–	4
Speech	3 or	3
Elective*	2-4	0-3

	1st	2nd
<b>JUNIOR YEAR</b>	<b>SEMESTER</b>	
Physics 11, 12	3	3
Physics Lab 21, 22	1	1
Anatomy/Physiology	4	4
Advanced Biology	4 or	4
Elective*	3-6	3-6

	1st	2nd
<b>SENIOR YEAR</b>	<b>SEMESTER</b>	
Biochemistry	3	–
Lab 202	1 or	1
Ecology - Botany 160	–	4
Advanced Biology	4 or	4
Undergraduate Research	4	4
Elective*	4-7	8-11

\*Electives include courses to meet the College requirements for communications, social sciences, and the humanities and fine arts as well as advanced science courses for specific concentrations or general interest.

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 12).

The specific courses to be taken for this option start with the Core Program of the College (page 51) 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 UVM Admissions Office or the Biological Sciences Program Director, Adams House, 601 Main Street, Burlington, VT 05401; or telephone (802) 656-0293; or email: dfoss@clover.uvm.edu.

**Botany**

Students in the Colleges of Agriculture and Life Sciences or Arts and Sciences may major in Botany. Each undergraduate plans a program in consultation with a personal departmental advisor. The emphasis on flexibility permits a

**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. Specific courses are selected from a current UVM catalogue and include the major requirements. Students are urged to participate in undergraduate research and to work directly with a faculty scientist on the cutting edge of research. This unusual opportunity has resulted in several students publishing results in major scientific journals. 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.

Recent graduates have gone to some of the best medical, dental, and veterinary schools in the country. A larger proportion of students have gone on to graduate studies leading to the Ph.D. degree in microbiology, biochemistry, nutrition, physiology, reproduction, endocrinology, genetics, and molecular biology. Others go into university or industrial positions as research laboratory technicians or sales and management jobs requiring a scientific background. Hence, our graduates are well prepared with many career-oriented, marketable skills.

**Possible Four-Year Curriculum**

	1st	2nd
<b>FIRST YEAR</b>	<b>SEMESTER</b>	
Beginnings 99	1	–
Race and Culture 95	1	–
Calculus 19, 20	3	3
Chemistry 31, 32	4	4



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. Many students aim specifically for careers that do not require formal education beyond the bachelor's degree, e.g. preparation for numerous positions in: agriculture, business, education, administration, government, industry, medicine, research, or their own businesses. Others prepare themselves for graduate education and professional careers requiring advanced degrees, e.g. careers in botany, biology, medicine, dentistry, agriculture, biochemistry, or environmental sciences. In each case, close attention is given to increasing choices after college. 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.

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 107, 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. These concentrations can be used in transcripts and resumes to enhance a student's credentials for further study or employment.

**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. Graduates will be equipped with the necessary skills for job opportunities in the public and private sectors including field and laboratory research, environmental consulting, science education, and natural resources management. Many students use the concentration as preparation for graduate study in plant biology, ecology and evolutionary biology, or for professional programs.

Core Requirements:	Hours
Biology 1, 2	8
Chemistry 1, 2	8
Chemistry 42 or 141, 142	4-8
Math. 19, 20	6
Bot. 104, Physiology	4
Bot. 108, Morph & Evol of Vascular Plants	4
Bot. 109, Plant Syst. and Phylogeny	4
Bot. 132 or Bot. 101, genetics	3
Bot. 160, Plant Ecology	4
Physics 11, 21 (one semester with lab)	4
Statistics 211 or Nat. Res. 140	3-4
	52-57

Core Electives: At least six courses from the following at least two of which must be 200-level Botany courses.

Biology 102, Environmental Biology	4
Biology 203, Population Ecology	3
Bot. 107, Algae, Fungi, Bryophytes	4

Bot. 117, Plant Pathology	4
Ag. Biochem. 201, 202, General Biochemistry	4
Bot. 261, Plant Growth and Development	3
Bot. 165, Introduction to Wetlands	4
Bot. 205, Mineral Nutrition of Plants	3
Bot. 209, Biology of Ferns	3
Bot. 213, Plant Communities	3
Bot. 223, Fundamentals of Field Science	3
Bot. 232, Botany Field Trip	1
Bot. 234, Ecology of Freshwater Algae	3
Bot. 241, Tropical Plant Systematics	4
Forestry 21, Dendrology	4
Forestry 120, 121, Forest Ecology and lab	4
Forestry 122, Forest Ecosystem and Analysis	4
Forestry 225, Tree Structure and Function	3
Forestry 229, Water Relations of Plants	3
Geology 1, Intro. Geol.	4
Geology 101, Field Geol.	4
Geology 121, Geol. History of Life	3
Micro. and Mol. Gen. 220, Environ. Microbiology	3
Nat. Res. 220, Landscape Ecology	2
Plant and Soil Sci. 161, Introductory Soil Science	4
Plant and Soil Sci. 215, Weed/Crop Ecology	3
Biology 270, Speciation and Phylogeny	3
	18-21

Total number of required credits for major: 95-103

**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 and it prepares students for the professional schools and positions that require liberal education. Alternatively, Plant Molecular Biology may be used intensively as the University offering to undergraduate education in development, genetics, physiology, and biochemistry of plants. This education may culminate as the preparation for technical positions in plant biology or be preparatory to professional or graduate study.

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:	Hours
Biology 1, 2	8
Chemistry 1, 2, or 11, 12, 13, 14; 141, 142	16
Physics 31, 42 or 11, 12 (either with labs)	8
Math. 19, 20; or 21 or 22	4-6
Bot. 132 or Bot. 101, Genetics	3
Microbiology 101	4
Bot. 104, Physiology of the Plant Body	4
Bot. 109, Plant Systematics and Phylogeny	4
Bot. 261, Plant Development	3
Agric. Biochem. 201, 202, Gen. Biochem.	4
Agric. Biochem. 220, 221, Molec. Biol.	4
	62-64

Two courses from plant electives:

Plant and Soil Sci. 138, Plant Propagation	3
Bot. 117, Plant Pathology	4
Plant and Soil Sci. 242, Plant Tissue Culture	3
Bot. 257, Physiology of the Plant Cell	3
Ag. Biochem. 250, Plant Biochemistry	2
Bot. 255, Adv. Plant Genetics	4
Bot. 152, Plant Anatomy	3
Bot. 205, Mineral Nutrition of Plants	3

Two courses from technology electives:	
Bot. 252, Molec. Genetics: Reg Gene Exp	4
Bot. 254, Genetics of Fungi	4
Ag. Biochem. 230, Adv. Biochem	3
Biology 103, Cell Structure and Fntn.	4
Ag. Biochem. 191, Bioch. of Nuc. Acids	2
Statistics 211	3
Alternatives in consultation with academic advisor	10–16
Approximately 17–25 credits for other electives	

## Community Development and Applied Economics

The mission of the Department of Community Development and Applied Economics is to study and seek to understand the structures and institutions that impact the quality of life of rural people. The department places special emphasis on identifying opportunities for sustainable communities, rural-based small businesses, agriculture, and consumers. The mission reflects the land-grant goal of integrating teaching, research, and outreach to contribute to maintaining a vital rural economy that preserves and promotes ecological soundness, social responsibility, and consumer confidence.

The Department of Community Development and Applied Economics offers one major, 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. Consumers include individuals, households, and communities, and issues are addressed from local, national, and global perspectives.

**International Development and Agricultural Economics:** Agricultural Economics provides students with the skills necessary to deal with economic and policy problems, issues in agricultural production, and marketing. It also provides important foundations for international development studies. 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, to achieve a world characterized by more social and economic qualities.

**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, environmental responsibility, and the building and sustaining of small businesses in rural environments.

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

### General Requirements – All concentrations (40–42 credits)

Communication Skills	Hours
English I	3
Communication course (CDAE) 183, Speech 11, or other approved course)	3
One additional communications course (either oral or written)	3

Quantitative Skills	
Math. 19	3
Statistics 111 or 141	3
CDAE 85 or Computer Science 2	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 (9)	
Economics 11	3
Economics 12	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, 201, 205, 207, 208, 237, 253E, 272, 273, 295.

### Required courses in Consumer Economics

Twenty-seven credit hours: CDAE 58, 127, 150, 151, 155, 157, 158, 159, 295.

### Required courses in Small Business

Twenty-eight credit hours: CDAE 127, 157 or Bus. Admin. 17 or 18, CDAE 166, 167, 168, 253E, 264, 266, 267.

## Environmental Studies

The Environmental Program is a University-wide response to the need for a better understanding of the cultural and biophysical environments which determine the quality of life on earth. Aware of its special location in Vermont, the Program seeks a truly integrated balance of education, research, and community service. While the Environmental Program attempts to respond to a wide array of environmental interests, its primary focus is the individual undergraduate student, as reflected in its Environmental Studies major curriculum.

The Major in Environmental Studies is an individually-designed interdisciplinary program available to qualified students upon approval of the Director of the Environmental Program. The major requires completion of six Environmental Studies core courses (ENVS 1, 2, 100, 151, 201, and 204), a senior thesis (ENVS 202) of six or more credits, and at least 24 credit hours of intermediate or advanced environmentally-related courses approved by the student's advisor. A total of 122 credit hours of courses, including two physical education credits and the college distribution requirements, are required to earn the Bachelor of Science degree.

Students in other majors may also elect a Coordinate Major in Environmental Studies. Those desiring to do so must complete all the requirements in their major, Environmental Studies 1, 2, 100, and 204, and at least three other intermediate or advanced environmentally-related courses chosen in consultation with an advisor from the Environmental Program.

### **Merchandising, Consumer Studies, and Design**

See Community Development and Applied Economics.

### **Microbiology and Molecular Genetics**

The Department of Microbiology and Molecular Genetics prepares students for careers in biotechnology, medicine, teaching, and research through formal courses, academic programs, and undergraduate research opportunities. Undergraduates who undertake studies in the Department receive instruction in the classroom and in state-of-the-art teaching and research laboratories. The Department offers courses in the areas of molecular genetics, general, clinical, and environmental microbiology, virology, and immunology. These courses can be elected by students who are enrolled as microbiology majors or minors and are frequently selected by students who are majors in other programs within the biological sciences. Numerous research opportunities provide undergraduates with close interactions with faculty at the cutting edge of molecular genetics. The laboratory apprenticeships are invaluable learning experiences and frequently provide an important boost towards careers in academic laboratories, medicine, or in the rapidly expanding biotechnology industry.

Students who complete the microbiology major are well prepared to accept laboratory positions in biotechnology, biomedical research, or other areas of microbiology and molecular biology. They are also ready to move on for further training in medical school or numerous graduate programs in molecular biology, microbiology, biochemistry, cell biology, and biotechnology. The microbiology major builds on a solid foundation of courses in the biological and physical sciences, including introductory biology and chemistry, genetics, organic chemistry, calculus, and physics. Students intending to major in microbiology typically select MMG 101 (Biology of Microorganisms) and 102 (Genes and Genomes) during their sophomore year. The major requirements are completed during the junior or senior years through the selection of courses from among the following: Environmental Microbiology; Clinical Microbiology; Virology; Immunology; Molecular Cloning Laboratory; Mammalian Cell and Molecular Biology Laboratory; Prokaryotic Molecular Genetics; Industrial Microbiology; Food Microbiology; Yeast Genetics; Macromolecular Processing; Biochemistry; Undergraduate Research.

Depending on the interest of the student, the major can be designed in such a way that a concentration in one or more of the following areas is obtained: Molecular Genetics, Applied Microbiology, Clinical Microbiology, or General Microbiology. The Department also offers a minor in Microbiology and Molecular Genetics. Specific requirements for the undergraduate major and minor may be obtained from the Department office.

### **Nutritional Sciences**

The Department of Nutritional Sciences prepares students

to enter the rapidly expanding field of diet, nutrition, health, and disease and is the only academic unit in Vermont that is approved by the American Dietetics Association. Nutrition, a unique field of study, is rooted in the physical, biological, and biochemical sciences but is comprehensive in scope since it integrates 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 and socioeconomic aspects of diet, nutrition, and foods. Thus, department majors are able to meet the current and future needs in nutritional sciences and assume innovative, leadership roles in society.

The course credits earned in Nutritional Sciences 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 physical, chemical, and nutritional properties of food, food safety, and consumer aspects of food related to socioeconomic status, lifestyle, cultural beliefs, and health. Although a series of courses providing knowledge in these areas is required of all majors, each student has a generous choice of electives 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 Nutritional Science) or to combine a major in this department with another area of study. In addition, department majors may elect to meet the undergraduate requirements needed for admission to medical school or graduate school in nutrition, nutritional biochemistry, or any related biological science.

Depending on current interests and future plans, majors may select one of three departmental 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. This didactic program in dietetics is designed to meet or exceed the Plan V academic requirements needed for certification by the American Dietetic Association. The curriculum provides a solid background in basic science, preventive and therapeutic nutrition, food safety, and quantity food management. To become a registered dietitian, the academic requirements and a post-baccalaureate American Dietetic Association approved, supervised practice experience must be completed. Career opportunities include private practice, hospital dietetics, community nutrition programs, quantity food management, corporate wellness programs, as well as graduate or medical school.

**Nutrition Education:** Nutrition Education is designed to provide a strong background in preventive and therapeutic nutrition plus allow students to apply to a postbaccalaureate, Master of Arts in Teaching (M.A.T.) program in order to obtain teacher licensure. Students completing the UVM-M.A.T. program can expect to receive their master's degree plus their license to teach home economics, science, and health. The Vermont teaching license is reciprocal with 32 other states and, due to the ability to teach three subjects, will make our graduates highly employable in both public and private school systems.

**Nutritional Sciences:** This customized major is designed to provide a strong background in preventive nutrition, nutritional biochemistry, and basic science with an opportunity to elect further course work in biological, biochemical, psychological and social science or business. Graduates may continue their education in medical or graduate school or

find career opportunities in the food industry, pharmaceutical companies, medical research laboratories, community nutrition programs, government agencies, and the Extension System.

### Course Requirements for Nutritional Science Majors

<b>I. General Education Studies for all Majors</b>	
Hours	
A. Communication Skills	6
English 1 (or equivalent)	
Speech 11 (or NUSC equivalent)	
B. Fine Arts and Humanities	6
Two unspecified courses	
C. Social Sciences	9
Psychology 1	
Economics 11 <i>or</i> Comm. Dev. and Appl. Ec. 61	
Sociology 1 or 109 <i>or</i> Social Work 47	
D. Basic Sciences*	24
Chemistry 23 (or 31)	
Chemistry 42 (or 141)	
Anatomy and Physiology 19–20 (or equivalent)	
Microbiology and Molecular Genetics 65 <i>or</i> 101	
<i>or</i> Animal Sciences 203	
Biochemistry 201 and 202	
E. Analytical Sciences*	6
Statistics 111 (or equivalent)	
Computer Science 2 <i>or</i> 3 <i>or</i>	
Community Development and Applied	
Economics 85 (or equivalent)	
F. Agriculture and Life Sciences	2
Agriculture 95, Race and Culture	
Agriculture 99, Beginnings	
G. Physical Activity	2
Two unspecified courses	
<b>II. Department Core Requirements for all Majors</b>	
Nutritional Sciences:	17
37, Basic Concepts of Food	
38, Basic Concepts of Food Lab	
43, Fundamentals of Nutrition	
44, Survey of the Field	
144, Nutrition in the Life Cycle	
237, Food Safety and Regulation	
242, Advanced Nutrition	
<b>III. Department Major Requirements</b>	
A. <b>Dietetics</b>	23
Nutritional Sciences:	
138, Quantity Food Production and Services	
238, Food Service Systems Management	
240, Methods in Nutrition Education	
245, Nutritional Biochemistry <i>or</i>	
Biochem. 212, Biochem. of Human Disease	
246, Diet and Disease	
248, Community Nutrition	
Business Administration 120, Prin.	
Management and Organ. Behavior	
Electives	27–49
B. <b>Nutritional Sciences</b> , choose one:	
1. <b>Nutrition Education</b>	18
Nutritional Sciences:	

239, Curriculum Development	
240, Methods in Nutrition Education	
243, Evaluation Techniques	
248, Community Nutrition	
Two additional Nutritional Sciences courses	
Electives	32–54
2. <b>Nutritional Sciences</b>	12–14
In consultation with the student's academic	
advisor, select four additional didactic	
Nutritional Sciences courses, at least two of	
which must be at the 200 level from the	
following: 138, 143, 195, 235, 238, 239, 240,	
241, 243, 245, 246, 247, 290.	
Electives	36–60

## 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 and are dedicated to excellence in teaching. 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. These areas are very important from societal and environmental perspectives. The program prepares students for careers and graduate studies associated with these areas.

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 area areas of concentration within the program:

**Agroecology/Sustainable Agriculture:** Realizing that food and a healthy environment are necessities of life, this option focuses on studying ecologically-sound agricultural practices from an ecosystem perspective. This holistic approach seeks to develop in students an understanding of the complex nature of managing agroecosystems that are environmentally sound, economically viable, and social responsible. Science is integrated with small business management. 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:** The design of landscapes to serve both human and ecosystem functions is important to sustaining environmental health and the quality of human life. Students selecting this option are prepared for a professional career as a landscape designer or for graduate studies in landscape architecture. This concentration emphasizes the theory and techniques of landscape design and their application to private, commercial, or public design problems.

**Horticulture:** The "green" industry which includes the production of plants used for ornamental and landscape purposes is expanding rapidly across the United States. 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. Students integrate science, business, and the liberal arts to prepare for professional opportunities and for graduate studies.

**Environmental Soil Science:** There is a growing awareness that soil processes determine the fate of most pollutants. Students will learn how the soil affects the transport and remediation of environmental contaminants in both natu-

\*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.

ral and agricultural ecosystems. Integrated with plant, water, and geological sciences, this concentration prepares students for careers in environmental consulting, regulatory agencies, and graduate studies.

The Plant and Soil Science faculty have received recognition for quality teaching and for their expertise in horticulture, soil science, sustainable agriculture, and integrated pest management including biological control of pests. They 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. Students have access to university laboratories and greenhouse facilities on campus and at the UVM Horticultural Research Center, a 97-acre site located approximately six miles from campus. In addition, through faculty contacts and interaction with landscape design firms, state and federal agencies, nurseries and garden centers, environmental consulting firms, and the agricultural community, opportunities exist for off-campus internships that provide valuable work experience and insights into professional careers.

Required Core Courses:	Hours
Plant and Soil Science:	
11, Principles of Plant Science	3
106, Insect Pest Management	4
161, Introductory Soil Science	4
162, Soil Fertility and Management	3
Botany:	
104, Plant Physiology	4
117, Plant Pathology	4
Chemistry 23	4
Chemistry 42 or 26	4
Six additional Plant and Soil Science courses at or above the 100 level	18-20

## 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. Landscape design and contracting, urban forestry, park supervision, and garden center management are some of the professions in this expanding field.

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 which provide valuable work experience and professional contacts.

FIRST YEAR	1st SEMESTER	2nd SEMESTER
Agri. 99, Beginnings	1	—
Plant and Soil Sci. 7, Orientation to Urban For. and Landscape Hort.	1	—
Math. 10, Precalculus <i>or</i> Statistics <sup>1</sup>	3	—
Forestry 3, No. American Trees	3	—
English 1, Written Expression	3	—
Plant and Soil Sci. 11, Princ. Plant Sci.	3	—
Chemistry 3, Gen'l Chem.	—	4
Speech 11, Effective Speaking	—	3
Computer Sci. <i>or</i> Comm. Dev. and Appl. Econ. 85	—	3

Agri. 95, Race and Culture	1	—
Physical Education	1	1
Other courses <sup>2</sup>	—	4
	16	16

SOPHOMORE YEAR	1st SEMESTER	2nd SEMESTER
Plant and Soil Sci. 161, Intro. Soil Science	4	—
Nat. Res. 25, Measurements & Mapping	4	—
Comm. Dev. and Appl. Econ. 61, Princ. Agr. Res. Econ.	3	—
Plant & Soil Sci. 125, Woody Landscape Plants	4	—
Plant & Soil Sci. 162, Soil Fert. and Mgmt.	—	3
Botany 104, Plant Physiology <i>or</i> Forestry 225 <sup>3</sup>	—	4
Forestry 120, Forest Ecology	—	3
Forestry 121, Forest Ecology Lab	—	2
Other courses <sup>2</sup>	—	4
	15	16

JUNIOR YEAR	1st SEMESTER	2nd SEMESTER
Plant & Soil Sci. 145, Turfgrasses	3	—
Plant & Soil Sci. 107, Forest Entomology	3	—
Plant & Soil Sci. 131, Landscape Design I	3	—
Plant & Soil Sci. 132, Landscape Design II	—	3
Comm. Dev. and Appl. Econ. 166, Small Bus. Mgmt. <i>or</i> Bus. Admin. 120, Prin. of Mgmt.	—	3
Forestry 134, Forest Pathology	—	4
Other courses <sup>2</sup>	6	6
	15	16

SENIOR YEAR	1st SEMESTER	2nd SEMESTER
Plant & Soil Sci. 123, Garden Flowers and Indoor Plants	3	—
Forestry 176, Urban Forestry	—	3
Co-op Program <i>or</i> other courses <sup>2</sup>	11	11
	14	14

<sup>1</sup>Students not having trigonometry in high school should also take Math. 2.

<sup>2</sup>Select two three-credit courses from arts and humanities: art, classics, English, foreign language, general literature, history, music, philosophy, religion, or theatre.

## The Self-Designed Major

The Self-Designed Major is an individualized program that provides the opportunity to create a unique academic major under the guidance of a faculty advisor. It offers students the chance to combine various areas from within the College and to complement their core design with relevant courses selected from all areas of the University. Students may enroll in a broad range of subjects in the College or may elect to focus on one or two. Off-campus experiences and internships may be incorporated into the Self-Designed Major. First-year students interested in pursuing a Self-Designed Major are encouraged to explore the offerings of the College for at least two semesters prior to making an official application to the program.

Students interested in becoming a Self-Designed Major must:

- Have accumulated no more than 80 credit hours at the time they begin the program;
- Fulfill all College distribution requirements.
- Complete 40 credits in courses offered by the College of Agriculture and Life Sciences; 20 of the 40 must be 100-level or higher.
- Discuss the proposed major with and receive the approval from two faculty advisors.
- Present the faculty-approved proposal to the Dean's Office for final approval.

## Vocational Education and Technology

See Community Development and Applied Economics.

## Home Economics Education

Because of the comprehensive scope of Home Economics 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 prepared to teach in public schools in consumer and home economics fields such as family living, child development, consumer education, food and nutrition, housing and interiors, clothing and textiles, and management found in middle, junior, and high school home economics programs. Home Economics Education graduates can be certified to teach in occupational home economics programs, including human service education and culinary arts. Experience in business or industry is needed to teach in an occupational program.

Students are enrolled in the interdisciplinary Home Economics Program (see page 44).

### Typical Curriculum

	1st SEMESTER	2nd SEMESTER
<b>FIRST YEAR</b>		
Nutr. Sci. 52	3	—
Psychology 1	—	3
Early Childhd. & Hum. Dev. 80	3	—
English 1	3	—
Math. 9	—	3
Home Economics Seminar	—	1
Chemistry 3	4	—
Chemistry 4	—	4
Comm. Dev. and Appl. Econ. 15	—	3
Nutritional Sciences	3	—
Phys. Ed.	—	1
	<u>16</u>	<u>15</u>
<b>SOPHOMORE YEAR</b>		
Economics 11 or Comm. Dev. and Appl. Econ. 61	—	3
Speech 11	3	—
Humanities Electives	3	3
Science Elective	4	—
Nutritional Sciences	3	—
Educ./Gen'l. 1 or 2	—	3
Early Childhd. & Hum. Dev. 81	3	—
Phys. Ed.	—	1
	<u>16</u>	<u>16</u>

Additional home economics courses and electives to meet College and concentration requirements including specific state and national requirements for certification, to be selected with the approval of advisor.

## MINORS

### SPECIFIC MINOR REQUIREMENTS

Any student in the College or in the School of Natural Resources 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:** Animal Sciences 1, 43, 122, 212, and a minimum of three additional credits in Animal Sciences courses.

**Applied Design:** Fifteen credits including nine credits in required courses CDAE 15, 16, 230. After completing the required courses that will enhance problem solving and visualization skills, students select an additional course that will define a particular focus within design.

**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 Economics:** Fifteen credit hours including 12 credits in required courses CDAE 58, 127, 155, 157; three credits from the following restricted electives: CDAE 128, 150, 151, 158, 159, 295.

**Dairy Foods:** Animal Sciences 1, 43, 106, 201, 203.

**Environmental Studies:** Seventeen hours in Environmental Studies consisting of 1, 2, 100, 204, and three additional credits at the 100 level or above.

**International Development:** Fifteen credits including required courses CDAE 2, 171, 205, 237; restricted electives CDAE 272 or 273.

**Microbiology and Molecular Genetics:** Fourteen credit hours in MMG including 101 and 102, plus at least six credit hours selected from the following courses; MMG 201, 203, 204, 211, 212, 220, 222, and 225. Undergraduate research (MMG 197/198) is excluded from the 14 required courses.

**Nutritional Sciences:** Fifteen credit hours in Nutritional Sciences consisting of 37, 43, 143, 144, 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 or Bus. Admin. 65, 168, 266; three-four credits from the following restricted electives: CDAE 169, 264, 267; CDAE 157 or Bus. Admin. 17 or 18.



# 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	International Studies
Art History	Latin
Art - Studio	Mathematics
Biology	Music
Botany	Philosophy
Chemistry	Physics
Classical Civilization	Political Science
Communication Sciences	Psychology
Economics	Religion
English	Russian
Environmental Studies	Sociology
French	Spanish
Geography	Theatre
Geology	Individually Designed
German	Major
Greek	
History	

The following majors are available through the Evening University: English, Psychology, Sociology, Studio Art (see page 12).

The Bachelor of Science degree program may be completed with an approved major in one of the following fields.

Biology	Physics
Chemistry	
Geology	

The Bachelor of Music degree program may be completed with an approved major in one of the following fields.

Music Performance

Music Theory

## 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.<sup>1</sup> The course selected to satisfy this requirement may also be used to fulfill the distributive requirement.



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. The course selected to satisfy this requirement may also be used to fulfill the distributive requirement.<sup>2</sup>

## 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.<sup>3</sup> 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 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.<sup>3</sup>
3. **Fine Arts:** One course in Studio Art or Art History, Music,<sup>4</sup> Theatre,<sup>5</sup> 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.<sup>6</sup>
5. **Humanities:** Two courses selected from a list of approved offerings in Art History, Classics, Greek, History, Latin, Philosophy, Political Science, and Religion.<sup>7</sup>
6. **Social Sciences:** Two courses selected from a list of approved offerings in Anthropology, Communication Sciences, Economics, Geography, International Stud-

<sup>1</sup>The following courses have been approved for this category for the 1995-96 academic year: Anthropology 21, 24, 60, 128, 160, 161, 162, 163, 165, 166, 170, 172, 175, 177, 179, 180, 185; Art 8, 146, 185, 187, 188, 285; Economics 172; Geography 1, 51, 56, 58; History 9, 10, 40, 45, 50, 51, 61, 91, 140, 145, 146, 149, 150, 151, 161, 162, 245, 246, 250, 252, 293, 294; Music 15; Philosophy 3, 121, 122, 221; Political Science 170, 174, 175, 176, 177, 178, 179; Religion 20, 21, 131, 132, 134, 141, 145, Sociology 171, 213, 272.

<sup>2</sup>The following courses have been approved for this category for the 1995-96 academic year: Anthropology 60, 160, 187, Communication Sciences 160, Economics 60, 160, English 57, 166, 167, 168, 170, 171, General Literature 143, History 60, Music 115, Political Science 129, Religion 80, 128, Sociology 19, 31, 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.

<sup>3</sup>See page 14 for information concerning academic credit for Advanced Placement Testing.

<sup>4</sup>Music 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.

<sup>5</sup>Speech courses will not satisfy the Fine Arts requirement.

<sup>6</sup>The following courses have been approved for this category for the 1995-96 academic year: Classics 37, 42, 153, 155, 156; all English courses except: 1, 4, 30, 50, 53, 101, 102, 103, 111, 112, 117, 118, 119, 120; all French courses numbered 155 or above except 201, 209, 210, 215, 216, 291, 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 155, 156; 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.

ies, Political Science, Psychology, Sociology, and Women's Studies.<sup>8</sup>

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 67), 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 or program supervising the minor (see page 72).<sup>9</sup> Also, a student must maintain a cumulative grade-point average of 2.0 in the minor field.<sup>10</sup> 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 re-

<sup>7</sup>The following courses have been approved for this category for the 1995-96 academic year: all Art History, History, Philosophy, Religion courses; Classics 24, 35, 154, 157, 158, 159; Greek 203, 205; Latin 255; Political Science 41, 141, 142, 143, 144, 146, 241, 242, 243, 249.

<sup>8</sup>The following courses have been approved for this category for the 1995-96 academic year: all Anthropology, Economics, Geography, Psychology, and Sociology courses; Communication Sciences 20, 80, 94; International Studies 91A, 91B; all Political Science courses except: 41, 141, 142, 143, 144, 146, 241, 242, 243, 249; Women's Studies 73.

<sup>9</sup>Only one course may be applied toward completion of both a major and a minor requirement.

<sup>10</sup>The 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.

quired, 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 63. 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). 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 67), 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 72) 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 63 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 requirements specified by the department (see page 70), 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 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 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 72) 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.

## INTEGRATED HUMANITIES PROGRAM

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 core courses for the program.

## 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 HONORS PROGRAMS

- 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 one week after the first day of classes 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, 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.

## REGULATIONS GOVERNING STUDY ABROAD

Students should refer to page 45 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 have a cumulative grade-point average of 2.50 or better, must have completed two semesters as a degree candidate at the University, and must have taken the secondary school course work or subsequent college-level courses in those subjects required for admission to the University (see page 9). 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 must be approved by the Committee on Honors and Individual Studies before the beginning of the candidate's junior year. 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.

**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, 172, 174, 176, 179, 181.

*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 (146, 148, 149), Medieval (150, 153, 154), Renais-

sance (158, 161, 164), Baroque (167, 168, 171), Modern/American (140, 172, 173, 174, 175, 176, 179, 181, 184) Asian (185, 187, 188); six additional Art History hours; two seminars (six hours) from 207 or above, one in the senior year; six hours of Studio Art; French or German through 52. In cases where a language other than French or German is appropriate to the student's area of interest, the student's advisor must approve the substitution and send a letter to the Dean's Office recording the approval of the substitution.

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 1, 2, 101, 102, 103, 104 and three additional courses in one of four concentrations, one of which 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 1, 2, 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 included, 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; Botany 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 re-

quirements 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 History 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 History 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, 22, 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 24, 35, 37, 42 (Mythology), Art 146 (Ancient Near East), 148 (Greek Art), Art 149 (Roman Art), Classics 153, 154, 155, 156, 157, 158, 159 (Greek and Latin Literature in Translation). Classics 22 (Etymology) is applicable, but not together with Classics 42. Also recommended are History 121 and 122. *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, 208 or 215, 251 or 261, 262, 298; Psychology 161; Statistics 111 or 141, and six hours from the following: Anthropology 128, 178; Linguistics 101, 102; Philosophy 110; Sociology 141; Psychology 207.

**ECONOMICS** Thirty hours in Economics including 11, 12, 101, 102, three courses at the 100 level, and three courses at or above the 200 level; Math. 19; Statistics 141. Taking Math. 19 and Statistics 141 early in the program is recommended.

**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). 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 STUDIES** Thirty-two hours in Environmental Studies, including 1, 2, 100, 151, 201, 204, six hours of 202 and/or 203, plus six hours at or above the 100 level (not to include 191, 202, or 203).

**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 either the traditional Geology concentration or the Environmental Geology concentration.

**Bachelor of Arts**

**Traditional Concentration:** Geology 1 or 41, 101, 110, 112, 121, 131, 153, 260, plus two courses in Geology or approved sciences at the 100 level or higher, selected in consultation with an advisor; Math. 19, 20 or 21, 22; Chemistry 31 and 32 (or 35, 37 and 36, 38); Physics 11, 21 (Physics 12, 22 also strongly recommended). Field experience (Geology 201 or equivalent) highly advisable.

**Environmental Geology Concentration:** 55 (or 1), 101, 110, 151, 153, 255, 260; two courses in Geology or approved ancillary sciences at the 100 level or higher selected in consultation with an advisor; Math. 19, 20 or 21, 22; Chemistry 31, 32; Physics 11, 21 (Physics 12, 22 also strongly recommended). Field experience (Geology 201 or equivalent) highly advisable.

**Bachelor of Science**

**Traditional Concentration:** Student selecting this degree program are encouraged to develop a strong minor field of specialization in one of the ancillary science or engineering programs.

Geology 1 or 41, 101, 110, 112, 121, 131, 153, 201,\* 260, plus three additional courses in Geology, two of which must be at the 200 level.\*\*

\*201 can also be taken as an independent field project or transfer credit from an accredited field program.

\*\*One additional approved science, engineering, or mathematics course, or senior research, may be substituted.

**Ancillary Science Requirements:** Chemistry 31 and 32 (or 35/37 and 36/38), Physics 21, 31 and 22, 42 (or 21, 31, and 125), Math. 21 and 22 (or 19, 20, and 22), Statistics 141; two approved science, engineering, or mathematics courses.

**Environmental Geology Concentration:** Geology 55 (or 1), 101, 110, 151, 153, 201, 255, 260, 235 or 278 and three additional advanced courses in Geology or approved ancillary sciences; Math. 21, 22 (or 19, 20, 22); Chemistry 31, 32 (or 35, 37 and 36, 38); Physics 31, 21 and 42, 22; Biology 1, 2; two approved science, engineering, mathematics or statistics courses.

**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 hours in History including History 9 and 10, at least nine hours at the advanced intermediate (100) level, and at least three hours at the seminar (200) level. Within the major, six hours in each of the

department's three area concentrations (Europe, Western Hemisphere, and Africa/Asia/Latin America), and nine additional hours in one concentration. These nine hours must include one advanced intermediate course and a seminar. The Western Hemisphere concentration must include three hours in Canadian or Latin American history.

**INTERNATIONAL STUDIES PROGRAM** Entering students are invited to consider the option of concentrating in 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 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. For specific requirements, see page 72.

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 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 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.*
- B. The remaining credit hours must include at least six 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.

#### *Canadian Studies*

The Canadian Studies major requires at least 30 credit hours to consist of the following:

- A. Three required courses: International Studies 91, Introduction to Canada; History 66, Canadian History: 1867

to the Present; 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:
  - IS 195, 196, 295
  - Anthropology 167
  - Art 173
  - Bus. Admin. 134
  - English 157, 158
  - French 293
  - Geography 52, 210
  - Geology 272 (when this field course goes to Canada)
  - History 65, 265
  - 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 International Studies, 193, 194, 195, 196, 197, 198; Economics 254; 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:                              | Hours |
|---|-------|
| Russian 52, and two courses at the advanced level | 10    |
| Two courses from History 27, 137, 138             | 6     |
| Economics 11, 12; and 185 or 281                  | 9     |
| Political Science; three hours and 172            | 6     |
| Three additional courses from the following list: | 9     |
| Economics 185, 277, 281                           |       |
| Political Science 146                             |       |
| General Literature 181, 182                       |       |
| Philosophy 133                                    |       |
| History 237, 238                                  |       |

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- B. Recommended Courses:
  - 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:  | Hours |
|--|-------|
| Two courses in Russian or another Slavic language at the intermediate level. |       |
| Example: Russian 51, 52  | 8     |
| Four courses in Economics including 185, 277, 281                            | 12    |
| Two Russian/East European Area Studies courses other than those in Economics | 6     |

Two courses in Business Administration	6
Two approved electives at the 100 level or above	6
	38

### *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, 150, 153, 154, 158, 161, 164, 167, 168, 171, 172, 174, 175, 176; **Classics**: 42, 153–156; **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**: 155, 156, 225, 226, 235, 245, 246, 247, 255, 256, 265, 266, 275, 276, 290, 291, 292; **General Literature**: 72, 131, 141, 153–156, 161, 162, 173, 181; **German**: 121, 122, 155, 156, 201, 213, 214, 225, 226, 237, 238, 247, 248, 251, 252, 263, 264, 273, 275, 276, 278, 281, 282; **Greek**: 111, 112, 201–206; **Italian**: 121, 122, 155, 156; **Latin**: 101, 102, 111, 112, 203, 204, 227, 251–253, 255, 256, 271; **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.

**Economics**: 170, 275, 281; **Geography**: 55, 155, 158; **History**: 13, 14, 21–27, 85, 86, 90, 120–126, 128–136, 139, 185, 186, 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.

**MATHEMATICS** Mathematics majors may choose from two concentrations.

**Mathematics**: Thirty-six hours of Math./Statistics courses numbered 21 or higher, including Math. 51 (Computer Science 16 can substitute for Math. 51 but will not count as part of the 36 hours of Math./Statistics); Math. 52 or 104; Math. 124; and one of the following: Math. 231, 241, 250, or 251. At least 12 hours must be 200 level or higher.

**Statistics**: Thirty-six hours of Math./Statistics courses numbered 21 or higher, including Math. 51 (Computer Science 16 can substitute for Math. 51 but will not count as part of the 36 hours of Math./Statistics); Math. 52 or 104; Math. 124; 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.

**MUSIC** Students must take a placement audition upon entering the Bachelor of Arts and Bachelor of Music programs. Thereafter they may elect either of two degree programs. 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	<u>2</u>
	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	<u>2</u>
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For Music Education see College of Education and Social Services.

**PHILOSOPHY** Thirty hours including: 13; 101 and 102; at least two of 201 or 202 or 240; at least one of 4, 140, 142, 143, 144, or 152; and a total of at least four 200-level courses in Philosophy. Students considering graduate work are urged 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, 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, 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) of the five core courses (21, 41, 51, 71, 81).

C. Fifteen 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 15 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** 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, 221, 222, 223; (B) 230, 231, 233, 234, 236, 237, 240, 254, 261, 262, 263, 266; (C) 250, 251, 253, 254, 255, 257, 263; (4) one additional course at/above 100 level.

**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:** A minimum of 33 hours of courses numbered above 100, of which at least 12 hours must be in literature and at least 18 in courses numbered above 200. Required courses: 155, 156, 291, 292. History 135 may be substituted for 291, and History 136 may be substituted for 292. (History 135 and/or 136 will not count in the 33 required hours.)\*

**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 241, 274, 275, or 279. Approved sociology concentrations include: \* *Gender Roles and Society*: 29, 122, 213, 223, 229, 239; *International/Comparative Sociology*: 11, 31, 102, 171, 202, 207, 213, 272; *Social Gerontology*: 20, 120, 154, 220, 221, 222, 254; *Work and Leisure*: 43, 63, 161, 237, 243; *Communication and Culture*: 43, 109, 141, 150, 151, 209, 243, 250; *Crime, Law, and Justice*: 14, 19, 57, 115, 132, 214, 216, 217, 258; *Social Structures and Forces*: 105, 144, 151, 207, 209, 211, 225, 237, 240; *Health and Society*: 11, 20, 57, 102, 120, 154, 222, 254; *Social Inequality*: 19, 31, 119, 132, 144, 205, 206, 211, 219, 232, 237, 240; *Urban and Rural Studies*: 19, 102, 105, 119, 132, 202, 204, 205, 206, 207, 219, 232; *Self-Design*. 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, 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).

**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 hours of Biology and Zoology including Biology 1, 2, 101, 102, 103, Zoology 104, plus seven hours chosen from Biology 203, 205, and 200-level Zoology courses.

**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 Zoology 104. The remaining credits may be chosen from Biology 203, 205, and 200-level Zoology courses. Three hours of Zoology 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.

### 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.

### 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: History 121; Classics 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: History 121; Classics 153, 154, 155, 156, 157, 158.

**Classical Civilization:** Eighteen hours, including six hours of Greek or six hours of Latin at the level of 5 or above, and 12 hours from the following (of which at least nine hours must be above 100): History 21, 22, 121, 122, 149; Classics 24, 35, 37, 42, 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.

**ECONOMICS** Economics 11 and 12; 101 or 102; two additional 100-level Economics courses numbered 111-196.

**+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 STUDIES** Seventeen hours in Environmental Studies consisting of 1, 2, 100, 204, and three additional credits at the 100 level or above.

### 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, 201, 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, 201, 216, 242, 261, and 285.

**GEOLOGY** 1, 101; 110; 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 History 9 or 10, nine hours at or above the 100 level, and six hours at any level in at least two of the department's three area concentrations.

**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 two courses completed prior to application for the ID Minor may be applied to the 18 hours required for the 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.

### 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  
 \*Economics 256  
 \*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) to include at least six hours at the 100 level or above. These courses must be selected from at least three academic disciplines and no more than two semesters (normally eight credit hours) of language can be counted toward the minor.

*Note:* Courses significantly but not entirely on Asia may be counted toward a student's minor requirements only if papers or projects relevant to their Asian subarea or to 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 minor.

**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 100 percent 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.

**Russian/East European Studies:** Twenty hours to include Russian 51, 52 or its equivalent, and four courses from the following: Economics 185, 277; General Literature 181, 182; History 27; 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.

#### **MATHEMATICS**

**Pure Mathematics:** 21, 22, 52, 121, 124, and either 241 or 251.

**Applied Mathematics:** 21, 22, 121, 124, 230, and one of 237, 240, 264, or 272.

**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 1, 3, or 4; one course from 101, 102, 140; one course from 201, 202, 240; and nine additional hours at the intermediate level or above. An upper-level course may be substituted for the introductory course with departmental permission.

**PHYSICS** Seventeen hours including 31 with 21, 42 with 22, 128, 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, 81), 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 above 100, as follows: Three hours of either 101 or 102; 201; six hours of literature courses; and six additional hours in courses numbered above 201.\*\*

**Italian Studies:** A total of 18 credit hours (six courses) as follows: (A) a minimum of two courses chosen from Italian 121, 122, 155, 156; (B) a minimum of two courses having significant Italian content chosen from Art\* 149, 161, 164; History 122, 125; English 122; Latin 51, 52, 101, 102, 111, 112, 195, 196, 200-level courses in Latin literature; (C) a maximum of one course having partial Italian content chosen from Art\* 5, 6, 150, 154, 167; Classics 155, 156; English 125; Film 107, 161; Geography 55, 155, 158; Political Science 141; Music 11, 12.\*\*

\*Other courses with either significant (category B) or partial (category C) Italian content may be applied. Approval of the Italian Studies advisor must be obtained in order to include these courses in the minor. Approval will be granted only if the course materials are appropriate.

**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. 15 credits 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.

**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.)

In addition to the minor, Women's Studies students are encouraged to explore the possibilities of an independently designed major and should consult with the Director of the Women's Studies program and the Committee on Honors and Individual Studies.

**ZOOLOGY** Biology 1 and 2; three courses at the level of 100 or above, chosen from courses acceptable for the Zoology major, 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.**

### NATURAL RESOURCES

**Forestry (FOR):** 3 or 21, 120 and 123, and an additional three courses (credit not given for both 1 and 73) at the 100 level or above.

**Recreation Management (RM):** Nine hours from NR 40, RM 50, 138, 153, 157, 158, and six hours from RM 225, 235, 255.

**Wildlife Biology (WFB):** 15 hours to include WFB 130, 174, or 273 and six hours from 131, 150, 176, 185, 272, 273, 274, 275, 279, 281, 285.

## AGRICULTURE AND LIFE SCIENCES

**Applied Design (CDAE):** Fifteen hours to include 15, 16, 231, and six additional hours at the 100 level or above to define a particular focus within design. The Applied Design minor is not available to students majoring or minoring in Studio Art.

**Dairy Foods (ASCI):** 1, 43, 106, 201, 203.

**Small Business (CDAE):** 61, 166, 167, 168, 266.

**Consumer Economics (CDAE):** 58, 157, 158, 159; 127 or 155; and one course from 127, 128, 150, 151, 155, 158, 291, 296.

**Microbiology and Molecular Genetics (MMG):** 15 hours to include 101, 102, and a minimum of seven hours from: MMG 201, 203, 211, 212, 220, 222, 223, 225, 254.<sup>†</sup>

**Nutritional Sciences (NUSC):** Fifteen hours to include NUSC 37, 43, 143, 144 plus three hours at or above the 195 level. Independent study or field experience are not applicable.

**Plant and Soil Science (PSS):** 11, 161, and three additional courses at the 100 level or above.

<sup>†</sup>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.

## BUSINESS ADMINISTRATION

**Business Administration (BSAD):** 60, 61, one course from 120, 132, 141, 150, 173, 180 and two courses numbered 120–272. Prerequisites are Economics 11, 12; Math. 20 or 21; Statistics 111 or 141; a 2.00 in these courses. Acceptance into this program by application only. Please contact Dean's Office, Engineering, Mathematics, and Business Administration for further details.

**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

Sociolinguistics\*\*

### ART

Art History\*\*

### BIOLOGY

Biology

Botany

Zoology

### CHEMISTRY

### CLASSICS

Greek

Latin

Classical Civilization

### ECONOMICS

### ENVIRONMENTAL STUDIES

### GEOGRAPHY

Human Geography

Physical Geography

### GEOLOGY

### GERMAN

### HISTORY\*\*

### INTERNATIONAL STUDIES

African Studies

Asian Studies

Canadian Studies

European Studies

Latin American Studies

Russia/East European Studies

### MATHEMATICS

Pure Math

Applied Math

Statistics

### MUSIC

### PHILOSOPHY\*\*

### PHYSICS

### RELIGION\*\*

### ROMANCE LANGUAGES\*\*

French

Italian

Spanish

### RUSSIAN

### SOCIOLOGY

Sociology

Gerontology

### THEATRE\*\*

Theatre

Speech

### 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.

**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 11) 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.



# 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
- Social Work: 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.

**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/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/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.

**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/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). 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 Curriculum 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  
Mathematics  
Statistics

Science:  
Biology

Social Sciences:  
Anthropology  
Economics  
Geography  
History  
Political Science  
Psychology  
Sociology

Humanities:  
Foreign Language  
Philosophy  
Religion

Botany  
Chemistry  
Environmental Studies  
Geology  
Physics

Health and Physical  
Education:  
Health Education  
P.E. 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
<b>FIRST YEAR</b>		
ECHD 3, 4	3	3
ECHD 5	3	-
General ed. requirements, electives	9	12
<b>SOPHOMORE YEAR</b>		
ECHD 7	1	-
ECHD 60, 61	3	3
ECHD 65	-	3
General ed. requirements, electives	12	9
<b>JUNIOR YEAR</b>		
Adv. seminar I, II	3	3
Family ecosystems	3	-
Development theory	-	3
General ed. requirements, electives	9	12
<b>SENIOR YEAR</b>		
Field experience	6	-
Adv. seminar III, IV	3	3
General ed. requirements, electives	6	12

Students in any of the two majors may co-enroll in the Home Economics program (see page 44). This requires completion of the professional concentration course requirements as well as Home Economic requirements.

### 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 is 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.

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
<b>FIRST YEAR</b>		
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
*Educ./Health 46	3	-
Educ./Phys Educ. 21, Foundations	3	-
*Educ./Phys Educ. 157, Care & Prevention	2	-
PEAC 28, Conditioning	1	-
Liberal Arts Major	3	6
<b>SOPHOMORE YEAR</b>		
Anat. & Phys. 19, 20	4	4
Psychology 1	3	-
*Educ./Phys. Educ. 185, 186	4	3
PEAC Activities (PE Major Elective)	1	or 1
Liberal Arts Major	-	3
*EDPE 23, First Aid	3	-
Elective	-	3
<b>JUNIOR YEAR</b>		
**Human Dev. 5	3	or 3
Educ./Phys. Educ. 155, Sec. Methods	-	3
Educ./Phys. Educ. 220, Sport in Society	3	-
*Educ./Phys. Educ. 167, Sports Physiology	3	or 3
**Educ./Phys. Educ. 260, Adapted Phys Educ	3	-
Educ./Phys. Educ. 240, Motor Learning	-	3
Liberal Arts Major	3	6
*Educ./Phys. Educ. 173, Practicum	3	-
*Nutrition 43	3	or 3



Students are required to complete an internship application before being assigned a placement.

	1st SEMESTER	2nd
<b>SENIOR YEAR</b>		
Philosophy 1	3	-
Educ./Phys. Educ. 295, Internship	-	12
*Educ./Phys. Educ. 166, Kinesiology	3	-
Liberal Arts Major	3	-
Free Elective	6	3
*Educ./Phys. Educ., 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 Social Work 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. Career opportunities in the profession of social work are explored. The student, in consultation with his/her advisor, selects elective courses which will provide the opportunity to develop individual interests.

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.

Acceptance as a major includes: completion of the required liberal arts courses with a minimum grade of C-; completion of the required social work courses with a minimum grade of C and a GPA of 2.5; and an overall GPA in all courses of 2.0.

Usual sequence of courses:

	1st SEMESTER	2nd
<b>FIRST YEAR</b>		
Professional Courses:		
SWSS 2	3	or 3
SWSS 51	-	3
Political Science 21	3	or 3
Psychology 1	3	or 3
Sociology 1	3	or 3
Human Biology (or sophomore year)	3	-
Race and Culture	1	or 1

	1st SEMESTER	2nd
<b>SOPHOMORE YEAR</b>		
Professional Courses:		
SWSS 47	3	or 3
SWSS 48	-	3
SWSS 167	3	or 3
Human Biology (or first year)	3	-
Economics 11	3	or 3
Psychology 152	3	or 3

Students are accepted into the College of Education and Social Services as a pre-major. Students must apply for status as a social work major prior to 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 on either October 15 or February 15 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.

	1st SEMESTER	2nd
<b>JUNIOR YEAR</b>		
Professional Courses:		
SWSS 165	3	-
SWSS 166	-	3
SWSS 168	3	-
SWSS 169	-	3
SWSS 194	3	-

	1st SEMESTER	2nd
<b>SENIOR YEAR</b>		
Professional Courses:		
SWSS 170	12	or 12
SWSS 171	3	or 3
SWSS 291	-	3

Successful completion of SWSS 170 and 171 are required for the completion of the Social Work major.

**Recommended Electives:** Additional courses in computer science, economics, education, political science, psychology, sociology, statistics, special education, and women's studies. Students who intend to pursue a Master of Social Work (MSW) degree are strongly advised to take a course in statistics.

## 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 need a 3.0 overall grade-point average, or above, a minimum grade of B in student teaching, and the recommendation of the program faculty to be eligible for licensure.

### Academic Major

Candidates for teacher licensure in the College are required to select 30 credit hours of course work in a liberal arts and sciences discipline. Courses in these disciplines constitute the major/major concentration required 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 below are available through the Office of Student Services, 528 Waterman.

#### Major/Major Concentrations

(Early Childhood, Elementary, and Physical Education)

Anthropology  
Classical Civilization  
Communication  
Communication Sciences  
Earth Science  
Greek  
Music  
Psychology  
Psychology and Communication Sciences  
Religion  
Sociology  
Studies in Cultural Diversity —  
Africa or East Asia or  
Latin America or Middle East  
Theatre

#### Majors

(Secondary Education as well as Early Childhood, Elementary, and Physical Education)

Biological Science  
Chemistry  
Earth Science  
English  
French  
Geography  
German  
History  
Latin  
Mathematics  
Physical Science  
Physics  
Spanish

#### Minors

(Secondary Education)

Anthropology  
Biological Science  
Chemistry  
Coaching  
Earth Science  
Economics  
English  
French  
Geography  
German  
History  
Latin  
Mathematics  
Physics  
Political Science  
Psychology  
Religion  
Russian  
Sociology  
Spanish

## Broadfield Majors

(Secondary Education as well as Early Childhood, Elementary, and Physical Education) Since 48-50 hours are required for these majors, students in programs other than Secondary Education who select a broadfield major will need additional time to complete their programs.

Environmental Studies*	Social Studies with concentrations in:
Natural Science with concentrations in:	Anthropology
Biological Science	Economics
Physical Science	Geography
	History
	Political Science
	Sociology

\*Secondary Education program majors interested in Environmental Studies must also complete a 30-hour major as listed above to be eligible for licensure. Environmental Studies is not an endorsement area recognized by the Vermont State Department of Education. Therefore, students interested in licensure must complete an appropriate endorsement area for Secondary Education in addition to the Environmental Studies course work.

## 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. The screening of applications at this point is competitive and the number of persons admitted to the various majors varies with the availability of college resources and practicum sites in the public schools. Students enrolled in the College of Education and Social Services receive priority consideration. Students who are not admitted 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 Studies 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. If 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. Once placed, the candidate will carry out an internship under the guidance of an approved cooperating teacher

and department supervisor. Students who are not admitted to student teaching may appeal through the College Studies Committee. Student teachers will be placed in Professional Development 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.

## 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			
JUNIOR YEAR		1st	2nd
		SEMESTER	
EDAR 177		4	-
EDAR 178		4	or -
Art History		3	or 3
Studio Electives			
Related Electives			
Teaching Reading/EDSC 215		3	or 3

Students are required to complete a student teaching internship application before being assigned a placement.

	1st	2nd
SENIOR YEAR	SEMESTER	
EDAR 283	-	3
EDAR 284	3-6 or	3-6
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 area early childhood centers 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 developmentally appropriate educational practices for children between the ages of birth to three; the second for children between the ages of three and six years (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 would take place in one or more preschools and elementary schools.

The third component is a two-semester student teaching experience across the three-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 a multi-age, inclusionary early childhood/kindergarten setting 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 an 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	
Physical Ed. Activity	1	1
Arts and Sciences Major	3	3
General Education	6	9
Race and Culture	1	-
Multicultural	3	3

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
ECHD 63	3	-
ECHD 60	3	-
General Education	6	3
Arts and Sciences Major	6	6
ECHD 1	-	6
Health	-	1

	1st	2nd
JUNIOR YEAR	SEMESTER	
ECHD 100	8	-
Arts and Sciences Major	6	6
General Education	3	3
PE Module	1	-
EDEL 156	-	2
EDEL 158	-	2
EDEL 176	-	2
ECHD 296	-	2

	1st	2nd
SENIOR YEAR	SEMESTER	
ECHD 189	12	-
Elective	3	-
EDEL 181	-	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 and an 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.** Training within the elementary program occurs in blocks of related courses. 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 an associated 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 to 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. Electives are used to pursue an approved major/major concentration consisting of 30 hours of study. Specific information may be obtained from advisors or from the Office of Student Services, 528 Waterman. In addition to the major/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 will enroll in the required 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.

Art 1, 2 or 3 or Music 181  
English Composition and Literature  
Math. (15 or above)  
U.S. History  
American Government  
Child Development or Social Science Elective  
Geography 1 or 2 or Anthropology 21 or 26  
Social Science  
Science  
Humanities (Philosophy, Religion, Foreign Language)  
Physical Education Activities  
Race and Culture Requirement

A typical program is as follows:

	1st	2nd
FIRST YEAR	SEMESTER	
EDEL 10	1	1
EDSS 24	3	or 3
English Composition	3	or 3
Race and Culture	1	or 1
Physical Education Activities	1	or 1
General Education Electives		
Academic Major Requirements		

	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
English Literature	3	or 3
Physical Education Activities	1	or 1
General Education Electives		
Academic Major Requirements		

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

Academic Major Requirements

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

Academic Major Requirements

Courses leading to an academic major 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 musi-

cal 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. Students may apply required courses in music to meet the general education requirements.

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
String Class (83, 84)	1	1
Speech 11 or Theatre 5	3	-
Education Elective	3	3
Physical Education	1	1
Elective	-	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
Woodwind Class (87, 88)	1	1
Voice Class (5, 85)	1	1
Electives	3	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
EDEL 200 or EDSC 215	3	-
EDSC 207	-	3
Advanced Theory (231)	3	-
Arranging (233)	3	-
Conducting (259)	-	3
EDMU 281	3	-
EDMU 282	-	3
Brass Class (81, 82)	1	1
Percussion Class (89)	-	1
Elective	-	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, Senior Seminar	-	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.

#### **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
Educ./Health 46	3	-
Educ./Phys. Educ. 21, Foundations	3	-
Educ./Phys. Educ. 157, Care & Prevention	2	or 2
PEAC Activities	2	2
Liberal Arts Major	3	3

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Anat. & Phys. 19, 20	4	4
Psychology 1	3	-
Educ./Phys. Educ. 104, PETEX	-	5
PEAC Activities	2	2
Liberal Arts Major	6	3
Elective	-	2

	1st	2nd
JUNIOR YEAR	SEMESTER	
Human Dev. 5	3	or 3
Sociology 1 or 19	3	or 3
Educ./Phys. Educ. 105	5	-
Educ./Phys. Educ. 155, Sec. Methods	-	3
Educ./Phys. Educ. 167, Sports Physiology	3	or 3
Educ./Phys. Educ. 220, Sports in Society	3	-
Educ./Phys. Educ. 240, Motor Learning	-	3
Educ./Phys. Educ. 260, Adapted	-	-
Phys. Educ.	3	-
Liberal Arts Major	3	6

Students are required to complete a student teaching application before being assigned a placement.

	1st	2nd
SENIOR YEAR*	SEMESTER	
Philosophy I	3	-
Educ./Phys. Educ. 181, Student Teaching -	-	12
Educ./Phys. Educ. 166, Kinesiology	3	-
EDSC 215, Reading	3	-
EDFS 190, Sr. Seminar or Elective	3	-
Liberal Arts Major	6	-
Free Elective	-	3

## 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. 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 be selected from the following academic areas. Two semester hours of physical education activities must be included.

English Composition and English Literature  
Speech/Theatre  
Science  
Mathematics  
U.S. History  
American Government  
Psychology I  
Humanities (Philosophy, Religion, Foreign Language)  
Physical Education activities  
Race and Culture

### Academic Majors and Minors

The current approved majors, minors, and broadfield majors for Secondary Education include:

*Majors* Biological Science, Chemistry, Earth Science, English, French, Geography, German, History, Latin, Mathematics, Physical Science, Physics, Spanish

*Minors* Anthropology, Biology, Chemistry, Coaching, Earth Science, Economics, English, French, Geography, German, History, Latin, Mathematics, Physics, Political Science, Psychology, Religion, Russian, Sociology, Spanish

*Broadfield Majors* Natural Science, Social Studies, Environmental Studies

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  
EDSC 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  
EDSC 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  
EDSC 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 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.

The deadline for applications is April 1 for the next academic year. Course work begins during the summer or fall, depending upon the area of licensure. Applications are accepted and considered only once each year with updated informational materials and application forms available in January. 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.





# The Division of Engineering, Mathematics, and Business Administration

The Division of Engineering, Mathematics, and Business Administration includes the College of Engineering and Mathematics and the School of Business Administration.

The Division offers professional undergraduate programs for either professional practice or further study. Because graduates of professional schools are expected to be able to plan and direct in many work situations, as well as to effect and manage change, the primary objective of professional education is to develop skills in problem solving.

Professional graduates must have the ability, confidence, and self-discipline to identify and define a problem; break it down into operable components; gather the necessary resources from the natural and social sciences, mathematics, and the humanities; and employ these resources to solve the problem. The Division promotes these qualities in students by emphasizing a balance between concept and skill in all curricula.

The Division is also committed to learning as a life-long endeavor and, therefore, provides a base for students to build on as their careers and personal interests broaden.

The offices of the Dean of the Division are located in 109 Votey Building.

## DEGREE PROGRAMS

The Bachelor of Science degree is awarded for the following majors:

- Business Administration
- Civil Engineering
- Computer Science
- Electrical Engineering
- Engineering Management
- Mathematics
- Mechanical Engineering

## HONORS PROGRAMS FOR EMBA STUDENTS

### Individually Designed Major

A student matriculating in the Division who, at the time of application, has completed at least three semesters of full-time study with a cumulative grade-point average of 3.0 or above may propose an individually designed major which builds on an appropriate core program of the division. The program is designed for the superior student with exceptional initiative and must contain a breadth and depth of courses consistent with regular professional programs or options. The program must be sponsored by a faculty member who will serve as the student's advisor. The program requires prior approval by the appropriate curriculum committee.

### 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 Division 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, or the School of Business Administration Undergraduate 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

The Division offers a cooperative education (CO-OP) program to students with cumulative grade-point averages placing them in the upper half of their class. Before acceptance, each candidate must be interviewed and approved by the program coordinator and the prospective employer. The program lets students apply their learning to a full-time, paid position in a business, industrial, or government setting. In the School of Business Administration it is designed to fit into a normal four-year academic program. In the College of Engineering and Mathematics the CO-OP work experience must consist of a total of at least nine months of approved work assignments for not more than three employers. In each curriculum area, there is a faculty member responsible for CO-OP students, serving also as the students' advisor and coordinating on-site visits to work assignments. Participants must submit learning objectives and an end-of-work report at the end of each assignment. Although the Division attempts to place all qualified students admitted to the program, it cannot guarantee the availability of positions.

The CO-OP office is located in the Center for Career Development in E Building of the Living/Learning Center.

## DEGREE REQUIREMENTS AND ACADEMIC REGULATIONS

### Academic Standards

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 Division of Engineering, Mathematics, and Business Administration. Additional degree requirements are specified for each major.

### Credit for Military Service

The Division does not, in general, grant credit for military service. Credit for specific courses or other academic experience acquired during military service may be available through petition to the appropriate Studies Committee.

### Credit for Calculus

Refer to page 41 in the section on General Information.

### Physical Education

In addition to the course requirements listed for each curriculum, all students must satisfactorily complete two credits of physical education activities.

### Research and Special Projects

Opportunities for undergraduate research and work on special projects are offered by the College/School, departments, and programs of the Division. Credit may be arranged, with a maximum of four hours per semester. No more than 12 hours of courses in these categories may be used to satisfy the requirements for the B.S. degree. It is understood that credit for such courses is contingent upon submission of a final report or other acceptable evidence of project completion.

### Transfer Credit

Transfer credits from other institutions are not used in the calculation of the UVM grade-point average. Students who wish transfer credits to satisfy specific requirements in their major in the Division must obtain approval from their department in the College of Engineering and Mathematics or the School of Business Administration.

## School of Business Administration

The School of Business Administration 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 as line and staff managers 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 arts 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 completes the business core. Seven required courses develop the framework for organizing information and structuring analysis in the context of an operating enterprise. Course work is offered in finance, human resource management, production and operations analysis, information systems, marketing, and other related areas. 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 152.

The undergraduate and master's business 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 REQUIREMENTS

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.

The 55 hours includes 18–20 hours in Lower Level Core courses and 35–37 hours in Distribution courses.

### 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.*

A. Language and Literature:	9–10
1. Any two of the following; English 11-26, or 50	
2. At least three hours from the following:	
Chinese	Hebrew
Classics	Italian
English	Japanese
Film	Latin
French	Linguistics 101, 102
General Literature	Russian
German	Spanish
Greek	Speech

- B. Social Sciences, Fine Arts, and Philosophy: 9
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. Mathematics, Sciences, and Professional: 10–12
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 Sciences	Mathematics
Civil Engineering	Mechanical Engineering
Computer Science	Natural Resources
Electrical Engineering	Nutritional Sciences
Environmental Studies (ENVS 1 and 2)	Plant and Soil Sciences
	Statistics
- D. One additional course taken from areas A, B, or C above.
- E. The remainder of the 55 hours may be selected from areas A, B, or C above or from other approved course offerings.

### 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–.*

During the junior year, the student will take courses in all of the functional areas of management and will do additional work in quantitative methods and the sociopolitical environment in which business functions. These Core courses are:

		Hours
Management and Organizational Behavior	BSAD 120	3
Legal and Political Environment of Business	BSAD 132	3
Management Information Systems	BSAD 141	3
Marketing Management	BSAD 150	3
Production and Operations Analysis	BSAD 173	3
Managerial Finance	BSAD 180	3
Quantitative Methods*		3
Business Policy	BSAD 191	3

\*The three hours required in quantitative methods may be satisfied by selecting a course from among Statistics 151, 201, 221, 224, 225, 229, 231, 233, or Business Administration 170, 177, 178, or 179.

### Concentration

*To be completed in the senior year, with a grade-point average of 2.0.*

In the senior year, the student must complete at least 12 additional hours in Upper Level concentration courses be-

yond those required in the Upper Level 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 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 Upper Level concentration must be approved by the student's advisor.

### 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.

### COURSE OF STUDY

Here is *one* illustrative schedule for the program.

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
*Math. 19	3	–
*English 1	3	–
*Economics 11, 12	3	3
*Math. 20	–	3
*BSAD 40	–	3
Distribution Courses	6–7	6–7
	15–16	15–16

### SOPHOMORE YEAR

*BSAD 60, 61	4	4
*BSAD 72	3	–
*Statistics 141	–	3
Distribution Courses	9 or 10	9 or 10
	16–17	16–17

### JUNIOR YEAR

Upper Level Core	12	9
Distribution or Electives	3	6
	15	15

### SENIOR YEAR

Concentration Courses	6	6
Electives	9	6
BSAD 191, Business Policy	–	3
	15	15

\*Denotes Lower Level Core

### SPECIAL PROGRAMS

#### Professional Accounting Program

Students planning to sit for the CPA examination should complete the Professional Accounting Program outlined below. Completion of the Professional Accounting Program satisfies the Concentration requirement.

Business Law	BSAD 17	3
Intermediate Accounting	BSAD 161, 162	6

Introduction to Federal Taxation	BSAD 164	3
Cost Accounting	BSAD 168	3
Advanced Accounting	BSAD 266	3
Auditing	BSAD 267	3

Additionally, a second Business Law course (BSAD 18) and a second Finance course (beyond BSAD 180) are recommended. These two additional courses are required for students who plan to sit for the CPA examination in New York.

### International Management

The program in international management is open to all Business Administration majors. Students interested in International Management are encouraged to spend the spring semester of their junior year studying abroad.

The University has formal arrangements with the University of Grenoble, France, to provide students with the opportunity to spend the spring semester at the University of Grenoble. The program consists of 14 credit hours in international business, French culture and society, and the French language. All courses are taught in English; however, students are advised that some background in French is desirable.

It is also possible for students to spend a year at Japanese, European, and 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 (Building E of the Living/Learning Center). If a full-time CO-OP work experience is done during a regular semester, students will need to take classes in a summer session. CO-OP can provide valuable full-time work experience and may be especially useful for students needing to work to finance their education.

**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. Support in finding internships, writing resumes, and preparing for interviews is available through the Center for Career Development. The Dean's Office in Kalkin Hall also maintains a list of firms seeking interns.

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 completed a related core course with a grade of B- or better and must have a cumulative grade-point average of at least a 2.5. 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. The School of Business Administration's Student Services Office, 218 Kalkin Hall, will maintain a list of appropriate faculty members. Once the internship is approved, students must enroll in BSAD 194 to receive internship credit. With their advisor's permission, up to three

credits of BSAD 194 may be used toward completion of the students' concentration requirements. 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

A minor in Business Administration is available for students majoring outside of the School of Business Administration. 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. 20 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 course requirements:

Accounting: BSAD 60 and 61 (Financial and Managerial Accounting) *or* BSAD 65 (Fundamentals of Accounting)

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.

## TRANSFER TO BUSINESS ADMINISTRATION

Students planning to transfer to the School of Business Administration from another college or school on campus are welcome to do so. To be accepted, a student must: (1) complete one semester as a degree candidate at the University; (2) be in good academic standing; (3) earn a cumulative grade-point average of 2.0 or better in all courses taken at the University.

Applications may be obtained at the Student Services Office at 218 Kalkin Hall. All students transferring to Business Administration should attend a transfer orientation session, typically held once a month. Call Student Services, 656-4015, for the time and place.

## The College of Engineering and Mathematics

The College of Engineering and Mathematics offers undergraduate curricula leading to the Bachelor of Science degree in Civil Engineering, Computer Science, Electrical Engineering, Engineering Management, Mathematics, and Mechanical Engineering.

The offices of the Dean of the College are located in the Votey Building.

## ORGANIZATION

The College of Engineering and Mathematics consists of four departments: Computer Science and Electrical Engineering; Civil and Environmental Engineering; Mechanical Engineering; and Mathematics and Statistics; and two programs: Materials Science and Statistics.

## 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 completed. 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.

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.

## AREAS OF STUDY

**Cross-College Minors** The College offers minors to students university-wide in computer science and statistics. In addition, students in the College may elect a minor in an academic unit in or out of the College which, when completed, would be noted on their transcripts.

**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.

**Minors 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 six credits of STAT 11/111/141/211 may be counted. The course for the Statistics Minor must be approved by a Statistics faculty advisor. Contact the Statistics Program Director for complete guidelines.

## Computer Science Curriculum

Computer Science is one of the mathematical sciences with strong ties to electrical engineering. It is the study of the theoretical basis, design, and application of electronic computing machines.

**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 specialization in an allied field is required so that students develop an ap-

preciation for the applicability of their knowledge of computer science.

Requirements for the degree of Bachelor of Science in Computer Science are a minimum of 128 credits as follows:

*Computer Science:* 21, 26, 27, 101, 103, 104, 105, 201, 222, 224 or 243, plus three additional 200-level courses.

*Mathematics:* 21, 22, 104, 121, 124, 173

*Electrical Engineering:* 131

*Physics:* 31 with 21; 42 with 22, or 125

*Statistics:* 151

*Other:* English 1, Speech 11, Race and Culture (AGRI 95)

*Allied Field Electives:* 18 credits of approved Minor Electives, as defined below.

*Distributional Electives:* 12 credits of approved distributional electives, as defined below.

*Free Electives:* 15 credits of free electives, excluding PEAC.

*PEAC:* Two credits of Physical Education Activities.

**Allied Field Electives:** Students must complete a minimum of six semester courses for a minimum of 18 credits in an approved allied area. Allied field electives are intended to provide depth in an allied area and must receive written approval of a Computer Science faculty advisor. Allied areas may be chosen from, but are not limited to, any branch of engineering, business administration, mathematics, statistics, or any of the physical, biological, or social sciences.

**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

**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, CS 105 and higher, EE 131, Math. 173, courses used as Allied Field Electives at the 100 level or above.

A typical program in Computer Science is as follows (where Elective includes Distributional, Allied Field, and Free Electives, and the two PEAC credits are not indicated):

	1st	2nd
FIRST YEAR	SEMESTER	
CS 21, Comp. Prog. I	4	—
Math. 21, Calculus I	4	—
Eng. 1, Written Expr.	3	—
Race and Culture (AGRI 95)	—	1
Electives	6	6
CS 26, Intro. to C	—	3
Math. 22, Calculus II	—	4
Speech 11, Effective Speaking	—	3
	17	17

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
CS 101, Mach. Org.	4	—
CS 27, Comp. Prog. II	1	—
Math. 121, Calculus III	4	—
Math. 104, Math. of Computation	3	—
Physics 31 with 21	4	—
Electives	—	3
CS 104, Data Structures	—	3
Math. 124, Linear Alg.	—	3
Physics 42 with 22	—	4
Stat. 151, Probability	—	3
	<u>16</u>	<u>16</u>

	1st	2nd
JUNIOR YEAR	SEMESTER	
CS 103, Prog. Lang.	3	—
CS2xx	3	—
EE 131, Dig. Comp. Des.	3	—
Electives	6	6
CS 105, Software Engr.	—	3
CS 222, Comp. Architecture	—	3
Math. 173, Combinatorics	—	3
	<u>15</u>	<u>15</u>

	1st	2nd
SENIOR YEAR	SEMESTER	
CS 201, Operating Systems	3	—
CS 2xx	3	—
Electives	9	9
CS 2xx	—	3
CS 2xx	—	3
	<u>15</u>	<u>15</u>

## 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, and a curriculum in Engineering Physics in cooperation with the Department of Physics. The latter leads to the degree of Bachelor of Science.

Engineering education at UVM 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 private or public domains, for graduate study in engineering and science, and for further professional study in such fields as business, law, or medicine.

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. At least 18 credit hours 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 EMBA Student Services Office.

Students in **Civil 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 Civil Engineering Office, the EMBA Resource Center (103 Votey), and the EMBA Student Services Office (218 Kalkin Hall).

Category	Approved Humanities Courses
C	Community Development and Applied Economics: 2, 61, 162, 205, 208, 254
C	Anthropology: all courses* <i>except</i> 200, 290
B	Art: all Art History courses*
C	Botany: 6
A	<sup>1</sup> Chinese: all courses*
A	<sup>1</sup> Classics: all courses*
C	Economics: all courses* <i>except</i> 100, 200
C	Education/Early Childhood and Human Development: 60, 61, 62, 63, 64, 65, 260
A	English: all courses* <i>except</i> 1, 4, 50, 177, 178 and Film courses
C	Environmental Studies: 1, 2, 95**, 100
A	General Literature: all courses
C	Geography: 1-7, 51-62, 146-171, 175-179
A	<sup>1</sup> German: all courses*
A	<sup>1</sup> Hebrew: all courses*
C	History: all courses*
C	<sup>2</sup> Military Studies: 2, 4
B	Music 3, all History and Literature courses*
C	Natural Resources: 40
C	Nursing: 15, 20, 140
B	Philosophy: all courses*
C	Political Science: all courses* <i>except</i> 181
C	Psychology 1, 119, 130, 132, 150, 152, 161, 162, 205, 206, 233, 234, 237
B	Religion: all courses*
C	Resource Economics: 121
A	<sup>1</sup> Romance Languages: all courses*
A	<sup>1</sup> Russian: all courses*
C	Social Work: 2, 47, 48, 51, 165, 166, 167, 168, 169
C	Sociology: all courses* <i>except</i> 100, 274, 275, 285, 286, 288, 289
B	Theatre: 1, 136, 137, 138

\*Special topics, seminars, honors, reading and research, or internships are not normally considered appropriate humanistic Social Study electives.

\*\*Only ENV5 95 Special Topics: Race and Culture is accepted.

<sup>1</sup>Grammar 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.

<sup>2</sup>Military 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, 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.

### FIRST-YEAR CURRICULUM FOR ENGINEERING STUDENTS\*

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
CS 16, Program. in MATLAB	3	—
English 1, Written Exp.*	3	—
Chemistry 31, Intro.	4	—
Math. 21, 22, Calculus I & II	4	4
HSS Elective*	3	3
Physics 31 with 21, Fund. of Physics**	—	4
Math. 31, Numerical Meth.	—	3
ME 2, Graph.Comm.**	—	2
Phys. Ed.	<u>1</u>	<u>1</u>
	18	17

\*Some students will be asked to take English 1 in the second semester. These students should take two HSS courses in the first semester.

\*\*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. In Electrical Engineering Options 3 and 4, ME 2 is not required. Two HSS electives should be taken in the spring semester for Option 3.

\*First-year curriculum for Mechanical Engineering students begins on page 94.

### 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 128 semester hours, plus two credits of physical education activities.

#### OPTION 1 – General Civil Engineering

	1st SEMESTER	2nd SEMESTER
SOPHOMORE YEAR		
Math. 121, Calculus III	4	—
Physics 125 <sup>1</sup> , Electromag. & Optics	4	—
CE 1, Statics	3	—
CE 10, Surveying	4	—
Statistics 141, Basic Stat. Methods	3	—
Math. 271, Applied Math/Engineers	—	3
ME 12, Dynamics	—	3
Science Elective	—	4
CE 11, Geometronics	—	3
HSS Elective <sup>2</sup>	<u>—</u>	<u>3</u>
	18	16

	1st SEMESTER	2nd SEMESTER
JUNIOR YEAR		
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 140, Transportation	—	3
CE 170, Struct. Analysis I	—	4
HSS Elective	<u>3</u>	<u>3</u>
	17	15

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
EE 100, Elect. Principles	4	—
CE 172, Steel Design	3	—
CE 171, Struct. Analysis II	3	—
CE 180, Soil Mechanics	4	—
CE 125, Eng'g. Econ./Decisions	—	3
CE 173, Reinf. Concrete Design	—	3
Design Elective <sup>3</sup>	—	3
Professional Elective <sup>4</sup>	—	3
HSS Elective	<u>—</u>	<u>3</u>
	14	15

#### OPTION 2 – Environmental Engineering

	1st SEMESTER	2nd SEMESTER
SOPHOMORE YEAR		
Math. 121, Calculus III	4	—
Physics 125 <sup>1</sup> , Electromag. & Optics	4	—
CE 1, Statics	3	—
CE 10, Surveying	4	—
Statistics 141	3	—
Math. 271, Applied Math/Engineers	—	3
ME 12, Dynamics	—	3
Chemistry 32	—	4
Biology 2	—	4
HSS Elective <sup>2</sup>	<u>—</u>	<u>3</u>
	18	17

	1st SEMESTER	2nd SEMESTER
JUNIOR YEAR		
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	<u>3</u>	<u>3</u>
	17	14

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
EE 100, Elect. Principles	4	—
CE 180, Soil Mechanics	4	—
Design Elective <sup>3</sup>	3	—
Professional Elective <sup>4</sup>	3	—
CE 125, Eng'g. Econ./Decisions	—	3
CE 173 <sup>5</sup> , Reinf. Concrete Design	—	3
CE 140, Transportation	—	3
Design Elective <sup>3</sup>	—	3
HSS Elective	<u>—</u>	<u>3</u>
	14	15

<sup>1</sup>Students may alternately elect to take Physics 42 and the associated lab, Physics 22, in the spring sophomore semester and take the spring sophomore HSS elective in the fall sophomore semester.

<sup>2</sup>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.



<sup>3</sup>Design Electives are CE 141, 142, 161, 175, 181, 230, 250, 251, 253, 255, 256, 258, 261, 264, 265, 280, 283.

<sup>4</sup>Professional Electives are all Design Electives plus CE 171, 191, 192, any CE 200 level course, Natural Resource 278.

<sup>5</sup>May be replaced by CE 172, Steel Design.

## Electrical Engineering

The curriculum in Electrical Engineering leading to the degree of Bachelor of Science in Electrical Engineering offers instruction in electrical and electronic circuits, semiconductor devices, signal and system analysis, digital systems, control systems and design, as well as in engineering, 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 129 semester hours for Options 1 and 2, 127 for Option 3, and 128 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.

An accelerated master's degree program leading to 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.

### OPTION 1: General Electrical Engineering

	1st SEMESTER	2nd SEMESTER
SOPHOMORE YEAR		
Math. 121, Calculus III	4	—
EE 3, Engr. Analysis I	3	—
EE 81, Sophomore Lab I	2	—
HSS Elective	3	—
Physics 42 and 22, Electromag. & Mod. Phys.	4	—
Physics 128, Modern Physics	—	4
Math. 271, Applied Math	—	3
EE 82, Sophomore Lab II	—	2
EE 4, Eng. Analysis II	—	3
HSS Elective	—	3
	16	15

	1st SEMESTER	2nd SEMESTER
JUNIOR YEAR		
EE 120, Electronics I	3	—
EE 141, Electromag. Field Theory <sup>3</sup>	3	—
EE 163, Solid State Physics I	3	—
EE 171, Signals & Systems I	4	—
EE 183, Jr. Lab I	2	—
EE 121, Electronics II	—	3
EE 142, E&M Field Theory II <sup>3</sup>	—	3
EE 164, Solid State Physics II <sup>3</sup>	—	3
EE 174, Intro to Comm. Sys. <sup>3</sup>	—	3
EE 184, Jr. Lab II	—	2
HSS Elective	—	3
	15	17

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
EE 131, Digital Design	3	—
EE 185, Sr. Lab I	1	—
Non-EE Eng. Sci. Elective*	3	—
Tech. Elective****	3	—
EE Design Tech. Elective**	3	—
HSS Elective	3	—
EE Tech. Elective	—	3
EE 186, Sr. Lab II	—	1
EE Eng. Science Elective***	—	3
EE 134, Fund. Micro. Based Systems <sup>3</sup>	—	4
Approved Elective	—	3
EE Design Tech. Elective**	—	3
	16	17

\*Non-EE Engr. Sci. Electives: CE 1, 10, 150; ME 12, 41, 111.

\*\*EE Design Tech. Elective: EE 131, 187, 221, 222, 227, 231, 232, 233, 250, 251, 266, 275, 276.

\*\*\*EE Engr. Sci. Elective: 201, 209, 210, 241, 245, 250, 261, 262, 270.

\*\*\*\*Tech. Electives: EE 113, 164, 201, 209, 210, 221, 222, 227, 231, 232, 233, 241, 245, 250, 251, 261, 262, 266, 270, 275, 276; CS 26, 31, 101, 103, 201, 222; Phys. 170, 201, 202; ME 12, 14, 150; CE 125; Chem. 162, 163; Math. 104, 124, 173; Statistics 141, 151. All 200-level Math. and Statistics courses except for practicum, seminar, and special topics.

<sup>3</sup>No credit may be received for both EE 140 (offered in prior years) and the current EE 141.

<sup>4</sup>Choose three of EE 134, 142, 164, 174 in the spring semester junior year with the fourth course to be taken in the spring semester of the senior year.

### OPTION 2: Computer Engineering

	1st SEMESTER	2nd SEMESTER
SOPHOMORE YEAR		
Math. 121, Calculus III	4	—
EE 3, Eng. Analysis I	3	—
EE 81, Sophomore Lab I	2	—
EE 131, Digital Design	3	—
Physics 42 and 22, Electromag. & Mod. Phys.	4	—
Physics 128, Modern Physics	—	4
Math. 271, Applied Math.	—	3
EE 82, Sophomore Lab II	—	2
EE 4, Eng. Analysis II	—	3
HSS Elective	—	3
	16	15

	1st SEMESTER	2nd SEMESTER
JUNIOR YEAR		
HSS Elective	3	—
EE 120, Electronics I	3	—
CS 26, Comp. Prog. II	3	—
EE 163, Solid St. Phys. I	3	—
EE 141, Electromag. Field Theory I <sup>3</sup>	3	—
EE 183, Jr. Lab I	2	—
EE 121, Electronics II	—	3
EE 134, Fund. Micro. Based Systems	—	4
EE 142, Electromag. Field Theory II	—	3
HSS Elective	—	3
EE 184, Jr. Lab II	—	2
	17	15

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
EE 171, Signals & Systems	4	—
EE 185, Sr. Lab I	1	—
EE 231, Dig. Comp. Design I	—	3
CS 101, Intro. Comp. Sci.	3	—
EE 187, Senior Project	3	—
Technical Elective**	—	3
EE 186, Sr. Lab II	—	1

EE Eng. Science Elec.***	-	3
Approved CS Elective****	-	3
EE 174, Intro. to Comm. Sys.	-	3
Non-EE Engr. Sci.	3	-
HSS Electives	3	-
	<u>17</u>	<u>16</u>

\*Non-EE Engr. Sci. Electives: See Option 1.

\*\*Tech. Electives: EE 113, 114, 164, 201, 209, 210, 221, 222, 227, 231, 232, 233, 241, 245, 250, 251, 261, 262, 266, 270, 275, 276; CS 103, 201, 222; Physics 170, 201, 202; ME 12, 14, 150; CE 125; Chemistry 162, 163; Math. 104, 124, 173; Statistics 141, 151; and all 200-level Math. and Statistics courses except for practicum, seminar, and special topics.

\*\*\*EE Engr. Sci. Elective: EE 113, 164, 201, 209, 210, 241, 245, 250, 261, 262, 270.

\*\*\*\*Approved CS Electives: CS 103, 222, 104.

\*No credit may be received for both EE 140 (offered in prior years) and the current EE 141.

### OPTION 3: Biomedical Engineering

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Math. 121, Calculus III	4	-
Physics 31 & 21, Intro. Physics	4	-
EE 3, Engr Analysis I	3	-
EE 81, Sophomore Lab I	2	-
HSS Elective	3	-
Physics 42 & 22, Electromag. & Mod. Phys.	-	4
Math 271, Applied Math.	-	3
HSS Elective	-	3
EE 4, Engr. Analysis II	-	3
EE 82, Sophomore Lab II	-	2
	<u>16</u>	<u>15</u>

	1st	2nd
JUNIOR YEAR	SEMESTER	
EE 120, Electronics I	3	-
Biology 1, Prin. of Bio.	4	-
EE 141, Electromag. Field Theory I <sup>#</sup>	3	-
EE 183, Junior Lab I	2	-
EE 163, Solid St. Physics I	3	-
EE 142, Electromag. Field Theory II	-	3
EE 184, Junior Lab II	-	2
EE 134, Microcomp. or EE 227	-	4-3
EE 121, Electronics II	-	3
Physiol. & Biophys. 101	-	4
	<u>15</u>	<u>16-15</u>

	1st	2nd
SENIOR YEAR	SEMESTER	
ME 207, Biomechanics I	3	-
Physiol. & Biophys. 102	4	-
EE 171, Signals & Systems	4	-
EE 185, Senior Lab I	1	-
EE Design Elective**	3	-
EE 134 or 227, Bio. Meas. Inst. & Sys.	-	4-3
EE 174, Intro. to Comm. Systems	-	3
ME 208, Biomechanics II	-	3
EE 187, Senior Project	-	3
HSS Elective	-	3
EE 186, Senior Lab II	-	1
	<u>15</u>	<u>17-16</u>

\*\*EE Design Elective: See Option 1.

\*No credit may be received for both EE 140 (offered in prior years) and the current EE 141.

### OPTION 4: Premedical Engineering

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
Math. 121, Calculus III	4	-
Physics 31 & 21, Intro. Phys.	4	-
Biology 1, Prin. of Biology	4	-
EE 3, Eng. Analysis I	3	-
EE 81, Sophomore Lab I	2	-
Physics 42 & 22, Electromag. & Mod. Phys.	-	4
Math. 271, Applied Math.	-	3
Biology 2, Prin. of Biology	-	4
EE 4, Eng. Analysis II	-	3
EE 82, Sophomore Lab II	-	2
	<u>17</u>	<u>16</u>

	1st	2nd
JUNIOR YEAR	SEMESTER	
EE 120, Electronics I	3	-
EE 183, Junior Lab I	2	-
EE 163, Solid State Physics I	3	-
Chem. 141, Organic Chemistry	4	-
HSS Elective	3	-
EE 184, Junior Lab II	-	2
EE 134, Fund. Micro. Based Systems	-	4
EE 121, Electronics II	-	3
HSS Elective	-	3
Chem. 142, Organic Chemistry	-	4
	<u>15</u>	<u>16</u>

	1st	2nd
SENIOR YEAR	SEMESTER	
EE 141, Electromag. Field Theory I <sup>#</sup>	3	-
HSS Elective	3	-
EE 131, Digital Design	3	-
EE 171, Signals & Systems	4	-
Non-EE Eng. Sci. Elect.*	3	-
EE 185, Senior Lab I	1	-
EE 142, Electromag. Field Theory II	-	3
EE 174, Intro. to Comm. Systems	-	3
HSS Elective	-	3
EE 186, Senior Lab II	-	1
EE Design Elective	-	3
EE Eng. Sci. Elective***	-	3
	<u>17</u>	<u>16</u>

\*Non-EE Eng. Sci. Elective: See Option 1.

\*\*EE Design Elective: See Option 1.

\*\*\*EE Eng. Sci. 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 126 semester hours, depending upon the engineering option selected, plus two credits of physical education activities.

**OPTION 1: Civil Engineering**  
(128-129 hours)

	1st	2nd
SOPHOMORE YEAR	SEMESTER	
CE 1, 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.	—	4
ME 12, Dynamics	—	3
ME 14, Mechanics of Solids	—	3
	18	17

	1st	2nd
JUNIOR YEAR	SEMESTER	
Statistics 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
	17	16

	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	3	—
Bus. Ad. 270/272, Quant. Anal./Simulation	—	3
CE Conc. Elective*	—	3-4
EMgt. 175, Mgmt. of Technology	—	3
Engr. Mgmt. Elective**	—	3
	15	12-13

\*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, 170, 174, 177, 192; and Statistics 221, 224, 225, 229, 231, 233, 237, 253.

**OPTION 2: Electrical Engineering**  
(126-128 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, Engr. 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.	—	4
	16	16

	1st	2nd
JUNIOR YEAR	SEMESTER	
Statistics 211, Stat. Methods I	3	—
Economics 12, Prin. of Economics	3	—
EE 131, Dgtl. Comp. Design	3	—
CE 125, Engr. Economics	—	3

EE 120, 121, Electronics I, II	3	3
Bus. Ad. 141, Mgmt. Info. Systems	3	—
EE 134, Micro. Syst.	—	4
Bus. Ad. 173, Prod. & Oper. Analy.	—	3
HSS Elective	—	3
	15-16	16

	1st	2nd
SENIOR YEAR	SEMESTER	
Bus. Ad. 120, Mgmt. & Organ. Behav.	3	—
EMgt. 185, Senior Project	3	—
Bus. Ad. 178, Quality Control	3	—
HSS Elective	3	—
EE 163/171, Solid State/Signal Sys.	3	4
EE 231, Dgtl. Comp. Design	—	3
Bus. Ad. 270/272, Quant. Anal./Simulation	—	3
EE Conc. Elective*	—	3-4
EMgt. 175, Mgmt. of Technology	—	3
Engr. Mgmt. Elective**	—	3
	15	15-16

\*EE Conc. Electives: EE 113, 141, 163 (if not used to fulfill another requirement), 171 (if not used to fulfill another requirement), 174, EE 183-184 (both courses are needed to meet this requirement), 210 and 250.

\*\*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**  
(127-129 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.	—	4
ME 12, Dynamics	—	3
ME 14, Mechanics of Solids	—	3
	18	17

	1st	2nd
JUNIOR YEAR	SEMESTER	
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 171, Design of Elements	—	4
Bus. Ad. 141, Mgmt. Info. Systems	3	—
EE 101/ME 162, EE Concepts/Mfg. Eng.	—	3-4
Bus. Ad. 173, Prod. & Oper. Analy.	—	3
HSS Elective	—	3
	16	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	3	—
Bus. Ad. 270/272, 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 (123 semester hours); (2) Biomedical Engineering (123 semester hours); (3) Manufacturing Engineering (123 semester hours); (4) Premedical Engineering (126 semester hours). In addition, all options require two credits of physical education activities.

An accelerated master's degree program leading to an M.S. in Mechanical Engineering 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.

### General Option (1)

	1st SEMESTER	2nd
FIRST YEAR		
Eng. 1, Written Expression	3	—
Chem. 31, Intro.	4	—
Math. 21, 22, Cal. I&II	4	4
HSS Electives	1*	3
ME 2, Graph. Comm.	—	2
CS 16, MATLAB	3	—
Phys. Ed.	1	1
Phys. 31/21, Intro. Phys	—	4
	16	14

\*Race and Culture

	1st SEMESTER	2nd
SOPHOMORE YEAR		
Stat. 141, 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.	—	4
ME 12, Dynamics	—	3
ME 14, Mech. Solids	—	3
ME 42, Engr. Thermo.	—	3
	16	16

	1st SEMESTER	2nd
JUNIOR YEAR		
ME 101, Materials	3	—
ME 111, System Dynamics	3	—
ME 143, Fluid Mechanics	3	—
ME 123, 124, Jr. Lab	2	2
EE 100, 101, Concepts I&II	4	4
ME 144, Heat & Mass Transfer	—	3

ME 171, Des. of Elements	—	4
HSS Elective	—	3
	15	16

	1st SEMESTER	2nd
SENIOR YEAR		
ME 161, Manufacturing Engr. I	3	—
ME 183, Sr. Lab	2	—
ME 185, Sr. Project	2	—
ME Elective <sup>1</sup>	3	3
Tech. Elective <sup>2</sup>	3	3
ME Elective <sup>3</sup>	—	4
ME 186, Sr. Project	—	1
HSS Electives	3	3
	16	14

<sup>1</sup>ME course 200-level or higher.

<sup>2</sup>Any 100-level or higher courses in EMBA (except Stat. 111), or courses in Natural Sciences or Computer Science with approval of advisor.

<sup>3</sup>ME 162 and 164, or ME 172 and 174.

### Biomedical Option (2)

	1st SEMESTER	2nd
FIRST YEAR		
Eng. 1, Written Expression	3	—
Chem. 31, Intro.	4	—
Math. 21, 22, Cal. I&II	4	4
CS 16, MATLAB	3	—
ME 2, Graph. Comm.	—	2
HSS Electives	1*	3
Phys. Ed.	1	1
Phys. 31/21, Intro. Phys	—	4
	16	14

	1st SEMESTER	2nd
SOPHOMORE YEAR		
Stat. 141, 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.	—	4
ME 12, Dynamics	—	3
ME 14, Mech. Solids	—	3
ME 42, Engr. Thermo.	—	3
	16	16

	1st SEMESTER	2nd
JUNIOR YEAR		
ME 101, Materials	3	—
ME 111, System Dynamics	3	—
ME 143, Fluid Mechanics	3	—
ME 123/124, Jr. Lab	2	2
Anatomy & Physiology 19-20	4	4
ME 171, Des. of Elements	—	4
ME 144, Heat & Mass Transfer	—	3
HSS Electives	—	3
	15	16

	1st SEMESTER	2nd
SENIOR YEAR		
ME 161, Manufacturing Engr. I	3	—
ME 183, Sr. Lab	2	—
ME 185, Sr. Project	2	—
ME 207, Biomechanics I	3	—
EE 100, Concepts I	4	—
Tech. Elective <sup>1</sup>	3	3
ME 208, Biomechanics II	—	3

ME 186, Sr. Project	—	1
HSS Electives	<u>—</u>	<u>6</u>
	17	13

<sup>1</sup>Any 100-level or higher courses in EMBA (except Stat. 111), or courses in Natural Sciences or Computer Science with advisor's approval.

\*Race and Culture

### Manufacturing Option (3)

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
Eng. 1, Written Expression	3	—
Chem. 31, Intro.	4	—
Math. 21, 22, Calc. I&II	4	4
CS 16, MATLAB	3	—
ME 2, Graph. Comm.	—	2
HSS Electives	1*	3
Phys. Ed.	1	1
Phys. 31/21, Intro. Phys	<u>—</u>	<u>4</u>
	16	14

\*Race and Culture

	1st SEMESTER	2nd SEMESTER
SOPHOMORE YEAR		
Stat. 141, 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.	—	4
ME 12, Dynamics	—	3
ME 14, Mech. Solids	—	3
ME 42, Engr. Thermo.	<u>—</u>	<u>3</u>
	16	16

	1st SEMESTER	2nd SEMESTER
JUNIOR YEAR		
ME 101, Materials	3	—
ME 111, System Dynamics	3	—
ME 143, Fluid Mechanics	3	—
ME 123, 124, Jr. Lab	2	2
EE 100, 101, Concepts I&II	4	4
ME 144, Heat & Mass Transfer	—	3
ME 171, Des. of Elements	—	4
HSS Elective	<u>—</u>	<u>3</u>
	15	16

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
ME 161, Manufacturing Engrn. I	3	—
ME 183, Sr. Lab	2	—
ME 185, Sr. Project	2	—
Tech. Elective <sup>1</sup>	3	—
Tech. Elective <sup>1</sup>	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 <sup>2</sup>	<u>—</u>	<u>3</u>
	16	14

<sup>1</sup>Courses in manufacturing, management or related area, with approval of advisor.

<sup>2</sup>ME course 200-level or higher.

### Premedical Option (4)

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
Eng. 1, Written Expression	3	—
Chem. 31, 32, Intro.	4	4
Math. 21, 22, Calc. I&II	4	4
CS 16, MATLAB	3	—
ME 2, Graph. Comm.	—	2
HSS Electives	1*	3
Phys. Ed.	1	1
Phys. 31/21, Intro. Phys	<u>—</u>	<u>4</u>
	16	18

\*Race and Culture

	1st SEMESTER	2nd SEMESTER
SOPHOMORE YEAR		
Math. 121, Calc. III	4	—
Stat. 141, Basic Stat.	3	—
ME 40, Thermo.	3	—
CE 1, Statics	3	—
Math. 271, Appl. Math. Engrs.	—	3
Phys. 42/22, EM&Mod Phys.	—	4
ME 12, Dynamics	—	3
ME 14, Mech. Solids	—	3
Biol. 1/2, Princ. Biol.	<u>4</u>	<u>4</u>
	17	17

	1st SEMESTER	2nd SEMESTER
JUNIOR YEAR		
ME 101, Materials	3	—
ME 111, System Dynamics	3	—
ME 143, Fluid Mechanics	3	—
ME 123, 124, Jr. Lab	2	2
Chem. 141, 142, Org. Chem.	4	4
ME 171, Des. of Elements	—	4
ME 144, Heat & Mass Transfer	—	3
HSS Elective	<u>—</u>	<u>3</u>
	15	16

	1st SEMESTER	2nd SEMESTER
SENIOR YEAR		
ME 161, Manufacturing Engrn. I	3	—
ME 183, Sr. Lab	2	—
ME 185, Sr. Project	2	—
ME 207, Biomech. I	3	—
EE 100, Concepts I	4	—
ME 208, Biomech. II	—	3
HSS Electives	—	9
ME 186, Sr. Project	<u>—</u>	<u>1</u>
	14	13

### 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 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.

**Basic Curriculum**

Math. 21, 22, 121, Math. 51, Math. 52 and 124.

Mathematics majors: one of Math. 231, 241, 250, 251.

Statistics majors: Stat. 241 or 261

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.** 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 majors must include 21 hours of Statistics including 141 or 211, 151 or 251, 201, 221 or 227, and 281 or 293.

B. **Allied Field Courses.** (Courses used to satisfy requirement A above may not be used to satisfy this requirement.)

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)          |                             |

Of these 24 hours, at least six hours must be in courses numbered 100 or above and at least six hours must be taken in fields (1) to (5). 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. Statistics majors must include one laboratory experience in science or engineering.

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	Linguistics
French	Russian
General Literature	Spanish
German	

II. **Fine Arts, Philosophy, and Religion**

Art	Religion
Film	Speech
Music	Theatre
Philosophy	

III. **Social Sciences**

Anthropology	History
Communication	Political Science
Sciences	Psychology
Economics	Sociology
Geography	

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**

Perhaps no discipline is more central to the modern world than mathematics. Since ancient times, mathematics has been a cornerstone of the educational process, exhibiting both theoretical and logical underpinnings as well as practical applications in the real world. In this century, fueled by the power of the computer (which, in large part, was invented by mathematicians), mathematics has emerged as central and crucial to the fabric of a technological society. In essence, mathematics is a *foundational* discipline unlike any other, and the ability to reason mathematically is the gatekeeper for a technologically literate workforce. Students who find mathematics interesting and wish to study it further, irrespective of career plans, are encouraged to consider majoring in 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. Mathematics majors are well prepared for jobs in business, industry, government, or teaching; or for advanced study in graduate school. As examples, UVM mathematics graduates are often employed in the computer, information, and communications industries, in engineering, in the insurance business as actuaries, in government agencies, and in a variety of other occupations. Some go on to graduate school in the mathematical sciences, business, or the sciences and social sciences, or to medical, dental, or law school.

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. 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. Some of the career plans for which a well-designed major in mathematics can provide ideal preparation are highlighted below. These are examples of the type of considerations which the Handbook discusses in more detail.

**Teaching of Mathematics.** The centrality of mathematics in a technological world requires high quality mathematics teaching in our schools. The Department of Mathematics and Statistics and the College of Education and Social Services maintain close cooperation in the area of mathematics education. A student seeking a career as a mathematics teacher in a middle or secondary school should take a rich array of mathematics courses from the areas of interest listed below. Suggested courses for prospective teachers include Math. 161, 173, 230, 251, 255, 260, 273, Statistics 151 and 211. Consult the Coordinator of Secondary School Education in the College of Education and Social Services for admission to the Secondary Education Program in CESS and for courses required for certification.

**Pregraduate Training.** A student intending to pursue advanced degrees in the mathematical sciences is urged to

obtain a solid foundation in mathematics and include as many as possible for the courses of particular importance marked with an asterisk below, and should also consider enrolling in the junior-senior seminar (Math. 283) and writing an honors thesis (Math. 293).

**Premedical Training.** The mathematics major provides excellent credentials for a student who plans to apply to medical school. It is suggested that the student follow the recommendations for a special interest in Area (1), (2), or (7) below. During the first or second year, a premedical student should review catalogues of those institutions to which he or she anticipates applying. In addition, the Office of Career Development should be contacted during the student's junior year regarding the specifics of the medical school application process. Premedical students wishing to specialize more exclusively in statistics may prefer the Premedical Concentration in Statistics described below.

#### Areas of Special Interest within the Mathematics Major

Because of the enormous spread of mathematics, the courses offered are grouped in the following areas of special interest to assist students in planning their mathematics program. Since mathematics also has an inner unity, there is a great deal of overlap among these areas, and the boundaries among these areas are at best blurred. Selecting courses from different areas helps a student achieve breadth in the major, while focusing several courses in the same area assures a depth of concentration in the major. Courses of particular importance in an area are marked with an asterisk(\*).

**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. 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, as well as the history of mathematics. Courses in this area include the following: *Math. 173, 236, 240, 241\*, 242, 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 should 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, 179 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 quantitative 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, 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.

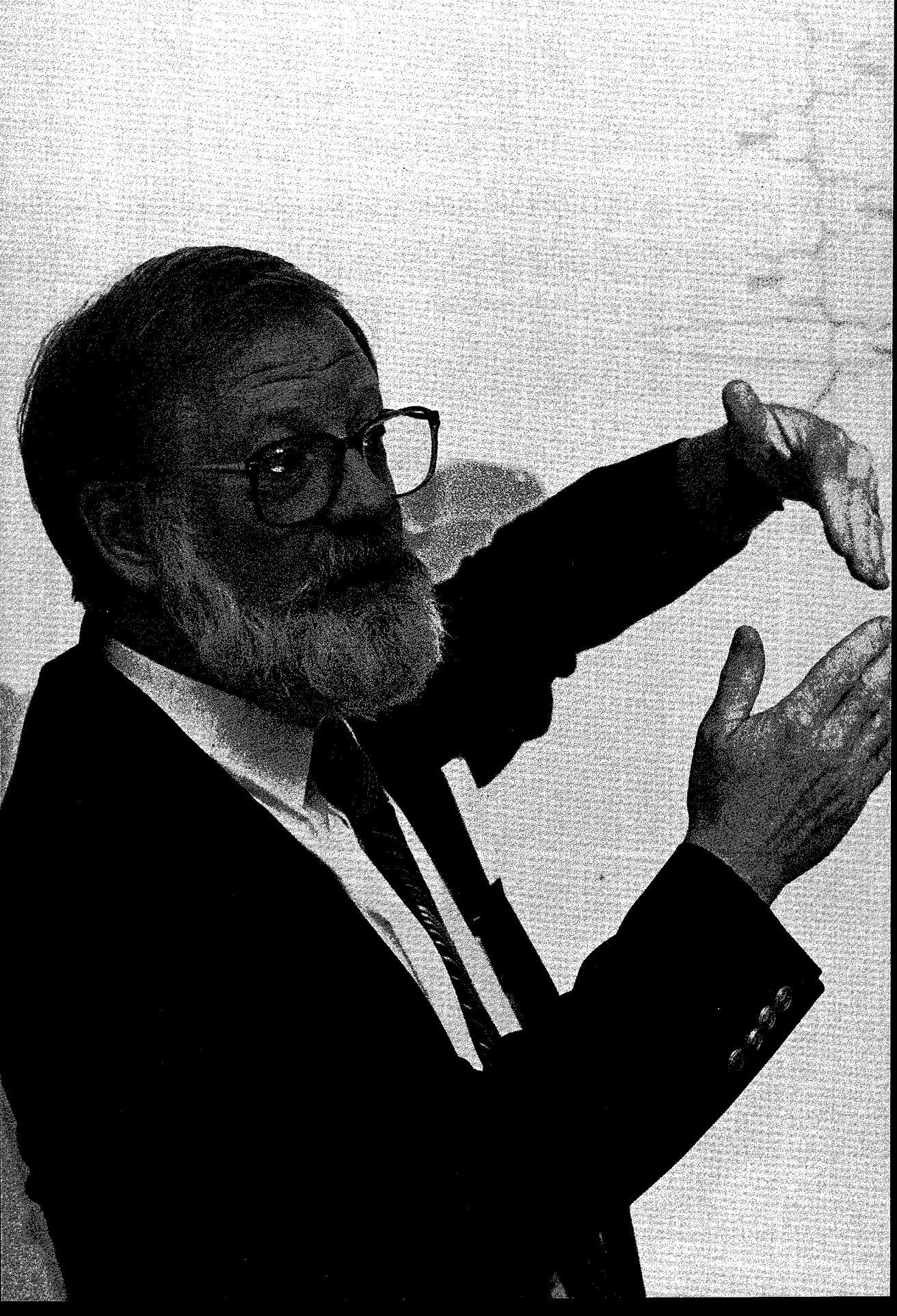
**Premedical Concentration in Statistics.** Each student electing the Premedical Concentration in Statistics will fulfill the general requirements for the Statistics major. In addition, the premedical concentration should include as a minimum two years of chemistry with laboratory (Chemistry 31, 32, 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. Students should discuss this possibility with the Statistics Program Director as soon as they think they may be interested in this program. 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.

To be eligible for the accelerated M.S. program, a student must be a declared Statistics major or minor, or otherwise acquire a sufficient breadth in statistics course work. After application to the Graduate College for admission to the AMP is accepted, up to six approved credits on a concurrent undergraduate/graduate credit basis are taken. For the Statistics M.S. program these credits would be selected from Statistics 221, 224, or 251. For the Biostatistics M.S. program these credits would be selected from Statistics/Biostatistics 200, 221, or 241. After graduation with a B.S. or B.A. degree, a student becomes a candidate for the M.S. degree, assuming that the standard mathematics prerequisites (Math. 121, 124) have been met and sufficient statistics courses have been taken to acquire some breadth in the field. The breadth requirement consists of Statistics 201 and an equivalent number of credits in other 200-level elective statistics courses as a student wishes to count above for concurrent graduate credit (e.g. selected from Statistics 225, 229, 233, 237, 252, 253, 281, 295).





# 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 in response to social and health care needs of the community. It encourages interaction among students and faculty in meeting these needs. All programs offer clinical education experiences in a variety of appropriately approved hospitals and health facilities in Vermont and throughout the country. The academic programs are nationally accredited by the responsible agencies. Criteria for academic standards will be given to students at registration time and are available upon request from the Dean's and departmental offices.

The Allied Health Dean's Office is located in the Rowell Building, Room 301.

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.

Hepatitis B immunization is required prior to the beginning of 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 should carry their own health insurance.

## ORGANIZATION

The School consists of four departments: Dental Hygiene; Medical Technology; Physical Therapy; and Radiologic Technology, which has two programs: Nuclear Medicine Technology and Radiation Therapy.

## DEGREE PROGRAMS

The Bachelor of Science degree is awarded for:

- Medical Technology
- Physical Therapy

The Associate in Science degree is awarded for:

- Dental Hygiene
- Nuclear Medicine Technology
- Radiation Therapy

## DEGREE REQUIREMENTS

Requirements for admission and requirements for the degrees offered in the School are detailed under the specific

areas of study which follow. All students are required to take a one-credit course in Race and Culture. The School of Allied Health Sciences reserves the right to require the withdrawal of any student from the School whose academic record or performance and behavior in the professional programs is judged to be unsatisfactory.

## AREAS OF STUDY

### 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 individual states.

Dental Hygienists are health professionals who, in cooperation with the dental profession, strive to provide services which promote optimum oral health for the public. Dental hygiene services are primarily educational and preventive in nature and are provided through a variety of health care settings, including general and specialty dental practices, community health agencies, and public schools.

Requirements for admission to the Dental Hygiene program are the same as the general University requirements. Applicants are welcome to visit the department and to make an appointment to discuss dental hygiene with faculty and students.

As this program of study is scientifically oriented, high school courses in algebra, chemistry, and biology are important prerequisites. Personal attributes essential to success include good health habits, a professional attitude, task orientation, high ethical standards, and an ability to relate well with patients of all ages.

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 the semester course loads are heavy. Students who have the opportunity and the desire 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.

	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 (or higher level)	3	—
Psychology 1	—	3
Physical Education	1	—
	18	18

	1st SEMESTER	2nd SEMESTER
SECOND YEAR		
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 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 semester hours including one hour of physical education and a grade-point average of 2.0 is required for the Associate in Science degree in this curriculum. A grade of C or better is required for all professional courses.

### Medical Technology

The Department of Medical Technology offers a four-year curriculum leading to the baccalaureate degree. The program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences.

Requirements for admission are the same as the general University requirements, with the addition that applicants must have taken high school biology and chemistry; physics is highly recommended.

Preparation in Medical Laboratory Science readies students for myriad careers, including clinical laboratory science, research, and biotechnology. Graduates can pursue postbaccalaureate study in the life sciences or professional education in medicine upon completion of this program. 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. Employment opportunities are diverse and include placement in hospital laboratories, pharmaceutical and medical instrumentation companies, academic research laboratories, physician and health clinics, biotechnology companies, medical sales, and related fields. Courses in the humanities and basic sciences are taken in departments throughout the University, including the College of Medicine. 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, Immunology, or Blood Banking).

	1st SEMESTER	2nd SEMESTER
FIRST YEAR		
Chemistry 23 (or 31-32)	4	(4)
Medical Technology 1	1	—
Medical Technology 3	1	—
English	3	—
Math. (by placement)	3	—
Computer Science	—	3
Medical Technology 34	—	3
Electives	3	6-9
Physical Education	1	1
AH 95 or AGRI 95, Race and Culture	<u>1</u>	<u>—</u>
	17	16-17

	1st SEMESTER	2nd SEMESTER
SECOND YEAR		
Anatomy & Physiology 19-20	4	4
Medical Technology 123	4	—
Medical Technology 101	1	—
Medical Technology 54	—	4
Chemistry 42	—	4
Electives	<u>6</u>	<u>3</u>
	15	15

	1st SEMESTER	2nd SEMESTER
THIRD YEAR		
Biochemistry 201	3	—
Biochemistry 202	1	—
Biochemistry 212	—	3
Biochemistry 213	—	1
Medical Technology 161	—	2
Medical Technology 110	—	0.5
Medical Technology 242	—	4
Microbiology 222	4	—
Pathology 101	3	—
Statistics 111 or 141	—	3
Electives	<u>6</u>	<u>3</u>
	17	16.5

	1st SEMESTER	2nd SEMESTER
FOURTH YEAR		
Medical Technology 111	0.5	—
Medical Technology 220,230,250,260	4-5	4-5
Medical Technology 231	3	—
Medical Technology 255	3	—
Medical Technology 256	—	1
Medical Technology 222	—	3.5
Medical Technology 262	—	3
Medical Technology 295	3	—
Medical Technology 296	—	2
Medical Technology 293	1	—
Elective	<u>—</u>	<u>3</u>
	14.5-15.5	16.5-17.5

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.

There is an affiliation agreement with Trinity College, Burlington, Vermont, whereby Trinity students who meet the requirements of the program may apply to complete their senior year requirements at UVM.

**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 select a course of work from one of these possible options: participation in at least two senior level specialty seminars with a comprehensive exam, completion of an independent research project, or completion of an independent reading thesis. Excellent and committed work will be required for a student to be granted Departmental Honors.

**Option: Cytotechnology** The Department of Medical Technology, 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 Allied Health Education and Accreditation of the American Medical Association.

Requirements for admission are the same as those for the medical technology 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 technology 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 SEMESTER	2nd SEMESTER
<b>FOURTH YEAR</b>		
Medical Cytology I-II Lecture	4	4
Medical Cytology I-II Lab	3	3
Cytology Seminar	2	1
Cytology Term Project	2	1
Laboratory Techniques	3	—
Cytology Practicum	—	10
	14	19

A minimum of 33 credit hours in the senior year and a total of 127 credit hours are required for the B.S. degree.

## 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.

The program embraces cultural diversity in curriculum content. In the first and sophomore 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 introductory courses in Physical Therapy. The junior and senior years are devoted to the professional program. During the professional program, clinical education experiences provide the student with concurrent opportunities to apply acquired knowledge and skills.

	1st SEMESTER	2nd SEMESTER
<b>FIRST YEAR</b>		
Psychology 1	3	—
Chemistry 23 and 26 (or 31 and 32)	4	4
Math. (10, 19 or above)	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	1	—
	15–18	14–17

+First or second semester.

	1st SEMESTER	2nd SEMESTER
<b>SECOND YEAR</b>		
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+	3	—
	16	16

+First or second semester.

	1st SEMESTER	2nd SEMESTER
<b>THIRD YEAR</b>		
Anatomy 202	3	—
Physiology & Biophysics 102	4	—
Pathology 101	3	—
Physical Therapy 121-122	4	3
Physical Therapy 124	—	5
Physical Therapy 131-132	2	2
Physical Therapy 143-144	1	3
Statistics III	—	3
Pharmacology 190	—	2
	17	18

SUMMER PT 156 Clinical Education (8 wks.—4 credits)

	1st SEMESTER	2nd SEMESTER
<b>FOURTH YEAR</b>		
Physical Therapy 125	2	—
Physical Therapy 127	5	—
Physical Therapy 133	3	—
Physical Therapy 145	2	—
Physical Therapy 158*	—	12
Physical Therapy 175 (optional)	2	—
Physical Therapy 177	3	—
	15–17	12

\*PT 158 Clinical Education (16 weeks)

A minimum of 127 credits are required for graduation, to include six credits in the humanities and 15 credits in behavioral and social sciences (including statistics and research methodology) and two credit hours of physical education.

A minimum grade-point average of 2.0 is required for the baccalaureate degree in this curriculum. The minimum grade required in a professional course is C-. At the end of each semester and prior to each Clinical Education assignment, the faculty review the development of professional attitudes and behaviors of the majors 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 clinical education experience. Students should plan their finances to include these expenses.

The affiliations will be scheduled as indicated unless inconvenient for the clinical facilities. Students may be required to affiliate during an alternate time period if sufficient clinical facilities are not available.

## Radiologic Technology

The Department of Radiologic Technology offers two 24-month programs leading to the Associate in Science degree.

**Nuclear Medicine Technology Program:** Preparation for a career in working with radioactive drugs and complex equipment for diagnosing patient problems.

**Radiation Therapy Program:** Preparation for a career in operating high energy radiation machines for treating cancer patients.

During the semester, students obtain direct patient care experiences at the Fletcher Allen Health Care (FAHC). Summertime clinical experiences are obtained at the FAHC and other hospitals throughout the region. The summer clinical experiences will require additional room, meal, transportation, and tuition expenses. Students should plan on spending at least one summer at an affiliate outside Burlington.

A limited number of eligible graduates of these programs may transfer to the College of Education and Social Services to complete a B.S. degree program for a teaching career in Radiologic Technology.

Registered technologists from hospital-based programs are encouraged to apply. Equivalency examinations are available in all Radiologic Technology courses and will be administered after a person matriculates.

Both programs are accredited nationally: the Radiation Therapy program by the Joint Review Committee for Radiation Therapy and the Nuclear Medicine Technology program by the Joint Review Committee for Nuclear Medicine Technology. Graduates are eligible to write the national registry and certification examination.

Interested persons should write directly to the Radiologic Technology Department in the Rowell Building for additional information, interview, and tour of clinical facilities.

#### *Nuclear Medicine Technology*

	1st	2nd
FIRST YEAR	SEMESTER	
Anatomy & Physiology 19-20	4	4
Math. 9 (or higher)	3	—
Physical Education	1	—
Radiologic Tech. 6	2	—
Radiologic Tech. 31, 32	1	3
Radiologic Tech. 33, 34	1	1
English (by placement)	—	3
Radiologic Tech. 4	3	—
Med. Tech. 110	—	0.5
Computer Science 2 or 3 or		
Statistics 11 or Comm. Dev. &		
Appl. Ec. 85	—	3
Distribution	—	3
	15	17.5

#### SUMMER SESSION

Radiologic Tech. 77	3
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	1st	2nd
SECOND YEAR	SEMESTER	
Chemistry 23	4	—
Distribution	—	3
Radiologic Tech. 131, 132	5	3
Radiologic Tech. 133, 134	3	3
Speech 11	3	—
Radiologic Tech. 142	—	2
Electives	—	1.5
AH 95 or AGRI 95, Race and Culture	1	—
	16	12.5

#### SUMMER SESSION

Radiologic Tech. 177	3
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#### *Radiation Therapy Technology*

	1st	2nd
FIRST YEAR	SEMESTER	
Anatomy & Physiology 19-20	4	4
Math. 9 or higher	3	—
Physical Education	—	1
Radiologic Tech. 6	2	—
Radiologic Tech. 21, 22	2	2
Radiologic Tech. 23, 24	1	1
English (by placement)	—	3
Radiologic Tech. 4	3	—
Radiologic Tech. 26	—	1
Computer Science 2 or 3 or		
Statistics 11 or Comm. Dev. &		
Appl. Ec.	—	3
	15	15

#### SUMMER SESSION

Radiologic Tech. 77	3
---------------------	---

	1st	2nd
SECOND YEAR	SEMESTER	
Speech 11	3	—
Radiologic Tech. 121, 122	3	4
Radiologic Tech. 123, 124	3	3
Radiologic Tech. 125	3	—
Electives	2	1
Distribution	3	3
AH 95 or AGRI 95, Race and Culture	—	1
Radiologic Tech. 142	—	2
	17	14

#### SUMMER SESSION

Radiologic Tech. 177	3
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**DISTRIBUTION** (at least one three-credit course from two of the following categories).

- A. Art, film, music, theatre
- B. Classics, French, German, Greek, Latin, Russian, Spanish
- C. History, philosophy, political science, religion
- D. Anthropology, economics, geography, psychology, sociology
- E. Business Administration, education, environmental studies, forestry, human nutrition, military studies, social work

A minimum of 61 approved semester hours (not including RT 77, but including one hour of physical education) with a cumulative grade-point average of 2.0 and a grade-point average of 2.0 in Radiologic Technology courses are required for the Associate in Science degree in this curriculum.

## CLINICAL AFFILIATIONS

#### *NUCLEAR MEDICINE TECHNOLOGY*

Central Vermont Hospital, Berlin, VT  
Hartford Hospital, Hartford, CT  
Maine Medical Center, Portland, ME  
Dartmouth-Hitchcock Medical Center, Hanover, NH  
Fletcher Allen Health Care, Burlington, VT  
Pharmalogic, LTD, Williston, VT  
Winchester Memorial Hospital, Winchester, MA

#### *RADIATION THERAPY*

Elliot Hospital, Manchester, NH  
Dartmouth-Hitchcock Medical Center, Hanover, NH  
Massachusetts General Hospital, Boston, MA  
Fletcher Allen Health Care, Burlington, VT

*Note:* The above list of clinical affiliations is subject to change.

# The School of Nursing

The School of Nursing offers an undergraduate educational program to prepare qualified individuals for the beginning practice of nursing and a graduate program for advanced practice. The four-year 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 admissions requirements for the University. Additionally, a high school year's course in chemistry and one in biology are required and one additional year of science in the senior year is highly recommended.

Financial Aid is available in the form of scholarships, loans, prizes, and employment (see section on Financial Aid).

The offices of the School of Nursing are located in the Rowell Building.

## DEGREE REQUIREMENTS

A minimum 2.0 grade-point average is required for graduation. Grades in nursing courses are based on achievement in theory and in 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.

All students in the School of Nursing are required to carry professional liability insurance when enrolled in clinical nursing courses and are responsible for transportation to and from the agencies which are used for clinical experiences. These include: Fletcher Allen Health Care; the Burlington Visiting Nurse Association, Inc.; Vermont State Hospital in Waterbury; and other selected agencies in the Burlington, Middlebury, and St. Albans areas.

## 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, are also addressed in the Student Handbook.

## 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 in a variety of settings including 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 an approximate balance in general and professional education. Courses in the sciences — biological, physical, and social — 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.

A typical program of studies follows:

	1st SEMESTER	2nd SEMESTER
<b>FIRST YEAR</b>		
English	3	3
Psychology 1	—	3
Chemistry 23, 26	4	4
Sociology 1*	3	—
Speech 11	3	—
Electives	3	6
Physical Education	<u>1</u>	<u>1</u>
	17	17

\*any sociology course under 100

	1st SEMESTER	2nd SEMESTER
<b>SECOND YEAR</b>		
Education/ECHD 5	3	—
Microbiology/Pathogenesis 65	4	—
Anatomy & Physiology 19-20	4	4
Professional Nursing 25	—	2
Professional Nursing 26	—	4
Nutritional Sci. 43	3	—
Electives	<u>3</u>	<u>6</u>
	17	16

	1st SEMESTER	2nd SEMESTER
<b>THIRD YEAR</b>		
Professional Nursing 125	9	—
Professional Nursing 126	—	9
Professional Nursing 128	3	—
Statistics 111 or 141	3	—
Electives	<u>—</u>	<u>6</u>
	15	15

	1st SEMESTER	2nd SEMESTER
<b>FOURTH YEAR</b>		
Professional Nursing 225	9	—
Professional Nursing 226	—	9
Professional Nursing 251	3	—
Professional Nursing 252	—	6
Elective	<u>3</u>	<u>—</u>
	15	15

The general education courses found in the curriculum outline are divided into categories, with specific credit requirements attached to each. Course selection will be based on individual needs and interest in consultation with the faculty advisor. These are:

	Credit Hours
Social Sciences	15
Humanities and Languages	15
General Electives	12
Physical Education	2

## **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 accord with University policy, the student may apply for transfer credits or credits by examination in general education, sciences, and selected 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.

## **OPPORTUNITIES FOR REGISTERED NURSES**

Some of the advanced standing policies outlined are applicable to registered nurse students seeking a baccalaureate degree in nursing. Students enroll in the alternate track

program that allows the registered nurse student the opportunity to complete the program on a part-time basis and requires completion of the program within six years of admission.

## **GRADUATE STUDIES**

Students interested in master's preparation may obtain information on admission and curriculum in the Graduate Catalogue, available in the offices of the Graduate College.

## **College of Medicine**

Information on admission and curriculum may be obtained in the catalogue of the College of Medicine which is available in the offices of the Dean in the Given Medical Building.

# The School of Natural Resources

The School of Natural Resources (SNR) 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 in harmony with the natural environment. Students are challenged to acquire knowledge, skills, and values necessary to become innovative, environmentally responsible, and accountable leaders. 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.

The School of Natural Resources is 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.

The School's academic programs and course scheduling are designed to accommodate transfer students and those undecided about an undergraduate major. 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.

SNR's core curriculum provides a common experience for all students. The innovative six-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.

Classes are held in the George D. Aiken Center for Natural Resources. The Center houses innovative teaching facilities, as well as modern laboratories equipped for research in forest biology, wildlife and fisheries biology, water resources, forest pathology, remote sensing, natural resource planning, and outdoor recreation and tourism. The School's computer facilities include sophisticated geographic mapping and information systems and a high end, fully networked Macintosh teaching laboratory. Many courses in the School incorporate extensive outdoor laboratory experiences. A 45-foot research and teaching vessel, the *Melosira*, provides a floating classroom on Lake Champlain. Students have ample opportunity to participate in faculty research or independent study.

The Office of the Dean of the School is located in the George D. Aiken Center for Natural Resources.

## ORGANIZATION

The School includes academic programs in Environmental Studies, Forestry, Natural Resources, Natural Resources Planning, Recreation Management, Resource Economics, Water Resources, and Wildlife and Fisheries Biology. In addition, the Vermont Water Resources and Lake Studies Center, the Natural Resources Extension Unit, and the Ver-

mont Cooperative Research Unit of the U.S. Fish and Wildlife Service are housed within the School.

## DEGREE PROGRAMS AND OPTIONS

The Bachelor of Science degree is awarded for the following programs:

- Environmental Studies
- Forestry
  - Forest Biology
  - Forest Resource Management
  - Urban Forestry and Landscape Horticulture
- Natural Resources
  - Aquatic Resources
  - Integrated Natural Resources
  - Terrestrial Ecology
- Recreation Management
  - Private Outdoor Recreation and Tourism
  - Public Outdoor Recreation
- Resource Economics
- Wildlife and Fisheries Biology
  - Wildlife Biology
  - Fisheries Biology

Students interested in studying natural resources, but who wish to postpone their decision on a specific major, enroll in *Undecided-NR*.

## DEGREE REQUIREMENTS

- A. University-wide: 120 credit hours, including two credits of physical education activities, with a cumulative grade-point average of 2.0 or above.
- B. School-wide: SNR core curriculum and 11 courses in distribution requirements.
- C. Major: Further requirements as specified in the following sections.

## SNR CORE CURRICULUM

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 or Theatre 5

### 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, 6, or 8), 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.

## 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.

## MAJOR REQUIREMENTS

### Environmental Studies

The major in Environmental Studies is an individually-designed interdisciplinary honors program. Continuation in the major (regardless of declared major at the time of admission to UVM) requires submission of an application to the Environmental Program, approval of the Director, and successful completion of Environmental Studies 151.

Students who major in Environmental Studies through the School of Natural Resources earn a Bachelor of Science degree. For additional information about the Environmental Program, see page 41.

**Environmental Studies Major** Environmental Studies – Natural Resources majors must fulfill the following requirements for graduation:

1. Completion of the SNR core curriculum
2. Completion of the SNR distribution requirements.
3. Completion of the Environmental Studies major courses:
  - Env. Studies 1, Intro. to Environmental Studies
  - Env. Studies 2, International Environmental Studies
  - Env. Studies 100, Environmental Theory
  - Env. Studies 151, Intermediate Environmental Studies\*
  - Env. Studies 201, Research Methods
  - Individually-Designed Program (24 credit hours of intermediate or advanced environmentally-related courses)
  - Env. Studies 202, Senior Project and Thesis (Research or action project planned in ENVS 201. Credit arranged in consultation with thesis advisors, six–15 credits.)
  - Env. Studies 204, Seminar in Environmental Studies
4. Completion of a minimum of 120 semester hours of courses, including two credits of physical education activities.

\*Requires application to Director for evaluation of qualifications to continue as a major in Environmental Studies. If not approved, the student must seek another major.

**Environmental Studies Minor** The minor in Environmental Studies requires completion of 17 semester hours:

- Env. Studies 1, Introduction to Environmental Studies
- Env. Studies 2, International Environmental Studies
- Env. Studies 100, Environmental Theory
- Env. Studies 204, Seminar in Environmental Studies

An additional course in Environmental Studies (ENVS) numbered above 100 (except ENVS 191).

### Forestry

The Forestry Program provides a challenging and personalized education that leads to a Bachelor of Science degree and is designed for students interested in the study, wise use, and protection of forested landscapes. This curriculum is excellent preparation for a variety of forestry professional and related careers. Graduates may work in government agencies, municipalities, and private enterprises. To enhance their professional employability, students are encouraged to avail themselves of readily available forestry internship and summer employment opportunities.

Program objectives are: (1) to provide a stimulating and sound basic education in natural resources that prepares individuals to contribute in a diverse global society; (2) to allow specialization in the areas of forest biology, forest management, or urban forestry; and (3) to provide a general forestry education for students enrolled in other curricula and for the community at large. To meet these objectives, the Forestry Program offers three academic options and a minor and participates in an accelerated master's program. The three options are: *Forest Biology*, *Forest Resources Management*, and *Urban Forestry and Landscape Horticulture*.

**Forestry Major** All students who enroll in the Forestry curriculum must fulfill the following requirements for graduation:

1. Completion of the SNR core curriculum
  2. Completion of the SNR distribution requirements.
- Specific selections are stipulated in two areas:

Science — Chemistry 23, Chemistry

Quantitative — Two courses:

Math. 19, Calculus, or higher-level math course (Math. 10 is permissible for Urban Forestry and Landscape Horticulture)

Nat. Res. 140, Natural Resources Biostatistics

3. Completion of Forestry professional core courses.

Computer Sci. 2 or Comm. Dev. and App. Econ. 85, Microcomputer Applications, or Computer Sci. 3, Concepts of Computer Systems, or Computer Sci. 11, Computer Programming

Nat. Res. 25, Nat. Res. Measurements and

Mapping

Forestry 21, Dendrology (Forestry 3 is permissible for Urban Forestry and Landscape Horticulture)

Nat. Res. 102, Water as a Natural Resource

Forestry 121, Forest Ecology Laboratory

4. Completion of option requirements in **Forest Biology**, **Forest Resource Management**, or **Urban Forestry and Landscape Horticulture**.

5. Completion of minimum number of semester hours of courses, including two credits of physical education activities, required for the degree:

Forest Biology — 126 hours

Forest Resource Management — 126 hours

Urban Forestry and Landscape Horticulture — 122 hours

The **Forest Biology** option provides a basic understanding of the structure, function, and dynamics of forest ecosystems and an appreciation for the possible impacts of environmental pollutants on long-term forest health. Based on a strong foundation in the biological sciences coupled with curricular flexibility, the Forest Biology option permits students to concentrate advanced course work in specialized areas such as environmental biology, forest and wildlife ecology, or molecular biology. Students may earn academic credit or receive payment for research in modern laboratories equipped for sophisticated studies of forest genetics, pathology, tree physiology, and water quality. They may also conduct field research on the ecology of plants and animals in nearby forests and wetlands. In addition to natural resources careers, graduates may choose occupations such as secondary school educators in biological and natural sciences, or continue their education to the master's or doctoral level.

**Forest Biology** course requirements:

Geology 1, Intro. Geology

Chemistry 26, Organic and Biochemistry, or Chemistry 42, Organic Chemistry

Biology 1 and 2, Princ. of Biology\*

Forestry 122, Forest Ecosystem Analysis

Physics 11 and 21, Elementary Physics

Forestry 225, Tree Structure and Function

Forestry 123, Silviculture

\*Also fulfills distribution requirement.

A minimum of 15 additional credit hours in plant and animal biology, selected from approved list:

Forestry 124, 126, 132, 133, 134, 205, 221, 228, 229, 231; Nat. Res. 260; Wildlife and Fish Biol. 130, 131, 176, 273, 275; Ag. Biochem. 201, 202, 210, 220, 221, 230, 250; Biology 101, 102, 103, 202, 203, 270; Botany 108, 109, 132, 152, 205, 213, 241, 256, 257; Microbiol. and Molecular Genetics 220; Plant and Soil Sci. 107; Biology 202, 270; others with approval of Program Chair.

The **Forest Resource Management** option, accredited by the Society of American Foresters, emphasizes the application of basic ecological, economic, and management principles

in the conservation, stewardship, and wise use of forest resources. Curricular flexibility within this option allows students to concentrate on various aspects of the long-term planning and sustainable management of publicly and privately owned forested ecosystems. There is extensive field instruction on University-owned forest land near the campus, the Green Mountain National Forest, and other public as well as private forests throughout Vermont. Graduates may be employed as state or federal foresters, consultants to private forest landowners, industrial foresters, or in related careers; others may seek graduate degrees in forestry, public administration, natural resources planning, or business.

**Forest Resource Management** course requirements:

Geology 1, Intro. Geology

Biology 1 and 2, Princ. of Biology\*

Economics 11, Princ. of Economics\*

Comm. Dev. and App. Econ. 61, Princ. of Ag. and Res.

Economics, or Economics 12, Princ. of Economics

Forestry 122, Forest Ecosystem Analysis

Forestry 123, Silviculture

Forestry 153, Forest Finance

Forestry 146, Remote Sensing of Forest Resources

Forestry 272, Forest Management

A minimum of 15 credit hours in restricted electives:

One course in forest protection (Forestry 133, 134, 231; Plant and Soil Sci. 107);

One course in forest utilization (Forestry 162 or 163);

One course in business management (Bus. Admin. 17, 60, 120, 150, 166, 167, 168; Comm. Dev. and App. Econ. 166, 167, 168);

One course in economic and policy science (Comm. Dev. and App. Econ. 162; Economics 101, 102, 116; Env. Studies 293; Forestry 155, 157, 254; Nat. Res. 235, 275; Poli. Sci. 141, 161; Resource Ec. 121, 222);

One additional Forestry course at the 100-level or higher, minimum of two credits.

\*Also fulfills distribution requirement.

The **Urban Forestry and Landscape Horticulture** option integrates landscape design, plant sciences, business, and liberal arts to produce professionals qualified to design for and manage plants in the urban environment. The program is administered jointly by the School of Natural Resources and the College of Agriculture and Life Sciences. Students are encouraged to participate in internships that provide valuable work experience and professional contacts. Graduates have excellent career opportunities as landscape designers, landscape contractors, nursery managers, arborists, garden center managers, nursery plant sales personnel, park superintendents, public grounds supervisors, city foresters, or city horticulturists. This option is excellent for students wishing to pursue graduate education in landscape architecture.

**Urban Forestry and Landscape Horticulture** course requirements:

Plant and Soil Sci. 7, Intro. to Urban Forestry and Landscape Hort.

Botany 4, Intro. to Botany\*

Plant and Soil Sci. 161, Intro. to Soil Science

Plant and Soil Sci. 162, Soil Fertility and Management

Botany 104, Plant Physiology, or Forestry 225, Tree Structure and Function

Forestry 133, Forest Entomology (PSS 107)

Plant and Soil Sci. 145, Turfgrasses

Plant and Soil Sci. 131 and 132, Landscape Design

Plant and Soil Sci. 125, Woody Landscape Plants

Forestry 134, Forest Pathology

Forestry 176, Urban Forestry

Comm. Dev. and App. Econ. 166, Small Business Management, *or* Bus. Admin. 120, Princ. of Management

\*Also fulfills distribution requirement.

**Forestry Minor** This program is designed to provide a basic understanding of forest biology and forest resources for students not majoring in Forestry. Applications are available from the Forestry Program office and must be filed no later than June 1 of the year preceding the student's graduation. A minimum of 18 credit hours is required.

Required courses:

Forestry 3, North American Trees, *or* Forestry 21, Dendrology

Forestry 121, Forest Ecology Laboratory

Forestry 73, Small Woodlot Management, *or* Forestry 123, Silviculture

Additional Forestry courses to total 18 credit hours (credit not given for both Forestry 73 and 123).

**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 of Public Administration degree in a total of five years, rather than the traditional six-year minimum. This opportunity will enhance the competitiveness of students interested in future forestry employment in the public sector. To be considered for this competitive program, a Forestry junior must have an expressed commitment to public/not-for-profit service, a 3.0 overall grade-point average, and a 3.25 average in Forestry, have taken Political Science 21, and have taken the Graduate Record Examination. If accepted to the program, the student takes three MPA courses in the senior year. During the summer prior to the fifth year, the student completes an approved three-credit public forestry internship. The fifth year is spent taking 24 credits of MPA course work. Upon successful completion of a comprehensive exam, the Master of Public Administration is awarded. A grade of B or better is expected for all MPA course work. This opportunity is best suited for Forestry majors in the Forest Resources Management or Urban Forestry and Landscape Horticulture options. Further information is available from the offices of the Forestry Program and the MPA Program.

## Natural Resources

The Natural Resources curriculum provides a strong basic education that draws from the traditional disciplines. It provides a contemporary, holistic framework that complements traditional natural resources curricula. Students may concentrate studies in *Aquatic Resources*, *Terrestrial Ecology*, or *Integrated Natural Resources*.

**Natural Resources Major** All students who enroll in the Natural Resources curriculum must fulfill the following requirements for graduation:

1. Completion of the SNR core curriculum
2. Completion of the SNR distribution requirements.
3. Completion of option requirements for *Aquatic Resources*, *Terrestrial Ecology*, or *Integrated Natural Resources*.

*Note:* Courses used to fulfill option requirements also count toward fulfilling distribution.

4. Completion of a minimum of 122 semester hours of courses, including two credits of physical education activities.

**Aquatic Resources** This option provides a strong fundamental education in the basic sciences with an emphasis on water. With careful selection of option electives, the student can develop expertise in areas such as watershed management, lake studies, or water pollution.

**Aquatic Resources** option requirements (41 credits):

Biology 1 and 2, Principles of Biology\*

Chemistry 23, General Chemistry\* *or* Chemistry 31 and 32  
Chemistry 26, Organic and Biochemistry, *or* Chemistry 42,  
Intro. Organic Chemistry, *or* Chemistry 141 and 142

Geology 1, Intro. Geology, *or* Plant and Soil Sci. 161, Intro. Soil Sci.

Math. 19 and 20, Calculus I, II\*

Nat. Res. 25, Nat. Res. Measurements and Mapping

Nat. Res. 102, Water as a Nat. Res.

Nat. Res. 140, Nat. Res. Biostatistics\*

Physics 11, Elem. Physics

\*Also fulfills distribution requirement.

**Option electives (24 credits):** In consultation with an academic advisor, student chooses a minimum of 24 additional credits from an approved list of courses available in the Dean's Office. 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.

**Terrestrial Ecology** This option offers natural resources education with a focus on ecology. Emphasis is placed on the biology and ecology of both plants and animals. Students can concentrate their studies on areas such as ecosystem analysis, environmental quality, or evolutionary biology.

**Terrestrial Ecology** option requirements (30 credits):

Biology 1 and 2, Principles of Biology\*

Chemistry 23, General Chemistry\* *or* Chemistry 31 and 32  
Chemistry 26, Organic and Biochemistry, *or* Chemistry 42,  
Intro. Organic Chemistry, *or* Chemistry 141 and 142

Geology 1, Intro. Geology, *or* Plant and Soil Sci. 161, Intro. Soil Science

Math. 19, Calculus I\*

Nat. Res. 25, Nat. Res. Measurements and Mapping

Nat. Res. 140, Nat. Res. Biostatistics\*

Physics 11, Elem. Physics

\*Also fulfills distribution requirement.

**Option electives (24 credits):** In consultation with an academic advisor, student chooses a minimum of 24 additional credits from an approved list of courses available in the Dean's Office. 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. The Integrated Natural Resources option 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. Most students in INR pursue social/environmental issues such as conservation, resource planning, or environmental education. Students who want a more scientific emphasis should select instead one of the three organism-specific options (Forest Biology, Fisheries Biology, Wildlife Biology) or one of the system options (Terrestrial Ecology or Aquatic Resources).

**Integrated Natural Resources** option requirements (minimum of nine credits):

Students elect at least one course in each of three areas from a list of approved courses. The areas are: (1) biology/ecology; (2) natural resources social sciences and communication; (3) quantitative and analytical methods. These courses are *in addition* to those taken to fulfill distribution requirements.

**Individualized Program of Study (minimum of 30 credits):**

The student develops an individualized program of study that establishes objectives and defines 30 credits of

course selection for the last four semesters. Courses must be consistent with objectives established in the program of study, be at the level of 100 above, and have an ENVS, FOR, NR, RM, RSEC, or WFB prefix. With careful selection of courses, students have developed such concentrations 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.

**Water Resources Minor** The minor in Water Resources is offered to students wishing to obtain an understanding of the physical, chemical, and biological aspects of aquatic systems.

Interested students should obtain an application from the Dean's Office in the School of Natural Resources. Those wishing further information should contact Professor McIntosh. Minimum requirements include completion of Nat. Res. 102 and at least 12 additional credits from the following list; at least one laboratory course (Civil Engr. 154, Nat. Res. 251 or Wildlife and Fish. Biol. 272) must be included.

Civil Engr. 154, Environmental Analysis  
 Nat. Res. 236, Geochemistry  
 Nat. Res. 250, Limnology  
 Nat. Res. 251, Limnology Laboratory  
 Nat. Res. 255, Field Methods in Water Resources  
 Nat. Res. 260, Wetlands Ecology and Management  
 Nat. Res. 270, Toxic and Hazardous Substances in Surface Waters  
 Nat. Res. 278, Principles of Aquatic Systems  
 Nat. Res. 280, Stream Ecology  
 Wildlife and Fish. Biol. 272, Wetlands Ecology and Marsh Management Lab.  
 Wildlife and Fish. Biol. 279, Marine Ecology

## Recreation Management

The Recreation Management Program prepares students for professional careers in the management of outdoor recreation resources. By the completion of the sophomore year, students elect to concentrate in one of two options: **Public Outdoor Recreation** or **Private Outdoor Recreation and Tourism**. Public recreation resources includes parks, forests, wilderness areas, and other outdoor recreation environments at the local, regional, state, and federal governmental levels. Private resources include ski areas, campgrounds, resorts, and other natural resource-based recreation facilities.

**Public Outdoor Recreation** The Recreation Management Program's option in public land management prepares the student for a professional career in the planning and management of natural resources for outdoor recreation use. It combines course work from natural resource disciplines with social sciences, communications, and public administration and management.

**Private Outdoor Recreation and Tourism** This option is designed to prepare students for careers in natural resource-based private outdoor recreation and tourism enterprises. The program permits specialization in several

types of private recreation businesses, including ski resorts. Course work is concentrated in natural resource management and business administration.

**Recreation Management Major** All students who enroll in the Recreation Management curriculum must fulfill the following requirements for graduation:

1. Completion of the SNR core curriculum.
2. Completion of the SNR distribution requirements.
3. Completion of the Recreation Management Program core courses:  
     Introduction to Recreation Management (two credits)  
     Rec. Mgmt. 181, Junior Recreation Seminar  
     Rec. Mgmt. 282, Senior Recreation Seminar  
     Rec. Mgmt. 191, Practicum (three credits)
4. Completion of requirements for either the **Public Outdoor Recreation** or **Private Outdoor Recreation and Tourism** option (see below).
5. Completion of a minimum of 126 semester hours of courses, including two credits of physical education activities.

**Public Outdoor Recreation** option requirements:

1. Completion of Public Outdoor Recreation core courses:  
     Rec. Mgmt. 138, Park and Recreation Design  
     Rec. Mgmt. 153, Recreation Administration and Operation  
     Rec. Mgmt. 235, Outdoor Recreation Planning  
     Rec. Mgmt. 240, Park and Wilderness Management  
     Rec. Mgmt. 255, Environmental Interpretation
2. Completion of three of the Private Outdoor Recreation and Tourism core courses (listed below).
3. Completion of nine credits of professional electives.

**Private Outdoor Recreation and Tourism** option requirements:

1. Completion of Private Outdoor Recreation and Tourism core courses:  
     Rec. Mgmt. 50, Tourism Planning  
     Rec. Mgmt. 157, Ski Area Management  
     Rec. Mgmt. 158, Resort Marketing and Management  
     Rec. Mgmt. 230, Ecotourism  
     Rec. Mgmt. 258, Entrepreneurship in Recreation and Tourism
2. Completion of three of the Public Outdoor Recreation core courses (listed above).
3. Completion of nine credits of professional electives.

**Recreation Management Minor** The minor in Recreation Management 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. Space in the minor is limited so acceptance will be on a competitive, space-available basis. A minimum of 15 semester hours of course work is required.

A minimum of nine semester hours are to be selected from the following:

Rec. Mgmt. 1, Introduction to Recreation Management  
 Rec. Mgmt. 50, Tourism Planning  
 Rec. Mgmt. 138, Park and Recreation Design  
 Rec. Mgmt. 153, Recreation Administration and Operations  
 Rec. Mgmt. 157, Ski Area Management  
 Rec. Mgmt. 158, Resort Marketing and Management  
 Rec. Mgmt. 181, Junior Recreation Seminar

A minimum of six semester hours are to be selected from the following:

Rec. Mgmt. 230, Ecotourism  
 Rec. Mgmt. 235, Outdoor Recreation Planning  
 Rec. Mgmt. 240, Park and Wilderness Management  
 Rec. Mgmt. 255, Environmental Interpretation  
 Rec. Mgmt. 258, Entrepreneurship in Recreation and Tourism  
 Rec. Mgmt. 282, Senior Recreation Seminar

## Resource Economics

This program deals with the application of economic theory to natural resources allocation problems. It prepares an individual to effectively use economics and conservation in achieving an efficient and equitable use of natural resources. Graduates will be prepared for positions in natural resources management and administration.

**Resource Economics Major** All students who enroll in the Resource Economics curriculum must fulfill the following requirements for graduation:

1. Completion of the SNR core curriculum
2. Completion of the SNR distribution requirements.  
Specific selections are stipulated in two areas:  
Quantitative — Math. 19 or 21, Calculus I  
Science — Geology 1, Intro. Geology
3. Completion of Resource Economics professional courses:  
Comp. Sci. 2 *or* Comm. Dev. and App. Econ. 85,  
Microcomputer Applications, *or* Comp. Sci. 3,  
Concepts of Computer Systems, *or* Comp. Sci. 11,  
Computer Programming  
Math. 20 or 22, Calculus II  
Economics 11, Princ. of Economics\*  
Comm. Dev. and App. Econ. 61, Princ. of Ag. and  
Res. Economics, *or* Economics 12, Princ. of  
Economics  
Nat. Res. 102, Water as a Natural Resource  
Res. Ec. 121, Resource Economics  
Economics 101, Macroeconomic Theory  
Economics 102, Microeconomic Theory  
Nat. Res. 143, Geographic Information Systems  
Res. Ec. 152, Forest Resources Values  
Forestry 153, Forest Finance  
Forestry 155, Forest Taxation  
Res. Ec. 222, Natural Resources Evaluation  
Economics 265, Urban and Regional Economics, *or*  
Economics 268, Economics of Energy  
Poli. Sci. 128, Issues in Public Policy, *or* Nat. Res. 254,  
Advanced Natural Resource Policy  
Env. Studies 293, Environmental Law  
Civil Engr. 125, Engineering Economy  
\*Also fulfills distribution requirement.
4. Completion of a minimum of 124 semester hours of courses, including two credits of physical education activities.

**Resource Economics Minor** The minor in Resource Economics is designed to provide students with a basic understanding of the role of economics in the allocation and use of natural resources. This minor is appropriate for anyone concerned with natural resources, especially those pursuing careers in fields that manage natural resources or use resources in their production processes. Applications for the minor in Resource Economics are available from the Resource Economics program office and must be filed by June 1 of the year preceding graduation. Space in the minor is limited so acceptance will be on a competitive, space-available basis. Students must successfully complete a minimum of 15 semester hours in required and elective courses. Prerequisites for selected courses must be met.

### Required Courses:

Res. Ec. 121, Resource Economics  
Env. Studies 289, Environmental Economics, *or* Res. Ec. 222 Natural Resources Evaluation

### Elective Courses:

Env. Studies 290; Nat. Res. 143, 235; Civil Engr. 125; Wildlife and Fish. Biol. 174; Geography 3; Comm. Dev. and App. Econ. 61, 162, 180, 264; Economics 102. Spe-

cial elective (students may select a course, with the approval of the advisor, that meets special interest needs).

## Wildlife and Fisheries Biology

This program prepares individuals for careers requiring expertise in wildlife and fisheries biology and ecology. Required courses satisfy educational requirements of the U.S. Office of Personnel Management for entry-level positions in wildlife biology and fisheries biology. Courses can be elected to meet the educational requirements for certification by The Wildlife Society and the American Fisheries Society. All majors in Wildlife and Fisheries Biology complete the same core of courses during the first year. As sophomores, students elect either the *Wildlife Biology* or *Fisheries Biology* option.

Graduates may find employment in a variety of federal, state, or private natural resource agencies or organizations, or they may choose to pursue graduate study in wildlife or fisheries science. The broad education in science and natural resources that forms the basis for the Wildlife and Fisheries Biology major also provides an appropriate background for many other career opportunities.

**Wildlife and Fisheries Biology Major** All students who enroll in the Wildlife and Fisheries Biology curriculum must fulfill the following requirements for graduation:

1. Completion of the SNR core curriculum
2. Completion of the SNR distribution requirements.  
Specific selections are stipulated in the quantitative area:  
Math. 19 or 21, Calculus I  
Nat. Res. 140, Natural Resources Biostatistics
3. Completion of a minimum of 122 semester hours of courses, including two credits of physical education activities.
4. Completion of the Wildlife and Fisheries Biology professional core courses:  
Biology 1 and 2, Principles of Biology\*  
Chemistry 23, General Chemistry\*  
Chemistry 26 or 42, Organic Chemistry  
Biology 101, Genetics, *or* Biology 103, Cell Structure and Function  
Nat. Res. 25, Nat. Res. Measurements and Mapping  
Forestry 121, Forest Ecology Laboratory  
Geology 1, Intro. Geology, *or* PSS 161, Intro. Soil Science  
Wildlife and Fish. Biol. 174, Princ. of Wildlife Management  
Wildlife and Fish. Biol. 161, Fisheries Biology  
\*Also fulfills distribution requirement.
5. Completion of option requirements in either **Wildlife Biology** or **Fisheries Biology**.

### Wildlife Biology option courses:

Forestry 21, Dendrology  
Wildlife and Fish. Biol. 130, Ornithology  
Wildlife and Fish. Biol. 131, Field Ornithology  
Botany 109, Plant Taxonomy  
Biology 217, Mammalogy

### Three courses selected from:

Nat. Res. 260/Wildlife and Fish. Biol. 272,  
Wetlands Ecology; *or* Wildlife and Fish. Biol. 271, Wetlands Wildlife/Wildlife and Fish. Biol. 272  
Wildlife and Fish. Biol. 273/274, Terrestrial Wildlife  
Wildlife and Fish. Biol. 275, Wildlife Behavior  
Wildlife and Fish. Biol. 279, Marine Ecology

### Fisheries Biology option courses:

Physics 11/21 and 12/22, Elementary Physics

Wildlife and Fish. Biol. 232, Ichthyology  
 Nat. Res. 260/Wildlife and Fish. Biol. 272, Wetlands  
 Ecology  
 Nat. Res. 250/251, Limnology  
 Nat. Res. 270, Toxic and Haz. Substances in Surface  
 Waters, *or* Wildlife and Fish. Biol. 279, Marine  
 Ecology  
 Nat. Res. 278, Princ. of Aquatic Systems  
 Six additional hours selected from Nat. Res. 260,  
 270; Wildlife and Fish. Biol. 271; Botany 234.

**Wildlife Biology Minor** The minor in Wildlife Biology requires a planned course of study that will provide a basic understanding of wildlife resources and wildlife management. Applications for the minor must be filed no later than June 1 of the year preceding graduation or completion of the requirements for the minor. A minimum of 15 hours of credit is required in prescribed and elective courses.

#### Required Courses:

Wildlife and Fish. Biol. 130, Ornithology  
 Wildlife and Fish. Biol. 174, Principles of Wildlife  
 Management  
 Wildlife and Fish. Biol. 271, Wetlands Wildlife  
 Wildlife and Fish. Biol. 273, Terrestrial Wildlife

#### Elective Courses:

Wildlife and Fish. Biol. 131, 150, 176, 185/186, 187/188,  
 272, 273, 274, 275, 279, 281/282; Nat. Res. 224.

### Undecided - Natural Resources

High school seniors and transfer students who are not ready to commit to a specific major in the School are admitted as "Undecided-NR" majors and may remain in this category for up to two years. These students and their advisors develop a curriculum which enables them to explore several fields of natural resources before committing to a specific major.





# 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 41) 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. M. Mzamane, Director*

See International Studies for special topics course listings.

## Agricultural and Resource Economics (AREC)

See Community Development and Applied Economics.

## Agricultural Biochemistry (AGBI)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

*Professor Barrington (Interim Chairperson), Weller; Associate Professor Currier; Research Associate Professor Kent.*

**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.

**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, sugars, and enzymes in biological materials. *Prerequisite:* Credit for or concurrent enrollment in 201. One hour.

**210 Quantitative Biochemistry (3)** Study of the physical principles of biochemistry, methods and theory, with strong emphasis on problem solving and data analysis. Three hours. *Prerequisite:* 201. Not offered 1995-96.

**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 and SDS-gel electrophoresis and gel isoelectric focusing. DNA separation and characterization by agarose gel electrophoresis and restriction enzyme digestion. *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 absorption, ion exchange, affinity, and partition chromatography. Introduction to modern GLC and HPLC techniques 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, 1995-96.

**295 Special Topics** *Prerequisite:* Instructor's permission.

## 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 Agriculture and Life Sciences. One hour.

**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.

**195,196 Special Topics** Appropriate for interdepartmental and interdisciplinary topics in Agriculture and Life Sciences. Permission of Dean's Office. Credit as arranged.

## 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 or instructor's permission. Three hours. Huot. Alternate years, fall semester.

## Anatomy and Neurobiology (ANPS; ANNB)

### COLLEGE OF MEDICINE

*Professors Parsons (Chairperson), Wells, Young (Emeritus); Associate Professors Cornbrooks, Fiekers, Forehand, Freedman, Mawe, May, Powers; 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 dissections, histological material, and

physiological experiments. Required of all Medical Technology, Nursing, Nutritional Sciences, Dental Hygiene, Radiologic Technology, and Physical Education; 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 Gross 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. Wells.

## Animal and Food Sciences (ASCI)

### COLLEGE OF AGRICULTURE AND LIFE SCIENCES

*Professors Bramley (Chairperson), Carew, C. Donnelly, Foss, Welch; Associate Professors Gilmore, Kindstedt, Nichols; Assistant Professors Chen, Plaut, Politis; Lecturers Davis, Rogers; Extension Professor Gibson; Extension Assistant Professor Bartel; Research Professor Pankey; Adjunct Professors Hsieh, Sniffen, Thomas; Adjunct Assistant Professors S. Donnelly, Levine, Stewart-Ballard, Sturges, Tuerk.*

**1 Introductory Animal and Food Science (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, Carew.

**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. Foss.

**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.

**104 Sensory Evaluation of Dairy 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:* Statistics 211. Three hours. Chen. Alternate years, 1995-96.

**106 Processing Frozen and Fluid Dairy Foods (2-3)** Fundamentals of ice cream manufacture: raw materials selection, handling, and processing. Ice cream mix formulation, freezing, and freezing equipment. *Prerequisite:* A course in organic chemistry. Three hours. Kindstedt. Alternate years, 1995-96.

**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. Welch.

**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. Welch.

**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 Production 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.

**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, 142 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*: For 141: Biology 2, a chemistry course or instructor permission; for 142: 141. Four hours. Politis.

**151, 152 Animal Biology (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. No laboratory. *Prerequisites*: For 151: Biology 2, a chemistry course or instructor permission; for 152: 151. Three hours. Politis.

**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, 1995-96.

**163 Clinical Veterinary Medicine (2)** Introduction to

clinical diagnostic and analytical skills in veterinary medicine based upon case studies in companion animals. *Prerequisite*: 141 or Biology 2; junior standing. Two 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.

**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, Agricultural Biochemistry 201, or permission. Four hours. Kindstedt. Alternate years, 1996-97.

**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*: Microbiology 65, 66; 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 Microbiology 65, 66. 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 radiation heat transfer; refrigeration, freezing, psychrometrics; and drying. *Prerequisites*: 104 or 106; Physics 11 or 31; calculus required (Math. 19) or instructor's permission. Four hours. Chen. Alternate years, 1996-1997.

**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 2, 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, 1995-96.

**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. Concurrent enrollment in 217 required. Three hours. Plaut. Alternate years, 1996-97.

**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. (Graduate credit pending.)

**281 Animal Sciences Senior Seminar** Reports and discussions of problems and special investigations in selected fields. One hour. Bramley.

**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 Problems in Animal and Food Science** Research and field experience activity under direction of faculty member whose approval has been given. Written proposal and report required. *Prerequisite:* Departmental chairperson permission. May enroll more than once for maximum of 15 hours.

## Anthropology (ANTH)

### COLLEGE OF ARTS AND SCIENCES

*Professors Gordon, Haviland, Mitchell; Associate Professors Gordon, Lewin (Chairperson), Pastner, Power, Woolfson; Assistant Professor Mahler; 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. Power.

**26 Physical Anthropology** Introduction to the study of the evolution and racial differentiation of humanity. Three hours. Haviland.

**60 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 culture history. Three hours. Haviland, Power. Alternate years.

**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. Haviland. Alternate years.

**162 Cultures of Africa** Ethnographic survey of represen-

tative 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. Mitchell. 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.

**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.

**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.

**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 or Linguistics 101. Three hours. Woolfson. Alternate years.

**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. Mitchell. Alternate years.

**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. Power. 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. Gordon. 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. Power. 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.

**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. Power. 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, Mitchell.

**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, Mitchell.

**250 Museum Anthropology** The cultural context of selected archaeological and ethnographic collections at Fleming Museum; cataloguing, conservation, research, and interpretation of objects; exhibition design and ethical issues. *Prerequisites:* Junior standing; Anthropology, Art History, Studio Art majors and minors. Three hours. Power, Porter (Museum Director). Alternate years.

**283 Culture Change** Study of sociocultural transformations in non-Western countries emphasizing industrialization, urbanization, and modernization and their impact on the lives of previously traditional peoples. *Prerequisites:* 21, one 100-level course, or 21, six hours in the social sciences. Three hours. Gordon. Alternate years.

**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 methodol-

ogy with practical experience in participant observation, interviewing, the genealogical method, and the recording of data. *Prerequisite:* Twelve hours of anthropology. Three hours. Mitchell. 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. *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 66 and contact Department for specific requirements. Three hours each.

## Art (ART)

### COLLEGE OF ARTS AND SCIENCES

*Professors Davison, Lipke, Owre, Zucker; Associate Professors Fengler-Stephany, Higgins, Lyman, McIntyre, Mierse (Chairperson), Seyller; Assistant Professors Brennan, Carter, Owen, Rubin, 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, Rubin.

**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.

**135 Intermediate Filmmaking** Techniques and theories of film production. Students edit a sound track, participate in a class-produced synchronous sound project, and individually produce a film/sound project. *Prerequisites:* 4 and either 1, 2, or 3, or instructor's permission. Three hours. Lyman.

**136 Intermediate Video** Techniques and theories of video production, including a live action studio production, a reflexive feedback production, and an edited location production. *Prerequisites:* 4 and either 1, 2, or 3, or instructor's permission. Three hours. Lyman.

**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.

**140 History of the 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. Fulfills the Art History requirement for Studio Art majors. *Prerequisites:* 2 or 6 or instructor's permission. 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.

**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. Rubin.

**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 66 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** (See Studio Art.)

**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.

**150 Christian Iconography** Introduction to subject matter and symbolism of Christian Art. Emphasis on major episodes from lives of Mary, of Christ, and of saints most frequently depicted in art. Examples drawn from Early Christian through Baroque periods. *Prerequisite:* 5. Three hours. Fengler-Stephany. Alternate years, 1995-96.

**153 Medieval Art to the Year 1000** Painting, sculpture, and architecture from the Early Christian through the Ottonian periods, emphasizing Byzantine and Carolingian art. *Prerequisite:* 5. Three hours. Mierse. Alternate years, 1995-96.

**154 Medieval Art from the Year 1000** Painting, sculpture, and architecture of the Byzantine, Romanesque, and Gothic periods. *Prerequisite:* 5. Three hours. Alternate years, 1996-97.

**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.

**167 Baroque Art in Southern Europe** Art of Italy, France, and Spain in the 17th century, emphasizing sculpture of Bernini, architecture of Versailles, and paintings of Caracci, Caravaggio, LaTour, Poussin, Zurbaran, and Velázquez. *Prerequisite:* 6. Three hours. Alternate years, 1996-97.

**168 Baroque Art in Northern Europe** Art of The Netherlands, Flanders, and England in 17th century, emphasizing paintings of Rembrandt, Vermeer, Rubens, and VanDyck. *Prerequisite:* 6. Three hours. Alternate years, 1995-96.

**171 Rococo and Romantic Art** European architecture, sculpture, and painting, circa 1700-1850, and the origins of the modern movement. *Prerequisite:* 6. Three hours.

**172 European Painting and Sculpture: 1848-1914** Detailed examination of shifts in European painting and sculpture from the aesthetic of the Academy to the new iconography and stylistic experiments up to WWI. *Prerequisite:* 6 or instructor's permission. Three hours. Lipke. Alternate years, 1996-97.

**173 Canadian Art and Architecture** A stylistic and thematic survey of the historical development of the visual arts in Canada from 1650 to present. *Prerequisite:* 6 or International Studies 91. Three hours. Lipke. Offered every three years, 1995-96.

**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, 1995-96.

**175 19th Century Architecture and Design** The practice and theory of building and design from early 19th to beginning of 20th century. *Prerequisite:* 6 or a course in historic preservation. Three hours.

**176 20th Century Architecture and Design** The practice and theory of building and design from the end of the 19th century to the recent past. *Prerequisites:* 6 or a course in historic preservation. Three hours.

**179 Issues in Contemporary Art** A critical inquiry into the development of postmodernism in contemporary art of all media. Emphasis varies with instructor. *Prerequisites:* Three hours of art history. Three hours. Lipke. Alternate years, 1994-95.

**181 American Painting and Sculpture** A survey of the major developments in American art between 1680 and 1914. *Prerequisites:* Three hours of art history. Three hours. Lipke. Alternate years, 1995-96.

**184 American Architecture** Building and design from the Colonial to the recent past. Local buildings of interest. *Prerequisite:* 6 or a course in historic preservation. Three hours.

**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, 1996-97.

**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, 1996-97.

**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.

**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.

**201 Architecture, Landscape, and History** (See Historic Preservation 201.) *Prerequisites:* Six hours advanced studies in art and architecture, permission. Three hours. Liebs.

**207 Seminar in American Architecture and Design** Selected topics in American art and/or architecture, individual research and reports. *Prerequisite:* By permission to advanced students in art history, architectural studies, or historic preservation. 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 66 and contact Department for specific requirements. Three hours each.

## Asian Studies

### COLLEGE OF ARTS AND SCIENCES

*Prof. Andrews, Director*

The following courses are among the course offerings; see department listings for specific descriptions. "E", "S", "W" indicates courses on East, South, and West subareas of Asia respectively. Also see International Studies for special topics listings.

Courses entirely on Asia: **Anthropology** 165 (S), 166 (W); **Art** 8 (E, S), 146 (W), 185 (E), 187 (E), 188 (S), 192 (E, S, W), 285 (E, S, W); **Chinese** 1, 2 (E), 51, 52 (E), 101, 102 (E), 201, 202 (E); **Geography** 58 (E); **History** 45 (W), 50 (E), 51 (E), 145 (W), 149 (W), 150 (E), 151 (E), 245 (W), 250 (E), 252 (E); **Japanese** 1, 2 (E), 51, 52 (E), 101, 102 (E); **Philosophy** 121 (E), 122 (E), 221 (E); **Political Science** 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, W), 163 (S), 170 (W); **Business Admin.** 127 (E, S, W); **Economics** 254 (W); **Education (EDFS)** 206 (E, S); **Geography** 1 (E, S, W); **History** 293, 294 (E, S, W); **Japanese** 1, 2 (E), 51, 52 (E), 101, 102 (E); **Music** 15 (E, S); **Philosophy** 3 (E); **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, Woodworth; Associate Professors Auletta, Hart, P. Tracy, R. Tracy; Adjunct Associate Professor Crabb; Assistant Professors Francklyn, Morrill; Research Associate Professors Church, Kalafatis, Mason, Shatos, N. Thanassi.*

**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** Disorders of hemoglobin, iron, bilirubin; biochemistry of diabetes, pancreatitis, atherosclerosis, liver and kidney dysfunction; acid-base balance; gene therapy; diagnostic enzymology. *Prerequisites:* Chemistry 42 or 141, Agricultural Biochemistry 201. Three hours. Hart.

**213 Biomedical Biochemistry Laboratory** Introduction to basic principles underlying biochemical analysis in areas of biomedical interest. *Prerequisite:* Concurrent registration in 212 or permission. One hour.

## Biological Science (BSCI)

### COLLEGE OF AGRICULTURE AND LIFE SCIENCES

**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, Happ (Chairperson), Heinrich, Schall, Van Houten; Associate Professors Davison, Goodnight, Gotelli, Kilpatrick, Landesman, Stevens; Assistant Professors Brody, Conn, Lannigan, Vigoreaux.*

**1 Principles of Biology (3-3)** Introduction to organismal biology: nature of scientific inquiry, plant form and function, reproductive biology, pollination ecology; animal phylogeny, illustrated by comparative development, physiology, and ecology. Credit not given for both Biology 1 and Botany 4. Four hours.

**2 Principles of Biology (3-3)** Introduction to cell biology, genetics, and evolution. Topics presented: biochemistry; origin of life; metabolism; molecular, Mendelian, and population genetics; and microevolution. *Prerequisites:* 1 and introductory chemistry recommended. Four hours.

**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.

**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. Lannigan, 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, 1996-97.

**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, 1995-96.

**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, 1996-97.

**267 Molecular Endocrinology** Study of hormone action at the cellular and molecular level. *Prerequisite:* 101. Four credits. Lannigan.

**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, 1995-96.

**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 66 and contact Department for specific requirements. Three hours each.

## Botany (BOT)

### COLLEGE OF AGRICULTURE AND LIFE SCIENCES

*Professors Barrington (Chairperson), Etherton, Tyree, Ullrich, Worley; Associate Professor Tierney; Assistant Professors Hoffmann, Hughes, Molofsky, Paris; Research Associate Professor Lintilhac; Research Assistant Professors Cumming, Perkins; Lecturer Daniel.*

### BIOLOGY (BIOL)

**1 Principles of Biology (3-3)** Introduction to organismal biology: nature of scientific inquiry, plant form and function, reproductive biology, pollination ecology; animal phylogeny, illustrated by comparative development, physiology, and ecology. Four hours. Barrington.

**2 Principles of Biology (3-3)** Introduction to cell biology, genetics, and evolution. Topics presented: biochemistry; origin of life; metabolism; molecular, Mendelian, and population genetics; and microevolution. *Prerequisites:* Chemistry and Biology 1 recommended. Four hours. Hoffmann, Vigoreaux.

**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. Cumming.

**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. 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.

**107 Biology of Algae and Fungi (3-3)** Structure and development as illustrated by "simpler" plant life. Principles of classification; the role of life cycles in ecology and evolution; ecological and economic significance. *Prerequisite:* 4 or Biology 1, 2. Four hours. Not offered 1995–96.

**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. 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, 1995–96.

**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.

**152 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.

**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.

**165 Introduction to Wetlands** The ecology, natural history, diversity, development, and values of wetlands. Hypothesis-testing and assessment methodologies. Predominantly field trips and projects. *Prerequisite:* Six hours science, three hours biological science preferred. Four hours. Worley. Not offered 1995–96.

**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 apprenticeships. *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. Bartlett, Etherton. Not offered, 1996–97.

**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, 1997–98.

**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 1995–96.

**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. Christmas or spring recess or end of school year. Not offered 1995–96.

**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.

**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, 1996-97.

**250 Microtechnique (1-4)** Theory and practice in preparation of biological materials for anatomical and cytological study, including histochemistry and photomicrography. *Prerequisites:* Introductory Chemistry; some knowledge of organic chemistry, anatomy, or cytology desirable. Three hours. Not offered 1995-96.

**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, 1996-97.

**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, 1995-96.

**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 1995-96.

**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. Etherton. Alternate years. 1995-96.

**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, 1997-98.

**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 66 and contact Department for specific requirements. Three hours each.

## Business Administration (BSAD)

### SCHOOL OF BUSINESS ADMINISTRATION

*Professors* Brandenburg, Grinnell, Laber, Savill, Shirland (Interim Dean); *Associate Professors* Averyl, Cats-Baril, Clark, Dempsey, Gatti, Gurdon, Hunt, Jesse, Kraushaar, McIntosh, Parke, Singula, Tashman, Thompson; *Assistant Professors* Baker, Battelle, Noordewier, Ramagopal, Wilson; *Lecturer* Woodman.

*Note:* Many business courses require that students 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. A specific exception is BSAD 40 which assumes no prior computer knowledge.

### 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.

**135 Economics of International Management** Study of the economic, political, and technological environments of international management and their influence on strategy formulation and implementation. *Prerequisites:* 120, senior standing. Three hours.

**191 Business Policy** A variety of policy questions are examined. The viewpoint is global rather than functional. Problems include make or buy, plant location, product addition, and expansion. *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** Preprofessional work experience. Written requirements include a substantive analysis of an aspect of the internship, linking it with the academic curriculum. *Prerequisites:* BSAD only; junior standing. 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.

**234 Canadian-U.S. Business Relations** A study of the Canadian-U.S. bilateral relationship as it affects international business, emphasizing trade, investment, energy, and industrial development policies. *Prerequisites:* Economics 11, 12; junior 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.

**160 Corporate Financial Reporting** A study of corporate financial accounting and reporting practices, focusing on contemporary issues and controversies. Not open to students who have completed BSAD 162. *Prerequisites:* 180. Three 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.

**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.

**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.

**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.

**227 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.

## 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 both 40 and Computer Science 2. 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, junior standing. Three hours.

**142 Structured Business Programming — COBOL** Fundamental principles of business computer programming. Topics include: the constructs of structured programming, topdown and modular development, sequential and nonse-

quential access techniques, other features of the COBOL language. Programming exercises include data editing, reporting, file updating. An on-line program development mode 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 Marketing Channels** The analysis of distribution channels as economic and behavioral systems. Topics include organizational patterns, power and conflict, transportation, inventory control, site location, and customer service. *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:* 151 (corequisite of 151 when 153 and 151 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, not including 151. 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.

## 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.

**172 Managerial Economics** Application of economic, mathematical, and statistical models to managerial decision making. Software support from PC spreadsheet programs. *Prerequisites:* 61 or 65, Math. 20 or 21, Statistics 141. Three hours. Not offered 1994-95.

**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. W. Metcalfe, Director*

The following courses are among the course offerings; see department for specific description. Also see International Studies for special topics listings.

**Anthropology** 128, 167, 178; **Art** 173, 282 (when taught by Lipke); **Business Administration** 134; **English** 157, 158;

**French** 285, 293; **Geography** 52, 210; **Geology** 272 (when field course goes to Canada), 273; **History** 65, 66, 165, 265; **International Studies** 91, 197, 198, 295, 296; **Political Science** 71, 173, 273; **Sociology** 31, 96, 132.

## Chemistry (CHEM)

### COLLEGE OF ARTS AND SCIENCES

Professors Allen, Bushweller (Chairperson), Flanagan, Geiger, Jewett, Krapcho, Kuehne, Strauss, White; Associate Professors Goldberg, Leenstra, Wellin; Assistant Professors Ahmed, Rosenthal; Lecturer Lewis.

*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 with 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 kinetic 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. Sentell.

**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, Rosenthal.

**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, Rosenthal.

**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, Strauss, White.

**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, Strauss, White.

**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, White. 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 current 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. Welton. 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. Welton. 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 66 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, Oppenlander, Pinder; Associate Professors Dougherty, Downer, Olson (Chairperson); Assistant Professor Hayden.*

**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.

**2 Civil Engineering Graphic Design (2-3)** Computer-aided and hand generation of: geometric shapes; dimensioning; pipe drafting; foundations and structures; survey plots; graphs and charts; topography; and highway geometry. Three hours.

**10 Surveying (3-4)** Fundamental surveying methods; propagation of errors as applied to surveying measurements; triangulation; control surveys; and traverse adjustments. *Prerequisites:* Math. 21, Computer Science 11. Four hours.

**11 Geomtronics (2-4)** Selected items in analytical photogrammetry; celestial observations, elements of photointerpretation; theory of curves; and digital terrain analysis. *Prerequisites:* 10 or 12, Math. 22. Three hours.

**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. Oppenlander.

**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. Olson, Oppenlander.

**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.

**180 Soil Mechanics (3-3)** (Same as Geology 180.) 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 Substructure Analysis and 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 (Chairperson), Schlunk; Associate Professor B. Saylor Rodgers; 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. R. Rodgers.

**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. 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. 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. 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. B. Rodgers. 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 Bacchylades. *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 66 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 5 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. Schlunk.

**5 Basic Latin Grammar Review** A complete survey of Latin grammar for students with one or two years of secondary school Latin. No credit with Latin 2. Three hours. B. Rodgers.

**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. 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. 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. 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. 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.H. 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. Rodgers. Alternate years, as needed.

**256 Satire** Selections from Horace, Persius, Juvenal, Petronius. Study of the development of this literary form. Three hours. R.H. Rodgers. Alternate years, as needed.

**271 Silver Latin** Extensive reading of post-Augustan authors not included in other advanced courses. Three hours. R.H. 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 66 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.*

**22 Etymology** Derivation of English words from Greek and Latin bases. Training in analysis of unfamiliar words, special attention to scientific vocabulary. Three hours.

**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.

**35 The End of the Roman Republic** Participants describe the Republics 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. 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.

**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:* History 21 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.H. 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. 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 History 22 or 122. Three hours. B. 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**

**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; History 21 (Classical Greek Civilization), 22 (Classical Roman Civilization), 121 (Greek History), 122 (Roman History), and 149 (Archaeology and History/Ancient Near East).

For The Teaching of Latin, see Secondary Education 179.

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 66 and contact Department for specific requirements. Three hours each.

## Communication Sciences (CMSI)

### COLLEGE OF ARTS AND SCIENCES

*Professors* Guitar, Lubker; *Associate Professor* McCauley (Chairperson); *Assistant Professors* Kahn, Needleman, Roberts; *Lecturer* Winslow.

**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.

**80 Introduction to Communication Sciences** Introduction to human communication, including the biological, cognitive, social, and cultural bases of language and speech. Emphasis on critical thinking and writing. Three hours. Lubker.

**90 (S) Phonetics** Linguistics, acoustics, 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.

**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. Needleman.

**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.

**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. Kahn.

**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. Kahn.

**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. Needleman.

**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. Needleman.

**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. Three hours. Kahn.

**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 66 and contact Department for specific requirements. Three hours each.

## Community Development and Applied Economics (CDAE)

### COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Associate Professors Bloom, Ferreira, Fife, Ford, Kolodinsky, Pelsue, Schmidt, Walsh; Assistant Professors Iskow, Petrillo, Sullivan; Lecturer Ashman; Extension Professor Bigalow; Extension Associate Professors Harris, Patterson, Scannell; Extension Assistant Professors Carlson, Wachernagel; Adjunct Assistant Professor Bancroft; Adjunct Lecturer Silver.

**1 Architectural Drafting and Print Reading (2-4)** Principles and procedures of technical graphics including orthographic, pictorial, and auxiliary views. Drafting as the universal language of industry. Introduction to architectural drawing. 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. Petrillo.

**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. Petrillo. Spring.

**30 Woodworking Technology (2-2)** 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. Walsh. 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. Fife.

**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, emphasizing the impact of social class, family structure, and

cultural background on behavior. *Prerequisites:* Sophomore standing. Three hours. Kolodinsky. Spring.

**128 The Consumer and Advertising** Examination of the principles of advertising. Emphasis on research, technique, and the impact of advertising strategies on consumers. *Prerequisite:* junior standing. Three hours. Kolodinsky.

**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. Walsh. Alternate years, 1995-96.

**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. Walsh. 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:* Instructor's permission. 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. Fife.

**167 Small Business Finance** Capital requirements of small business, financial analysis, capital budgeting, and types and sources of credit. *Prerequisites:* 61 or Economics 12, 166. Three hours.

**168 Small Business Marketing** Essentials of marketing for the small business firm. Focus on the fundamental criteria guiding small business marketing decisions. *Prerequisite:* 61 or Economics 12. Three hours. Sullivan.

**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 Economics 12. 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, 201, junior standing, and instructor's permission. Three hours. Pelsue.

**180 Real Estate Appraisal** Basic concepts and methods of measuring real estate values. *Prerequisites:* 61 or Economics 12, or instructor's permission. Three hours. Silver.

**183 Communication Methods** Analysis of media impact and presentation of information through press, radio, tele-

vision, and audiovisual techniques. Three hours. Both semesters.

**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.

**205 Rural Communities in Modern Society** (See Sociology 205.)

**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. Pelsue. Alternate years. Not offered 1995-96.

**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 Economics 12, permission. Three hours. Rogers (Animal Sciences), Schmidt.

**210 Seminar in Small Business Marketing and Entrepreneurialism** 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. Fife.

**218 Community Organization and Development** (See Sociology 207.)

**231 Applied Computer Graphics** Directed research, planning, design, technical experimentation, production and evaluation for computer-generated design application. *Prerequisite:* Permission. Three hours. Petrillo. Spring. (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 Economics 12, or permission. Three hours. Ford, Pelsue. Alternate years 1996-97.

**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:* 85 or permission; Statistics 111 or 141. 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 Economics 12. Three hours. Pelsue.

**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. *Prerequisites:*

61 or Economics 12, Mathematics 19, or instructor's permission. Three hours. Iskow.

**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. Walsh. Spring. (Not offered for graduate credit.)

**264 Price Analysis and Forecasting** Analysis and measurement of factors affecting supply, demand, and elasticity; their relation to the level and changes of market prices; and use of quantitative techniques in forecasting. *Prerequisites:* 61 or Economics 12, Math. 19, or instructor's permission; computer science and statistics helpful. Three hours.

**266 Small Business Decision Making** Applying economic concepts to decision making in a small business. Incremental analysis, contribution margins, personnel management, and linear programming. *Prerequisites:* 166, 167, or equivalent. Three hours. Fife, Iskow.

**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. Fife.

**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. Offered fall 1996.

**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. Offered fall 1995.

**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.

**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

*Professors Absher, Archdeacon, Dawson, Dinitz, Williams; Associate Professors Hegner, Zwick; Assistant Professor Baruah, Pruesse, Xue, Yang; Lecturers Douglas, Eppstein, Erickson.*

**2 Microcomputer Applications Software (2-2)** Introduction to popular applications software packages, including word processor, spreadsheet, and database packages. Emphasis on hands-on experience. No credit for E&M majors. *Prerequisite:* Two years high school algebra. 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.

**15 Survey of Business-Oriented Languages (3-0)** Survey. COBOL language, emphasizing file manipulation capabilities. Several applications problems studies. *Prerequisites:* 11 and 12, or instructor's 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: Pascal** Introduction to algorithmic problem solving. Implementation of algorithms using Pascal. 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. 17 or 19 or concurrent enrollment in 21. Four hours.

**26 Introduction to C Programming** Design an implementation of algorithms in C. Lexical elements, primary data types, control flow, functions, arrays, structures, strings, and pointers. Credit not given for more than one of the courses CS 12, 26, 31. *Prerequisites:* 11 or 16 or 21 or Math. 51 or comparable knowledge of programming. Three hours.

**27 Computer Programming II (1-0)** 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. *Prerequisite:* 26. One hour.

**95 Special Topics** *Prerequisite:* Instructor's permission. Hours variable.

**101 Machine-Level Organization and Programming (3-3)** Introduction to organization, architecture, and low-level programming or microcomputer systems. Assembly language and machine-level data representation. Interfacing to devices, both directly and through operating-system calls. *Prerequisites:* 26, Math. 21. Four hours.

**103 Programming Languages (3-0)** Systematic treatment of principles underlying the features and implementation of programming languages. Contrast of traditional procedural languages and at least one nontraditional language. *Prerequisites:* 101, Math. 22. Three hours.

**104 Data Structures (3-0)** Lists, Strings, Arrays, Trees and Graphs. Storage systems and structures. Storage allocation and "garbage collection." Searching and sorting techniques. Generalized data management systems. *Prerequisites:* 27, 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:* 104. Three hours.

**193, 194 College Honors**

**195 Special Topics** *Prerequisite:* Instructor's permission. Hours variable.

**201 Operating Systems (3-0)** Supervisory and control software for multiprogrammed computer systems. Processes synchronization, interprocess communication, scheduling, memory management, resource allocation, performance evaluation, object-oriented systems, case studies. *Prerequisite:* 104. Three hours.

**202 Compiler Construction (3-0)** 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.

**203 Programming Languages II (3-0)** Formal specification and program correctness. Multi-tasking and parallelism. Object-oriented and applicative languages. Introduction to translator design. *Prerequisite:* 103, 104. Three hours.

**207 Operating Systems Laboratory** Programming workshops and assignments that develop or modify various components of an operating system. *Prerequisites:* Previous or concurrent enrollment in 201; instructor's permission. One hour.

**222 Computer Architecture (3-0)** 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.

**223 Introduction to Formal Language Theory (3-0)** (Same as Math. 223.) Introduction to theory and applications of context-free languages. Phrase structure and context-free grammars, normal forms, pushdown automata, decision problems, power series in noncommuting variable, application to parsing. *Prerequisite:* Math. 52 or 104. CS 243 highly recommended. Three hours.

**224 Analysis of Algorithms (3-0)** (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. 121, 124, 173. Three hours.

**243 Introduction to Theoretical Computer Science (3-0)** (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. *Prerequisites:* 12 or 31, Math. 52 or 104. Three hours.

**251 Introduction to Machine Intelligence (3-0)** 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.

**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.

**294 Independent Readings and Research** Independent readings and investigation under the direction of faculty member. *Prerequisite:* Instructor's permission. Three to six hours.

**295 Special Topics in Computer Science (3-0)** Lectures, reports, and directed readings on advanced topics. *Prerequisite:* Instructor's permission. Three hours.

## Dental Hygiene (DHYG)

### SCHOOL OF ALLIED HEALTH SCIENCES

*Associate Professors Farnham, Hill (Chairperson), Wootton; Clinical Associate Professor Mercier; Clinical Assistant Professors Ivey, Levi; Lecturers Averill, Grimes, Leffler, MacDonald, Rowell, Schimmele; Instructor Venmar.*

**1 Introduction to Dental Hygiene** Principles of dental hygiene, orientation to clinical practice, and preclinical experience. Four hours. Wootton.

**2 Introduction to Clinical Dental Hygiene** A continuation of 1 with early clinical experience. *Prerequisites:* 1, Anatomy and Physiology 9. Two hours. Wootton.

**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 9. 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 9 or permission. Two hours. 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.

**91 Dental Materials** Study and manipulation of the materials commonly used in dental practice. *Prerequisites:* 2, 12 or permission. Two hours.

**141 Clinical Dental Pharmacology** Introduction to clinical pathology and pharmacological management in the treatment of dental patients. *Prerequisites:* 2, 12. Three hours. Hill, Mercier.

**143 Periodontics** Morphologic and functional aspects of the supporting structures, recognition and therapy for diseases of the periodontium. *Prerequisites:* 2, 12, Anatomy and Physiology 10. Three hours. Hill.

**146 Oral Pathology** Functional and organic diseases of the oral cavity and their clinical management. *Prerequisite:* 143 or permission. Two hours. Mercier.

**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 10. Four hours.

**182 Senior Clinic and Seminar** Continuation of 181. *Prerequisites:* 143, 181. Four hours.

**195 Special Topics** *Prerequisites:* Instructor's permission.

## Economics (ECON)

### COLLEGE OF ARTS AND SCIENCES

*Professors Alnasrawi, Campagna, Chase, Gibson; Associate Professors Boyd, Gedeon, Knodell, McCrate, Rizvi, Thomson (Chairperson), Woolf; Assistant Professor Sethi.*

**11 Principles of Macroeconomics** Introduction to eco-

economic concepts, institutions, and analysis, particularly as related to the economy as a whole. Three hours.

**12 Principles of Microeconomics** Study of individual economic units with particular emphasis on market interactions among firms and households. *Prerequisite:* 11. Three hours.

**60 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. Three hours.

**100 Statistical Methods for Economists** Data organization and presentation; construction and weighting of index numbers; analysis of central tendencies and probability; confidence intervals and hypothesis testing; measurement of correlation; simple linear regression with application to secular trend and seasonal variation of time series. Statistics 141 may be substituted, but Statistics 111 may not. *Prerequisite:* 11; Pre- or corequisite 12. Three hours.

**101 Macroeconomic Theory** Keynesian and post-Keynesian theories of economic development; government policies in relation to the problems of employment, stability, and growth in developed economies. *Prerequisite:* 12. Three hours.

**102 Microeconomic Theory** Analysis of consumer demand, supply, market price under competitive conditions and monopolistic influences, and the theory of income distribution. *Prerequisite:* 12. Three hours.

**111 Money and Banking** Commercial and central banking with special attention given to the Federal Reserve system, monetary theory and policy. *Prerequisite:* 101. Three hours.

**116 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. *Prerequisite:* 102. Three hours.

**122 Industrial Organization** The structure, conduct, and performance of U.S. industry and appraisal of its economic efficiency and social impact, including governmental policies. *Prerequisite:* 102. Three hours.

**130 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. *Prerequisite:* 12 or instructor's permission. Three hours. McCrate.

**141 Labor Economics** Labor as an economic factor, the labor force, wages, productivity, and income. Wage and hour legislation, social security, and unemployment insurance. *Prerequisite:* 102. Three hours.

**151 International Economics I: Trade** Theory, policy, and history in international trade patterns, terms of trade, protectionism, competitiveness, structural adjustment, and international aspects of microeconomics. *Prerequisite:* 102. Three hours.

**152 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. *Prerequisite:* 101. Three hours.

**154 Economic Development** Theories of economics growth applied to developing countries of the contemporary world including the political and social determinants of economic progress. *Prerequisite:* 101. Three hours.

**160 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. *Prerequisites:* Sophomore standing; Economics 12 recommended. Three hours.

**170 Evolution of Capitalism** Origins and development of capitalism; their social-economic institutions and their transference from Western Europe to North America. *Prerequisite:* 12.

**171 Survey of American Economic History** Survey of 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. *Prerequisite:* 12. Three hours.

**172 Economic History of the Third World: Pre-capitalist and Colonial Economies** Pre-capitalist and colonial non-European economic formations within the context of their interactions with each other as well as with European mercantilism. *Prerequisite:* 12 or instructor's permission. Three hours.

**185 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. *Prerequisite:* 12. 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.

*All 200-level courses have minimum prerequisites of 101, 102, and Statistics 141. Any prerequisites noted in the following course descriptions are in addition to the noted minimum.*

*Note: No Economics courses are offered for graduate credit.*

**200 Econometrics** A combination of economic theory, mathematics, and statistics for testing of economic hypotheses and developing economic models. Three hours.

**201 Advanced Macro and Monetary Theory** Analysis of classical Keynesian and modern macroeconomic models; micro and macro demand for and supply of money; portfolio choice and the influence of financial intermediaries. Three hours.

**202 National Economic Policies** Macroeconomic problems faced by the U.S. economy from the Great Depression to the present and the policies proposed to solve them. Three hours.

**223 Antitrust and Regulation** Theories, history, and policies of government's role in U.S. economy, emphasizing antitrust laws and decisions and federal regulatory programs. Three hours. Alternate years.

**230 Mathematical Economics** Basic mathematical techniques employed by economists; use of maximum and minimum criteria and optimization problems; partial and general equilibrium analysis; comparative statics; some dynamic analysis. *Prerequisite:* Math. 19. Three hours.

**241 Human Resources** Labor economics, economic demography, and economic history of female participation in household and market production. *Prerequisite:* 141. Three hours.

**242 Labor-Management Relations** Economic influences of unionization. The grievance process, arbitration, and labor relations laws. *Prerequisite:* 141. Three hours. Alternate years.

**254 Topics in Economic Development** Economic analysis of selected areas of the world, or selected topics in economic development. *Prerequisite:* 154. Three hours.

**256 Problems of the International Economy** Examination of some of the stresses and strains of the world economy including inflation, growth, role of multinational corporations, external debt, and terms of trade. *Prerequisite:* 151 or 152. Three hours. Alternate years.

**260 Income, Wealth, and Welfare** Analysis of the distribution of income and wealth and policies which affect them. Three hours.

**263 The Vermont Economy** Description and analysis of the Vermont state economy, focusing on employment, output, income, housing, and state and local government expenditures and taxes. *Prerequisites:* 101, 102. Three hours. Woolf.

**265 Urban and Regional Economics** Economic analysis applied to the problems of cities, states, and regions. Three hours.

**268 Economics of Energy** International and domestic aspects of energy policies as they relate to output and prices. Three hours.

**271 Topics in American Economic History** In-depth analysis of selected historical topics, emphasizing the use of economic theory to understand and explain historical events. Three hours.

**275 Development of Economics: Foundations Through the Keynesian Era** Development of economic ideas. The Pre-Classical, Classical, Socialist, Neoclassical, Keynesian Schools, and individual theoreticians. Three hours.

**276 The Development of Macroeconomics: Keynes, Keynesianism, and Contemporary Schools of Thought** The historical development of Keynesian macroeconomic thinking and its relationship to major contemporary schools of theory, policy, and ideology. Three hours.

**277 Marxian Economic Theory** Examination of the economic method of Karl Marx concentrating on the labor theory of value, accumulation, crisis, and realization problems. Three hours.

**281 The Command Economy and its Reform** Analysis of the economic development, structure, performance, and direction of command economies (such as in the Soviet Union, Eastern Europe, and China) and their reform. 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 Readings and Research** Independent study with permission of supervising professor prior to registration.

**299 Departmental Honors** By invitation only.

#### HONORS – ARTS AND SCIENCES

**218, 219 Honors/Economics** See page 66 and contact Department for specific requirements. Three hours each.

## Education (ED)

### COLLEGE OF EDUCATION AND SOCIAL SERVICES

*Professors Abruscato, Agne, Burrell, Conrad, Fishell, Fox, Hasazi, Larson, Nash, Paolucci-Whitcomb, Peterson, Shiman, Tarule, Williams, Witkin; Associate Professors Barbour, Bishop, Clarke, Erb, Fitzgerald, Glesne, D. Goldhaber, Griffin, Hunter, Lang, Manning, Meyers, B. Nichols, Ponzo, Rathbone, Sandoval, Shelton, Stevenson; Assistant Professors Bryant, Burdett, Capone, J. Goldhaber, Hood, Mosenthal, Parks, Roche, Salembier; Research Associate Professors Cloninger, Thousand; Research Assistant Professors Giangreco, Hamilton; Lecturers Bakeman, Biss, Broer, Cass, Conte-Scheer, Cravedi-Cheng, Dennis, Edelman, Fiebelkorn, T. Fox, Furney, Godek, Hull, Kay, Keogh, Mekhelsen, Morgan, Morris, Mueller, Razza, K. Roche, Ross-Allen, Schattman, Smith, Spinney, Watson, Welkowitz, White, Wise, Yuan; Extension Associate Professor E. Nichols.*

*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.

#### 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.

**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. *Prerequisites:* Instructor's permission. 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 for Global Awareness** Important value issues — peace and prevention of war, social and economic justice, environmental harmony — and their relationship to global problems. Curriculum materials developed and shared. Ways of teaching about global issues. 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.

## 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.

**190 Approaches to Education: Senior Seminar** Ideas and values, historic and contemporary, emphasizing ideological bases of American education. Students develop new perspectives as guide toward resolving some crucial issues of our time. *Prerequisite:* Senior standing or instructor's permission. 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:* Acceptance into licensure program. 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.

## 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. Variable credit: one to two 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. *Prerequisite:* EDEL 10; EDSS 24. 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. *Prerequisite:* Admission to Elementary Teacher Education Program. 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. *Prerequisite:* Admission to Elementary Teacher Education Program. 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. *Prerequisite:* Admission to Elementary Teacher Education Program. 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. *Prerequisite:* Admission to the Elementary Teacher Education Program. 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. *Prerequisite:* Admission to Elementary Teacher Education Program. 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. *Prerequisite:* Admission to Elementary Teacher Education Program. 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. *Prerequisite:* Admission to Elementary Teacher Education Program. 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. *Prerequisite:* Admission to Elementary Teacher Education Program. 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. *Prerequisite:* Admission to Elementary Teacher Education Program. 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 Instruc-**

**tion 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.

## 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, curriculum, 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.

## HOME ECONOMICS EDUCATION

Courses related to this program are offered through the Nutritional Sciences Department (see pages 179).

## 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 Practicum in Field Experience** Student works as teaching assistant to faculty member in foundation, studio, advanced studio, art history, or museology depending on interest and capabilities. *Prerequisites:* Junior standing, permission. Four hours.

**283, 284 Seminar: Current Issues in Art and Education** Research and discussion of issues relevant to contemporary art and the teaching of art. *Prerequisite:* Senior standing or permission, 12 hours in art and/or related areas. Three hours.

## MUSIC EDUCATION — 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 Music course listings.

**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. Sliker-Bouman.

**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 Education 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 Education or instructor's permission. Credit variable, one to four hours. Not offered every semester.

**253 Practicum in Music Education** Current methodology in music education for music specialist and classroom teacher. Each year emphasis in a different area of concentration. *Prerequisites:* Undergraduate major in Music Education or teaching experience or instructor's permission. Credit variable. May be taken for one to four hours each semester, may be repeated up to eight hours.

**281 Elementary Music Education Methods** Methods and materials in the teaching of vocal and instrumental music in elementary schools. Five hours classroom observation per week required. *Prerequisite:* Junior standing in Music Education. Three hours. Sliker-Bouman.

**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. Sliker-Bouman.

**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.

#### SPECIAL EDUCATION-RESPONSIVE TEACHER PROGRAM — EDRT

**201 Foundation of Special Education** Examination of historical and current trends in treatment of handicapped individuals, including effects of litigation, legislation, and economic consideration on educational and residential service delivery systems. *Prerequisite:* Twelve hours in education and related areas or instructor's permission. Three hours.

#### EARLY CHILDHOOD AND HUMAN DEVELOPMENT — ECHD

**1 Infant/Toddler Curriculum Block** This course studies infant/toddler development through a combination of lecture, discussion, observation and participation in an infant/toddler group setting. *Prerequisite:* Majors only or permission. Six hours. D. Smith.

**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.

**4 Introduction to Early Childhood and Human Development II** Second of three seminars designed to introduce students to the concepts and practices of the discipline. Emphasis on the applications of research findings. *Prerequisites:* 3 or permission. Two hours.

**5 Human Development** A comprehensive survey of life span individual and family development within social and historical context. Three hours.

**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. *Prerequisite:* 4. One hour.

**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. Brown, 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 to four hours. Shelton.

**62 Adolescent Development** Physical growth, physiological, psychological, and social development in adolescence. Emphasis on interrelationships of these processes and the developing personality. *Prerequisites:* Sophomore standing, Psychology 1. 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.

**80, 81 Human Development** A two-semester comprehensive survey of development across the life cycle. Three hours lecture and one hour optional discussion each semester. *Prerequisite:* 80 for 81. Six to eight hours. D. Goldhaber.

**82 Creative Curriculum Activities for the Early Childhood Years I** Planning interdisciplinary program materials for children on an individual and group basis using movement, graphic, plastic, language arts. *Prerequisite:* Instructor's permission. Three hours.

**83 Creative Curriculum Activities for the Early Childhood Years II** Planning interdisciplinary program materials for children on an individual and group basis emphasizing mathematics, the natural ecology, and general sciences. *Prerequisite:* 82 in preceding semester or instructor's permission. Three hours.

**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. Eight hours. J. Goldhaber.

**152 Biology of Aging** (Same as Nursing 100.) Three hours.

**163 The Emerging Family** Development of parents and children in various stages of the family life cycle and various emerging family forms. *Prerequisite:* Sophomore standing. Three hours.

**164 Parent-Child Relations** Interpersonal relations of adults and children and the application of underlying principles in parent education and family consulting. *Prerequisite:* 63 or instructor's permission. Three hours. Shelton.

**165 Practicum: Facilitating Human Sexuality Discussion Groups** Designed to train participants to become effective facilitators of discussion groups dealing with human relationships and sexuality. *Prerequisites:* 65, sophomore standing, permission. Three hours. Barbour.

**184 Early Childhood Programs** An active examination of present day early childhood programs in relationship to their historical development from early history. Three hours.

**185 Cognitive and Personality Development in Aging** Perception, memory, learning, and creativity in old age. Continuity and change in personality during the later years. *Prerequisite:* 80, 81 or 20 or instructor's permission. Three hours.

**187 Field Practicum** Supervised teaching in accredited early childhood facilities licensed or approved by responsible boards. *Prerequisite:* Permission. Eight hours.

**188 Prepracticum Internship** Administration and planning for an early childhood development center. *Prerequisites:* Early Childhood major, permission. Three 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. Fifteen hours. J. Goldhaber.

**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. *Prerequisite:* Senior standing or instructor's permission. Three hours. E. Nichols.

**263 Advanced Child Development** Survey of professional literature in child development with special emphasis on influence of early life experiences throughout the life cycle. *Prerequisite:* 80, 81 or equivalent. Three hours. Goldhaber.

**264 Contemporary Issues in Parenting** Contemporary cultural factors that influence adult lifestyles and their relationship to successful parenting. *Prerequisite:* Nine hours in human development or instructor's permission. Three hours.

**265 Teaching Human Development** Designed for individuals who teach or plan to teach human development. Emphasis on group-building skills and interpersonal relationships. *Prerequisites:* Six hours in human development, instructor's permission. Three hours. Barbour.

**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 of human development or equivalent. Three hours.

**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:* 60, 65, 81 or permission. Three hours.

**281 Infancy** Development and rearing from conception to 18 months and their relationship to subsequent development. *Prerequisites:* Nine hours in human development, nutrition, and physiology or biology or instructor's permission. Three hours. Shelton.

**282 Seminar in Physical Development and Health in Later Life** Physical manifestations of senescence, anatomical and physiological development, longevity, vitality, health care, nutrition, chronic conditions and disability. *Prerequisite:* 185 or permission. Three hours.

**283 Personal and Family Development in Later Life** Cognitive development, intellectual performance, work and achievement, retirement and leisure, personal development, self-esteem, coping mechanisms, dying, couples, intergenerational and kinship issues. *Prerequisite:* 185 or permission. Three hours.

**284 Public Policy and Programs for Elders** Demography of aging, social institutions and roles, policy and program implementation, income maintenance, housing, health care, social services, transportation, legal and political issues. *Prerequisite:* 185 or permission. Three hours.

**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.

## 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:* Junior standing, Elem. Ed. majors only. Three 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 sched-

ule 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. Two hours.

**166 Kinesiology** Designed for the teacher/coach to analyze factors of peak physical performance. Muscle actions, mechanical principles, related factors enhancing movement are emphasized. *Prerequisite:* One year of biological science; PE majors, coaching minors; others by instructor's permission. Three hours.

**167 Sports Physiology** Analysis of responses on circulatory, respiratory, and other body systems to vigorous activity. Comprehensive aspects of conditioning, fatigue, heat, attitude, nutrition, energy continuum, ergogenic aids, aging also examined. *Prerequisite:* PE majors, coaching minors; others by instructor's permission. Three hours.

**168 Tests and Measurements in Physical Education and Health** Principles and techniques in evaluation of instruc-

tion. Emphasis given to test selection, administration, construction, application of statistical procedures, and development and interpretation of research data. *Prerequisites:* Six hours in EDPE or health education, 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 Advanced Athletic Training** Advanced concepts and skills in screening tests for injuries, rehabilitation, athletic fitness and conditioning programs, injury recognition and treatment, the use of drugs in athletics, and pathology. *Prerequisites:* 157, instructor's permission. Three 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 Adaptive Physical Education** Recognition, prevention, and correction of functional and structural deviations from normal body mechanics. Organization of programs adapted to needs of handicapped individuals in both special class and mainstreamed settings. *Prerequisites:* 155, 104, 105 or equivalent teaching experience. 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.

### 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.

**275 Developing Vocational Instruction for Students With Special Needs** (See Vocational Education and Technology 275.)

### 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.

### 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.

### 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 39). 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.*

Aerobics	Racquetball
Archery	SCUBA Diving
Badminton	Soccer
Conditioning	Social Dance
Cross Country Skiing	Stress Reduction
Fencing	Squash
Fitness Assessment	Swimming
Folk and Square Dance	Tennis
Golf	Volleyball
Gymnastics	Walking for Fitness
Handball	Weight Training
Lifeguard Training	Yoga
Modern Dance	

The following activities require special fees for transportation and/or instruction. The student must also provide special attire and/or equipment in skiing, ice skating, and karate:

Ballet	Judo
Bowling	Modern Jazz
Downhill Skiing	Moo Gong Do
Figure Skating	Mountain Biking
Horseback Riding	Sailing
Ice Skating	Ski Instructors
	Telemarking

The following activities, co-offered by the Physical Education and Military Studies Departments, may be counted toward the physical education requirements:

Orienteering  
Rappelling  
Wilderness Survival

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.

## Electrical Engineering (EE)

### COLLEGE OF ENGINEERING AND MATHEMATICS

Professors Absher, Evering, Golden, Mirchandani, Oughstun, Williams; Associate Professors Fuhr, Stavrakakis, Tilcomb (Chairperson), Varhue; Assistant Professor Snapp; Adjunct Professor Bonaccio.

#### UNDERGRADUATE COURSES

**3 Engineering Analysis I (3-0)** Circuit elements, laws, and basic techniques of circuit analysis. Network principles and theorems. Energy-storage elements. Transient analysis and time-constants. Sinusoids and phasors. Sinusoidal steady-state response and steady-state power. *Prerequisite:* Math. 21. Three hours.

**4 Engineering Analysis II (3-0)** Complex frequency and network functions. Resonance. Magnetically coupled circuits. Two-port networks. Application of Fourier series and Fourier transforms in circuit and systems analysis. Laplace transform techniques. *Prerequisite:* 3. Three hours.

**94 Bioengineering Applications of Physical Principles II (3-3)** Application of principles of electromagnetism and electrical engineering to an understanding of the structure and function of the human body and to diagnostic and therapeutic instrumentation. Four hours.

**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** 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.

**120 Electronics I** 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 11 or equivalent. Three hours.

**134 Fundamentals of Microcomputer Based Systems** 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 11; EE 131 and Computer Science 101 desirable. Four hours.

**141 Electromagnetic Field Theory I** Basic laws and elementary applications of electromagnetic fields emphasizing time-independent fields; vector analysis, static electric and magnetic fields, boundary conditions and boundary value problems. No credit may be received for both EE 140 (offered in prior years) and the current EE 141. *Prerequisites:* Math. 271, Physics 42 or 125. Three hours.

**142 Electromagnetic Field Theory II** Basic laws and elementary applications of electromagnetic fields emphasizing time-dependent fields; Faraday's law, Maxwell's equations, Poynting's theorem, plane wave propagation, transmission lines, wave guides, antennas. *Prerequisites:* 141 or Physics 213. 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.

**163 Solid State Physical Electronics I (3-0)** Physical principles of operation of common semiconductor devices. Physical and circuit models of p-n junctions, bipolar junction transistors, Schottky barriers, and field-effect transistors. *Prerequisite:* Physics 42 with 22 or 128. Three 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, Physics 128. 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 (3-0)** 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.

**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.

**227 Biomedical Measurements, Instrumentation, and Systems** 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, Physiology and Biophysics 101, instructor's permission.

**228 Sensors** 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. *Prerequisites:* 141, Physics 128, instructor's permission. Three hours.

**246 Engineering Optics** 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.

**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. In-



teraction 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** (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** (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.

**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.

**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.

**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 Management (EMGT)

DIVISION OF 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 Biddle, Bradley, Broughton (Chairperson), Clark, Eschholz, Fuhwiler, Gutman, Huddle, Manchel, Poger, Rosa, Shepherd, Stephany, Thompson, Warhol; Associate Professors Edwards, Magistrale, Mzamane, Simone, Stanton, Sweterlitsch; Assistant Professors Barnaby, Baruth, Dickerson, Kete, Lin, Schnell, Welch, Winter; 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. Bitner, Martenis.

*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. Lin, 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.

**57 Race and Ethnicity in Literary Studies: Introductory** Courses addressing the representation and construction of "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. Three hours. Topic for 1995-96: Comparative American Identities. Dickerson.

**61 Introduction to African Literature** Readings in African literature, concentrating on major human and political themes and literary techniques. Mzamani.

**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*.

**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 Composing Process." May be repeated for credit with departmental permission.

**112 Personal Voice** Intensive examination of writing from the first person point of view. Theory and practice in personal writing and analysis of published writing in this mode. *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 Romanticisms** Late 18th and early 19th century English literature including, for example, works by Wordsworth, the Shelleys, Keats. Occasional special topics. Lin, 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. Biddle, 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 1995-96: Re-Orienting the Western Landscape. Lin.

**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. Mzamane.

**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: "The American Renaissance;" Influence of Family and Family of Influence: Portraying Revolution (Wollstonecraft, Godwin, and the Shelleys)."

**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** May not be used to satisfy major requirements. *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. Biddle, 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 cir-

cumstances 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 1995: "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 66 and contact Department for specific requirements. Three hours each.

### 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, King, Richardson; Assistant Professors Kaza, McArthur; Adjunct Professor Eddy; Lecturers Paradis, Samsom.*

**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.

**95, 96 Introductory Special Topics**

**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** Analysis of environmental problems and issues from the perspective of various academic disciplines and professional fields, emphasizing interdisciplinary scholarship and research. *Prerequisites:* Major in Environmental Studies; 1, 2, 100. Three hours. Kaza.

**178 Environmental Ethics** Critical examination of contemporary environmental moral problems; metaethical and normative analyses of issues including animal rights, earth duties, war, deep ecology, ecosophy, and alternative ethics. *Prerequisites:* One course in environmental studies, junior standing. Three hours. Worley.

**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.

**195, 196 Special Topics** Special topics courses taught by Program faculty and community environmental practitioners which vary each semester. Topics have included envi-

ronmental health, energy, regional planning, international studies, literature, natural area management.

**201 Research Methods** Planning, design, and methods of research for the study of environmental problems. *Prerequisite:* 151, junior standing, major in Environmental Studies. Three hours. McArthur. (Not offered for graduate credit.)

**202 Senior Project and Thesis** Individual research under staff direction. *Prerequisites:* 201, permission of Environmental Program, major in Environmental Studies. Credit 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:* 100, senior standing, major, coordinate major, or minor in Environmental Studies. Three hours. Hudspeth. (Not offered for graduate credit.)

**289 Environmental Economics** (Same as 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 ENV. Three hours. King. (Graduate credit pending.)

**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. *Prerequisite:* Six hours of intermediate or advanced courses in ENV or related areas. Three hours. Reidel. (Not offered for graduate credit.)

**291 Special Topics**

**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 Advanced Seminar**

## European Studies

### COLLEGE OF ARTS AND SCIENCES

*Prof. Moyser, Director.*

The following courses are among the course offerings; see department for specific course description. Also see International Studies for special topics listings.

**International Studies 291** (European Studies Seminar); **Art:** 5, 6, 148, 149, 150, 153, 154, 158, 161, 164, 167, 168, 171, 172, 174, 175, 176; **Classics:** 42, 153-156; **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:** 72, 131, 141, 153-156, 161, 162, 173, 181; **Geography:** 55, 155, 158; **German:** 121, 122, 155, 156, 201, 213, 214, 225, 226, 237, 238, 247, 248, 251, 252, 263, 264, 273, 275, 276, 278, 281, 282; **Greek:** 111, 112, 201-206; **History:** 13, 14, 21-27, 85, 86, 90, 120-126,

128-136, 139, 185, 186, 191, 221, 222, 224-228, 285; **Italian:** 121, 122, 155, 156; **Latin:** 101, 102, 111, 112, 203, 204, 227, 251-253, 255, 256, 271; **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, Wang; Extension Associate Professors Bousquet, McEvoy; Assistant Professor Hughes; Lecturers Shane, Turner; Adjunct Associate Professor Tritton; Research Assistant Professor Scherbatsky.*

**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. Donnelly.

**21 Dendrology (3-4)** Classification, silvical characteristics, and identification features of native and introduced trees and shrubs. Four hours. Donnelly.

**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. Wang.

**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. Not offered 1995-96.

**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, 1996-97.

**126 Forest Ecology Field Trip** Assessment of southeastern forest ecosystems including Smoky Mountain communi-

ties, 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.

**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 Forest Resources (2-3)** Identification, interpretation, measurement, and mapping of forest resources from aerial photographs and other remote sensing devices. *Prerequisites:* Junior standing; a course in tree identification. Three hours.

**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. McEvoy.

**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. Bousquet.

**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, 1996-97.

**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, 1995-96.

**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, 1996-97.

**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, 1996-97.

**222 Advanced Silviculture (2-4)** Scientific basis and contemporary status of silviculture practices. *Prerequisites:* 123, permission. Three hours. Hannah. Alternate years, 1996-97.

**225 Tree Structure and Function** The anatomy and physiology of woody plants with particular emphasis on those facets unique to trees. *Prerequisite:* Junior standing in a plant science curriculum. Three hours. Scherbatskoy. (Not offered for graduate credit.)

**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. Donnelly. Alternate years, 1995-96.

**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, 1995-96.

**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, 1995-96.

**244 Quantitative Assessments of Natural Resources** (See Natural Resources 244.) Three hours. Newton.

**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. Reidel. (Not offered for graduate credit.)

**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. 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 Transition** 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. 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. 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 (Chairperson), Gade; Associate Professors Barnum, Lind; Assistant Professors Allen, Hannah, Kennedy, Seager.*

*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 man's natural environment with particular attention to landforms, climate, soil, vegetation, and water resources. Three hours. Allen.

**3 Introduction to Economic Geography** Elementary spatial models of economic patterns, processes, and relationships. Three hours. Bodman, 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. Lind.

**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** Gade.

**52 Canada** Seager.

**55 Europe** Barnum.

**56 Latin America** Gade.

**57 The United States** Hannah.

**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.

**81 Introduction to Cartography** Maps and map preparation, principles of map construction, information suitable for map presentation, techniques of map drawing, methods of map reproduction, graphs and frequency distribution. *Prerequisite:* Instructor's permission. Three hours. Kennedy.

**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. Lind.

**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. Allen, Lind.

**143 Climatology** Analysis of regional and local climatic data with special reference to climatic controls; special laboratory projects. *Prerequisite:* 43. Three hours. Lind.

**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.

**172 Medical Geography** The distribution of health and disease and access to health care at different geographic scales and between more and less developed countries. *Prerequisite:* Three hours in Geography. Three hours. Kennedy.

**173 Industrial Location and Regional Development** Classical and contemporary theories of location and measurement 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. Barnum, Bodman.

**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.

**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. Kennedy.

**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. Bodman.

**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 Perspectives on Geography** Geographic concepts and research methodology; the formulation, conduct, and presentation of a research effort. *Prerequisite:* Junior, senior, or graduate standing with at least 12 hours in geography. 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 his-



torical 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, carrying 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. Allen, Gade, Lind.

**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. Barnum, Bodman, Gade, Kennedy, Seager.

**278 Gender, Space, and Environment** Examination of the ways in which human relationships to both the built and the national 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. Kennedy.

**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. Lind.

**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, Kennedy.

**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 66 and contact Department for specific requirements. Three hours each.

## Geology (GEOL)

### COLLEGE OF ARTS AND SCIENCES

*Professors Hunt, Mehrtens, Stanley; Associate Professors Bucke, Doolan (Interim Chairperson), Drake, Hannah; Visiting Assistant Professor Bierman; Adjunct Professors Jaffe, Stein, Wright.*

**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.

**10 Geological Oceanography (2-2)** Characteristics and development of the oceans, their basins and shorelines, including plate tectonic history and basic physical, chemical, and biological processes. *Prerequisite:* 1 or introductory science course. Three hours. Bucke, Hunt.

**35 Global Water Cycle** A geologic perspective and global analysis of pathways of water and its major dissolved constituents on, above, and below earth's surface. *Prerequisite:* High school chemistry. Three hours. Drake, Mehrtens.

**41 Plate Tectonics and Earth History (3-3)** Introduction to concepts of the new global tectonics and its role in shaping earth history. Labs stress graphical solutions to plate movements. Four hours. Doolan, Mehrtens.

**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.

**110 Earth Materials (3-3)** Introduction to the chemical and physical properties of minerals and rocks, and their associations in the field. Lab stresses hand specimen identification of rocks and minerals. *Prerequisite:* 1 or 55. Four hours. Drake.

**112 Crystallography and Optical Mineralogy (2-4)** Introduction to crystallography and the behavior of light in crystalline materials. Lab stresses use of the petrographic microscope and microscopic identification of minerals. *Prerequisite:* 110 or concurrent enrollment. Three hours.

**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 and Metamorphic Petrology (3-3)** Description, classification, and genesis of igneous and metamorphic rocks. Introduction to petrogenetic models of the earth's crust and mantle. *Prerequisite:* 112. Four hours. Doolan.

**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, Hunt.

**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.

**170 Geophysics** The structure of the solid earth, using seismic, magnetic, and gravitational methods. *Prerequisites:* Math. 20. Three hours. Detenbeck (Physics), Doolan.

**176 Water Quality Analysis** (See Natural Resources 176.)

**180 Soil Mechanics** (See Civil Engineering 180.) Four hours. Olsen.

**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. Doolan, Hannah, Mehrtens, Stanley.

**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.

**220 Invertebrate Paleontology (2-3)** Classification, geological distribution, evolution, paleoecology, and morphology of major invertebrate fossil groups. *Prerequisites:* 121, Biology 1, or equivalent. Three hours. Hunt.

**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.

**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.

**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.

**251 Recent Sedimentation (1-6)** Investigation of recent sedimentary environments using geoliminological and oceanographic techniques. Group and individual projects. *Prerequisite:* 153 or equivalent. Three hours. Hunt.

**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.

**272 a, b Regional Geology 272a** (1 hour) Discussion of the geology of a selected region of North America; **272b** (3 hours) A four-week summer field trip to the area in question. *Prerequisites:* 101, 110; 272a for 272b. Four hours.

**273 Geology of the Appalachians** Origin of mountain belts; the Appalachian mountain system discussed in terms of tectonics and geologic processes active in modern continental 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 66 and contact Department for specific requirements. Three hours each.

## German (GERM)

### COLLEGE OF ARTS AND SCIENCES

*Professors Mieder (Chairperson), Mahoney, Srase; Associate Professors Richel, 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, Richel, 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. Mahoney, Richel, Schreckenberger.

**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, Richel.

**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 *Helmbrucht*. 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, Richel.

**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, Richel.

**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. Richel.

**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. Richel.

**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. Richel.

**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' sociocultural 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 on page 158.)

#### HONORS – ARTS AND SCIENCES

**228, 229 Honors/German** See page 66 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

*Professor Liebs; Lecturer Visser.*

**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. Liebs.

**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. Kellogg.

## History (HST)

### COLLEGE OF ARTS AND SCIENCES

*Professors Andrea (Director of Graduate Studies), Felt, Hutton (Chairperson), Liebs, Metcalfe, Overfield, Seybolt, Steffens, Stoler, Stout; Associate Professors B. Rodgers, See, True, Youngblood; Assistant Professors Bergen, Gustafson, Saad; Lecturer Visser.*

History course numbers are designed to indicate method of instruction and expected preparation level of students, as follows:

**9-14 Introductory Surveys** Open to all students, but primarily designed for first-year students. Designed to teach not only historical content but also skills such as library use, writing, methods of citing evidence, analysis of various types of historical sources.

**21-96 Specialized Introductory Courses** Open to all students, but especially designed for sophomores, juniors, and first-year students with special interests or preparation. Paper writing is normally an important component.

**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. Bergen, Overfield.

**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.

**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. Bergen, Hutton.

**21 Classical Greek Civilization** Detailed study of Athens in the 5th century B.C.E., continuing through Alexander the Great. (Students who have already taken 121 or 122 may not take 21 or 22.) Three hours. B. Rodgers, Schlunk.

**22 Classical Roman Civilization** Growth of the Roman Empire; political and social disruption at Rome and elsewhere from the early 2nd century B.C.E. through the 1st century C.E. Three hours. B. Rodgers.

**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. Bergen, 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. Saad.

**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. Saad.

**50 East Asian Civilization: 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. Seybolt.

**51 East Asian Civilization: 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. 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

Amerind-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. See.

**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.

**90 Western World since 1945** Comparative history of European nations and the United States since 1945. Three hours. Hutton, Youngblood.

**91 Africa, Asia, and Latin American since 1945** Non-Western societies since 1945 emphasizing problems relating to national independence and economic development. Three hours.

**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** Survey of history of ancient Greece from prehistoric times (emphasizing the Minoan and Mycenaean cultures) to the Hellenistic Age. *Prerequisite:* 9 or 21 or appropriate work in Classics. Three hours. B. Rodgers.

**122 History of Rome** History of ancient Italy from prehistoric times (emphasizing the Italic peoples, the Etruscans, and Greek colonization) to the age of Justinian. *Prerequisite:* 9 or 22 or appropriate work in Classics. Three hours. B. Rodgers.

**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.

**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.

**133 Early English History** Political, cultural, and social history of England from the Anglo-Saxons to ca. 1500. *Prerequisites:* 9 or 10 or 14 or 25 or six hours of history. Three hours. Metcalfe.

**134 Tudor-Stuart England** England from 1485 to 1660, emphasizing the period from the 1530's to the 1640's (the Henrican Reformation to the Puritan Revolution). *Prerequisites:* 133 preferred, otherwise 10 or 14 or 25 plus three additional hours of history. Three hours. Metcalfe.

**135 France 1700–1851** An introduction to French civilization. Principal themes: Absolutism, Enlightenment, French Revolution, 19th Century Society and Culture. *Prerequisites:* 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. Bergen.

**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 problem of development in present-day Africa. *Prerequisite:* 40. Three hours. Saad.

**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. Saad.

**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. *Prerequisites:* 45 or permission. Three hours. Saad.

**149 Archaeology and History of the Ancient Near East** Survey of primary civilizations of Egypt and Mesopotamia and the secondary cultures of Anatolia, Syria-Palestine, Assyria, and Iran, with major emphasis on archaeological evidence. *Prerequisite:* 9 or 21 or appropriate work in Classics. Three hours.

**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. 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. Seybolt.

**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. See.

**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 discussed. *Prerequisites:* For 175: 11; for 176: 12. Three hours. Felt.

**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. Felt.

**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.

**180 African-American History** Economic, social, political, and intellectual developments in U.S. history as they have affected and been effected by the African-American; emphasis on the period since 1865. Three hours.

**182 History of Women in the U.S.** Survey of the origins and changes in images, status, and roles of women in American society since the colonial period. *Prerequisite:* 11 or 12. 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.

**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.

**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. Bergen.

**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. Three hours. Andrea, Overfield.

**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.

**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. *Prerequisite:* Junior, senior, or graduate standing and 12 hours of history. Three hours. Metcalfe, Overfield.

**226, 227 Seminar in Modern Europe** Selected topics on European history from 1815 to present. Three hours. Bergen, Hutton.

**228 Seminar in Popular Culture** History of the attitudes of ordinary people towards every day life in European society from the Middle Ages to the present. *Prerequisite:* 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). *Prerequisite:* 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. Saad.

**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:* 146 or permission. Three hours. Saad.

**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. 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. 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. See.

**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** Three hours.

**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:* Junior, senior, or graduate standing, 184 or permission. Three hours.

**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.

**290 Historical Research and Computer Analysis** Role of computers and quantifiable research in broadening historical understanding. Practical computer skills lead to research projects using Vermont census material as a pri-

mary source. *Prerequisites:* Junior, senior, or graduate standing, 12 hours of history. Three hours. See.

**291 Seminar in Film and History** Topics in the history of European cinema and society, focusing on the concepts of the filmmaker as historian and the film as historical artifact. *Prerequisite:* Will vary according to topic. Youngblood.

**292 Seminar in Comparative History** Investigation of phenomena such as revolution, social change, class conflict, etc., in a comparative context. Three hours.

**293, 294 Seminar in Comparative African/Asian/Latin American History** Investigation of similarities and differences in experience of "Third World." Three hours.

**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 66 and contact Department for specific requirements. Three hours each.

## 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 66.

## Integrated Humanities (HUMN)

### COLLEGE OF ARTS AND SCIENCES

*Professors Dickerson, Hutton, Martin, Metcalfe, 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.

## International Studies (IS)

### COLLEGE OF ARTS AND SCIENCES

*Executive Committee: Professors Andrews, Dunlop, J. Ford, K. Ford, Gedeon, McCann, McKenna (Director), W. Metcalfe, Moyser, M. Mzamane, Shiman, Tashman.*

### 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/International Studies** See page 66 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.

## 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, Yamasaki.

**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, Yamasaki.

**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. Four hours each. Hayashi, Yamasaki.

**295 Advanced Special Topics** Advanced courses or semi-

nars on topics beyond the scope of existing department offerings. See Schedule of Courses for specific titles. *Prerequisites*: 101, 102 or equivalent. Three hours. Yamasaki.

## 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 International Studies for special topics listings.

**Anthropology** 161; **Geography** 56; **History** 61, 161, 162; **International Studies** 195, 196, 197, 198; **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. Clark.

## Mathematics (MATH)

#### COLLEGE OF ENGINEERING AND MATHEMATICS

*Professors Archdeacon, Aleong, Ashikaga, Burgmeier, Cooke (Associate Chairperson), Costanza, Dinitz, Foote, Golden, Gross, Haugh, Lakin (Chairperson), Oughtstun, Wright; Associate Professors Buzas, Dummit, Mickey, Sands, Son, Wilson, Yu, Zwick; Assistant Professor Yang; Lecturers Badger, Brown, Johansson, Karstens, Kost, Larson, Lawlor, Low, MacPherson, Morency, Putterbaugh, 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.

**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.

\*Math 21 may be accepted as the prerequisite for Math. 20 with permission of department.

**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.

\*\*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.

**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.

**41, 42 Mathematical Analysis I and II** Problem seminar, cultivating analytical skills through study of exemplary classical and modern problems. *Prerequisites:* Special interest in mathematics, adequate secondary school background, departmental permission; 41 for 42. 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.

**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. *Prerequisite:* Math. 52 or 104 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 Engineering and Math. curriculum. *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.

**223 Introduction to Formal Language Theory** (Same as Computer Science 223.)

**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.\* *Prerequisites:* 121, 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, 1995-96.

**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 Introduction to Theoretical Computer Science** (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, 1996-97.

**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, 1996-97.

**271 Applied Mathematics for Engineers and Scientists** Matrix theory, linear ordinary differential equations. Emphasis on methods of solution, including numerical methods. *Corequisite:* 121. Three hours. No credit for mathematics majors. For a mathematics concentration, a sequence beginning with 230 is advised. 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

**238, 239 Honors/Mathematics** See page 66 and contact Department for specific requirements. Three hours each.

## Mechanical Engineering (ME)

### COLLEGE OF ENGINEERING AND MATHEMATICS

*Professors Beliveau, Flanagan, Francis, Hermance, Hundal (Chairperson), Pope, von Turkovich; Associate Professors Durham, Huston, Keller, Wu; Assistant Professors Huston, Squires; Research Assistant Professor Beynnon; Adjunct Professor Sheporaitis; Lecturers Bean, Rossi; Adjunct Instructor Brooks.*

**1 Introduction to Engineering (2-3)** Introduction to engineering analysis and design. Communication methods. Design and research projects. Three hours.

**2 Graphical Communication (1-2)** Orthographic and isometric views, dimensioning, sketching, surface layout, graphs. *Prerequisite:* Enrollment in, or application for admission to, engineering. Two hours.

**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. *Prerequisites:* 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. *Coresquisite:* Physics 31 with 21. Three hours.

**42 Engineering Thermodynamics (3-0)** Properties and processes of fluids; the perfect gas, and approximate relationships for real gases; application of thermodynamics principles to areas such as combustion, mixtures, power cycles, gas compression, and refrigeration. *Prerequisite:* 40 or 41. Three hours.

**44 Introduction to Heat Transfer** Introductory treatment of heat transfer by conduction, convection, and radiation. *Coresquisite:* 40. One hour.

**95 Special Topics (1-3)** One hour.

**101 Engineering Materials (3-0)** Physical and mechanical metallurgy, structures, atomic, crystalline, amorphous; thermodynamics, multicomponent systems, phase equilibria; diffusion; electronic; structural changes, microplasticity, dislocations; fracture. *Prerequisite:* 14. Three hours.

**102 Materials Behavior (3-0)** Mechanical behavior: elastic, plastic. Testing: tensile, compression, impact, fatigue, creep. Failure: fracture, fatigue, corrosion. Modification of properties; polymers, ferrous and nonferrous metals, ceramics. *Prerequisite:* 101. 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.

**123, 124 Junior Laboratory (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. *Prerequisite:* 171. 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)** Design of machine elements; fatigue designs; selection of mechanical and electrical components; introduction to tribology. *Prerequisite:* Junior standing in engineering. 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 Senior Laboratory (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.

**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.

**232 Micromanufacturing Technologies (3-0)** Crystal processes; thin films; vacuum, chemical vapor deposition; integrated circuit materials, processes selection. Manufacture of semiconductors, printed circuit boards, microchips, wafers. Micromachining, microfilming, precision instruments. *Prerequisite:* 161. 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.

**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 (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.

**265 Integrated Product Development** (See Business Administration 293.) *Prerequisite:* Senior standing. Three hours.

**272 Mechanical Behavior of Materials (3-0)** Elastic and plastic behavior of single crystals; dislocations; approximate plastic analysis; anisotropic materials; hardness; residual stress, brittle, transitional and ductile fractures; fatigue; damping; creep and surface phenomena. *Prerequisite:* 101. Three hours.

**273 Corrosion of Materials** Corrosion principles: electrochemical, environmental, and metallurgical aspects. Corrosion testing. Corrosion prevention. Seawater corrosion.

Biological corrosion. Material selection. *Prerequisite:* 102. Three hours.

**277 Composite Materials** Fibers, matrices. Unidirectional and short fiber composites. Experimental characterization. *Prerequisite:* 102. 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. Three hours.

## Medical Technology (MEDT)

### SCHOOL OF ALLIED HEALTH SCIENCES

*Associate Professor Emeritus Lachapelle; Associate Professors Howard, Huot (Interim Chair), Reed, Sullivan; Lecturer Griffin; Clinical Associate Professor Wilcke; Clinical Assistant Professor Wadsworth; Clinical Instructors Busch, Bushor, Dopp, Durett, Fiore, Gibson, Giroux, Hammond, Hills, Isham, Koktowski, Messier, Morgan, Poudlen, Purchase, Raardon, Rowley, Standage, Sullivan, Thomas, Truskolowski, Westenfeld.*

**1 Professional and Health Issues in Medical Laboratory Science** Discussion of relevant issues in the profession of medical laboratory science and the delivery of health care. Fall. One hour.

**3 Medical Terminology** Terminology related to medical science and hospital services. Required of all students in Medical Technology. Open to nonmajors by instructor's permission. Fall. One hour.

**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.

**101 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. One hour.

**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.

**161 Introduction to Transfusion Medicine** Lectures and laboratory experiences in the basic principles of blood transfusion. Spring. Two hours. Howard.

**170 Medical Cytology Practicum** Development of expertise (speed and accuracy) of daily evaluation of slides of

gynecologic and nongynecologic materials for cellular changes. Ten hours. Spring.

**171 Medical Cytology I** Identification of cells and concepts of cell growth and differentiation. Biology and pathology of the female genital tract. Patient management and specimen collection techniques introduced. Four hours. Giroux.

**172 Medical Cytology II** Biology and pathology of the nongynecologic body systems. Medical cytogenetics introduced. *Prerequisites:* 171, 173. Cytology Lab I. Four hours.

**173 Medical Cytology Lab I** Microscopic study and recognition of normal and abnormal cellular manifestations in gynecologic materials. Three 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. Three hours. Giroux.

**175 Cytology Seminar** Topics in oncology, pathophysiology (case studies), and management. Students are responsible for some presentations. Three hours. Giroux.

**178 Cytology Term Project** Independent investigation of topic in medical cytology. Research project or extensive literature review are options. Written paper and oral presentation required. One to three hours. Giroux.

**179 Cytology Techniques** Handling and processing of cellular specimens is covered in two semesters. Includes collection, fixation, smear preparation, cytocentrifuge, staining, and safety techniques. Fall. Three hours.

**220 Clinical Practicum: Chemistry** Experiences with chromatography, immunoassays, random access analyses, and a variety of manual and automated test systems. MT majors only. Fall and 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.

**229 Seminar: Clinical Chemistry** Discussion of recent advances in clinical chemistry. One hour. Sullivan. (Not offered for graduate credit.)

**230 Clinical Practicum: Hematology** Experiences in clinical analysis of blood cells in the FAHC laboratories. MT majors only. Fall and 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:* Biochemistry 212. Fall. Three hours. Reed.

**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. 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. One hour. Huot.

**249 Seminar: Immunology** Discussion of recent advances in immunology. One hour. Huot. (Not offered for graduate credit.)

**250 Clinical Practicum: Microbiology** Practical experiences at Fletcher Allen Health Care. MT majors only. Fall and 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. One hour.

**259 Seminar: Clinical Microbiology** Discussion of recent advances in clinical microbiology. One hour. (Not offered for graduate credit.)

**260 Clinical Practicum: Immunohematology** Clinical experiences in operation of a hospital transfusion service and regional reference laboratory. MT majors only. Fall and spring. One and one-half hours. Howard.

**262 Advanced Immunohematology** Advanced theory and experience related to human blood groups and transfusion practice. Spring. Three hours. Howard.

**269 Seminar: Immunohematology** Discussion of recent advances and practices used in transfusion medicine. Spring. One hour. (Not offered for graduate credit.)

**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. *Prerequisite:* Chemistry 31, 32 or 23; 141, 142 or 42; Biology 1, 2 or Anatomy and Physiology 19, 20. Four hours. Howard, Huot.

**293 Research Concepts** Discussion of research methodology with or without individual research participation. *Prerequisite:* MT majors only. Fall and spring. Variable 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. Spring. Two hours.

**297 Undergraduate Research** Research projects sponsored by faculty. Variable credit.

**299 Special Topics** Courses or seminars beyond scope of existing departmental offerings. *Prerequisite:* Departmental permission. Variable credit.

## Merchandising, Consumer Studies, and Design (MCSD)

See Community Development and Applied Economics.

## Microbiology and Molecular Genetics (MMG)

COLLEGE OF AGRICULTURE AND LIFE SCIENCES  
AND COLLEGE OF MEDICINE

*Professors Albertini, Fishel, Fives-Taylor, Gump, Kurjan, T. Moehring, Novotny, Schaeffer, Wallace (Chairperson); Associate Professors Burke, Heintz, Johnson, Macara, Pederson, Sjogren, Tierney; Assistant Professors Bateman, Gilmartin; Research Professor J. Moehring; Research Associate Professors Kow, Raper; Research Assistant Professors 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 Microbiology and Molecular Genetics** Comprehensive introduction to molecular genetics, focusing on the molecular structure and functional aspects which underly modern biology. Emphasis on the experimental and conceptual aspects. *Prerequisite:* 101 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:* 101 or 102 or equivalent. Three hours. Silverstein.

**203 Mammalian Cell and Molecular Biology Lab** Analysis of gene expression in mammalian tissue culture cell lines. 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. T. Moehring. Alternate years, 1995-96.

**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.

**212 Yeast Molecular Genetics** The use of lower eukaryotes, such as the yeasts *Saccharomyces cerevisiae* and *Schizosaccharomyces pombe*, as model genetic systems to answer questions of biological importance. Three hours. Johnson. Alternate years, 1995-96.

**220 Environmental Microbiology** The activities of microorganisms, primarily bacteria, in air, soil, and water. *Prerequisite:* A previous course in microbiology. Three hours. Sjogren. Alternate years, 1995-96.

**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. Silverstein.

**223 Immunology** Analysis of the immune response with respect to structure and function of immunoglobulins and the T-cell receptor, tolerance, innate and adaptive immuni-

ty, the Major Histocompatibility Complex, hypersensitivity states, transplantation, cancer, and AIDS. *Prerequisite:* Instructor's permission. Three hours. Silverstein. Alternate years, 1995-96.

**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. Alternate years, 1996-97.

**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, 1996-97.

## Military Studies (MSTD)

*Professor: Lt. Col. Galbreath (Chairperson); Assistant Professors: Capts. Casciaro, Graham, Jensen; Instructors: Sgts. Bailey, Leary, Parks, Yates.*

*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.*

**1 Fundamentals of National Defense (1)** Provides a perspective on U.S. defense policy, military force structure, and their roles in providing for the nation's defense and attaining national objectives. *Prerequisite:* First-year or sophomore standing or departmental permission. One hour.

**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.

**3 Simulations and Wargaming (3)** Examines military and nonmilitary use of modeling, simulation, and wargaming. Surveys types of models, simulation, and wargaming in present use. Uses role-playing simulations and existing wargames to play test selected models. *Prerequisite:* 1. First-year or sophomore standing or departmental permission. Fall. Three hours.

**4 Contemporary Military Concepts (2)** Examines international uses of military forces viewed against a background of long-range national concerns (required subjects for sophomores). *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 in incorporating classroom instruction while developing unit cohesion and leadership techniques. No credit. *Prerequisite:* Enrollment in MS classes. Kuk.

**\*12 Rappelling** (1/2 Physical Education credit) Basic instruction in rope management, rope installation, and rappelling, consisting of both classroom instruction and outdoor practical exercises.

**\*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.

**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.

**101 Special Studies** (Academic credit as arranged) In-depth analysis of topics broached in 1, 2, 3, or 4. 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 Alpert (Chairperson), Evans, Gibbons, Low, Nelson, Pallak, Warshaw; Associate Professors Fujii, Haeblerle, Hamrell,

Osol, Stirewalt, Webb; Assistant Professors Berger, Schneider; Research Professor Maughan; Research Associate Professors Maddox, Mulieri; Research Assistant Professors Jones, Mitchell, Peterson, Rovner, 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. Szilva, Webb.

**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, T. Read, Wigness; Associate Professors Brown, Neiveem, Nelson; Assistant Professors Schneider, Sliker-Bouman; Lecturers Bedell, Blair, Boyer, Brubaker, Fleming, Geoghegan, Janson, Klimowski, E. Metcalfe, Pacun, Parker, Parshley, Polk, E. Read, Sklar, Soons.

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. Three hours.\*

**31, 32 Basic Musicianship** Study of melody and elementary harmony, melodic and rhythmic dictation, sight singing. *Prerequisites:* Rudiments of notation and ability to read music. Three hours. Metcalfe, Parker, 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. *Prerequisites:* 132, 134, or instructor's permission. Three hours. Parker, 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. 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.

**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. 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.\*

**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. *Prerequisite:* 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 20.

*For B.A. students with a concentration in performance and B.M. students, except theory majors, a senior recital is required. See repertory 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 accompaniment 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.

**5-8 Performance Study** Group voice, piano, jazz guitar, or jazz piano. No prerequisites, but contact must be made in Music Department office to determine availability of space. Lab fee required if taken as elective. One hour.

**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

**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. May be repeated for credit.

81 Brass Class

83 String Class

85 Voice Class

87 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. Bedell.

**281 Elementary Music Education Methods** (Same as Education EDMU 281). *Prerequisite:* Junior standing in Music Education. Three hours. Sliker-Bouman.

**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. Sliker-Bouman.

\*Courses may not be used to fulfill the major or minor requirements.

### HONORS – ARTS AND SCIENCES

**240, 241 Honors/Music** See page 66 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, King, Wang; Research Associate Professor Meals; Assistant Professors Ginger, Hughes, Levine; 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.

**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. Meals.

**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.

**103 Ecology, Ecosystems and Environment** Major ecological concepts and their application. Analysis of form, structure, and function of organisms, populations, communities, ecosystems, and landscapes. Concurrent enrollment in 104 is required for SNR majors. *Prerequisites:* 1, 2, Math. 10 or above, completion of SNR biological sciences distribution requirement, or permission. 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. Concurrent enrollment in 103 is required for SNR majors. *Prerequisite:* 2. 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.

**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** Discussion and application of basic techniques involved in the use of computer-based, geographically-referenced information systems. *Prerequisites:* Sophomore standing. Computer Science 3 or 11. Three hours.

**155 Fluvial Geology** (See Geology 155.) Three hours. Drake, Mehrtens.

**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 experiences. *Prerequisite:* 176. Three hours. (2.5 hours lecture per week and 20 hours lab per semester.) Cassell.

**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. Wang. Alternate years, 1996-97.

**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.

**244 Quantitative Assessments of Natural Resources** Principles associated with inventorying selected natural resources. Survey of measurement and estimation techniques for land, timber, wildlife, fisheries, surface water, and recreation. *Prerequisites:* One course in statistical methods, one 200-level natural resource course, instructor's permission. Three hours. Newton.

**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 Marsh 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, senior standing. Three hours (two hours lecture and three hours laboratory per week). 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. McIntosh.

**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.

## Nursing (NURS)

### SCHOOL OF NURSING

*Professor McGrath, Interim Dean.*

*Professional Nursing: Professor Hamel-Bissell, Winstead-Fry; Associate Professors Brown, Gilbert (Chairperson), Green-Hernandez, B. Murray, Palmer; Assistant Professors Botter, Carr, Ellinger, B. Johnson; Clinical Associate Professor M. Johnson; Lecturers Kasprisin, Laferriere, Meloan, Tyler, Whitney; Adjunct Associate Professor Dale; Adjunct Assistant Professors Curry, Churchill, Davis, Gruppi, Hawksworth, Ireland, L'Herauld, McDonald, Sample, Webber-Jones; Instructor Owen.*

*Technical Nursing: Associate Professors Clarke (Chairperson), Cohen; Clinical Associate Professor Palumbo; Lecturers Gagne, Goetschius, McCay, Perrault; Adjunct Assistant Professors Clough, Geran, Resi, Rinker.*

### 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 instructor 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 instructor's permission. Three hours.

### 195, 196 Special Topics

### PROFESSIONAL NURSING MAJOR (PRNU)

*Note: All courses limited to students majoring in Nursing.*

**25 Concepts in Nursing and Health** Study of psychosociocultural effects on health, health care, and the professional nursing role. Introduction to cognitive processes and communication skills used in nursing. Two hours.

**26 Introduction to Nursing Skills** Identification and application of basic nursing skills. Self-directed study, creativity and application of knowledge emphasized. Includes supervised experience in clinical setting. *Prerequisites:* Sophomore standing; a grade of C- or better in Anatomy and Physiology 19. *Pre- or Corequisites:* A grade of C- or better in Anatomy and Physiology 20, Microbiology and Pathogenesis 65 or Principles of Microbiology 54.

**125-126 Nursing I and II** Development of knowledge and skills needed to assess and maintain psychosocial, physical, and physiological integrity of individuals of all ages during health and episodes of illness. Health problems resulting from common deviations from normal physical, physiological, and psychosocial functions. Dynamics of groups (family and peer). Laboratory experiences in different hospital settings and with families in community. *Prerequisites:* A grade of C or better in PRNU 25 and 26, a grade of C- or better in Chemistry 23 and 26, Anatomy and Physiology 19 and 20, Microbiology and Pathogenesis 65 or Principles of Microbiology 54, Early Childhood and Human Development 80 and 81, Psychology 1, Fundamentals of Nutrition 43, Sociology 1 or 11 and a grade-point average (GPA) of 2.0.

**128 Nursing Implications of Drug Therapy** Study of drug influences on major body functions and the nurse's role in drug therapy. *Prerequisites:* A grade of C- or better in Chemistry 23 and 26, Microbiology/Pathogenesis 65, Anatomy and Physiology 19-20, and a grade of C or better in PRNU 25 and PRNU 26, or instructor's permission. Three hours.

**195 Independent Study** Independent study in nursing as indicated by student's interest. *Prerequisite:* Departmental permission. One to three hours.

### 196 Special Topics

**225 Nursing III** Continuation and expansion of 125-126. Content and experiences organized around interrelationships of the individual, family, and community at varying levels of wellness. Focus is on more complex nursing challenges. Laboratory experiences in community agencies including the hospital. *Prerequisites:* A grade of C or better in 126, 128. Nine hours. (Not offered for graduate credit.)

**226 Nursing IV** Study and practicum focusing on knowledge and skills needed to assume role of a professional nurse. Core content includes theory on the nurse as change agent, leader, and accountable professional. Laboratory experience in leadership occurs in the same setting as 252. *Prerequisites:* A grade of C or better in 225, 251. Nine hours. (Not offered for graduate credit.)

**251 Nursing Research** Introductory research course. Knowledge and skills essential for the professional nurse to facilitate the conduct and utilization of research are presented. *Prerequisite:* A grade of C or better in PRNU 126, a grade of C- or better in Statistics 111 or 141. Three hours.

**252 Senior Practicum** Practicum in a setting selected to meet student identified learning objectives. *Prerequisites:* A grade of C or better in 225, 251. Six hours. (Not offered for graduate credit.)

### TECHNICAL NURSING MAJOR (TENU)

The Department of Technical Nursing will be eliminated and the associate degree program terminated at the end of the 1995-96 academic year.

**123-124 Nursing Care of Children and Adults** Focuses on using the nursing process to identify alterations in normal human functions to arrive at nursing diagnosis. Concurrent clinical experiences in hospital setting provided. *Prerequisites:* 15-16, Anatomy and Physiology 19-20, Nutritional Sciences 43, Early Childhood and Human Development 80, 81, English 1. Ten hours. Copeland, Gagne, Malone-Rising, Moss.

**130 Nursing Seminar** Focuses on issues in nursing and the role of the associate degree nurse within the profession of nursing. *Prerequisite:* 123. Two hours. Clarke.

**195 Independent Study** Independent study in nursing as indicated by student's interest. *Prerequisite:* Departmental permission. One to two hours.

## Nutritional Sciences (NUSC)

### COLLEGE OF AGRICULTURE AND LIFE SCIENCES

*Professors Carew, Chamberlain; Associate Professors McArthur, Pintauro, Ross, Sheard, Tyzbir (Chairperson); Assistant Professors Clark, Johnson; Extension Assistant Professor Harvey; Lecturers Geiger, Knisley; Adjunct Instructors DeFuria, Estrin, Lyons.*

**37 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.

**38 Basic 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:* 37 or concurrent registration in 37 or permission. One hour. Ross. Spring.

**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: Nutritional 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.

**52 Home Economics in Contemporary Schools** Principles and philosophies of home economics education. Exploration in education careers provided through 30 hours of observation and participation in actual school settings. Three hours. Chamberlain. Fall/spring.

**138 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. Includes field trips and studies of the techniques of different types of food service establishments. *Prerequisite:* 37. Four hours. Geiger. Fall.

**143 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. *Prerequisite:* 43 or equivalent. Three hours. Tyzbir. Fall.

**144 Nutrition in the Life Cycle (3-0)** Nutritional needs of individuals during the life cycle emphasizing physiological and environmental factors which affect nutritional status. Designed for nutrition majors. *Prerequisites:* 43, Chemistry 42 or 141 or equivalent, completed or concurrently enrolled in Anatomy/Physiology 19 or equivalent. Three hours. Johnson. Fall.

**151 Management of School Youth Organization** 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.

**155 Teaching Practicum in the Human Sciences** Teaching in elementary or secondary schools under guidance of cooperating teacher and college supervisors. Credits variable up to 15 hours per semester. Chamberlain. Fall/spring.

**195 Special Topics** Lectures, laboratories, readings, or projects relating to contemporary areas of study. 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. Hours arranged, 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. *Prerequisites:* Arrangement with faculty member, department chairperson permission. Credit negotiable up to three hours per semester.

**235 Recent Advances in Foods and Nutrition** Interpretation and application of particular topics and trends in foods and nutrition as evidenced through literature and research. May be taken more than once for a maximum of nine hours. *Prerequisites:* 43, Chemistry 42 or equivalent, Anatomy/Physiology 19; junior standing. Three hours.

**237 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. *Prerequisite:* Agricultural Biochemistry 201. Three hours. Pintauro. Spring.

**238 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:* Business Administration 120; Nutrition 138 or permission. Three hours. Geiger. Spring.

**239 Curriculum Development in the Human Sciences** 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. *Prerequisite:* Nine hours in education or instructor's permission. Three hours. Chamberlain. Fall.

**240 Methods in Nutrition Education (2-2)** Needs assessment, planning, and presenting of appropriate methods and materials for an identified audience in a community, school, or institutional setting emphasizing interpersonal communication, interviewing, and group process skills. *Prerequisites:* 43, Speech 11 or equivalent; junior standing. Three hours. Chamberlain. Fall/spring.

**242 Advanced Nutrition (3-0)** Study of nutrients and their specific functions in metabolic process integrating cellular physiology, biochemistry, and nutrition. *Prerequisites:* 43, Agricultural Biochemistry 201 or equivalent, Anatomy/Physiology 19 or equivalent; junior standing. Three hours. Tyzbit. Spring.

**243 Evaluation Techniques in the Human Sciences** Test and questionnaire construction and nontesting means of evaluation, usability, validity, reliability, and discrimination of evaluation instruments. Selected sociometric techniques and evaluation in affective domain. *Prerequisite:* 240 or instructor's permission. Chamberlain. Spring.

**245 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:* 242 or instructor's permission. Three hours. Tyzbit. Fall.

**246 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:* 37, 144, 240, 242. Four hours. Ross. Fall.

**248 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:* 246, senior standing. Three hours. Johnson. Spring.

**249 Nutrition Seminar (1-0)** Review of recent developments in nutrition research. *Prerequisites:* 242, instructor's permission. One hour. Pintauro. Fall/Spring.

**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.

**296 Field Experience** Professionally-oriented field experience under joint supervision of faculty and business or community representative. Credits negotiable. May enroll more than once. Maximum up to 15 hours in 196 and 296 combined. *Prerequisite:* Departmental permission.

## Pathology (PATH)

### COLLEGE OF MEDICINE

*Professors Bovill (Chairperson), Craighead, Hardin, Howard, Macara, Mossman, Stark, Trainer, Winn; Associate Professors Heintz, Huber, Leslie, Lind, Lunde, MacPherson, Morrow, Pendlebury, Thor, Tindle, Tracy, Waters, Yandell; Assistant Professors Adams, Allen, Mattia, Mount, Taatjes, Tang, Tutschka, Weaver, 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 Pathobiology** Basic introductory course in pathological mechanisms of disease for graduate students and postdoctoral fellows who are not candidates for M.D. degree, advanced medical students, pathology residents, and undergraduates by permission of course director. Alternate years. Three hours. Not offered 1995-96.

**375 Special Topics in Molecular Pathobiology** Four independent, rotating one-semester modules concerning coronary heart disease, DNA replication, control of cell cycle and human genetics. Based on critical review of primary literature. *Prerequisites:* Biochemistry 301, 302, open to undergraduates with instructor's permission. Crosslisted with Cell Cycle Module, Microbiology and Molecular Genetics 310, Zoology 381. Cell cycle modules, three hours; others two hours. Heart module: Taatjes; t.b.a.: Tracy; DNA replication module: Heintz; Cell cycle module: Macara (with others); Human genetics: 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:* 305, immunology (Microbiology 223) desirable, or departmental permission. Two hours. Alternate year course with 305.

## Pharmacology (PHRM)

### COLLEGE OF MEDICINE

*Professors J. Bevan (Chair), R. Bevan, Hacker, McCormack, Nelson, Scollins, Triton; Associate Professors Brann, Brayden, Shreeve; Research Assistant Professors Bhushan, Bigelow, Visiting Professors Dustan, Standen; Visiting Associate Professor Hescheler; Visiting Assistant Professors Jones, Kovacs; Adjunct Assistant Professor Bress.*

**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. Hacker.

**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 Guignon, Hall, Kornblith (Chairperson), Mann; Associate Professors Christensen, Kuflik, Pereboom; Assistant Professors Chan, Loeb, 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.

\*Credit will not be given for more than one of 1, 3, 4.

**13 Introduction to Logic** Study of the basic principles of deductive inference. Three hours. Christensen, Kornblith, Mann.

**101 History of Ancient Philosophy** Study of the works of the Pre-Socratics, Plato, Aristotle, and their successors. *Prerequisite:* 1, 3, or 4. 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, or 4. 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, or 4 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, or 4. 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, or 4. 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, or 4. 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, or 4. 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, or 4 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, privacy, 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, or 4 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, or 4. Three hours. Offered once a year. Kuflik, Loeb.

**151 Philosophical Ideas in Literature** Philosophical themes as exemplified in literature. *Prerequisite:* 1, 3, or 4. 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, or 4. Three hours. Offered once a year. Hall.

**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, or 4, or instructor's permission. Three hours. Guignon.

**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 66 and contact Department for specific requirements. Three hours each.

## Physical Therapy (PT)

### SCHOOL OF ALLIED HEALTH SCIENCES

*Professor Feitelberg (Chair); Professor Emeritus Moffroid; Associate Professors Held, Reed, Zimny; Clinical Associate Professors Nalette, Nelson, O'Rourke; Clinical Assistant Professor Sands; Adjunct Clinical Assistant Professor Henry; Clinical Instructor Currier.*

**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. Feitelberg.

**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. Currier, Zimny.

**121 Musculoskeletal Evaluation and Management Procedures** Principles of assessment and management of musculoskeletal dysfunction. Observational, manual, and professional 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.

**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. Reed.

**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 Communications in the Health Care Setting** Development of the written and verbal skills of professional com-

munication 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 the practice of physical therapy. *Prerequisites:* 41, 142, 143. Three hours. Feitelberg, Nalette.

**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. Nalette.

**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. 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. Feitelberg, Held, O'Rourke, Reed, Zimny.

**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. Held.

## Physics (PHYS)

### COLLEGE OF ARTS AND SCIENCES

*Professors Arns, Brown, Rankin, Smith (Chairperson); Associate Professors Spartalian, Wu; Assistant Professors Anderson, Clougherty, Yang.*

**2a, b, c Topics in Physical Science** A sequence of three four-week mini-courses offered for one credit each on topics announced in advance. Students may enroll for from one to three credits. Limited use of algebra and geometry.

**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.

**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 (1-2)** *Prerequisite:* Concurrent enrollment or credit in 11 or 31. One hour.

**22 Introductory Laboratory II (1-2)** *Prerequisite:* Concurrent enrollment or credit in 12 or 42. 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. Three 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. Three 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 (3-2)** Classical and electromagnetic waves, physical optics, wave-particle phenomenology, wave mechanics, and applications of the Schrödinger equation. *Prerequisites:* 42, Math. 121. Four hours.

**170 Geophysics (3-0)** Structure of the solid earth, using seismic, magnetic, and gravitational methods. *Prerequisites:* Six hours calculus, six hours physics. Three hours. Alternate years, spring 1995.

**195, 196 Intermediate Special Topics** Intermediate courses or seminars on topics beyond the scope of existing department 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. 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. Alternate years, spring 1996.

**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:* 128 or 42; Math. 121. Three hours.

**273 Quantum Mechanics I** Introduction to nonrelativistic quantum mechanics. Schrodinger 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 66 and contact Department for specific requirements. Three hours each.

## Plant and Soil Science (PSS)

### COLLEGE OF AGRICULTURE AND LIFE SCIENCES

*Professors Aleong, Bartlett, Boyce, Magdoff, Murphy, Parker, Pellett; Assistant Professor Mzamane; Extension Professors Costante, Gollieb; Extension Associate Professors Berkell (Chairperson), Bosworth, Jokela, Perry; Research Assistant Professor Froeliger; Research Assistant Professors Brownbridge, Harper, Ross, Skinner.*

**7 Orientation to Urban Forestry and Landscape Horticulture** Survey of professions and career planning in Urban Forestry and Landscape Horticulture. One hour. Donnelly, Pellett.

**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. Course does not meet distribution requirements for P&SS majors. Three hours. Boyce, Pellett.

**11 Principles of Plant Science** Principles and practices involved in the culture, management, and utilization of economically important horticulture and agronomic crops. Three hours. Boyce.

**22 Agroecology** An ecosystem approach to agriculture. Topics include: evolution of ecological thinking in agriculture, plant/soil ecosystems, ecological design principles, specific sustainable systems (permaculture, biodynamics, agroforestry, organic). Three hours. Harper.

**24 Composting Ecology and Management** Examines the ecological principles and practical management of the composting process. Topics include: principles, methods, materials, site factors, microorganisms, macrofauna, maintenance, problem solving, and use. Three hours. Harper. Alternate years, 1996–97.

**51 Agriculture in the Third World** Indigenous agricultural systems in Latin America, Caribbean, African, Asian, and Pacific countries contrasted ecologically, economically, and socio-politically with imported approaches to agricultural research and development. Three hours. Mzamane.

**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. Boyce.

**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. Pellett. Alternate years, 1995–96.

**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, 1996–97.

**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. Pellett.

**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. Pellett.

**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, 1996–97.

**145 Turfgrasses (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, 1996–97.

**161 Introductory Soil Science (3-3)** Biological, chemical, and physical properties of the dynamic soil system as related to plant growth and environmental problems. Including: management of agricultural and forest soils, wetlands, permaculture, waste disposal, pollution, and bioremediation. *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, 1996–97.

**207 Water Relations of Plants** (See Forestry 229.) Three hours. Donnelly and Botany and Plant and Soil Science staff. Alternate years, 1996–97.

**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, 1995–96.

**215 Weed/Crop Ecology** Weed identification, reproduction, ecological relationships with crops, and integrated management. *Prerequisite:* 11, 161 or permission. Three hours. Murphy. Alternate years, 1996–97.

**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 of management intensive grazing. *Prerequisites:* 11, 161 or permission. Three hours. Murphy. Alternate years, 1995–96.

**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. Boyce. Alternate years 1996–97.

**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, 1996–97.

**261 Soil Classification and Land Use (2-4)** Field techniques that describe soil properties and classification; the principles and processes of soil genesis; land use classification systems; and the challenges of competing land uses. *Prerequisite:* 161 or permission. Harper. Alternate years, 1996–97.

**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, 1996–97.

**266 Soil Physics (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, 1995–96.

**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, Nelson, Ventriss, Wertheimer; Associate Professors Bryan, Burgin, Feldman, Forrest, Neal, Rice, Stavarakis, Taylor; Assistant Professors Gause, Gierzynski, Kaufman, Kingstone, Smith, Steele, Pubbs, Zheng.*

*The following courses (21, 41, 51, 71, 81) may all be taken without prerequisite. Each course introduces students to a different sub-field of political science.*

**21 American Political System** Institutions, processes, and problems of American government. Three hours.

**41 Introduction to the Problems of Political Thought** Examination of basic problems in political philosophy, e.g. mortality and law; punishment; freedom; equality; obligation and disobedience. Three hours.

**51 International Relations** The state as actor in international relations. Global division and problems. Three hours.

**71 Comparative Political Systems** Examination of political behavior, political structures, and political processes from a cross-national perspective. Three hours.

**81 Political Behavior** Introduction to the political beliefs and activities of individual citizens. Topics include: voting, elections, socialization, and public opinion. Three hours.

*All courses numbered 121–198 require sophomore standing and the appropriate core course.*

**121 Law and Politics** An examination of civil and criminal justice in the U.S. *Prerequisite:* 21. Three hours.

**122 Constitutional Law I** Emphasis on developing skills of legal analysis. Historical origins and general principles of constitutionalism. *Prerequisite:* 121. 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 Civil Rights in America: Law and Politics** Legal, political, historic bases of race and discrimination in America. Federal courts' efforts to provide equal justice examined; congressional and presidential efforts to end race discrimination. *Prerequisites:* 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.

**134 Public Policy Analysis** Examination of the principles for choosing among alternative public policies. Discussion of basic analytical tools, e.g. welfare economics, cost-benefit analysis, operations research. *Prerequisites:* 21, 41; Economics 11-12 strongly recommended. 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. Three hours.

**136 Subnational Political Systems** Politics, institutions,

and policy in state and local governments of the U.S. Topics include state legislatures, parties, and public policies. *Prerequisite:* 21. Three hours.

**141, 142 History of Political Thought** First semester: Development of political thought from Plato to Burke. Second semester: Political thought of the 19th and 20th centuries emphasizing socialist ideologies from Marx to Marcuse. *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.

**145 Introduction to Political Economy** Basic concepts and historical development of international political economy. Topics include capitalism; socialism; several hybrid systems; trade and industry policy. *Prerequisites:* 51, 71; Economics 11 or 12 strongly recommended. 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.

**151, 152 American Foreign Policy** First semester: Constitutional principles, institutional factors, and historic traditions in the formation of foreign policy. Second semester: Contemporary policies toward specified countries. *Prerequisite:* 21, 51. Three hours.

**153 International Organization** Theory and practice in supranational institutions. *Prerequisite:* 51. Three hours.

**161 Political Geography** (See Geography 177.) *Prerequisite:* 51 or 71 or Geography 1 or 3.) Three hours.

*Courses numbered 170–179 may be taken by International Studies majors without political science prerequisite if the student has the appropriate area studies background.*

**170 Politics and Political 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 Government and Politics of the Soviet Union and Its Successor States** Examination of the structure and process of the Soviet Union and its successor states. *Prerequisite:* 71. Three hours.

**173 Canadian Political System** Institutions, process, and problems of the Canadian polity. *Prerequisite:* 71. Three hours.

**174 Latin American Political Systems** 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.

**176 Government and Politics of Japan** Institutions, process, and problems of government of Japan. *Prerequisites:* 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.

**178 The Israeli Political System** Background, contemporary political structures and behavior, and current foreign policy considerations in Israeli politics. *Prerequisite:* 71. Three hours.

**179 Women 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:* 21 or 81. Four hours.

**183 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:* 81. Three hours.

**185 Voting Behavior** Introduction to theories of voter turnout and candidate choice. Topics include: the social background of voters, partisanship, political issues, the impact of campaigns and media. *Prerequisite:* 21 or 81. Three hours.

**186 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, 81. Three 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 221–298 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.*

**221 Urban Government and Politics** An analysis of metropolitan governments and their problems and roles. *Prerequisites:* 21, three hours at 100 level. Three hours.

**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.

**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.

**251 Foreign Policy of the U.S.S.R. and its Successor States** Historical topical study of Soviet foreign relations of the Soviet Union and its successor states. *Prerequisites:* 51, three hours at 100 level. Three hours.

**252 Craft of Diplomacy** Emphasis on experiences and reflections of diplomatic personalities, supplemented by studies of specialists. *Prerequisites:* 51, three hours at 100 level. Three hours.

**253 Defense Politics Seminar** U.S. defense politics, policies, and processes. Civil-military relations, strategic policy, arms control, defense-industrial complex, defense budget. *Prerequisite:* 151. Three hours.

**254, 255 International Law I, II** Principles and applications of public international law. *Prerequisites:* For 254: 51, three hours at 100 level; for 255: 254. Three hours.

**256 Marxism in the Third World** Explores Marx's theory of revolution, Marx's writings on the third world, and contemporary Marxist writings on the third world. Second part of the course focuses on revolutionary strategies and country case studies. *Prerequisites:* 41, 51, 71, three hours at 100 level. Three hours.

**257 Politics of European Integration** Survey of the European community, including development, public opinion, institutions, internal policies, external relations, and future prospects. *Prerequisites:* 51, 71, and three hours at the 100 level; or 171. Three hours.

**259 Seminar in International Relations** Three hours.

**271 Peasants, Politics, and Rebellion** Peasants as political actors with a focus on rural ecology and economy, peasant mentality and culture, and theories of rural rebellion and revolution. *Prerequisites:* 71, three hours at 100 level. 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.

**273 Comparative Judicial Systems** The political roles of courts in modern democracies, e.g. Sweden, England, France, West Germany, Italy, Canada, the U.S., Australia, and Japan. *Prerequisites:* 71, three hours at 100 level or 121. Three hours.

**274 Comparative Legislative Behavior** The important structures, processes, and functions of legislative institution

in a variety of Western and non-Western societies with discussion of comparative research methodologies. *Prerequisites:* 71, three hours at 100 level. Three hours.

**275 Comparative Federalism** Comparative study of federal political institutions and political behavior in Canada, the U.S., Australia, and West Germany. *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:* 171. 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.

**279 Seminar in Comparative Politics** Three hours.

**283 Methods of Political Science Research** Examination of advanced problems in political methods. Topics include: measurement, correlation, multiple regression, and scaling techniques. *Prerequisite:* 181, or equivalent with instructor's permission. 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.

**287 Participation and Democracy** Political participation in selected Western democracies. Topics include the structure of participation; social bases of political activism; protest; mass-elite linkages. *Prerequisites:* 81, three hours at 100 level. Three hours.

**289 Seminar in Political Behavior** Three hours.

**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 66 and contact Department for specific requirements. Three hours each.

## Psychology (PSYC)

### COLLEGE OF ARTS AND SCIENCES

*Professors Emeriti* Albee, Ansbacher; *Professors* Achenbach, Bond, Bouton, J. Burchard, Compas, Crockenberg, Gordon, Guilar, Howell, Hughes, Joffe (Chairperson), Kapp, Lawson, Leitenberg, Lubker, Musty, Rosen, Rothblum; *Associate Professors* Bickel, Bronstein, S. Burchard, Gordon, Hasazi, Higgins, Kessler, Leff, Miller, Yadav; *Assistant Professors* Gorman, Young; *Research Associate Professors* Belenky, Solomon; *Research Assistant Professors* Dorans, Hamilton, Perry, Supple, Widrick; *Adjunct Associate Pro-*

*ceptors Carling; Adjunct Assistant Professors Gioffari, Gottlieb, Hemley, Nemazee, Riess, Wells, Yoe; Adjunct Instructor Deforge; Clinical Associate Professors Dietzel (Emeritus), Peyser, Willmuth; Adjunct Instructor Froelich; Clinical Assistant Professors Budney, Butler, Does, Fondacaro, McKenna, Reynolds.*

Credit not given for 101 and 109 or 110.

**1 General Psychology** Introduction to the entire field, emphasizing the behavior of the normal adult human being. Three hours. Joffe.

**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 students to conduct and report research in psychology, with special attention to experimental procedures in learning and cognition. Laboratory experiences. *Prerequisite:* 109. Four hours.

**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.

**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. Albee, 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.

**163 Process and Effects of Mass Communication** Study of mass communication process and effects in socialization of children, diffusion of information, and persuasive campaigns in such areas as health, politics, consumer behavior. *Prerequisite:* 1. 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:* 110 or 101. Three hours. Bouton.

**206 Motivation** Theory and research on the nature of motives, their influence on behavior, and their relation to

other psychological processes. *Prerequisite:* 110 or 101. Three hours.

**207 Thinking** Survey of cognitive psychology, examining theory and research on perception, memory, language, cognition, and their interactions. *Prerequisites:* 110 or 101. 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:* 110 or 101 or Biology 102. Three hours. Bouton.

**221 Physiological Psychology I** Structure and function of mammalian nervous system, emphasizing neurological correlates of sensory experience and perception. Individual laboratory experience. *Prerequisite:* 110 or 101. For hours. Kapp.

**222 Physiological Psychology II** Study of role of central nervous system mechanisms in determination of innate behavior, arousal, motivation, learning, and memory. Individual laboratory experience. *Prerequisite:* 221. Four hours. Kapp.

**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:* 110 or 101, 121 or 222. Three hours. Musty.

**230 Advanced Social Psychology** Advanced survey of current research on the behavior of individuals in social situations. *Prerequisite:* 110 or 101 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. 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 101 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 101 or 130 or 230; other advanced background in education or a social science. Three hours. Yadav.

**240 Organizational Behavior** Study of the impact of macro and micro features of organizations (culture, systems, and individuals) upon leadership, decision making,

group process, conflict, and organization development. *Prerequisites:* 1, 109, 110, 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:* 152; 110 or 101. 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 101 or 161 (109 may be taken concurrently). Three hours. Hasazi.

**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 or 101, 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:* 152. Three hours. Albee, Joffe.

**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:* 110 or 101 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 or 101. Three hours. Bronstein.

**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 101 or 161 (109 may be taken concurrently). Three hours. Bond.

**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 101 or 161 (109 may be taken concurrently). Three hours.

**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.

**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 101 or 161 or 163. Three hours. Yadav.

**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 66 and contact Department for specific requirements. Three hours each.

## Public Administration (PA)

COLLEGE OF ARTS AND SCIENCES/DEPARTMENT OF POLITICAL SCIENCE

*Professors Burke, Cooper (Program Director), Ventriss; Part Time: Professor Ball; Campus Affiliated Faculty: Professors Lawson, Wertheimer; Associate Professors Bryan, Hindes, R. Martin, Parke, Patterson, Tashman, Twardy, Woolf; Assistant Professors Gierzynski, Tubbs; UVM President Salmon; Lecturers Altemus, Haupt, Meier.*

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.

## Radiologic Technology (RT)

SCHOOL OF ALLIED HEALTH SCIENCES

*Associate Professor Izzo; Lecturers Ball, Kellogg, Marschke (Interim Chair); Instructors Biron, Giasson; Clinical Associate Professor Patt; Clinical Assistant Professors Chiaravalle, Pembroke; Clinical Instructors Birch, Chatoff, Elgert, Farrand, Hard, Jarvis, Lew, McCarthy, McGovern, Morely, Newman, Reid, Relation, Shea, Tumielewicz.*

#### FOR NONMAJORS

**55 The Use of Radiation in our Society** A mini-course to introduce nonmajors to radiation. Covers applications in medicine and industry as related to benefits and risks. *Prerequisite:* Sophomore standing. One hour (five weeks). Izzo, Marschke.

#### FOR ALL MAJORS

**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. *Prerequisite:* Instructor's permission. Three hours. Marschke.

**6 Introduction to Medical Terminology and Human Anatomy** Introduction to the clinical setting by presenting information about patient handling, medical ethics, diagnostic and therapeutic procedures, medical terminology, and human anatomy. *Prerequisite:* Enrollment in the Radiologic Technology curriculum or instructor's permission. Two hours. Giasson, Marschke.

**77 Summer Clinical Practicum (0-40)** Thirteen weeks during summer at an affiliated hospital. Both 77 and 177 required to meet eligibility requirements of national certifying examinations. Three hours. Giasson, Marschke, McCarthy, Pembroke.

**91, 92 Special Radiologic Projects** Independent projects under direction of faculty members. *Prerequisite:* Faculty permission. Variable credit hours.

**142 Senior Seminar** Topics include: related allied health modalities, career mobility, national certification, and future trends; also includes research methods and requires completion of a project. *Prerequisite:* Senior standing in Radiologic Technology. Two hours. Giasson, Marschke.

**177 Summer Clinical Practicum (0-40)** Thirteen weeks during summer at an affiliated hospital. Both 77 and 177 required to meet eligibility requirements of national certifying examinations. Three hours. Giasson, Marschke, McCarthy, Pembroke.

**191, 192 Advanced Radiologic Projects** Independent projects under direction of faculty members. *Prerequisite:* Permission of department chairperson. Variable credit hours.

### NUCLEAR MEDICINE TECHNOLOGY MAJORS

**31 Introduction to Nuclear Medicine Technology (1-0)** Introduction to patient positioning, film processing, anatomical, pharmaceutical, and technical considerations in common imaging procedures. *Prerequisites:* Credit or concurrent enrollment in 33, Anatomy and Physiology 19. One hour. Giasson, Kellogg.

**32 Radiopharmacology (3-0)** Introduction to concepts of radioactivity, dose calculations, radionuclide generators, radiopharmaceuticals and their biological tracing mechanisms, radiation protection, patient dosimetry, and quality control. *Prerequisites:* 31, concurrent enrollment in 34, 4. Three hours. Giasson, Izzo.

**33, 34 Nuclear Medicine Clinical Practicum (0-4)** Routine imaging procedures emphasizing patient positioning, instrumentation, and film processing on Gamma Cameras; includes introduction to pharmacology. *Prerequisite:* Enrollment in RT. One hour. Giasson.

**131 Nuclear Medicine Imaging (5-0)** Principles of imaging procedures emphasizing anatomy, physiology, pathology, radiopharmaceuticals, positioning, film critique and pathology recognition, instrumentation principles, computer applications, quality control, and current research. *Prerequisite:* 32 or instructor's permission. Five hours. Giasson, Izzo.

**132 Radioassays in Nuclear Medicine (2-2)** Principles and technical considerations for *in vivo* and *in vitro* clinical tests, emphasizing competitive binding and immunological techniques; includes equipment operation, quality control, and labs using commercial kits. *Prerequisites:* 32, Chemistry 23. Three hours. Giasson.

**133, 134 Advanced Nuclear Medicine Practicum (0-12)** Experience in advanced clinical and pharmacological procedures, including portable gamma camera, computers, departmental administration, cardiac studies, and radioassays. *Prerequisites:* 34 for 133, 133 for 134. Three hours. Giasson.

### RADIATION THERAPY TECHNOLOGY MAJORS

**21, 22 Introduction to Radiation Therapy (1-0, 1-2)** Introduction to the theories and practice of radiation therapy technology through discussion and laboratory sessions. *Prerequisites:* 4 for 22; enrollment in Therapy program. Two hours. Marschke.

**23, 24 Radiation Therapy Clinical Practicum (0-4)** Students observe and participate in the Medical Center Hospital of Vermont Radiation Therapy Department. *Prerequisite:* Enrollment in Therapy program. One hour. Biron, Marschke, Pembroke.

**26 Radiologic Technology Clinical Lab** Concurrent enrollment in RT 24, the clinical practicum course. Activities include unit calibration, patient care and handling, immobilization techniques, etc. *Prerequisite:* 23. One hour. Biron.

**121, 122 Radiation Therapy Techniques (3-0, 3-1)** Instructs students in the theory and clinical techniques involved in radiation therapy. *Prerequisite:* 121 for 122. Three hours, four hours. Marschke.

**123, 124 Senior Radiation Therapy Clinical Practicum (0-10)** A continuation of 23, 24 emphasizing increasing clinical capabilities. *Prerequisites:* 23, 24. Three hours each. Marschke, Pembroke.

**125 Clinical Oncology (3-0)** Various types of neoplasms, methods of treatment, and elementary pathology. *Prerequisite:* Anatomy and Physiology 19-20 or instructor's permission. Three hours. Marschke.

## Recreation Management (RM)

### SCHOOL OF NATURAL RESOURCES

*Professor Manning (Program Chair); Associate Professors Gilbert, Hudspeth, Lindsay; Assistant Professor Kuentzel; Lecturers Kaufman, Koenemann, Vissering; Adjunct Associate Professors Echelberger, More.*

**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. Lindsay.

**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. Vissering.

**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. Koenemann.

**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, 1996-97.

**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. Koenemann.

**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. Lindsay.

**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. Not offered 1996-97.

**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 Andrews, Martin, Paden (Chairperson); Associate Professors Brenneman, Clark, Gussner, Sugarman; Assistant Professor Trainor.*

*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. Brenneman, Gussner, 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. Andrews, Brenneman, Gussner.

**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. Martin, Sugarman.

**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. Gussner.

**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. Fall. Brenneman, Paden.

**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. 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. Martin.



**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. Gussner.

**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. Andrews.

**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. Andrews.

**145 Religion in China** Examination of the content and development of the folk, Confucian, Taoist, and Buddhist traditions, and of contemporary Marxist values. *Prerequisite:* Three hours in religion. Three hours. Andrews.

**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. Gussner.

**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. through 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. Andrews, Gussner, 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 66 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, 1995–96.

**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, 1996–97.

### 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, Kuizenga (Chairperson), Senécal, Weiger, Whalley, Zárata; Associate Professors Crichfield, Maura, Murad, Roof, van Slyke, Wesseling; Assistant Professors Bamps, Escaja, Mazzoni, Ngame, Senior, Whitebook; Visiting Assistant Professor Pardo; Lecturers Byerly, Green, Jamieson, Murad, Rubaud, Simon, Wesseling.

*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.

**101 Intensive Written Expression** Guided practice of French written expression through a systematic study of writing processes and strategies. 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.

**201 Advanced Composition and Conversation** Course activities (discussions, exposés, written work, etc.) designed to lead to mastery of French oral and written expression. 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. Three hours. Carrard, Rubaud, van Slyke.

**210 Romance Philology** Development of French, Spanish, and Italian from Latin. Study of documents. *Prerequisite:* Intermediate level in at least two of the languages, or permission. Taught in English. Three hours. Whitebook.

**215 Methods of Text Analysis** Introduction to procedures and terminology used in analysis of texts of various genres. 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. 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.

### 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 require-

ment, 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.)

**210 Romance Philology** (See French 210.) Three hours.

**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

**155, 156 Masterworks** Overview of French literature (155: Middle Ages to Revolution; 156: 19th, 20th centuries) through reading of outstanding works representing major authors, periods, themes, and forms. *Prerequisite:* French 52 or equivalent. Three hours each course.

**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.

**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 19th Century Literature** Discourses of knowledge through imagination, instinct, emotion in early manifestos, romantic writers, symbolists, and fin de siècle decadents. Representative authors: Staël, Hugo, Flaubert, Rimbaud, Mallarmé. 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.

**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. Ngame.

**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.

**291 Civilization of France** French civilization from the Middle Ages through the 19th century, including major socioeconomic, political, intellectual, and cultural aspects. Three hours. Bamps.

**292 Contemporary French Civilization** 20th century France, emphasizing current social, economic, and political structures, cultural and intellectual developments, and daily life. French 291 or History 53 strongly recommended as preparation. Three hours. Bamps.

**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.

**155 Masterworks** A study of major authors and genres from the origins of Italian literature to the 18th century. *Prerequisite:* 52 or equivalent. Three hours. Mazzoni.

**156 Masterworks** A study of major authors and genres from 18th century to the present. *Prerequisite:* 52 or equivalent. Three hours. Mazzoni.

## 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. Pardo.

**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. Weiger.

**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. Wesseling.

**245, 246 Cervantes** *Don Quijote*, the *Novelas Ejemplares*, and the theatre of Cervantes. Three hours. Weiger.

**265 19th Century Spanish Literature** Romanticism and realism: (1) Romantic theatre; (2) the realist and naturalist novelists: Galdos and Leopoldo Alas. Three hours. Wesseling.

**276 20th Century Spanish Poetry and Drama** Vanguard vs. tradition from the Generation of 1898 to present. Three hours. Roof, Wesseling.

**277 20th Century Spanish Prose Fiction and Essay** Innovation and experimentation from the Generation of 1898 to the present. Three hours. Roof, Wesseling.

**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.

**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**

**LING 101, 102 Linguistics**

## HONORS – ARTS AND SCIENCES

**222, 223 Honors/French** See page 66 and contact Department for specific requirements. Three hours each.

**256, 257 Honors/Spanish** See page 66 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' sociocultural 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 66 and contact Department for specific requirements. Three hours each.

## Russian and East European Studies

#### COLLEGE OF ARTS AND SCIENCES

*Prof. Youngblood, Director.*

The following courses are among the course offerings: **Economics** 11, 12, 185, 277, 281; **General Literature** 181, 182, 183; **History** 27; **Political Science** 172, 272; **Russian** 52.

## Social Work (SWSS)

#### COLLEGE OF EDUCATION AND SOCIAL SERVICES

*Professors Paolucci-Whitcomb, Wilkin (Chairperson); Associate Professors Bishop, Burrell; Assistant Professors Moroz, Roche; Lecturers Biss, Cass.*

**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.

**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 in group situations. *Prerequisite:* Accepted 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 and communities. *Prerequisites:* Accepted SW major or permission; 168. Three hours.

**170 Field Experience** Field experience under supervision given in social agencies four and one-half days each week. To be taken concurrently with 171. *Prerequisites:* 169, majors, senior standing. Twelve hours.

**171 Field Experience Seminar** Weekly seminar. *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.

## Sociology (SOC)

### COLLEGE OF ARTS AND SCIENCES

*Professors Cutler, Danigelis, Loewen, Mintz, Sampson (Chairperson), Smith, Stanfield; Associate Professors Berkowitz, Diouf, Fengler, Fishman, Krymkowski, McCann, Schmidt (CALS) Streeter; Assistant Professors Fox, Kahn, Strickler.*

**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. 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, Loewen.

**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. Cutler, Palumbo.

**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, 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.

**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. *Prerequisite:* 1 or Psychology 1. 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, McCann.

**63 Sociology of Sport** Analysis of the sociocultural organization and institutional relationships of sport in contemporary society. Also examines the social origins of athletes and the functioning of athletic groups. Three hours. Streeter.

**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, Loewen, 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.

**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, Loewen, 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, 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. Fishman, McCann, Stanfield.

**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.

**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.

**144 Sociology of Education** Analysis of the social organization of educational roles and associations in modern society. Special attention will be given to an examination of the changing structure of the educational institution and its re-

lationship to other institutions in society. *Prerequisite:* Three hours of sociology. Three hours. Loewen.

**150 Popular Culture** Analysis of social significance of a selected range of contemporary nonelite 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. Fenger, Kahn.

**161 Sociology of Leisure** Analysis of the sociocultural organization of nonwork activity, emphasizing the relationships of class, life style, education, and work to contemporary recreation and leisure use patterns. *Prerequisite:* Three hours of sociology. Three hours. Danigelis, Streeter.

**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. 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, Loewen, 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.

**204 Ecological Perspective on Human Communities** Analysis of relationships between the social, economic, and technological organization of communities and their physical and sociocultural environments. Emphasis upon community land use and settlement patterns. *Prerequisite:* Six hours of sociology or Anthropology/Geography 179. Three hours. Schmidt.

**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. Loewen, 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, 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 or permission. 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, Loewen.

**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. (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.

**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.

**223 Sociology of Reproduction** Examines reproduction of cultural values in relation to social conduct of reproduction of human life (childbearing) under advanced capitalism. *Prerequisites:* 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:* 129 or six hours of sociology. Three hours. Fengler, Kahn, 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. Danigelis, Diouf, Krymkowski, McCann, Mintz, Sampson, Schmidt, Smith.

**237 Occupations and Professions** Analysis of social organization of economic roles in industrial societies, the institutional relationships of occupations and professions, and impact of working structure on the individual. *Prerequisite:* Six hours of sociology. Three hours. Mintz, 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, Loewen, Mintz.

**241 Methods of Public Opinion Research** (Same as Political Science 284.)\* Methods used in conducting public opinion research, emphasizing design, sampling, questionnaire construction, administration, data control, and analysis of cross-sectional, longitudinal and time series data. *Prerequisite:* 100 (Political Science 181) or equivalent with instructor's permission. Three hours. Berkowitz, Danigelis.

**242 Public Opinion: Theory and Research** (Same as Political Science 285.)\* Examination of theories of public opinion. Topics include: attitude formation and change, political ideology, alienation and allegiance, political socialization, tolerance, and political extremism. *Prerequisite:* 241 (Political Science 284) or instructor's permission. Three hours. Sampson.

\*Credit not given for both 241 and Political Science 284 or for both 242 and Political Science 285.

**243 Mass Media in Modern Society** Intensive examination of selected topics in the structure of media organizations 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.

**258 Sociology of Law** Analysis of the sociocultural struc-

ture 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, Loewen, 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** *Prerequisites:* 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 66 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; Associate Professors Mickey, Newton, Son; Assistant Professor Buzas; Research Associate Professor Williams; 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 Discrete Probability Models** Introduction to probability emphasizing models of real world phenomena (e.g.



genetics, screening for diseases, birth and death processes). *Prerequisite:* Two years of high school 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, includes 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, and 141, unless special permission has been given by the Statistics Program.

**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** (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 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. *Prerequisites:* Junior standing, Math. 19 or 21, or college algebra with instructor permission. 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:* 211 or 241 or 261 or 141 with instructor's permission. Three hours.

**223 Applied Multivariate Analysis** (Same as Biostatistics 223.) Analysis methods for categorical and continuous multivariate data. Discriminant analysis, logistic regression, canonical correlation, principal components, factor

analysis and log linear models. Computer software usage. *Prerequisites:* 211 or 241 or 261, or 141 with instructor's permission; 221 or 225 recommended; Math. 124 recommended. Three hours.

**224 Statistics for Quality and Productivity** (Same as Biostatistics 224.) Statistical methods for product quality and productivity. Statistical process control. Shewhart, CUSUM, empirical Bayes control charts. Acceptance, continuous, sequential sampling. Selected statistical computer programs utilized. *Prerequisites:* Any one of 211, 241 or 261, or 141 with instructor permission. Three 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:* Any one of 111, 141, 211, 241, or 261. Three hours.

**227 Statistical Methods for the Behavioral Sciences** (Same as Psychology 341.) *Prerequisite:* 211 with computer experience or Psychology 340.

**229 Reliability and Survival Analysis** (Same as Biostatistics 229.) Probabilistic modeling and inference in reliability. Replacement, maintenance inspection policies. Weibull, lognormal analyses. Accelerated life tests. Regression analyses with survival data; proportional hazards. Computer applications. *Prerequisites:* Any one of 211, 241, 261, or 141 plus a second statistics course; Math. 121. Statistics 151 recommended. Some computer experience desirable. Three hours.

**231 Experimental Design** (Same as Biostatistics 231.) Randomization, complete and incomplete blocks, cross-overs, covariance analyses, factorial experiments, confounding, fractional-replication, nesting split plots, repeated measures, response surface optimization, Taguchi methods, and optimal designs. *Prerequisite:* Any one of 141, 211, 241, or 261. Three hours.

**233 Design of Sample Surveys** (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, 241 or 261, or 141 with instructor's permission. 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 241 or 261, or 141 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:* Any one of 141, 211, 225, 241, or 261. Three hours.

**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

*Professor Bryan; Associate Professors Schenk, Snider, Thaler (Chairperson); Assistant Professors Fawcett, Modereger, Tkatch; Lecturer Woods.*

**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. Modereger.

**5 Oral Interpretation of Literature** Performance of literature that is traditionally nondramatic. Three hours.

**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. Fawcett, 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. Offered fall semester only.

**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. Offered fall semester only, in alternate years.

**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. Three hours. Thaler. Fall semester only, in alternate years.

**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. Fawcett, 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. Fawcett.

**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 semester only.

**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.

**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. Bryan.

**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. Bryan.

**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. Bryan.

**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. Bryan.

**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. Offered spring semester only.

**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. Offered every fourth year. Spring. Thaler.

**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. Offered every fourth year. Spring. Thaler.

**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. Offered every fourth year. Spring. Thaler.

**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. Offered every fourth year. Spring. Thaler.

**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.

**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. Fall only. Tkatch.

**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.

**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. Fall only. Three hours. Bryan.

**251 Directing II** Development of skills and aesthetic values through the direction of a complete theatrical event. *Prerequisites:* 250, and declared Theatre majors only. Three hours. Spring. Fawcett.

**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. Lynch.

**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 66 and contact Department for specific requirements. Three hours each.

## Vocational Education and Technology (VOTC)

See Community Development and Applied Economics.

## Wildlife and Fisheries Biology (WFB)

### SCHOOL OF NATURAL RESOURCES

*Associate Professors Capen, Hirth (Program Chair), Watzin; Research Associate Professors Parrish, Williams.*

**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. Two weeks in summer. *Prerequisites:* 131, Forestry 21 or Botany 109, Natural Resources 140. Two hours. Hirth.

**161 Fisheries Biology** Detailed life histories of major sport and forage fish species. Overview of traditional and contemporary fishery management principles and practices including censusing, sampling of fish populations, and determination of parameters necessary for intelligent management of fish stocks. *Prerequisites:* Biology 1, 2 or equivalent. Four hours.

**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 2; an ecology course. Three hours. Capen.

**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, 1996–97.

#### 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. Study of the structure and function of systems; behavior and ecology of modern fishes. *Prerequisite:* Biology 104 or 219 or equivalent. Three hours. Alternate years, 1995–96.

**271 Wetlands Wildlife** Breeding biology, behavior, habitat management, and population ecology of wetland wildlife with emphasis on waterfowl. Concurrent registration in 272 required. *Prerequisites:* 174, Natural Resources 103. Two hours. Hirth. (Not offered for graduate credit.)

**272 Wetlands Ecology and Marsh 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, Bond, V. Clark, Elliott, Kuizenga, Mintz, Rankin, Rothblum, J. Smith; Associate Professors A. Clark, Fishman, C. Lewin, McCrate, van Slyke, Warhol; Assistant Professors Bergen, Chan, M.J. Dickerson, Gustafson, Kahn, Kaza, Lin, Mahler, Schnell, Seager, 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.

**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.

**157 Greek Feminism** (See Classics 157.)

**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.

**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.

**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 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 Women's Studies department. Three hours.

*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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*Shelburne, Vermont*

### Term Ending March 1997

David C. Larsen, B.A., M.Ed.  
Elisa Sierra Martin, B.A.  
Jennifer Recine  
Charles R. Ross, B.A., M.A.  
Edward R. Zuccaro, B.A., J.D.

*Wilmington, Vermont*  
*Barre, Vermont*  
*Easton, Connecticut*  
*Hinesburg, Vermont*  
*St. Johnsbury, Vermont*

### Term Ending March 1998

Edward L. Austin, Jr., B.S.  
Richard A. Dennis, B.A., M.A.  
Joan L. Kalkin

*South Burlington, Vermont*  
*Basking Ridge, New Jersey*  
*Bernardsville, New Jersey*

### Term Ending March 1999

Thomas R. Alderman, B.A., M.Ed.  
Barbara L. Grimes, A.S.  
Michael W. Metcalf, B.A., M.A.  
Martha H. O'Connor, B.S.

*Middlebury, Vermont*  
*Burlington, Vermont*  
*Greensboro, Vermont*  
*Brattleboro, Vermont*

### Term Ending March 2000

Frank A. Bolden, B.A., M.B.A., J.D.  
Vi I. Luginbuhl, R.N., B.A.  
Richard E. Tarrant, B.A.

*Berkeley Heights, New Jersey*  
*Panton, Vermont*  
*Burlington, Vermont*

### Term Ending March 2001

Peter D. Baldwin, B.A.  
Gerry F. Gossens, B.S.  
Mary-Ann Parizo, B.S.  
Richard A. Westman, B.A.

*Hinesburg, Vermont*  
*Salisbury, Vermont*  
*Essex Junction, Vermont*  
*Cambridge, Vermont*

## Officers of Administration

SALMON, THOMAS P., J.D. (1991)	<i>President</i>
LOW, ROBERT B., Ph.D. (1970)	<i>Provost</i>
TRITTON, THOMAS R., Ph.D. (1985)	<i>Vice Provost</i>
SAULE, MARA R., M.L.S. (1985)	<i>Vice Provost for Enrollment Management</i>
LAVIGNE, RAYBURN V., M.B.A. (1968)	<i>Interim Vice President for Administration</i>
ANDREAS, ROSALIND E., Ph.D. (1989)	<i>Vice President for Student Affairs</i>
WELBOURN, DAVID M., M.A. (1992)	<i>Vice President for Development and Alumni Relations</i>
BAZLUKE, FRANCINE T., J.D. (1985)	<i>General Counsel</i>
BALI, HOWARD, Ph.D. (1989)	<i>Dean, College of Arts and Sciences</i>
DURHAM, DELCIE R., Ph.D. (1989)	<i>Dean, Graduate College</i>
FORCIER, LAWRENCE K., Ph.D. (1977)	<i>Dean, Division of Agriculture, Natural Resources, and Extension and Dean, College of Agriculture and Life Sciences and Dean, School of Natural Resources</i>
FRYMOYER, JOHN W., M.D. (1969)	<i>Dean, College of Medicine</i>
IZZO, LOUIS M., M.S. (1969)	<i>Interim Dean, School of Allied Health Sciences</i>
MARTIN, REBECCA R., Ph.D. (1990)	<i>Director of Libraries and Media Services</i>
MCGRATH, H. MARIE, Ph.D. (1989)	<i>Interim Dean, School of Nursing</i>
PINDER, GEORGE F., Ph.D. (1989)	<i>Dean, Division of Engineering, Mathematics, and Business Administration and Dean, College of Engineering and Mathematics</i>
SHIRLAND, LARRY E., Ph.D. (1976)	<i>Interim Dean, School of Business Administration</i>
TARULE, JILL M., Ed.D. (1992)	<i>Dean, College of Education and Social Services</i>
TWARDY, EDWARD S., Ph.D. (1990)	<i>Director of Continuing Education</i>

## Emeriti Faculty

- Abajian, John, Jr., M.D.  
*Professor of Anesthesiology*
- Albee, George W., Ph.D.  
*Professor of Psychology*
- Allen, Sinclair T., Jr., M.D.  
*Professor of Medicine*
- Alpert, Norman R., Ph.D.  
*Professor of Physiology and Biophysics*
- Anderson, Richard L., Ph.D.  
*Professor of Electrical Engineering*
- Ansbacher, Heinz, Ph.D.  
*Professor of Psychology*
- Armstrong, Frank H., Ph.D.  
*Associate Professor of Natural Resources*
- Atherton, Henry V., Ph.D.  
*Professor of Animal Sciences*
- Atwood, Elizabeth F., M.S.  
*Associate Professor of Merchandising, Consumer Studies, and Design*
- Babbott, David, M.D.  
*Professor of Medicine*
- Balch, Donald J., Ph.D.  
*Professor of Animal Sciences*
- Bandel, Betty, Ph.D.  
*Professor of English*
- Barney, Bernard B., M.D.  
*Associate Professor of Surgery*
- Barrett, Evaline I., M.S.  
*Associate Professor of Professional Nursing*
- Beeken, Warren L., M.D.  
*Professor of Medicine*
- Bevins, Malcolm II, M.S.  
*Extension Professor of Agricultural and Resource Economics*
- Blair, Alice J., B.S.  
*Extension Associate Professor in Extension Service*
- Bland, John H., M.D.  
*Professor of Medicine*
- Bliss, Francis R., Ph.D.  
*Professor of Classics*
- Boller, Betty M., Ed.D.  
*Professor of Organizational, Counseling, and Foundational Studies*
- Bolognani, Betty M., B.S.  
*Extension Instructor in Extension Service*
- Bolton, Wesson D., D.V.M.  
*Professor of Animal Sciences*
- Bouchard, Richard E., M.D.  
*Professor of Medicine*
- Boushey, Dallas R.  
*Assistant Professor of Anatomy and Neurobiology*
- Bouton, Edward L., M.S.  
*Extension Professor in Extension Service*
- Breen, Mary E., M.S.  
*Associate Professor of Medical Technology*
- Bright, William E., II, Ed.D.  
*Assistant Professor of Education*
- Brook, Munro S., M.A.  
*Extension Professor in Extension Service*
- Brown, Constance L., M.S.  
*Associate Professor of Chemistry*
- Brown, Peter M., M.M.  
*Associate Professor of Music*
- Buechler, John L., M.A.I.S.  
*Library Professor*
- Burns, Stanley L., Jr., M.D.  
*Professor of Medicine*
- Buxton, Beatrice F., M.S.  
*Extension Associate Professor in Extension Service*
- Cain, R. Nolan, M.D.  
*Associate Professor of Surgery*
- Caldwell, Martha M., M.S.  
*Associate Professor of Textiles, Merchandising, and Consumer Studies*
- Carlson, Robert V., Ed.D.  
*Professor of Education*
- Carpenter, Howard J., M.S.  
*Associate Professor of Mechanical Engineering*
- Chamberlain, Erling W., Ph.D.  
*Professor of Mathematics*
- Chambers, Alfred H., Ph.D.  
*Professor of Physiology and Biophysics*
- Chapman, James G., Ph.D.  
*Professor of Music*
- Chase, Marilyn, Ph.D.  
*Assistant Professor of Human Development Studies*
- Cheney, Arthur H., Jr., M.Ed.  
*Assistant Professor of Organizational, Counseling, and Foundational Studies*
- Christie, Lu S., M.Ed.  
*Lecturer in Special Education*
- Clemmons, Jackson J.W., Ph.D., M.D.  
*Professor of Pathology*
- Cochran, Robert W., Ph.D.  
*Professor of English*
- Coffin, Laurence H., Jr., M.D.  
*Professor of Surgery*
- Cohen, Julius G., M.D.  
*Professor of Psychiatry*
- Cook, Philip W., Ph.D.  
*Associate Professor of Botany*
- Corey, William M., M.S.  
*Extension Professor in Extension Service*
- Crooks, George, Ph.D.  
*Professor of Chemistry*
- Danforth, Elliott, Jr., M.D.  
*Professor of Medicine*
- Daniels, Robert V., Ph.D.  
*Professor of History*
- Davison, Jean M., Ph.D.  
*Lyman Roberts Professor of Classical Languages and Literature*
- Deck, Edith F., M.S.  
*Associate Professor of Professional Nursing*
- Demers, I. Aline, M.S.  
*Associate Professor of Professional Nursing*
- Detenbeck, Robert W., Ph.D.  
*Professor of Physics*
- Dietzel, Cleason S., Ph.D.  
*Clinical Associate Professor of Psychology*
- Doremus, Henry M., D.V.M.  
*Associate Professor of Animal Pathology*
- Dowe, Thomas W., Ph.D.  
*Professor of Animal Sciences*
- Duchacek, Howard, M.S.  
*Professor of Mechanical Engineering*
- Ducharme, Edward R., Ed.D.  
*Professor of Organizational, Counseling, and Foundational Studies*
- Dumville, Robert W., B.A.  
*Extension Assistant Professor in Extension Service*
- Durfee, Herbert A., Jr., M.D.  
*Professor of Obstetrics and Gynecology*
- Duthie, Alexander H., Ph.D.  
*Professor of Animal Sciences*
- Dwork, Julius S., Ph.D.  
*Associate Professor of Mathematics*



- Eastman, Oliver N., M.D.  
*Professor of Gynecology*
- Eddy, Dwight K., M.E.E.  
*Extension Professor of Agricultural and Resource Economics*
- Edgerton, James A., M.E.E.  
*Extension Professor in Extension Service*
- Elliott, Norris A., M.E.Ed.  
*Extension Associate Professor in Extension Service*
- Emerson, Faith G., M.A.  
*Associate Professor of Professional Nursing*
- Farr, Gordon W., M.E.A.E.  
*Extension Associate Professor in Extension Service*
- Feidner, Edward J., M.F.A.  
*Professor of Theatre*
- Finney, Henry C., Ph.D.  
*Associate Professor of Sociology*
- Flanagan, Theodore R., Ph.D.  
*Extension Associate Professor of Plant and Soil Science*
- Foote, Murray W., Ph.D.  
*Associate Professor of Microbiology and Biochemistry*
- Forsyth, Ben R., M.D.  
*Professor of Medicine*
- Fuller, Gerald R., Ed.D.  
*Professor of Vocational Education and Technology*
- Fuller, Robert W., M.S.  
*Assistant Professor of Natural Resources*
- Gallagher, Fred W., Ph.D.  
*Professor of Medical Microbiology*
- Gans, Joseph H., V.M.D.  
*Professor of Pharmacology*
- Gay, Barbara T., M.L.S.  
*Library Associate Professor in Bailey/Howe Library*
- Geno, Marie J., M.A.  
*Lecturer in Romance Languages*
- Geno, Thomas, Ph.D.  
*Associate Professor of Romance Languages*
- Gibson, Thomas C., M.B.B.Ch.  
*Professor of Medicine*
- Gilleland, Brady B., Ph.D.  
*Professor of Classics*
- Gillies, Ellen M., B.L.S.  
*Library Professor*
- Gobin, Robert J., Ph.D.  
*Professor of Human Development Studies*
- Gould, Nathaniel, M.D.  
*Associate Professor of Orthopaedics and Rehabilitation*
- Grams, Armin E., Ph.D.  
*Professor of Human Development Studies*
- Greif, Edwin C., M.S.  
*Professor of Business Administration*
- Greig, Harold A., M.P.E.  
*Assistant Professor of Human Development Studies*
- Gribbons, Jackie M., M.A.  
*Assistant Professor of Organizational, Counseling, and Foundational Studies*
- Grime, Philip K., M.E.A.E.  
*Extension Professor in Extension Service*
- Gump, Dieter W., M.D.  
*Professor of Medicine*
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*Associate Professor of Surgery*
- Hall, Mary S., Ph.D.  
*Associate Professor of English*
- Halpern, William, Ph.D.  
*Professor of Physiology and Biophysics*
- Hand, Samuel B., Ph.D.  
*Professor of History*
- Hanley, Edward M., Ph.D.  
*Professor of Professional Education and Curriculum Development*
- Hendley, Edith D., Ph.D.  
*Professor of Molecular Physiology and Biophysics*
- Henson, E. Bennette, Ph.D.  
*Professor of Zoology*
- Hilberg, Raul, Ph.D.  
*Professor of Political Science*
- Hochheiser, Louis I., M.D.  
*Professor of Family Practice*
- Honnold, Robert E., Ed.D.  
*Extension Professor in Extension Service*
- Hopp, Susan M., M.Ed.  
*Research Associate Professor, College of Agriculture*
- Horton, Chesley P., M.E.  
*Extension Assistant Professor in Extension Service*
- Horton, Edward S., M.D.  
*Professor of Medicine*
- Houghaboom, Verle R., Ph.D.  
*Extension Professor of Agricultural and Resource Economics*
- Houston, Charles S., M.D.  
*Professor of Epidemiology and Environmental Health*
- Howard, Philip L., M.D.  
*Professor of Pathology*
- Howe, James R., IV, Ph.D.  
*Professor of English*
- Huber, Robert B., Ph.D.  
*Edwin P. Lawrence Forensic Professor of Speech*
- Huessy, Hans R., M.D.  
*Professor of Psychiatry*
- Hughes, Muriel J., Ph.D.  
*Professor of English*
- Hunt, Lyman C., Jr., Ph.D.  
*Professor of Professional Education and Curriculum Development*
- Hyde, Beal B., Ph.D.  
*Professor of Botany*
- Izzo, Joseph A., Ph.D.  
*Professor of Mathematics*
- Jaffe, Julian J., Ph.D.  
*Professor of Pharmacology*
- Jameson, DeeDee M., Ph.D.  
*Assistant Professor of Human Development Studies*
- Janson, Richard H., Ph.D.  
*Professor of Art*
- Jewett, Silas H., B.S.  
*Extension Assistant Professor in Extension Service*
- Johnston, Stuart, Ph.D.  
*Professor of Romance Languages*
- Johnstone, Donald B., Ph.D.  
*Professor of Microbiology and Biochemistry and Medical Microbiology*
- Julow, Roy G., Ph.D.  
*Associate Professor of Romance Languages*
- Kebabian, Paul B., B.A.  
*Library Professor*
- Keller, Jay E., M.D.  
*Associate Professor of Surgery*
- Kelly, William H., Ph.D.  
*Associate Professor of Community Development and Applied Economics*
- Kent Samuel S., Jr., Ph.D.  
*Research Associate Professor of Agricultural Biochemistry*
- Kidder, George V., Ph.D., L.H.D.  
*Professor of Classical Languages and Dean of College of Arts and Sciences*
- Kinnard, Douglas, Ph.D.  
*Professor of Political Science*
- Kinsey, David L., Ph.D.  
*Associate Professor of Music*
- Klein, Richard M., Ph.D.  
*Professor of Botany*

- Knowles, Esther L., M.S.  
*Associate Professor of Housing and Residential Environment*
- Korson, Roy, M.D.  
*Professor of Pathology*
- Kristiansson, Karin, M.A.  
*Extension Professor in Extension Service*
- Kundert, Elizabeth, M.D.  
*Assistant Professor of Clinical Psychiatry*
- Kunin, Arthur S., M.D.  
*Professor of Medicine*
- Lambert, Denis E., M.A.T.  
*Assistant Professor of Human Development Studies*
- Lambert, Lloyd M., Ph.D.  
*Professor of Physics*
- Lamden, Merton P., Ph.D.  
*Professor of Biochemistry*
- Leamy, William P., M.S.  
*Extension Associate Professor of Animal Sciences*
- Leggett, Leslie R., D.P.Ed.  
*Professor of Human Development Studies*
- Letteri, Charles A., Ed.D.  
*Associate Professor of Education*
- Lewis, Gordon F., Ph.D.  
*Professor of Sociology*
- Lewis, William J., Ph.D.  
*Professor of Sociology*
- Lidral, Frank W., Ph.D.  
*Professor of Music*
- Little, George T., Ph.D.  
*Professor of Political Science*
- Livak, Joyce, Ph.D.  
*Associate Professor of Nutritional Sciences*
- Lochhead, John H., Ph.D.  
*Professor of Zoology*
- Loker, Suzanne, Ph.D.  
*Associate Professor of Merchandising Consumer Studies and Design*
- Long, Littleton, Ph.D.  
*Professor of English*
- Luginbuhl, William H., M.D.  
*Professor of Pathology*
- Luse, Eleanor, Ph.D.  
*Professor of Speech*
- MacCollom, George B., Ph.D.  
*Professor of Plant and Soil Science*
- Marshall, Gilbert A., M.S.  
*Professor of Mechanical Engineering*
- Martin, Herbert L., M.D.  
*Professor of Neurology*
- Massonneau, Suzanne, M.A.  
*Library Professor*
- Mazuzan, John E., M.D.  
*Professor of Anesthesiology*
- McAree, Christopher P., M.B.C.H.  
*Associate Professor of Psychiatry*
- McCormick, Thomas J., M.E.E.  
*Extension Professor in Extension Service*
- McCrorey, H. Lawrence, Ph.D.  
*Professor of Molecular Physiology and Biophysics*
- McGill, J. Bishop, M.D.  
*Associate Professor of Surgery*
- McKay, Robert J., M.D.  
*Professor of Pediatrics*
- McKenzie, Hugh S., Ph.D.  
*Professor of Special Education*
- McLean, Donald L., Ph.D.  
*Professor of Plant and Soil Science*
- McSweeney, E. Douglas, M.D.  
*Assistant Professor of Surgery*
- Meeks, Harold A., Ph.D.  
*Professor of Geography*
- Melville, Donald B., Ph.D.  
*Professor of Biochemistry*
- Mercia, Leonard S., M.S.  
*Extension Professor in Extension Service*
- Meserve, Bruce E., Ph.D.  
*Professor of Mathematics*
- Milligan, Jean B., Ed.D.  
*Professor of Professional Nursing*
- Mills, Isabel C., M.A.  
*Associate Professor of Art*
- Moffroid, Mary S., Ph.D.  
*Professor of Physical Therapy*
- Morselli, Maria Franca C., Ph.D.  
*Research Professor of Botany*
- Moser, Donald E., Ph.D.  
*Professor of Mathematics*
- Munger, Bethia N., B.S.  
*Extension Associate Professor in Extension Service*
- Murray Roger W., D.V.M.  
*Research Associate Professor of Animal Sciences*
- Newton, David P., M.S.  
*Extension Professor in Extension Service*
- Nielsen, Gordon R., Ph.D.  
*Extension Assistant Professor of Plant and Soil Science*
- Nyborg, Wesley L., Ph.D.  
*Professor of Physics*
- Nyquist, Elbert A., M.S.  
*Professor of Business Administration*
- Orth, Ralph H., Ph.D.  
*Corse Professor of English*
- Outwater, John O., Ph.D.  
*Professor of Mechanical Engineering*
- Pacy, James S., Ph.D.  
*Professor of Political Science*
- Page, Dorothy, B.S.  
*Associate Professor of Physical Therapy*
- Page, H. Gordon, M.D.  
*Professor of Surgery*
- Page, John C., M.S.  
*Extension Professor in Extension Service*
- Pappoutsakis, Ippocrates, M.Mus.  
*Professor of Music*
- Paquette, Lucien D., M.Ed.  
*Extension Professor in Extension Service*
- Petrusich, Mary M., Ph.D.  
*Professor of Human Development Studies*
- Phillips, Carol F., M.D.  
*Professor of Pediatrics*
- Potash, Milton, Ph.D.  
*Professor of Zoology*
- Powell, Agnes T., M.S.  
*Associate Professor of Human Nutrition and Foods*
- Price, John R., B.S.  
*Extension Assistant Professor in Extension Service*
- Racusen, David W., Ph.D.  
*Professor of Agricultural Biochemistry*
- Raynor, Louise A., Ph.D.  
*Associate Professor of Botany*
- Reinhardt, John E., Ph.D.  
*Professor of Political Science*
- Reit, Ernest M.I., Ph.D.  
*Associate Professor of Pharmacology*
- Riggs, Heath K., Ph.D.  
*Professor of Mathematics*
- Rippa, S. Alexander, Ed.D.  
*Professor of Organizational, Counseling, and Foundational Studies*
- Roland, Margaret, Ph.D.  
*Associate Professor of Art*
- Roth, Wilfred, Ph.D.  
*Professor of Electrical Engineering*

- Rothwell, Kenneth S., Ph.D.  
*Professor of English*
- Runge, Carl F., M.D., C.M.  
*Associate Professor of Medicine*
- Rush, Stanley, Ph.D.  
*Professor of Electrical Engineering*
- Sachs, Thomas D., Ph.D.  
*Associate Professor of Physics*
- Sargent, Frederic O., Ph.D.  
*Professor of Agricultural and Resource Economics*
- Sawyer, Janet R., Ph.D.  
*Professor of Professional Nursing*
- Scarfone, Leonard M., Ph.D.  
*Professor of Physics*
- Schmokel, Wolfe W., Ph.D.  
*Professor of History*
- Schoonmaker, N. James, Ph.D.  
*Professor of Mathematics*
- Schultz, Herbert L., Ed.D.  
*Associate Professor of Music*
- Schultz, Harold S., Ph.D.  
*Professor of History*
- Schumacher, George A., M.D.  
*Professor of Neurology*
- Schwab, Roberta B., M.A.  
*Associate Professor of Professional Nursing*
- Senghas, Dorothy C., M.S.  
*Library Assistant Professor in Dana Medical Library*
- Severance, Malcolm F., Ph.D.  
*Professor of Business Administration*
- Simon, Morris L., M.A.  
*Associate Professor of Political Science*
- Sims, Ethan A. H., M.D.  
*Professor of Medicine*
- Sinclair, Robert O., Ph.D.  
*Professor of Agricultural and Resource Economics*
- Smith, Albert M., Ph.D.  
*Professor of Animal and Food Sciences*
- Soule, M. Phyllis, M.A.  
*Assistant Professor of Nutritional Sciences*
- Spinner, Thomas J., Jr., Ph.D.  
*Professor of History*
- Stark, Ernest, M.D.  
*Professor of Pathology*
- Staron, Stanislaw J., Ph.D.  
*Professor of Political Science*
- Steele, Doris H., Ph.D.  
*Extension Professor in Extension Service*
- Steffenhagen, Ronald A., Ph.D.  
*Professor of Sociology*
- Stephenson, John F., M.E. Ed.  
*Extension Professor in Extension Service*
- Stevens, Dean F., Ph.D.  
*Associate Professor of Zoology*
- Stinebring, Warren R., Ph.D.  
*Professor of Medical Microbiology*
- Stone, William W., M.A.  
*Extension Professor in Extension Service*
- Strassburg, Kathleen R., M.A.T.  
*Extension Professor of Textiles, Merchandising, and Consumer Studies*
- Stultz, Walter A., Ph.D.  
*Professor of Anatomy*
- Sumner, J. Williams, B.S.  
*Extension Assistant Professor in Extension Service*
- Tabakin, Burton S., M.D.  
*Professor of Medicine*
- Taylor, Fred H., Ph.D.  
*Professor of Botany*
- Thimm, Alfred L., Ph.D.  
*Professor of Business Administration*
- Thompson, Harry L., Ph.D.  
*Associate Professor of Social Work*
- Thompson, Noah C., M.E.A.E.  
*Extension Professor in Extension Service*
- Thorpe, Marion B., M.S.  
*Professor of Home Economics Education*
- Tisdale, W. Allan, M.D.  
*Professor of Medicine*
- Tormey, David M., M.D.  
*Professor of Family Practice*
- Trainer, Thomas D., M.D.  
*Professor of Pathology*
- Tremblay, Raymond H., Ph.D.  
*Professor of Agricultural and Resource Economics*
- Tuthill, Arthur F., M.S.  
*Professor of Mechanical Engineering*
- Ure, Helena A. M.S.  
*Associate Professor of Professional Nursing*
- Van Buren, H. Carmer, M.D.  
*Associate Professor of Medicine*
- Vander Meer, Canute, Ph.D.  
*Professor of Geography*
- Varney, Kenneth, M.S.  
*Assistant Professor of Plant and Soil Science*
- Vogelmann, Hubert W., Ph.D.  
*Professor of Botany*
- Waller, Julian A., M.D.  
*Professor of Medicine*
- Wallman, Lester J., M.D.  
*Professor of Neurosurgery*
- Wasson, Louellen, M.E.E.  
*Extension Associate Professor in Extension Service*
- Weaver, Irlon A., Jr., Ph.D.  
*Associate Professor of Psychology*
- Webster, Fred C., Ph.D.  
*Professor of Agricultural and Resource Economics*
- Webster, Selina M., M.S.  
*Professor of Clothing, Textiles, and Design*
- Weed, Lawrence L., M.D.  
*Professor of Medicine*
- Whaples, Donald R., M.S.  
*Extension Professor in Extension Services*
- White, Robert E., B.S.  
*Extension Assistant Professor in Extension Service*
- White, William N., Ph.D.  
*Professor of Chemistry*
- Whitmore, Roy A., M.F.  
*Professor of Natural Resources*
- Whittlesey, Margaret B., M.S.W.  
*Associate Professor of Special Education, Social Work, and Social Services*
- Wiggans, Samuel C., Ph.D.  
*Professor of Plant and Soil Science*
- Williams, Blair, M.S.  
*Professor of Human Nutrition and Foods*
- Wilson, Mary L., Ph.D.  
*Professor of Communication Sciences*
- Wood, Glen M., Ph.D.  
*Professor of Plant and Soil Science*
- Woodruff, William A., L.M.C.C.  
*Associate Professor of Psychiatry*
- Wright, Alice, M.S.  
*Extension Assistant Professor of Nutritional Sciences*
- Young, William G., M.D.  
*Associate Professor of Psychiatry*
- Young, William J., II, Ph.D.  
*Professor of Anatomy and Neurobiology*

## Faculty

Dates after names represent the year of appointment, either original or following a lapse of service.

- Abajian, John C. (1974). B.A., 1965; M.D., 1969, *University of Vermont. Associate Professor in Anesthesiology.*
- Abbott, Donald W. (1981). A.B., 1969, *Boston University; M.D., 1974, University of Massachusetts. Clinical Associate Professor of Family Practice.*
- Abouleish, Hassan E. (1993). B.A., 1983, *Franklin and Marshall College; M.D., 1987, University of Texas, Houston. Clinical Instructor in Medicine.*
- Abourjaily, Georges S. (1982). M.D., 1963, *Geneva Medical School. Clinical Assistant Professor of Surgery.*
- Abrahams, Tod G. (1986). B.S., 1976, *University of Pennsylvania; M.D., 1980, Wake Forest University. Clinical Associate Professor of Radiology.*
- Abramson, Leslie S. (1983). B.A., 1973; M.D., 1977, *University of Pennsylvania. Clinical Assistant Professor of Pediatrics.*
- Abruscato, Joseph A. (1969). B.A., 1962; M.A., 1965, *Trenton State College; Ph.D., 1969, Ohio State University. Professor of Education.*
- Absher, P. Marlene (1979). B.S., 1962, *University of New Mexico; Ph.D., 1968, University of North Carolina. Research Associate Professor of Medicine and Instructor in Medicine.*
- Absher, Richard G. (1968). B.S., 1960, *Oklahoma State University; M.S., 1962, University of New Mexico; Ph.D., 1967, Duke University. Professor of Electrical Engineering.*
- Achenbach, Thomas M. (1979). B.A., 1962, *Yale University; Ph.D., 1966, University of Minnesota. Professor of Psychiatry and Psychology.*
- Ackerson, Elizabeth K. (1991). B.A., 1977, *Antioch College; M.D., 1983, Michigan State University. Clinical Instructor in Medicine.*
- Adams, Charles F. (1993). B.A., 1968, *Bowdoin College; M.D., 1972, Tufts University. Clinical Instructor in Anesthesiology.*
- Adams, David L. (1981). B.A., 1958, *Colby College; M.D., 1962, Yale University. Clinical Assistant Professor of Medicine.*
- Adams, Stephen P. (1991). B.A., 1971, *American International College; M.D., 1976, University of Maryland. Clinical Assistant Professor of Pathology.*
- Adele, Chituru (1993). M.D., 1984, *University of Ibadan. Clinical Instructor in Medicine.*
- Ades, Philip A. (1984). B.S., 1971; M.D., 1978, *University of Maryland. Associate Professor of Medicine.*
- Agne, Russell M. (1969). B.S., 1962, *Central Connecticut State University; M.S., 1963, Syracuse University; Ph.D., 1970, University of Connecticut. Professor of Education.*
- Aguiar, Neil W. (1990). B.S., 1988; M.S., 1990, *University of Vermont. Lecturer in Statistics.*
- Ahmed, Kazi J. (1989). B.Sc., 1979, *Rajshahi University; Ph.D., 1985, Indiana University. Assistant Professor of Chemistry.*
- Aiken, Douglas C. (1993). B.S., 1975, *Davidson College; M.D., 1979, Bowman-Gray School of Medicine. Clinical Assistant Professor of Family Practice.*
- Aines, Linda D. (1983). B.S.B.A., 1976; M.B.A., 1978, *Ohio State University. Extension Associate Professor in Extension Service.*
- Albert, Gail D. (1990). B.A., 1965, *Vassar College; M.S., 1978, University of Vermont. Lecturer in Education.*
- Albertini, Richard J. (1972). B.S., 1960; M.D., 1963; Ph.D., 1972, *University of Wisconsin. Professor of Medicine, Microbiology and Molecular Genetics, and Pediatrics.*
- Alden, Peter D. (1964). M.D., 1958, *Harvard University. Clinical Associate Professor of Medicine.*
- Aleong, John (1976). B.A., 1968, *University of West Indies; M.Sc., 1971, University of Toronto; Ph.D., 1975, Iowa State University. Professor of Statistics and Plant and Soil Science.*
- Alexander, Alan R. (1980). B.A., 1967, *University of Massachusetts; M.D., 1971, University of Vermont. Clinical Assistant Professor of Obstetrics and Gynecology.*
- Algis, Michael (1995). B.A., 1975, *State University of New York, Buffalo; M.D., 1979, Downstate Medical Center. Clinical Assistant Professor of Medicine.*
- Allan, Walter C. (1980). A.B., 1965, *Northwestern University; M.S., 1967, University of Missouri; M.D., 1971, State University of New York, Upstate Medical Center. Clinical Associate Professor of Pediatrics.*
- Allard, William E., Jr. (1974). B.S., 1954; M.D., 1957, *University of Vermont. Clinical Associate Professor of Medicine and Family Practice.*
- Allegretta, Gary J. (1988). A.B., 1977, *Bowdoin College; M.D., 1981, University of Connecticut. Clinical Assistant Professor of Pediatrics.*
- Allen, Christopher W. (1967). B.A., 1964, *University of Connecticut; M.S., 1966; Ph.D., 1967, University of Illinois. Professor of Chemistry.*
- Allen, Elizabeth F. (1979). B.A., 1964, *University of Connecticut; M.S., 1966; Ph.D., 1969, University of Illinois. Assistant Professor of Pathology.*
- Alnasrawi, Abbas (1963). B.S., 1953, *University of Baghdad; A.M., 1957; Ph.D., 1965, Harvard University. Professor of Economics.*
- Alnasrawi, Susan C. (1992). B.S., 1964, *Simmons College; M.Ed., 1980, University of Vermont. Lecturer in Education.*
- Warren D. (1986). B.S.C.E., 1973, *University of Denver; M.D., 1979, University of Colorado. Clinical Assistant Professor of Medicine.*
- Alpert, Jamie A. (1994). B.A., 1984; M.D., 1990, *University of Vermont. Clinical Assistant Professor of Medicine.*
- Alsofrom, Gary F. (1988). B.S., 1975, *Union College; M.D., 1979, State University of New York, Downstate Medical Center. Assistant Professor of Radiology.*
- Alston, Wallace K. (1993). B.S., 1980, *Tulane University; M.D., 1987, New York Medical College. Assistant Professor of Medicine.*
- Altemose, Craig E. (1989). B.S., 1978, *Pennsylvania State University. Extension Instructor in Extension Service.*
- Altemus, Vaughn L., III. (1987). B.A., 1975, *University of Delaware; M.A., 1976; Ph.D., 1986, University of Wisconsin. Assistant Professor of Political Science.*
- Altman, Francis M., Jr. (1984). B.S., 1969; M.D., 1974, *University of Pittsburgh. Associate Professor of Medicine.*
- Amberson, Steven M. (1988). B.A., 1977, *Linfield College; M.D., 1981, University of Washington. Clinical Assistant Professor of Radiology.*
- Ambrose, Jane P. (1965). B.S., 1961, *Skidmore College; M.A., 1963, University of Vermont. Professor of Music.*
- Ambrose, Z., Philip. (1962). A.B., 1958; M.A., 1960; Ph.D., 1963, *Princeton University. Lyman-Roberts Professor of Classics.*
- Amer, Al-Roubaie (1995). B.A., 1967, *Baghdad University; M.A., 1975, New Brunswick University; Ph.D., 1986, McGill University. Visiting Assistant Professor of Economics.*
- Anderson, Frederick G. (1992). B.S., 1980, *Lafayette College; M.S., 1982, Rensselaer Polytechnic Institute; M.S., 1983; Ph.D., 1987, Lehigh University. Assistant Professor of Physics.*
- Anderson, James E. (1983). B.A., 1985, *State University of New York, Stony Brook; M.D., 1989, University of Virginia. Clinical Instructor in Medicine.*

- Anderson, Larry G. (1981). B.A., 1963, *Harvard University*; M.D., 1967, *Johns Hopkins University*. Clinical Associate Professor of Medicine.
- Anderson, Richard A. (1981). B.A., 1956, *Wesleyan College*; M.D., 1960, *Columbia University*. Clinical Associate Professor of Medicine.
- Andrea, Alfred J. (1967). A.B., 1963, *Boston College*; Ph.D., 1969, *Cornell University*. Professor of History.
- Andreas, Rosalind E. (1989). B.A., 1963, *Bethel College*; M.A., 1973, *University of Kansas*; Ph.D., 1984, *University of Michigan*. Assistant Professor of Education.
- Andrews, Allan A. (1970). B.A., 1955, *University of Chicago*; M.A., 1964; Ph.D., 1970, *Claremont Graduate School*. Professor of Religion.
- Andrews, Kevin P. (1993). B.A., 1978; M.D., 1982, *University of Vermont*. Clinical Instructor in Obstetrics and Gynecology.
- Andrews, Margaret R. (1981). B.A., 1972, *University of Pennsylvania*; M.S., 1978, *Michigan State University*. Extension Associate Professor in Extension Service.
- Angney, Alice W. (1991). B.S., 1965; M.Ed., 1973; Ed.D., 1986, *University of Vermont*. Adjunct Associate Professor of Education.
- Anson, Philip S. (1994). B.A., 1972, *College of Wooster*; M.D., 1979, *State University of New York, Buffalo*. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Antoniak, Christina M. (1995). B.S., 1989, *Johnson State College*. Adjunct Instructor in Education.
- Applebaum, Brett I. (1987). B.A., 1975, *University of Texas, Austin*; M.D., 1981, *University of Texas, Houston*. Clinical Assistant Professor of Radiology.
- Aranson, Albert (1981). A.B., 1935, *Harvard University*; M.D., 1941, *Boston University*. Professor of Medicine.
- Archdeacon, Dan S. (1982). B.A., 1975, *Earlham College*; M.S., 1976; Ph.D., 1980, *Ohio State University*. Associate Professor of Mathematics.
- Arns, Robert G. (1977). B.S., 1955, *Canisius College*; M.S., 1956; Ph.D., 1960, *University of Michigan*. Professor of Physics.
- Aronson, Frederick R. (1993). B.A., 1975, *Johns Hopkins University*; M.P.H., 1980; M.D., 1980, *Yale University*. Clinical Associate Professor of Medicine.
- Aronsson, David D. (1990). B.S., 1968; M.D., 1973, *University of Michigan*. Associate Professor of Orthopaedics and Rehabilitation and Pediatrics.
- Asada, Yasuhiko (1994). B.S., 1978; M.S., 1980; Ph.D., 1986, *Kyoto University*. Research Associate in Botany.
- Ashikaga, Takamaru (1973). B.A., 1966; M.S., 1970; Ph.D., 1973, *University of California, Los Angeles*. Professor of Statistics.
- Ashman, Jay I. (1982). B.A., 1970, *Amherst College*; J.D., 1973, *George Washington University*. Lecturer in Community Development and Applied Economics.
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- Atchinson, Alana B. (1994). B.S.W., 1983, *Eastern College*; M.S.W., 1986, *University of Pennsylvania*. Lecturer in Social Work.
- Atkins, Mary Ellen (1994). B.A., 1980, *University of Memphis*; Ph.D., 1992, *University of Vermont*. Clinical Assistant Professor of Psychology.
- Augur, Newell A., Jr. (1981). B.E., 1958, *Yale University*; M.D., 1962, *Columbia University*. Clinical Professor of Medicine.
- Auletta, Frederick J. (1979). B.S., 1965, *Springfield College*; Ph.D., 1970, *University of Massachusetts*. Associate Professor of Obstetrics and Gynecology and Biochemistry.
- Ault, Kenneth A. (1991). B.S., 1966, *Massachusetts Institute of Technology*; M.D., 1970, *Harvard University*. Associate Professor of Medicine.
- Averill, David C. (1988). B.A., 1980, *University of Vermont*; D.D.S., 1984, *Baltimore College*. Lecturer in Dental Hygiene.
- Averyt, William F. (1984). B.A., 1966, *University of Alabama*; M.A., 1969, *Johns Hopkins University*; Ph.D., 1976, *Yale University*. Associate Professor of Business Administration.
- Azar, Massoud (1983). B.S., 1957, *College of Saint Marie*; B.S., 1959, *Faculte de Lyon*; M.D., 1965, *Faculte Francaise*. Clinical Assistant Professor of Neurology.
- Aziz, Waseem I. (1994). F.S.C., 1981, *Government College*; M.B.B.S., 1987, *King Edward Medical College*. Clinical Instructor in Medicine.
- Babikian, George M. (1993). B.S., 1977, *State University of New York, Buffalo*; M.D., 1981, *Stanford University*. Clinical Assistant Professor of Surgery.
- Backus, Linda H. (1994). B.S., 1972, *Shippensburg University*; M.S., 1984; Ph.D., 1991, *University of Kansas*. Research Assistant Professor of Education.
- Backus, Robert W. (1982). B.A., 1963, *University of Nevada*; M.D., 1976, *University of Vermont*. Clinical Assistant Professor of Family Practice.
- Badger, Gary J. (1991). B.A., 1978, *McGill University*; M.S., 1983, *University of Vermont*. Lecturer in Statistics.
- Baegle, Monika I. (1994). B.A., 1981, *University of Massachusetts*; M.S., 1993, *University of Vermont*. Extension Instructor in Extension Service.
- Bagley, Frederick H. (1994). B.A., 1966, *Carleton College*; M.D., 1970, *University of Minnesota*. Clinical Assistant Professor of Surgery.
- Bagwell, Sandra P. (1986). B.S., 1971, *University of Connecticut*; B.S., 1978, *Florida International University*; M.D., 1982, *University of Miami*. Associate Professor of Medicine and Assistant Professor of Pediatrics.
- Bailey, Bryan (1993). A.D., 1983, *Central Texas College*. Instructor in Military Studies.
- Bakeman, Anne S. (1990). B.A., 1966, *State University of New York, Albany*; M.Ed., 1976, *College of Saint Rose*. Lecturer in Education.
- Baker, Frederick C., III (1990). B.A., 1973, *Lake Head University*; M.D., 1976, *McMaster University*. Clinical Assistant Professor of Surgery.
- Baker, John D. (1987). B.A., 1967, *Princeton University*; M.D., 1971, *Columbia University*. Clinical Assistant Professor of Medicine.
- Baker, Nancy E. (1982). B.S., 1966, *Tufts University*; M.S., 1969; Ph.D., 1981, *University of Pittsburgh*. Research Assistant Professor of Communication Sciences.
- Baker, Roger D. (1971). B.A., 1959; M.D., 1962, *University of Vermont*. Clinical Instructor in Pediatrics.
- Baker, William E. (1993). B.A., 1977, *Northeastern University*; M.A., 1985; Ph.D., 1991, *University of Florida*. Assistant Professor of Business Administration.
- Ball, Carol N. (1993). B.S., 1962, *University of Bridgeport*; M.Ed., 1981, *Mississippi State University*. Lecturer in Mathematics.
- Ball, Howard (1989). B.A., 1960, *City College of New York, Hunter College*; M.A., 1963; Ph.D., 1970, *Rutgers University*. Professor of Political Science and Public Administration.
- Ball, Karen J. (1984). B.S.N., 1968, *University of Bridgeport*; M.S.N., 1972, *University of Rhode Island*. Lecturer in Radiologic Technology.
- Ballard, Catherine S. (1991). B.S., 1984; M.S., 1988, *University of Vermont*. Adjunct Assistant Professor of Animal and Food Sciences.
- Ballor, Douglas L. (1991). B.S., 1976, *University of Michigan*; M.S., 1980, *Central Michigan University*; Ph.D., 1986, *University of Michigan*. Assistant Professor of Education.
- Bamps, Yvan, A. (1993). B.A., 1986, *Free University of Brussels*; M.A., 1990, *University of Maryland*; Ph.D., 1993, *Princeton University*. Assistant Professor of Romance Languages.

- Bancroft, Robert L. (1992). B.A., 1974; M.S., 1976, *University of Vermont*; Ph.D., 1981, *Purdue University*. Adjunct Assistant Professor of Community Development and Applied Economics.
- Baranowski, Ann (1994). B.A., 1981, *Trinity College*; M.A., 1987; Ph.D., 1994, *University of Toronto*. Lecturer in Religion.
- Barbour, James R. (1974). B.A., 1961, *Rutgers University*; M.A., 1967, *Trenton State College*; M.E.D., 1971, *Rutgers University*; Ed.D., 1974, *Fairleigh Dickinson University*. Associate Professor of Integrated Professional Studies.
- Barker, Heidi W. (1987). B.S., 1986, *University of Vermont*. Extension Assistant Professor in Extension Service Northeast Region.
- Barnaby, Andrew T. (1993). B.A., 1983, *Catholic University of America*; Ph.D., 1989, *Princeton University*. Assistant Professor of English.
- Barnum, H., Gardiner. (1965). B.A., 1957, *Middlebury College*; M.S., 1961; Ph.D., 1965, *University of Chicago*. Associate Professor of Geography.
- Barrett, John W. (1982). B.A., 1952, *Pennsylvania College*; M.D., 1956, *Western Reserve University*. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Barrett, Lisa L. (1994). A.B., 1966, *Radcliffe College*; J.D., 1970, *Columbia University*. Lecturer in Community Development and Applied Economics.
- Barrington, David S. (1974). B.S., 1970, *Bates College*; Ph.D., 1974, *Harvard University*. Professor of Botany.
- Barron, Martin A., Jr. (1981). B.S., 1951, *Saint Francis Xavier University*; M.D., 1958, *Tufts University*. Clinical Associate Professor of Pediatrics.
- Barss, Mary B. (1990). B.S., 1979, *Grand Valley State University*; M.D., 1985, *Wayne State University*. Assistant Professor of Psychiatry.
- Bartel, Lavon L. (1982). B.S., 1973; M.S., 1975, *Oregon State University*; Ph.D., 1979, *University of Wisconsin*. Extension Assistant Professor of Animal and Food Sciences.
- Bartlett, Richmond J. (1958). B.A., 1949; Ph.D., 1958, *Ohio State University*. Professor of Plant and Soil Science.
- Baruah, Sanjoy, K. (1993). B.Tech, 1987, I.I.T., Delhi; M.S., 1990; Ph.D., 1993, *University of Texas*. Assistant Professor of Computer Science and Mathematics.
- Baruth, Philip, E. (1993). B.A., 1984, *Brown University*; M.A., 1988; Ph.D., 1993, *University of California, Irvine*. Assistant Professor of English.
- Baska, Robert, S. (1993). B.S., 1979, *Eastern Illinois University*; M.D., 1983, *St. Louis University*. Clinical Assistant Professor of Surgery.
- Bateman, Erik A. (1988). B.Sc., 1977, *Sussex University*; Ph.D., 1983, *Reading University*. Research Assistant Professor of Microbiology and Molecular Genetics.
- Bates, Peter W. (1987). B.S., 1973; M.D., 1977, *University of Washington*. Associate Professor of Medicine.
- Bates, Thomas C. (1967). B.A., 1958, *Syracuse University*; M.D., 1962, *McGill University*. Clinical Associate Professor of Pediatrics.
- Battelle, Peter E. (1970). B.A., 1960, *Middlebury College*; M.B.A., 1963, *Columbia University*. Assistant Professor of Business Administration.
- Battista, Mark E. (1991). B.A., 1969, *Queens University, Kingston*; J.D., 1981, *Boston University*; M.D., 1973, *Queens University, Kingston*. Clinical Instructor in Family Practice.
- Battle, Robert W. (1987). B.A., 1978, *Dartmouth College*; M.D., 1984, *University of Virginia*. Assistant Professor of Medicine.
- Baum, Timothy C. (1991). B.A., 1979, *Ithaca College*; M.D., 1984, *University of Massachusetts*. Clinical Instructor in Medicine.
- Beach, Katherine M. (1993). B.A., 1974, *Goucher College*; B.S.N., 1981; M.S., 1984, *Columbia University*. Instructor in Obstetrics and Gynecology.
- Bean, Erzsebet T. (1992). B.S., 1975; M.S., 1983, *University of Vermont*. Lecturer in Mechanical Engineering.
- Bedard, Louise T. (1970). Clinical Assistant Professor of Medicine.
- Bednar, Martin M. (1992). B.S., 1979, *State University of New York, Albany*; M.S., 1983; M.D., 1986; Ph.D., 1986, *New York Medical College*. Assistant Professor of Surgery.
- Belcher, Debra L. (1992). B.S., 1987; B.S., 1988, *University of Vermont*. Lecturer in Education.
- Belenky, Mary F. (1985). M.A., 1956, *University of Chicago*; Ed.D., 1977, *Harvard University*. Research Associate Professor of Psychology.
- Belisle, Charles M. (1986). B.A., 1967, *University of Maine*; M.D., 1971, *University of Vermont*. Associate Professor of Family Practice.
- Beliveau, Jean-Guy L. (1985). B.S., 1968, *University of Vermont*; Ph.D., 1974, *Princeton University*. Professor of Civil and Environmental Engineering and Mechanical Engineering.
- Bell, Joyce R. (1994). B.S., 1948, *Queens College*; M.S., 1958, *University of Vermont*. Research Associate in Biology.
- Bell, Ross T. (1955). B.S., 1949; M.S., 1950; Ph.D., 1953, *University of Illinois*. The John Purple Howard Professor of Natural History and Biology.
- Bell, Roy W. (1969). M.B., 1956, *Edinburgh University*; D.A.B.A., 1971; F.A.C.A., 1971. Associate Professor of Anesthesiology.
- Bellino, Francis A. (1981). B.S., 1974, *Rensselaer Polytechnic Institute*; M.D., 1974, *Albany Medical College*. Clinical Assistant Professor of Family Practice.
- Benay, Elliott M. (1955). B.A., 1970, *George Washington University*; M.A., 1972, *New School for Social Research*. Adjunct Instructor in Psychology.
- Bennert, Harry W., Jr. (1980). A.B., 1958, *Bates College*; M.D., 1965, *Boston University*. Clinical Associate Professor of Obstetrics and Gynecology.
- Bennett, Christine A. (1991). B.S., 1984, *Fordham University*; M.D., 1988, *Loyola University*. Clinical Instructor in Pediatrics.
- Bennett, Roberta K. (1987). A.B., 1976; M.D., 1980, *Indiana University*. Clinical Assistant Professor of Neurology.
- Benoit, Michel, Y. (1992). M.D., 1985, *University of Montreal*; F.R.C.S., 1990, *University of Ottawa*. Assistant Professor of Orthopaedic Rehabilitation.
- Berg, Nancy M. (1991). B.S.N., 1974, *Boston College*; M.S.N., 1981, *Boston University*. Clinical Instructor in Obstetrics and Gynecology.
- Bergdahl, Dale R. (1977). B.S., 1966; M.S., 1974; Ph.D., 1979, *University of Minnesota*. Professor of Natural Resources.
- Bergen, Doris L. (1991). B.A., 1982, *University of Saskatchewan*; M.A., 1984, *University of Alberta*; Ph.D., 1991, *University of North Carolina*. Assistant Professor of History.
- Berger, Christopher L. (1994). B.A., 1986, *Lawrence University*; Ph.D., 1991, *University of Minnesota*. Assistant Professor of Molecular Physiology and Biophysics.
- Berger, Claudia A. (1994). B.A., 1983, *Williams College*; M.D., 1991, *Albert Einstein College*. Assistant Professor of Medicine.
- Bergeron, Cathryn H. (1995). B.A., 1972; M.Ed., 1975, *University of Vermont*. Adjunct Instructor in Education.
- Bergner, Arthur (1970). A.B., 1952; J.D., 1956, *Cornell University*; M.D., 1965, *New York Medical College*. Clinical Professor of Medicine.
- Bergner, Renee S. (1970). A.B., 1955, *Cornell University*; M.D., 1959, *Tufts University*. Clinical Professor of Pediatrics.
- Berkett, Lorraine P. (1983). B.A., 1974, *Gettysburg College*; M.S., 1978, *University of Maine*; Ph.D., 1985, *Pennsylvania State University*. Extension Associate Professor of Plant and Soil Science.

- Berkovich, Sumner (1980). B.Sc., 1952, McGill University; M.D., 1956, Boston University. Clinical Associate Professor of Pediatrics.
- Berkowitz, Stephen D. (1980). A.B., 1965, University of Michigan; Ph.D., 1975, Brandeis University. Associate Professor of Sociology.
- Berlin, A. Jan (1991). B.Sc., 1956, Denison University; M.D., 1960, Case Western Reserve University. Clinical Associate Professor of Ophthalmology.
- Berman, Jeffrey L. (1993). B.S., 1983; M.D., 1987, Tufts University. Clinical Assistant Professor of Surgery and Ophthalmology.
- Bernstein, Ira M. (1987). B.S., 1978, Union College; M.D., 1983, University of Vermont. Assistant Professor of Obstetrics and Gynecology.
- Bernstein, Richard A. (1976). A.B., 1965, Dartmouth College; M.D., 1970, Boston University. Clinical Associate Professor of Psychiatry.
- Bernstein, Richard H. (1989). A.B., 1968, Kenyon College; M.D., 1972, Case Western Reserve University. Clinical Instructor in Family Practice.
- Bernstein, S. Todd (1989). B.S., 1979, Trinity College; M.D., 1984, Temple University. Clinical Instructor in Orthopaedics and Rehabilitation.
- Bertocci, Paul V. (1976). B.S., 1966, Bates College; M.D., 1970, Boston University. Clinical Assistant Professor of Family Practice.
- Bertsch, Tania F. (1988). B.S., 1974, University of Detroit; M.D., 1978, Michigan State University. Associate Professor of Medicine.
- Beth, Amy (1955). B.A., 1986, Earlham College; M.L.S., 1987 Indiana University. Library Associate Professor in Bailey/Howe Library.
- Betts, Douglas H. (1984). B.S., 1956, Mount Allison University; M.D., 1961, Dalhousie University. Clinical Assistant Professor of Psychiatry.
- Bevan, John A. (1983). B.S., 1950; M.B.B.S., 1953, University of London. Professor of Pharmacology.
- Bevan, Rosemary D. (1983). M.B.B.S., 1953; D.C.H., 1955, University of London. Professor of Pharmacology.
- Beynnon, Bruce, D. (1986). B.S., 1982; M.S., 1986; Ph.D., 1991, University of Vermont. Research Assistant Professor of Orthopaedic Rehabilitation and Mechanical Engineering.
- Bhushan, Alok (1988). B.Sc., 1975; M.Sc., 1977, University of Delhi; Ph.D., 1982, Punjab Agriculture University. Research Assistant Professor of Pharmacology.
- Bianchi, Nancy A. (1991). B.A., 1977, Our Lady of Elms College; M.L.S., 1980, Simmons College. Library Assistant Professor in Dana Medical Library.
- Biber, Barbara P. (1991). B.S., 1979, Massachusetts Institute of Technology; M.D., 1983, University of Rochester. Clinical Assistant Professor of Radiology.
- Bickel, Warren K. (1987). B.A., 1978, State University of New York, New Paltz; M.A., 1981; Ph.D., 1983, University of Kansas. Associate Professor of Psychiatry and Psychology.
- Biddle, Arthur W. (1970). B.A., 1961, University of Connecticut; M.A., 1967, Trinity College; Ph.D., 1970, Michigan State University. Associate Professor of English.
- Bierman, Paul R. (1993). B.A., 1985, Williams College; M.S., 1990; Ph.D., 1993, University of Washington. Visiting Assistant Professor of Geology.
- Bigalow, Charles W. (1967). B.S., 1964, Cornell University; M.S., 1967, University of Vermont. Extension Associate Professor of Community Development and Applied Economics.
- Bigelow, James C. (1987). B.S., 1979, University of Illinois; Ph.D., 1985, Indiana University. Research Assistant Professor of Pharmacology.
- Bigos, S. Thomas (1981). B.S., 1965, Boston College; M.D., 1969, Tufts University. Professor of Medicine.
- Bijunas, Al B. (1995). B.S., 1972, McGill University; M.S., 1974, University of Toronto. Research Associate in Chemistry.
- Bing-You, Robert G. (1993). M.D., 1986, George Washington University. Assistant Professor of Medicine.
- Bingham, Richard L. (1975). B.A., 1951; M.A., 1953, University of Colorado; M.Div., 1955, Union Theological Seminary; M.S.W., 1962, University of Denver. Clinical Associate Professor of Medicine and Psychiatry.
- Birch, Lori H. (1993). A.S., 1979, University of Vermont. Clinical Instructor in Radiologic Technology.
- Biron, Maryse C. (1992). A.S., 1983, University of Vermont. Instructor in Radiologic Technology.
- Bishop, Kathleen K. (1988). B.A., 1966, Holy Family College; M.S.W., 1969; D.S.W., 1986, Catholic University. Assistant Professor of Social Work.
- Biss, Susan M. (1992). B.S.W., 1982, University of Vermont; M.S.W., 1985, Boston University. Lecturer in Social Work.
- Bisson, John A. (1993). A.B., 1969, Dartmouth College; M.D., 1973, University of Vermont. Clinical Assistant Professor of Surgery.
- Bittermann, Donald E. (1981). B.S., 1962, University of Wisconsin; M.D., 1966, University of Illinois. Clinical Associate Professor of Radiology.
- Blake, Kimberly D. (1994). B.A., 1986; M.D., 1990, State University of New York, Buffalo. Clinical Instructor in Obstetrics and Gynecology.
- Blanchette Porter, Misty M. (1993). B.A., 1985, Boston University; M.D., 1989, Dartmouth College. Clinical Instructor in Obstetrics and Gynecology.
- Bland, Walter P. (1977). B.S., 1972, University of Vermont. Lecturer in Education.
- Blattner, Stephen (1982). A.B., 1971, Cornell University; M.S., 1975; M.D., 1977, State University of New York, Buffalo. Clinical Associate Professor of Pediatrics.
- Blattspieler, Carol L. (1988). R.T., 1974, University of Iowa; B.S.N., 1980, University of Vermont. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Blinick, Joseph S. (1981). B.S., 1962, College of William and Mary; Ph.D., 1971, Brown University. Clinical Associate Professor of Radiology.
- Bloom, Thomas K. (1973). A.B., 1963; M.A., 1965, California State University; Ed.D., 1973, University of Illinois. Associate Professor of Community Development and Applied Economics.
- Bodman, Andrew R. (1978). B.A., 1970; M.A., 1973, Cambridge University; Ph.D., 1978, Ohio State University. Professor of Geography.
- Boedy, David L. (1979). B.A., 1972, Wartburg College; M.S.W., 1974, Washington University. Clinical Assistant Professor of Psychiatry.
- Boerman, Paul G. (1989). B.S., 1980, Calvin College; D.D.S., 1984, University of Detroit. Clinical Instructor in Surgery.
- Bokinsky, George E., Jr. (1984). B.A., 1966, Washington and Lee University; M.D., 1970, Medical College of Virginia. Associate Professor of Medicine.
- Bolduc, Joyce B. (1995). B.S.Ed., 1970; M.Ed., 1979, Plymouth State College. Adjunct Instructor in Education.
- Bolton, Margaret A. (1994). B.A., 1982; M.D., 1990, University of Vermont. Clinical Instructor in Psychiatry.
- Bouazinga, Bartholomew J. (1994). B.S., 1972, Union College; M.D., 1976, State University of New York, Downstate Medical Center. Clinical Assistant Professor of Medicine.
- Bond, Lynne A. (1976). B.A., 1971, Wheaton College; M.S., 1973; Ph.D., 1975, Tufts University. Professor of Psychology.
- Bonev, Adrian D. (1993). Ph.D., 1984, Institute of Physiology, Bulgaria. Research Associate in Pharmacology.
- Booth, Donald M. (1982). M.D., 1966, Thomas Jefferson University. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Boothby, John A. (1981). A.B., 1962; M.D., 1966, Cornell University. Clinical Assistant Professor of Neurology.
- Bosworth, Sidney C. (1989). B.S., 1976; M.S., 1978, Auburn University; Ph.D., 1984, University of Kentucky. Extension Associate Professor of Plant and Soil Science.

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- Botter, Mary L. (1993). B.S.N., 1976, Duke University; M.S.N., 1984, University of Pennsylvania. Assistant Professor of Professional Nursing.
- Boucher, Jacqueline L. (1995). B.A., 1980, Saint Francis College; M.S.Ed., 1973, University of Maine, Gorham. Adjunct Instructor in Education.
- Bouder, Thomas G. (1994). B.S., 1985, Juniata College; M.D., 1991, West Virginia University. Clinical Instructor in Medicine.
- Bouman, Sandra S. (1993). B.S., 1961; M.A., 1968; M.F.A., 1971; Pennsylvania State University. Assistant Professor of Music.
- Bousquet, Daniel W. (1975). B.S., 1964; M.S., 1966, University of Massachusetts; M.B.A., 1973, Pennsylvania State University. Extension Associate Professor of Natural Resources.
- Bouton, Mark E. (1980). B.A., 1975, Williams College; Ph.D., 1980, University of Washington. Associate Professor of Psychology.
- Bove, Louis G. (1981). A.B., 1948, Bowdoin College; M.D., 1952, Cornell University. Clinical Associate Professor of Medicine.
- Bovill, Edwin G. (1982). A.B., 1968, Dartmouth College; M.D., 1972, University of California. Professor of Pathology.
- Bowen, Charles R. (1972). A.B., 1962, Susquehanna University; D.M.D., 1966, Harvard University. Clinical Associate Professor of Oral Surgery and Instructor in Dental Hygiene.
- Boyack, Cindy (1994). B.Sc., 1981, University of Massachusetts; M.D., 1987, University of Toronto. Clinical Assistant Professor of Psychiatry.
- Boyce, Bertie R. (1958). B.S., 1956; M.S., 1958, University of Vermont; Ph.D., 1966, Rutgers University. Professor of Plant and Soil Science.
- Boyd, Marjorie A. (1981). B.A., 1960, Ohio Wesleyan University; M.D., 1966, State University of New York, Buffalo. Clinical Associate Professor of Medicine.
- Boyd, Michael L. (1984). B.A., 1977, Harvard University; M.A., 1982; Ph.D., 1984, Stanford University. Associate Professor of Economics.
- Boyer, Neil V. (1973). M.M., 1972, State University of New York, Stony Brook. Lecturer in Music.
- Boyle, Lakshmi J. (1989). B.A., 1984, University of Vermont; M.S., 1986, James Madison University. Adjunct Instructor in Communication Sciences.
- Braas, Karen M. (1989). B.A., 1976, Xavier College; Ph.D., 1983, Northwestern University. Research Assistant Professor of Anatomy and Neurobiology.
- Bradley, Anthony G. (1969). B.A., 1964, Queens University; Ph.D., 1972, State University of New York, Buffalo. Professor of English.
- Bradley, Patricia H. (1985). B.A., 1964, State University of New York, Buffalo; M.A., 1972, University of Vermont. Lecturer in English.
- Brakeley, Johanna K. (1981). M.S., 1973, Middlebury College; M.D., 1977, State University of New York, Upstate Medical Center. Clinical Instructor in Pediatrics.
- Bramley, Andrew J. (1990). B.Sc., 1971, University of Newcastle; Ph.D., 1975, University of Reading; C.B.I.O., 1985, Institute of Biology. Professor of Animal and Food Sciences.
- Branda, Richard F. (1983). B.S., 1962, University of Wisconsin; M.D., 1966, Harvard University. Professor of Medicine.
- Brandenburg, Richard G. (1987). B.M.E., 1958; M.B.A., 1960; Ph.D., 1964, Cornell University. Professor of Business Administration.
- Brandes, Mary C. (1990). B.S., 1980, University of Michigan; M.D., 1984, Johns Hopkins University. Clinical Assistant Professor of Obstetrics and Gynecology.
- Brann, Mark R. (1991). B.S., 1980, University of Maine; Ph.D., 1984, University of Vermont. Associate Professor of Psychiatry and Pharmacology.
- Braun, Theodore E., Jr. (1970). A.B., 1956, Princeton University; M.D., 1960, University of Pennsylvania. Associate Professor of Obstetrics and Gynecology.
- Brayden, Joseph E. (1986). B.S., 1973, Union College; Ph.D., 1982, University of Vermont. Associate Professor of Pharmacology.
- Brendenberg, Carl E. (1990). B.S., 1962; M.D., 1964, Johns Hopkins University. Professor of Surgery.
- Brennan, Thomas (1990). M.F.A., 1983, University of Arizona. Assistant Professor of Art.
- Brennan, Thomas J. (1986). B.S., 1972, University of Georgia. Lecturer in Education.
- Brenneman, Walter L., Jr. (1969). B.A., 1958, Gettysburg College; M.A., 1965, University of Chicago; Ph.D., 1974, Union Graduate School. Associate Professor of Religion.
- Bress, William C. (1989). B.S., 1971, CW Post College; M.S., 1978; Ph.D., 1984, Saint Johns University. Adjunct Assistant Professor of Pharmacology.
- Brew, Linda S. (1983). B.A., 1971, University of New Hampshire; M.S., 1982, Simmons College. Library Associate Professor in Bailey/Howe Library and Associate Professor of Education.
- Brewster, Thomas G. (1980). B.A., 1965; M.S., 1967; M.D., 1971, University of Nebraska. Clinical Assistant Professor of Pediatrics.
- Briggs, Russell C. (1981). A.B., 1954, Middlebury College; M.D., 1958, Albany Medical College. Clinical Professor of Radiology.
- Briggs, Winton (1981). B.S., 1956, Tufts University; M.D., 1960, University of Pittsburgh. Clinical Assistant Professor of Medicine.
- Brigham, Christopher R. (1991). B.A., 1972, Rutgers University; M.M.S., 1974, Rutgers Medical School; M.D., 1976, Washington University. Clinical Instructor in Family Practice.
- Brittain, Stephen M. (1983). B.A., 1972, Princeton University; M.D., 1976, University of Connecticut. Clinical Assistant Professor of Neurology.
- Broadbuss, Samuel B. (1985). B.A., 1973, Bowdoin College; M.D., 1977, University of Vermont. Clinical Assistant Professor of Urology.
- Broda, Lawrence S. (1984). B.S., 1971, John Carroll University; M.D., 1974, Ohio State University. Clinical Assistant Professor of Medicine.
- Broer, Stephen M. (1987). B.A., 1983, Marist College; M.S., 1986, Saint Johns University. Lecturer in Education.
- Bronstein, Phyllis (1981). B.A., 1962, University of Michigan; M.A., 1966, Boston University; Ph.D., 1979, Harvard University. Associate Professor of Psychology.
- Brook, Judy T. (1977). A.S., 1971, Vermont College; B.S., 1973, Norwich University; M.F.E., 1992, University of Vermont. Extension Assistant Professor in Extension Service Northwest Region.
- Brookes, Timothy J. (1990). P.G.C.E., 1977; M.A., 1976, Oxford University. Lecturer in English.
- Brooks, George D. (1994). B.S.M.E., 1961, University of New Hampshire; M.S.M.E., 1980, University of Vermont. Adjunct Instructor in Mechanical Engineering.
- Brooks, Nancy E. (1994). B.A., 1985, College of William and Mary; Ph.D., 1994, University of Pennsylvania. Assistant Professor of Economics.
- Broughton, Laurel G. (1986). B.A., 1974, M.A., 1982, University of Vermont. Lecturer in English.
- Broughton, T. Alan (1966). B.A., 1962, Swarthmore College; M.A. 1964, University of Washington. Professor of English.



- Brown, Dona L. (1994). A.B., 1978, *Bryn Mawr College*; M.A., 1983; Ph.D., 1989, *University of Massachusetts*. Assistant Professor of History.
- Brown, Douglas W. (1982). A.B., 1968, *Bowdoin College*; M.D., 1977, *University of Vermont*. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Brown, Janet P. (1973). B.S.N., 1953, *Cornell University*; M.S. 1965; Ed.D., 1985, *Boston University*. Associate Professor of Professional Nursing.
- Brown, Joanne C. (1987). B.S., 1960, *University of Maine*; M.A., 1965, *Rutgers University*. Lecturer in Mathematics.
- Brown, John S., Jr. (1966). S.B., 1957, *Massachusetts Institute of Technology*; M.S., 1963; Ph.D., 1967, *Rutgers University*. Professor of Physics.
- Brown, Kenneth A. (1984). A.B., 1973, *Rutgers University*; M.D., 1977, *Cornell University*. Associate Professor of Medicine and Assistant Professor of Radiology.
- Brown, Patrick M. (1979). B.A., 1974; E.D.S., 1977; M.Ed., 1977, *University of Florida*. Lecturer in Integrated Professional Studies.
- Brownbridge, Michael (1991). B.Sc., 1979; Ph.D., 1985, *University of Newcastle, Tyne*. Research Assistant Professor of Plant and Soil Science.
- Browne, Allen F. (1990). A.B., 1967, *Brown University*; M.D., 1971, *George Washington University*. Clinical Assistant Professor of Surgery.
- Brubaker, Camille M. (1987). B.S., 1969, *Indiana University of Pennsylvania*. Lecturer in Family Practice.
- Brubaker, David W. (1985). B.S., 1968, *Indiana University of Pennsylvania*. Lecturer in Music.
- Bruehl, Michael B. (1989). M.D., 1975, *University of Vermont*. Clinical Instructor in Family Practice.
- Bruening, Gary A. (1986). B.S., 1982, *College of William and Mary*. Lecturer in Education.
- Brumsted, John R. (1985). A.B., 1975; M.D., 1978, *Dartmouth College*. Associate Professor of Obstetrics and Gynecology.
- Bryan, Frank M. (1976). B.A., 1963, *Saint Michael's College*; M.A., 1965, *University of Vermont*; Ph.D., 1970, *University of Connecticut*. Associate Professor of Political Science.
- Bryan, George B. (1971). B.A., 1961, *Centenary College*; M.R.E., 1964, *Southern Baptist Seminary*; M.A., 1969; Ph.D., 1971, *Indiana University*. Professor of Theatre.
- Bryan, Phoebe E. (1984). A.B., 1959, *University of Kentucky*; M.A., 1960, *Duke University*. Lecturer in English.
- Bryant, Daniel C. (1981). B.A., 1961, *Princeton University*; M.D., 1965, *Columbia University*. Clinical Assistant Professor of Medicine.
- Bucke, David P., Jr. (1969). B.S., 1959, *Pennsylvania State University*; M.S., 1968; Ph.D., 1969, *University of Oklahoma*. Associate Professor of Geology.
- Buck-Rolland, Carol L. (1992). B.S.N., 1976, *University of Southern Maine*; M.S.N., 1981, *Medical College of Virginia, Richmond*. Lecturer in Technical Nursing.
- Budd, Ralph C. (1989). B.A., 1973, *Cornell University*; M.D., 1977, *Cornell Medical College*. Associate Professor of Medicine.
- Budney, Alan J. (1993). B.S., 1981, *Pennsylvania State University*; M.S., 1987; Ph.D., 1989, *Rutgers University*. Research Assistant Professor of Psychiatry and Clinical Assistant Professor of Psychology.
- Burchard, John D. (1970). B.S., 1958, *Denison University*; Ph.D., 1963, *University of Nebraska*. Professor of Psychology.
- Burchard, Sara N. (1977). B.S., 1958, *Denison University*; Ph.D., 1977, *University of Vermont*. Associate Professor of Psychology.
- Burczy, Sara A. (1977). B.S., 1974, *University of Nebraska*; M.E.Ed., 1980, *University of Vermont*. Extension Associate Professor in Extension Service Central Region.
- Burden, Charles E. (1980). B.S., 1955, *Yale University*; M.D., 1959, *Harvard University*. Clinical Assistant Professor of Pediatrics.
- Burdett, Carol A. (1970). B.S., 1959; M.Ed., 1970; Ed.D., 1989, *University of Vermont*. Assistant Professor of Education.
- Burfoot, Michael F. (1987). B.A., 1954; B.M., 1958; M.A., 1958, *Oxford University*; D.A., 1962, *Royal College of Physicians and Surgeons*. Associate Professor of Anesthesiology.
- Burgin, Eileen K. (1988). B.A., 1978, *University of Michigan*; M.A., 1984; Ph.D., 1988, *Harvard University*. Associate Professor of Political Science.
- Burgmeier, James W. (1969). B.A., 1965, *University of Saint Thomas*; M.S., 1967, *University of Colorado*; Ph.D., 1969, *University of New Mexico*. Professor of Mathematics.
- Burke, John M. (1988). A.B., 1975, *Middlebury College*; M.S., 1979, *University of Vermont*; Ph.D., 1983, *Massachusetts Institute of Technology*. Associate Professor of Microbiology and Molecular Genetics.
- Burke, John P. (1984). A.B., 1975, *Stanford University*; M.A., 1978; Ph.D., 1982, *Princeton University*. Professor of Political Science.
- Burns, Legrand C. (1968). B.A., 1958, *Wesleyan University*; M.D., 1962, *Albany Medical School*. Clinical Assistant Professor of Medicine.
- Burrell, Leon F. (1971). B.S., 1965; M.A., 1968, *Michigan State University*; M.S.W., 1985, *McGill University*; Ph.D., 1971, *Michigan State University*. Professor of Social Work.
- Burrington, Barbara A. (1994). B.S., 1985, *Vermont College*. Lecturer in Integrated Professional Studies.
- Busch, Susan V. (1990). B.A., 1982, *Cedar Crest College*; M.T., 1983, *Barnert School of Medical Technology*; M.S., 1990, *University of Vermont*. Clinical Instructor in Medical Technology.
- Bushweller, C. Hackett (1978). A.B., 1961, *Hamilton College*; M.S., 1963, *Middlebury College*; Ph.D., 1966, *University of California*. Professor of Chemistry.
- Butler, William M. (1991). A.A., 1982, *Greenfield Community College*; B.A., 1984, *Clark University*; Ph.D., 1991, *University of Vermont*. Clinical Assistant Professor of Psychology.
- Buturla, Edward M. (1993). B.S., 1967, *University of Connecticut*; M.S., 1970; Ph.D., 1976, *University of Vermont*. Adjunct Professor of Mechanical Engineering.
- Buzas, Jeff S. (1993). B.S., 1985, *University of Maryland*; M.S., 1987, *University of North Carolina*; Ph.D., 1993, *North Carolina State University*. Assistant Professor of Statistics.
- Byerly, Priscilla M. (1991). B.A., 1962, *Wells College*; M.A.T., 1965, *Duke University*. Lecturer in Romance Languages.
- Cahill, Sandra S. (1995). A.S., 1975, *Green Mountain College*; B.S., 1977, *University of Vermont*. Adjunct Instructor in Education.
- Calderwood, Louise H. (1988). B.S., 1983, *University of Vermont*; M.S., 1986, *Virginia Polytechnic Institute*. Extension Assistant Professor in Extension Service.
- Caldwell, Cecilia L. (1990). B.S., 1981, *University of Rhode Island*; M.D., 1985, *Pennsylvania State University*. Clinical Instructor in Obstetrics and Gynecology.
- Caldwell, Edgar J. (1966). B.S., 1954, *University of New Hampshire*; M.D., 1958, *University of Vermont*. Associate Professor of Medicine.
- Calhoun, Brian L. (1989). B.A., 1979, *Middlebury College*; M.D., 1984, *University of Virginia*. Assistant Professor of Anesthesiology.
- Callas, Peter W. (1994). M.S., 1984, *University of California, Berkeley*. Research Assistant Professor of Medicine and Statistics and Lecturer in Statistics.
- Calles-Escandon, Jorge (1989). B.S., 1971, *University Center, Mexico*; M.D., 1976, *National University of Mexico*. Associate Professor of Medicine.
- Campagna, Anthony S. (1965). B.S., 1960; M.A., 1962; Ph.D., 1966, *Rutgers University*. Professor of Economics.

- Campbell, Christine (1986). B.F.A., 1973, *Ohio Wesleyan University*; M.F.A., 1976, *Western Michigan University*. Lecturer in Art.
- Campbell, Judy B. (1977). B.S., 1965, *North Texas State University*; M.S., 1972, *University of Arizona*. Extension Associate Professor in Extension Service.
- Capeless, Eleanor L. (1980). B.A., 1970, *Wheaton College*; M.D., 1976, *Georgetown University*. Professor of Obstetrics and Gynecology.
- Capeless, Mark A. (1982). B.S., 1970; M.A., 1972, *Columbia University*; M.D., 1976, *Georgetown University*. Associate Professor of Medicine.
- Capen, David E. (1976). B.S.F., 1969, *University of Tennessee*; M.S., 1972, *University of Maine*; Ph.D., 1977, *Utah State University*. Associate Professor of Natural Resources.
- Capone, Angela M. (1988). B.S.E., 1974, *Westfield State College*; M.Ed., 1985, *College of William and Mary*; Ph.D., 1989, *Pennsylvania State University*. Assistant Professor of Integrated Professional Studies.
- Carew, Lyndon B. (1969). B.S., 1955, *University of Massachusetts*; Ph.D., 1961, *Cornell University*. Professor of Animal and Food Sciences.
- Carlson, Mary C. (1968). B.A. 1967, *University of Maine*; M.E.Ed., Extension Assistant Professor in Community Development and Applied Economics.
- Carnaghi, Jill E. (1992). B.A., 1975, *Purdue University*; M.A., 1977, *Michigan State University*; Ph.D., 1992, *Indiana University*. Adjunct Assistant Professor of Integrated Professional Studies.
- Carnes, Charlotte C. (1980). B.A. 1964, *Wellesley College*; M.D. 1968, *Albany Medical College*. Clinical Instructor in Pediatrics.
- Carnes, Timothy D. (1981). B.A. 1965, *Yale University*; M.D. 1969, *Tufts University*. Clinical Assistant Professor of Medicine.
- Carney, Jan K. (1984). A.B. 1976, *Middlebury College*; M.D. 1981, *University of Cincinnati*. Clinical Associate Professor of Medicine.
- Carr, Jeanine M. (1994). A.D., 1983, *Castleton State College*; B.S., 1987; M.S., 1989, *Clemson University*; Ph.D., 1994, *University of South Carolina*. Assistant Professor of Professional Nursing.
- Carrard, Philippe (1973). B.A., 1957, *Gymnase of Lausanne*; I.C., 1962; Ph.D., 1974, *University of Lausanne*. Professor of Romance Languages.
- Carroll, Janet E. (1985). B.A., 1976, *Brown University*; B.S.N., 1979, *Cornell University*; M.S.N., 1984, *Yale University*. Clinical Instructor in Obstetrics and Gynecology.
- Carroll, Ronald J. (1981). B.S., 1959, *Bridgewater State College*; M.D., 1963, *State University of New York, Buffalo*. Clinical Associate Professor of Medicine.
- Carter, Jeffrey E. (1985). B.S., 1983, *University of Idaho*. Extension Instructor in Extension Service.
- Carter, John H. (1979). B.A., 1972, *Middlebury College*; M.A., 1974, *Stanford University*. Lecturer in Education.
- Carter, Stephen M. (1989). B.A., 1982, *Niagara University*; B.F.A., 1985, *Alfred University*; M.F.A., 1989, *Arizona State University*. Assistant Professor of Art.
- Carter, William P., Jr. (1985). B.A., 1968, *Yale University*; M.D., 1972, *Tufts University*. Clinical Assistant Professor of Surgery.
- Casciaro, Thomas L. (1994). B.S., 1985, *Columbus College*. Assistant Professor of Military Studies.
- Case, Delvyn C., Jr. (1981). A.B., 1967, *Brown University*; M.D., 1971, *Jefferson Medical College*. Clinical Professor of Medicine.
- Case, Terrence D. (1992). B.A., 1979, *Goddard College*; M.Ed., 1980, *Harvard University*. Clinical Instructor in Surgery.
- Casey, Kevin J. (1993). A.D., 1978, *North Kentucky University*; A.D., 1992, *Cuyahoga College*. Clinical Instructor in Surgery.
- Casey-Spillane, Jean (1992). B.S., 1977, *Lyndon State College*; M.S., 1981, *University of Vermont*. Adjunct Instructor in Communication Sciences.
- Cass, Jean E. (1993). A.A., 1970, *Genesee Community College*; B.A., 1972, *State University of New York, Cortland*; M.S.S.W., 1979, *University of Louisville*. Lecturer in Social Work.
- Cassell, Eugene A. (1974). B.S.S.E., 1956, *Pennsylvania State University*; S.M.S.E., 1958, *Massachusetts Institute of Technology*; Ph.D., 1964, *University of North Carolina*. Professor of Natural Resources and Geology.
- Cassidy, Bruce R. (1991). B.S., 1968, *Union College*; M.D., 1972, *Albany Medical College*. Clinical Assistant Professor of Surgery.
- Cathcart, Charles J. (1987). B.S., 1980; M.D., 1984, *University of Vermont*. Clinical Instructor in Medicine.
- Cathcart, Wendy S. (1992). B.A., 1979; M.D., 1988, *University of Vermont*. Clinical Instructor in Medicine.
- Cats-Baril, William L. (1982). B.S., 1976; M.S., 1977; Ph.D., 1982, *University of Wisconsin*. Associate Professor of Business Administration.
- Cernosia, Arthur W. (1989). B.A., 1972; J.D., 1976, *Northern Illinois University*. Adjunct Assistant Professor of Education.
- Chaffee, Mary Ann M. (1995). B.A., 1960, *University of Vermont*. Adjunct Instructor in Education.
- Chamberlain, Valerie M. (1985). B.S., 1951, *University of Vermont*; M.S., 1963; Ph.D., 1969, *Florida State University*. Professor of Nutritional Sciences.
- Chan, Sin Yee (1993). B.A., 1981, *University of Hong Kong*; M.A., 1987, M.A., 1990; Ph.D., 1993, *University of Michigan*. Assistant Professor of Philosophy.
- Chandler, Richard C. (1985). B.A., 1969, *University of Virginia*; M.D., 1973, *Hahnemann University*. Clinical Assistant Professor of Surgery.
- Chang, Poh Y. (1988). M.B.Ch., 1977, *University of Manchester*. Clinical Instructor in Pediatrics.
- Chapitis, Jane (1985). B.A., 1968; M.D., 1972; Ph.D., 1978, *University of Connecticut*. Assistant Professor of Obstetrics and Gynecology.
- Charnock, David R. (1995). B.A., 1980, *Buffalo State College*; M.D., 1984, *New York Medical College*. Clinical Assistant Professor of Surgery.
- Chaplin, Jill J. (1993). M.D., 1987, *University of Massachusetts*. Clinical Assistant Professor of Family Practice.
- Chase, Christopher R. (1977). B.A., 1970; M.D., 1974, *University of Vermont*. Associate Professor of Anesthesiology.
- Chase, David S. (1971). B.A., 1959; M.D., 1962, *University of Vermont*. Clinical Assistant Professor of Ophthalmology.
- Chase, Richard X. (1966). B.S., 1957, *New York University*; M.B.A., 1959; Ph.D., 1966, *University of Maryland*. Professor of Economics.
- Chavez, Anthony J. (1992). A.A.S., 1981, *Reno Lake College*; B.A., 1977, *University of Notre Dame*; M.S., 1982, *Southern Illinois University*. Lecturer in Education.
- Chen, Harry L. (1993). A.B., 1973, *University of Michigan*; M.D., 1979, *Oregon Health Science University*. Clinical Assistant Professor of Surgery.
- Chen, Hongda (1990). B.S., 1983, *University of Fuzhou*; M.S., 1987; Ph.D., 1990, *University of California, Davis*. Assistant Professor of Animal and Food Sciences.
- Cherouny, Peter H. (1992). B.A., 1976, *University of Vermont*; M.D., 1981, *St. George's University*. Assistant Professor of Obstetrics and Gynecology.
- Chiappinelli, Emanuele Q. (1981). A.B., 1971, *Brown University*; M.D., 1975, *University of Vermont*. Clinical Instructor in Pediatrics.
- Chiaravalle, Paul J. (1993). A.S., 1987, *George Washington University*. Clinical Assistant Professor of Radiologic Technology.
- Chilmonczyk, Barbara A. (1984). B.A., 1974, *Smith College*; M.D., 1978, *University of Cincinnati*. Clinical Assistant Professor of Pediatrics.

- Chiu, Jen-Fu (1978). B.Sc., 1964, *Taipei Medical College*; M.Sc., 1967, *National Taiwan University*; Ph.D., 1972, *University of British Columbia*, Professor of Biochemistry.
- Chodorkoff, Betsy M. (1993). B.A., 1980, *Coddard College*; M.S.S.W., 1986, *Columbia University*. Lecturer and Research Associate in Social Work.
- Christensen, David P. (1987). B.A., 1978, *Hampshire College*; Ph.D., 1987, *University of California, Los Angeles*. Associate Professor of Philosophy.
- Christie, Walter R. (1980). B.A., 1964, *Bowdoin College*; M.D., 1968, *Temple University*. Clinical Associate Professor of Psychiatry.
- Church, William R. (1986). B.S., 1974, *Oklahoma State University*; Ph.D., 1979, *University of Kansas*. Research Associate Professor of Biochemistry.
- Churchill, Bruce L. (1989). B.S., 1976, *Michigan State University*; M.D., 1980, *University of Michigan*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Churchill, Martha E. (1992). B.S.N., 1986, *Georgetown University*; M.S.N., 1989, *University of Pennsylvania*. Adjunct Assistant Professor of Professional Nursing and Clinical Instructor in Obstetrics and Gynecology.
- Cichoski, Roy S. (1995). B.S., 1970, *Lyndon State College*. Adjunct Instructor in Education.
- Ciongoli, Alfred K. (1978). A.B., 1964, *University of Pennsylvania*; D.O., 1968, *Philadelphia College of Osteopathic Medicine*. Clinical Associate Professor of Neurology.
- Cirignano, John S. (1993). B.A., 1982, *Cornell College*; M.A., 1991; Ph.D., 1993, *University of Iowa*. Adjunct Assistant Professor of Classics.
- Claffey, Thomas F. (1981). M.D., 1970, *University of Vermont*. Clinical Associate Professor of Medicine.
- Clark, Ann M. (1994). B.S.N., 1975, *Fitchburg State College*; M.S.N., 1978, *Boston University*. Lecturer in Professional Nursing.
- Clark, Anne L. (1988). B.A., 1979, *College of Mount Saint Vincent*; M.A., 1981; M.Ph., 1984; Ph.D., 1989, *Columbia University*. Assistant Professor of Religion.
- Clark, Cantwell V. (1990). A.B., 1977; M.D., 1980, *Dartmouth College*. Clinical Associate Professor of Anesthesiology.
- Clark, Christopher L. (1993). B.A., 1974, *Haverford College*; M.D., 1981, *University of Pennsylvania*. Clinical Assistant Professor of Family Practice.
- Clark, David E. (1983). A.B., 1971, *Dartmouth College*; M.D., 1975, *George Washington University*. Clinical Associate Professor of Surgery.
- Clark, Nathaniel G. (1994). B.A., 1976, *University of Massachusetts, Amherst*; M.S., 1978, *Massachusetts Institute of Technology*; M.D., 1988, *University of Massachusetts*. Assistant Professor of Medicine.
- Clark, Robert A. (1988). B.A., 1976; B.S., 1977; M.B.A., 1983, *University of Maine*; Ph.D., 1989, *Purdue University*. Assistant Professor of Business Administration.
- Clark, Virginia P. (1965). B.A., 1961; M.A., 1963, *University of Vermont*; Ph.D., 1968, *University of Connecticut*. Professor of English.
- Clarke, John H. (1977). A.B., 1965, *Princeton University*; M.A.T., 1966, *Harvard University*; Ed.D., 1977, *North-eastern University*. Associate Professor of Education.
- Clarke, Lorraine M. (1970). B.S., 1964; Ed.M., 1968, *Columbia University*. Associate Professor of Technical Nursing.
- Clauss, David W. (1991). M.S., 1983, *Saint Lawrence University*; M.D., 1987, *Emory University*. Assistant Professor of Emergency Medicine and Surgery.
- Cleary, Richard J. (1995). B.S., 1978, *Oneonta State College*; M.A., 1980, *University of Massachusetts, Amherst*; Ph.D., 1993, *Cornell University*. Visiting Associate Professor of Statistics.
- Clements, Diane B. (1995). B.N., 1970; M.S.C., 1973, *McGill University*. Lecturer in Professional Nursing.
- Clements, John P. (1969). B.A., 1956; M.D., 1960, *University of Vermont*. Professor of Radiology and Medicine.
- Clewley, Elizabeth C. (1961). B.S., 1953; M.D., 1956, *University of Vermont*. Clinical Associate Professor of Pediatrics.
- Clewley, John D. (1985). A.B., 1958, *Middlebury College*; M.S., 1966; Ph.D., 1971, *University of Vermont*. Research Assistant Professor of Chemistry.
- Clifford, Patrick P. (1988). B.A., 1974; B.S., 1975; M.D., 1984, *University of Vermont*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Cloninger, Chigee J. (1986). A.A., 1966, *Cotley College*; B.S., 1969, *University of Southwestern Louisiana*; M.A., 1975; Ph.D., 1977, *Ohio State University*. Research Associate Professor and Lecturer in Education.
- Clough, Elizabeth A. (1989). B.S., 1960, *Columbia University*; M.S., 1969, *University of California, San Francisco*. Adjunct Assistant Professor of Technical Nursing.
- Clougherty, Dennis P. (1992). B.S., 1982; M.S., 1982; Ph.D., 1989, *Massachusetts Institute of Technology*. Assistant Professor of Physics.
- Cobean, Roy A. (1993). B.S., 1980, *Tufts University*; M.D., 1985, *University of Vermont*. Clinical Assistant Professor of Surgery.
- Coddaire, David M. (1979). A.B., 1968, *College of the Holy Cross*; M.D., 1972, *University of Vermont*. Clinical Assistant Professor of Family Practice.
- Coffey, Dianne (1994). B.A., 1974, *Earlham College*; M.A., 1991, *University of Maine*. Assistant Professor of Integrated Professional Studies.
- Coffey, Jean S. (1994). A.D.N., 1977, *University of Vermont*; B.S.N., 1992, *Norwich University*. Lecturer in Technical Nursing.
- Cohen, Judith A. (1981). B.S., 1975, *University of Vermont*; M.S., 1981, *University of Michigan*. Associate Professor of Technical Nursing and Professional Nursing.
- Cohen, Lewis J. (1988). B.S., 1972, *University of Massachusetts*; M.S., 1973, *University of Illinois*; M.D., 1979, *University of Arizona*. Clinical Assistant Professor of Pediatrics.
- Cohn, Arthur B. (1992). B.A., 1971, *University of Cincinnati*; J.D., 1974, *Boston College*. Adjunct Assistant Professor of Natural Resources.
- Collen, Desire J. (1985). M.D., 1968; Ph.D., 1974, *University of Leuven*. Professor of Biochemistry and Medicine.
- Colletti, Richard B. (1974). A.B., 1964, *New York University*; M.D., 1968, *University of Pittsburgh*. Associate Professor of Pediatrics.
- Collins, Charles M. (1991). B.A., 1968; M.A., 1982, *University of Vermont*. Lecturer in Education.
- Collins, Linda A. (1993). B.A., 1980, *Williams College*; M.D., 1986, *University of Vermont*. Clinical Assistant Professor of Medicine.
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- Compas, Bruce E. (1981). B.A., 1973; M.A., 1975; Ph.D., 1980, *University of California*. Professor of Psychology.
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- Conn, Jan E. (1994). B.S.C., 1977, *Concordia University*; M.S.C., 1981, *Simon Fraser University*; Ph.D., 1987, *University of Toronto*. Assistant Professor of Biology.
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- Connors, Edwards J. (1993). B.S., 1951, *University of South Dakota*; M.H.A., 1955, *University of Minnesota*. Visiting Professor of Medicine.
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- Conrad, Sally Y. (1995). B.A., 1963, *Boston University*; M.Ed., 1967, *Northeastern University*. Adjunct Assistant Professor of Social Work.
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- Cook, Andrew D. (1994). B.A., 1967, *Swarthmore College*; M.D., 1971, *Yale University*; M.Ed., 1972, *Harvard University*. Clinical Assistant Professor of Psychiatry.
- Cook, Francis W. (1984). B.A., 1974, *Saint Michael's College*; M.D., 1978, *Georgetown University*. Clinical Assistant Professor of Family Practice.
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- Cooper, Kyle A. (1991). B.S., 1981, *New Mexico State University*; M.D., 1987, *University of New Mexico*. Assistant Professor of Medicine.
- Cooper, Phillip J. (1995). B.A., 1975, *California State University, Sacramento*; M.A., 1976; Ph.D., 1978, *Syracuse University*. Professor of Political Science; Gund Professor of Liberal Arts.
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- Corkum, Dean S. (1995). B.A., 1988, *University of Vermont*. Adjunct Instructor in Education.
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- Corrigan, Michael J. (1990). B.S., 1975; M.D., 1980, *University of Vermont*. Clinical Instructor in Family Practice.
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- Crabb, John W. (1987). B.S., 1971, *Lewis & Clark College*; Ph.D., 1978, *University of Kansas*. Adjunct Associate Professor of Biochemistry.
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- Crichfield, Grant (1968). B.A., 1962, *University of Massachusetts*; M.A., 1966; Ph.D., 1972, *University of Wisconsin*. Associate Professor of Romance Languages.
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- Cronan, Judith A. (1993). B.A., 1969, *Upsala College*; M.A., 1993, *Saint Michael's College*. Clinical Instructor in Family Practice.
- Grose, Ruth A. (1982). B.A., 1972, *Anderson College*; M.D., 1976, *Indiana University*. Clinical Instructor in Family Practice.
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- Crute, Catherine (1993). B.S., 1969, *Gettysburg College*; B.S.N., 1972, *Catholic University*; M.D., 1980, *University of Maryland*. Clinical Assistant Professor of Family Practice.
- Culver, Jimmy L. (1976). B.S., 1970, *University of Michigan*; D.D.S., 1973, *University of Detroit*. Clinical Instructor in Surgery.
- Cumming, Jonathan R. (1990). B.S., 1981, *College of William and Mary*; M.S., 1984, *University of New Hampshire*; Ph.D., 1990, *Cornell University*. Research Assistant Professor of and Lecturer in Botany.
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- Currier, Pamela S. (1991). B.S., 1977, *University of Vermont*. Clinical Instructor in Physical Therapy.
- Currier, Willard F. (1987). B.S., 1983, *University of Vermont*; M.S., 1985, *Western Carolina University*. Lecturer in Education.
- Currier, William W. (1977). B.S., 1969, *University of Washington*; Ph.D., 1974, *Purdue University*. Associate Professor of Agricultural Biochemistry.
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- Cushman, Mary (1992). B.S., 1985; M.D., 1989, *University of Vermont*. Clinical Instructor in Medicine.
- Cutler, D. Joshua (1986). A.B., 1970, *Harvard University*; M.D., 1974, *Duke University*. Clinical Assistant Professor of Medicine.
- Cutler, Joel E. (1993). B.A., 1976, *Hampshire College*; M.D., 1980, *University of Vermont*. Clinical Assistant Professor of Medicine.
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- D'Angelo, William F. (1991). B.A., 1974, *College of the Holy Cross*; M.D., 1978, *Tufts University*. Clinical Assistant Professor of Family Practice.
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- Damon, Deborah H. (1995). B.A., 1978, *Hartwick College*; Ph.D., 1985, *University of Virginia*. Assistant Professor of Pharmacology.
- Daniel, Alicia E. (1990). B.A., 1982, *University of Texas*; M.S., 1989, *University of Vermont*. Lecturer in Botany.
- Daniels, Patricia A. (1994). B.S., 1972, *University of Vermont*. Lecturer in Education.
- Danielson, Kenneth S. (1994). B.A., 1961, *University of Rochester*; M.D., 1965, *Harvard University*. Clinical Assistant Professor of Surgery.
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- Davenport, David A. (1988). B.S., 1973, *University of Southern Colorado*; M. M., 1973, *Cleveland Institute of Music*. Assistant Professor of Music.
- Davis, Cameron (1990). B.A., 1976, *University of Vermont*; M.F.A., 1981, *Pratt Institute*. Lecturer in Art.
- Davis, Elizabeth J. (1988). B.A., 1958, *University of New Hampshire*; B.S., 1961, *Columbia University*; M.P.H., 1980, *Harvard University*. Adjunct Assistant Professor of Professional Nursing.
- Davis, Gerald S. (1971). B.S., 1966, *Yale University*; M.D., 1970, *University of Virginia*. Professor of Medicine.
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- Davis, Jeffrey B. (1994). B.A., 1985, *Columbia University*; M.D., 1990, *University of Rochester*. Assistant Professor of Medicine.
- Davis, Robert E. (1968). A.B., 1954, *Colgate University*; M.D., 1958, *Cornell University*. Clinical Professor of Obstetrics and Gynecology.
- Davis, Wendy S. (1987). A.B., 1975, *Brown University*; M.D., 1981, *University of Virginia*. Associate Professor of Pediatrics.
- Davison, John A. (1967). B.S., 1950, *University of Wisconsin*; Ph.D., 1955, *University of Minnesota*. Associate Professor of Biology.
- Davison, William, E. (1967). B.A., 1963, *Albion College*; M.F.A., 1966, *University of Michigan*. Professor of Art.
- Davitt, Martha A. (1993). B.A., 1983, *Cornell University*; M.D., 1987, *University of Rochester*. Clinical Assistant Professor of Medicine.
- Dawson, Robert F. (1969). B.S., 1957, *University of Vermont*; M.S., 1961, *Cornell University*; Ph.D., 1964, *Purdue University*. Professor of Civil and Environmental Engineering and Computer Science.
- Dawson-Chalat, Erin C. (1993). B.A., 1983; M.D., 1988, *University of Vermont*. Clinical Instructor in Obstetrics and Gynecology.
- Day, Rachel F. (1995). B.A., 1971, *University of Colorado*; M.Ed., 1978, *Tufts University*. Lecturer in Integrated Professional Studies.
- Defuria, Karen (1994). A. S., 1982, *Bunker Hill Community College*; B.S., 1991, *Framingham State College*. Adjunct Instructor in Nutritional Sciences.
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- Dean, Howard B. (1987). B.A., 1971, *Yale University*; M.D., 1978, *Albert Einstein Medical Center*. Clinical Assistant Professor of Medicine.
- Deane, Robert S. (1967). MB,BChir, 1954; *University of Witwatersrand*. Professor of Anesthesiology.
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- DeGrandpre, Richard J. (1992). B.A., 1987, *University of Montana*; M.S., 1989, *Auburn University*. Lecturer in Psychology.
- DeHayes, Donald H. (1977). B.S., 1972, *State University of New York, Stony Brook*; M.S., 1974; Ph.D., 1977, *Michigan State University*. Professor of Natural Resources.
- Delaney, Maureen K. (1991). B.S., 1975, *State University of New York, Genesee*; M.S., 1979, *College of Saint Rose*. Adjunct Instructor in Communication Sciences.
- Demers, Marc L. (1994). A. S., 1978, *Stone Hill College*; B.A., 1981; M.D., 1985, *Boston University*. Clinical Assistant Professor of Surgery.
- Demicco, William A. (1993). B.A., 1969, *Wesleyan College*; M.D., 1973, *Tufts University*. Clinical Assistant Professor of Family Practice.
- Deming, Howard R. (1981). A.B., 1955, *Dartmouth College*; M.D., 1959, *University of Vermont*. Clinical Associate Professor of Radiology.
- Dempsey, Stephen J. (1987). B.S., 1982, *State University of New York, Binghamton*; M.A., 1983; Ph.D., 1985, *Virginia Polytechnic Institute and State University*. Associate Professor of Business Administration.
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- Desieyes, Charles J. (1981). B.A., 1973, *Stanford University*; M.D., 1977, *Case Western Reserve University*. Clinical Assistant Professor of Family Practice.
- DeSai, Cynthia A. (1992). A.B., 1981, *Mount Holyoke College*; M.D., 1985, *University of Rochester*. Clinical Instructor in Medicine.
- Devlin, John T. (1983). B.A., 1973, *Lehigh University*; M.D., 1977, *Cornell University*. Associate Professor of Medicine.
- Deweese, Martha P. (1994). B.A., 1966, *University of Wisconsin*; M.Ed., 1974, *West Chester State College*; M.S.W., 1985, *Adelphi University*. Visiting Instructor in Social Work.
- Dibbins, Albert W. (1989). A.B., 1955, *Princeton University*; M.D., 1959, *Tufts University*. Clinical Professor of Surgery.
- Dickerman, Joseph D. (1972). B.A., 1960, *Johns Hopkins University*; M.D., 1965, *Cornell University*. Professor of Pediatrics.
- Dickerson, Mary J. (1973). B.A., 1959, *University of North Carolina, Greensboro*; M.A., 1960, *University of North Carolina, Chapel Hill*. Assistant Professor of English.
- Dickstein, Richard M. (1995). B.S.E.E., 1963, *Drexel University*; M.S.E.E., 1974; Ph.D., 1988, *University of Vermont*. Visiting Associate Professor of Electrical Engineering.
- Dietrich, Peter A. (1971). B.S., 1961, *Yale University*; M.D., 1965, *Case Western Reserve University*. Professor of Radiology.
- Ding, Hongming (1989). B.A., 1964, *Fudan University*; M.A., 1982, *Shanghai Jiaotong University*; Ph.D., 1989, *University of Georgia*. Adjunct Assistant Professor of Mathematics.
- Dinitz, Jeffrey H. (1980). B.S., 1974, *Carnegie Mellon University*; M.S., 1976; Ph.D., 1980, *Ohio State University*. Professor of Mathematics and Computer Science and Electrical Engineering.

- Dinitz, Susan M. (1988). B.A., 1974, *Ohio Wesleyan University*; M.A., 1976; Ph.D., 1981, *Ohio State University*. Lecturer in English.
- Diouf, Moustapha (1989). B.A., 1979; M.A., 1981, *University of Paris*; M.A., 1985; Ph.D., 1989, *University of Missouri*. Associate Professor of Sociology.
- Dissin, Jonathan (1988). B.S., 1970, *Monmouth College*; M.S., 1973, *Medical College of Georgia*; M.D., 1982, *Saint George's University*. Assistant Professor of Neurology.
- Ditchey, Roy V. (1985). B.S., 1970, *Stanford University*; M.D., 1974, *University of California, Irvine*. Associate Professor of Medicine.
- Dobieski, Steven T. (1994). B.S., 1987, *Bates College*; M.D., 1991, *University of Connecticut*. Clinical Instructor in Medicine.
- Does, Richard B. (1969). B.A., 1963, *Rockford College*; M.A., 1965; Ph.D., 1969, *Michigan State University*. Clinical Assistant Professor of Psychology.
- Doherty, Richard A. (1992). B.A., 1954, *Bowdoin College*; M.D., 1960, *Columbia University*. Clinical Professor of Pediatrics and Obstetrics and Gynecology.
- Doil, Kenneth L. (1980). B.A., 1959, *Central Michigan University*; M.D., 1963, *University of Michigan*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Doiron, Richard G. (1987). B.A., 1962, *Boston College*; M.A., 1965; Ph.D., 1968, *Loyola University*. Clinical Associate Professor of Psychiatry.
- Donegan, Desmond J. (1983). M.B., 1974, *Galway University*. Clinical Assistant Professor of Cardiology.
- Donnelly, Catherine W. (1983). B.S., 1978, *University of Vermont*; M.S., 1980; Ph.D., 1983, *North Carolina University*. Professor of Animal and Food Sciences.
- Donnelly, John R. (1969). B.S., 1963; M.S., 1964; Ph.D., 1970, *University of Michigan*. Professor of Natural Resources.
- Donnelly, L. Scott (1983). B.S., 1974, *Saint Olaf College*; M.S., 1976, *Iowa State University*; Ph.D., 1981, *University of Minnesota*. Adjunct Assistant Professor of Animal and Food Sciences.
- Donnis, Susan H. (1994). B.S., 1972; M.A., 1974, *University of Vermont*. Lecturer in Integrated Professional Studies.
- Donohoe, Orla M. (1994). M.B.B.C.H., 1988, *Royal College of Surgeons*. Clinical Instructor in Medicine.
- Doolan, Barry L. (1970). B.A., 1966, *Colgate University*; Ph.D., 1971, *State University of New York, Binghamton*. Associate Professor of Geology.
- Dopp, Sarah L. (1977). B.S., 1968; M.A., 1982, *University of Vermont*. Clinical Instructor in Medical Technology.
- Dorsk, Brian M. (1981). B.S., 1964, *Washington and Lee University*; M.D., 1968, *Medical College of Virginia*. Clinical Assistant Professor of Medicine.
- Dougherty, David E. (1990). B.S., 1975, *Swarthmore College*; M.S., 1976, *Tufts University*; M.A., 1983; Ph.D., 1985, *Princeton University*. Associate Professor of Civil and Environmental Engineering.
- Douglas, Jeanne M. (1985). B.S., 1973; M.A., 1976, *Castleton State College*; M.S., 1985, *University of Vermont*. Lecturer in Computer Science.
- Douglas, Priscilla. (1988). B.S., 1972, *Mannes College of Music*; M.S., 1983, *University of Vermont*. Adjunct Instructor in Communication Sciences.
- Douglass, Majorie E. (1995). B.S., 1964, *University of Vermont*. Instructor in Family Practice.
- Dow, Elizabeth H. (1990). M.L.S., 1970, *University of Oregon*; M.A., 1985, *University of Vermont*; Ph.D., 1988, *University of Pittsburgh*. Library Assistant Professor in Dana Medical Library.
- Dowd, Mary (1993). B.A., 1974, *Smith College*; M.A., 1976, *University of Connecticut*; M.D., 1988, *University of Massachusetts*. Clinical Assistant Professor of Family Practice.
- Dowling, Patrick A. (1982). A.B., 1962; B.M.S., 1963, *Dartmouth College*; M.D., 1965, *Columbia University*. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Downer, Richard N. (1967). B.S., 1963, *University of New Hampshire*; Ph.D., 1967, *Colorado State University*. Associate Professor of Civil and Environmental Engineering.
- Downs, Murna, G. (1993). D.A.P., 1983; B.A., 1979, *University College of Dublin*. Research Assistant Professor of Psychology.
- Drake, Emerson H. (1982). B.S., 1938, *Yale University*; M.D., 1941, *Columbia University*. Clinical Professor of Surgery.
- Drake, John C. (1970). B.S., 1962, *Denison University*; A.M., 1964; Ph.D., 1968, *Harvard University*. Associate Professor of Geology.
- Dransfield, Douglas A. (1980). B.A., 1969, *College of Wooster*; M.D., 1973, *Columbia University*. Clinical Assistant Professor of Pediatrics.
- Draves, Susan J. (1994). B.S., 1981, *Cornell University*; M.R.P., 1994, *University of Massachusetts*. Extension Instructor in Extension Service.
- Dreher, George K. (1994). B.S., 1968, *University of Illinois*; M.D., 1977, *Albany Medical School*. Clinical Assistant Professor of Psychiatry.
- Driscoll, John P. (1984). B.A., 1972, *Yale University*; M.D., 1976, *Tufts University*. Clinical Assistant Professor of Medicine.
- Drolet, Suzanne L. (1987). Diploma, 1980, *University De Haute Bretagne*; B.A., 1982; M.A., 1987, *University of Vermont*. Lecturer in Romance Languages.
- Drucker, Nancy A. (1992). A.B., 1981, *Smith College*; M.D., 1985, *Johns Hopkins University*. Assistant Professor of Pediatrics.
- Dubois, Donald A. (1993). B.A., 1979, *Bates College*; M.D., 1988, *Uniformed Services University*. Clinical Instructor in Medicine.
- Dugas, Kristen M. (1994). A.S., 1990, *University of Vermont*. Clinical Instructor in Dental Hygiene.
- Dummit, David S. (1984). B.S., 1975; M.S., 1975, *California Institute of Technology*; M.A., 1976; Ph.D., 1980, *Princeton University*. Associate Professor of Mathematics.
- Duncan, Paula M. (1984). B.A., 1968, *Manhattanville College*; M.D., 1972, *The Medical College of Pennsylvania*. Clinical Assistant Professor of Pediatrics.
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- Durett, Carol L. (1981). B.S., 1970, *University of Vermont*. Clinical Instructor in Medical Technology.
- Durham, Delcie R. (1989). B.S., 1971; M.S., 1974; Ph.D., 1981, *University of Vermont*. Associate Professor of Mechanical Engineering.
- Dustan, Harriet P. (1995). B.S., 1942; M.D., 1944, *University of Vermont*. Visiting Professor of Pharmacology and Medicine.
- Dye, Sean M. (1991). B.A., 1986, *University of Vermont*; M.F.A., 1989, *Pratt Institute*. Lecturer in Art.
- Dyhrberg, John S. (1984). B.S., 1967, *University of Maine*; M.D., 1971, *University of Nebraska*. Clinical Assistant Professor of Urology.
- Dykes, Lucinda J. (1988). B.A., 1976; M.D., 1980, *University of Colorado*. Clinical Assistant Professor of Pediatrics.
- Earle, Donald V. (1989). B.S., 1977, *Bates College*; M.B.A., 1984, *Boston University*. Clinical Instructor in Family Practice.
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- Echelberger, Herbert E. (1985). B.S., 1965; M.S., 1966, *Southern Illinois University*; Ph.D., 1976, *State University of New York, College of Environmental Science and Forestry*. Adjunct Associate Professor of Natural Resources.

- Echo, Craig A. (1995). B.S., 1966, *Johnson State College*; M.A.T., 1968, *Saint Michael's College*; C.A.S., 1976, *University of Vermont*. Adjunct Instructor in Education.
- Eddy, William H., Jr. (1980). B.A., 1949, *Williams College*. Adjunct Assistant Professor of Natural Resources and Environmental Studies.
- Edelman, Susan W. (1977). B.S., 1973, *University of Pittsburgh*; M.Ed., 1979, *University of Vermont*. Lecturer in Education and Physical Therapy.
- Edwards, Keith R. (1987). M.D., 1973, *Duke University*. Clinical Assistant Professor of Neurology.
- Edwards, Margaret F. (1971). B.A., 1967, *Bryn Mawr College*; M.A., 1971; Ph.D., 1971, *Stanford University*. Associate Professor of English.
- Edwards-Orr, Merle T. (1991). B.A., 1972, *Pomona College*; M.S.S.W., 1974, *University of Tennessee, Knoxville*; Ph.D., 1982, *University of Wisconsin, Madison*. Adjunct Assistant Professor of Social Work.
- Eicker, Joan N. (1992). B.S., 1978; M.D., 1983, *University of Michigan*. Assistant Professor of Medicine.
- Eisenberg, Howard E. (1993). B.S.C., 1967; M.S.C., 1971; M.D.C.M., 1972, *McGill University*. Clinical Associate Professor of Family Practice.
- Eisinger, Maj (1992). A.B., 1979, *University of California, Berkeley*; M.D., 1986, *University of California, San Francisco*. Assistant Professor of Surgery.
- Eldrup-Jorgensen, Jens (1990). S.B., 1974, *Massachusetts Institute of Technology*; M.D., 1978, *University of Rochester*. Clinical Associate Professor of Surgery.
- Elgert, Kathleen M. (1993). A.S., 1982; B.S., 1990, *University of Vermont*. Clinical Instructor in Radiologic Technology.
- Elkins, Alan M. (1980). A.B., 1952, *Dartmouth College*; M.D., 1957, *Boston University*. Professor of Psychiatry.
- Ellerson, R. David (1970). A.B., 1951, *Columbia University*; M.D., 1955, *Albany Medical College*. Clinical Instructor in Pediatrics.
- Elliott, Carolyn M. (1987). B.A., 1959, *Wellesley College*; M.A., 1962, *Radcliffe College*; Ph.D., 1967, *Harvard University*. Professor of Political Science.
- Elliott, Riley A. (1983). B.A., 1970; D.D.S., 1975, *University of North Carolina*. Assistant Professor of Anesthesiology.
- Ellis, John (1980). B.S., 1973, *California Institute of Technology*; M.S., 1979; Ph.D., 1980, *University of Rochester*. Research Associate Professor of Psychiatry.
- Emanuelson, Jane F. (1987). A.S., 1986, *University of Vermont*. Clinical Instructor in Dental Hygiene.
- Emery, Carol (1986). B.A., 1973; M.A., 1975, *State University of New York, Buffalo*. Adjunct Instructor in Communication Sciences.
- Emery, E. Stanley, III (1970). A.B., 1957, *Princeton University*; M.D., 1961, *Columbia University*. Associate Professor of Neurology and Pediatrics.
- Emery, Michael J. (1984). B.S., 1975; M.Ed., 1981; Ed.D., 1990, *University of Vermont*. Associate Professor of Physical Therapy.
- Emmons, Robert S. (1989). B.A., 1981, *Luther College*; M.D., 1985, *University of Iowa*. Clinical Assistant Professor of Psychiatry.
- Engel, Richard M. (1988). B.A., 1974, *Harvard University*; M.D., 1978, *University of Cincinnati*. Clinical Assistant Professor of Medicine.
- Eppstein, Margaret J. (1983). B.S., 1978, *Michigan State University*; M.S., 1983, *University of Vermont*. Lecturer in Computer Science.
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- Erickson, John E. (1991). A.B., 1976, *Bowdoin College*; M.D., 1980, *George Washington University*. Clinical Instructor in Medicine.
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- Escaja, Tina F. (1993). B.A., 1988, *University of Barcelona*; Ph.D., 1993, *University of Pennsylvania*. Assistant Professor of Romance Languages.
- Eschholz, Paul A. (1969). B.A., 1964, *Wesleyan University*; M.A., 1966, *University of Vermont*; Ph.D., 1971, *University of Minnesota*. Professor of English.
- Estrin, Nona D. (1994). B.S., 1979, *Johnson State College*. Adjunct Instructor in Nutritional Sciences.
- Etherton, Bud (1968). B.S., 1956; Ph.D., 1962, *Washington State University*. Professor of Botany.
- Ettliger, Trudee A. (1993). B.S., 1979, *University of Vermont*; M.S., 1986, *Russell Sage College*. Assistant Professor of Professional Nursing.
- Evans, John N. (1976). B.A., 1970, *Clark University*; Ph.D., 1976, *University of Florida*. Professor of Molecular Physiology and Biophysics.
- Evering, Frederick C., Jr. (1965). B.E.S., 1958; M.S.E., 1960; Ph.D., 1965, *Johns Hopkins University*. Professor of Electrical Engineering.
- Ezerman, Elizabeth B. (1988). B.A., 1964, *Bryn Mawr College*; Ph.D., 1968, *University of Pennsylvania*. Lecturer in Anatomy and Neurobiology.
- Fairbank, Jonathan T. (1976). B.A., 1962, *Dartmouth College*; M.D., 1967, *Case Western University*. Professor of Radiology.
- Fanning, Joseph P. (1981). M.B.C.H., 1955, *University College*. Clinical Associate Professor of Pathology.
- Farmer, Ruth A. (1994). B.S., 1979, *Brooklyn College*; M.S., 1985, *Long Island University*. Adjunct Assistant Professor of Social Work.
- Farnham, John E. (1963). B.A., 1951, *Norwich University*; D.M.D., 1959, *Tufts University*. Clinical Professor of Oral Surgery and Associate Professor of Dental Hygiene.
- Farnham, Richard A. (1974). B.S., 1969; M.Ed., 1975, *University of Vermont*. Lecturer in Education.
- Farrand, Todd F. (1993). B.S., 1990, *University of Wisconsin*. Clinical Instructor in Radiologic Technology.
- Farrar, Paul A., Sr. (1994). E.S.D., 1963, *New York University*. Lecturer in Mechanical Engineering.
- Farrell, Sandra M. (1968). B.A., 1957, *Middlebury College*; M.S., 1962, *Smith College*. Lecturer in Education.
- Fassler, David G. (1987). B.A., 1978, *Wesleyan University*; M.D., 1982, *Yale University*. Clinical Assistant Professor of Psychiatry.
- Faucette, Robert A. (1982). B.S., 1975, *University of Massachusetts, Amherst*; M.D., 1979, *University of Massachusetts, Boston*. Clinical Assistant Professor of Pediatrics.
- Fawcett, Robin A. (1989). B.A., 1984; M.F.A., 1988, *University of Iowa*. Assistant Professor of Theatre.
- Feeney, Vincent E. (1994). B.A., 1966, *San Jose State University*; M.A., 1974, *University of Vermont*; Ph.D., 1989, *University of Washington*. Lecturer in History.
- Feitelberg, Samuel B. (1971). B.S., 1952; M.A., 1954, *Columbia University*. Professor of Physical Therapy.
- Feldman, Jan L. (1982). B.A., 1976, *Swarthmore College*; M.A., 1980; Ph.D., 1982, *Cornell University*. Associate Professor of Political Science.



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- Felt, Jeremy P. (1957). A.B., 1951; M.A., 1956, *Duke University*; Ph.D., 1959, *Syracuse University*. Professor of History.
- Feng, Jian Jun (1994). B.S., 1982; M.S., 1985, *Tianjin Institute of Light Industry*. Research Associate in Animal and Food Sciences.
- Feng, Lizhen (1995). B.S., 1982, *Beijing University*; M.A., 1992, *University of Vermont*. Lecturer in History.
- Fengler, Alfred P. (1976). B.A., 1964, *Colgate University*; M.A., 1966; Ph.D., 1970, *University of Wisconsin*. Associate Professor of Sociology.
- Fengler-Stephany, Christie K. (1970). A.B., 1965, *Smith College*; M.A., 1967; M.A., 1969; Ph.D., 1974, *University of Wisconsin*. Associate Professor of Art.
- Fenn, Mary Ellen (1980). M.D., 1964, *University of Michigan*. Clinical Instructor in Obstetrics and Gynecology.
- Fenton, Ardith M. (1987). B.S., 1962, *Casleton State College*. Extension Instructor in Extension Service.
- Ferguson, John C. (1982). B.A., 1970, *Middlebury College*; M.D., 1977, *University of Vermont*. Clinical Assistant Professor of Family Practice.
- Fernow, Lesley M. (1993). B.S., 1972; M.D., 1976, *Tufts University*. Clinical Assistant Professor of Medicine.
- Ferreira, Charles W. (1975). B.S., 1970, *Fitchburg State University*; M.Ed., 1973; Ph.D., 1976, *Bowling Green State University*. Associate Professor of Community Development and Applied Economics.
- Ferreira, Patricia J. (1988). B.A., 1982, *Keene State College*; M.A., 1988, *University of Vermont*. Lecturer in English.
- Fiebelkorn, Donna J. (1993). B.A., 1975, *Michigan State University*; M.E.D., 1991, *University of Vermont*. Lecturer in Education.
- Fiekers, Jerome F. (1978). B.S., 1970; M.S., 1973, *Massachusetts College of Pharmacy*; Ph.D., 1978, *University of Connecticut*. Associate Professor of Anatomy and Neurobiology.
- Fife, C. Lynn (1966). B.S., 1960, *Brigham Young University*; M.S., 1962, *Oregon State University*; Ph.D., 1967, *Purdue University*. Associate Professor of Community Development and Applied Economics.
- Fife, Jennifer (1995). B.A., 1983, *Wellesley College*; M.D.C.M., 1987, *McGill University*. Clinical Assistant Professor of Radiology.
- Fifield, William K. (1982). A.B., 1967; M.D., 1971, *University of Vermont*. Clinical Assistant Professor of Family Practice.
- Finette, Barry A. (1991). B.Sc., 1979, *University of Wisconsin*; M.D., 1988, *University of Texas Southwestern Medical School, Dallas*; Ph.D., 1984, *University of Texas, Austin*. Assistant Professor of Pediatrics.
- Fink, Theodore J. (1977). B.A., 1966, *University of Rochester*; M.D., 1970, *State University of New York, Downstate Medical Center*. Clinical Instructor in Medicine.
- Finkelstein, Claudia A. (1991). B.Sc., 1981; M.D., 1986, *McGill University*. Clinical Instructor in Medicine.
- Finley, Christine A. (1993). B.S.N., 1980, *Niagara University*; M.S.N., 1984, *Syracuse University*; M.P.H., 1988, *Johns Hopkins University*. Lecturer in Professional Nursing.
- Fiore, Joellen B. (1986). B.S., 1980, *State University of New York, Upstate Medical Center*. Clinical Instructor in Medical Technology.
- First, Lewis R. (1994). B.A., 1976; M.S., 1985; M.D., 1980, *Harvard University*. Professor of Pediatrics.
- Fischer, Joseph C. (1980). B.S., 1972, *Springfield College*; M.A., 1977, *University of Vermont*. Lecturer in Education.
- Fischer, Steven R. (1987). B.A., 1977, *Hofstra University*; D.D.S., 1982, *State University of New York, Buffalo*. Lecturer in Dental Hygiene.
- Fishel, Richard A. (1991). B.S., 1976; Ph.D., 1980, *University of California, Irvine*. Professor of Microbiology and Molecular Genetics.
- Fishell, Kenneth N. (1971). B.S., 1952, *State University of New York, Brockport*; M.S., 1958; Ed.D., 1964, *University of Rochester*. Professor of Education.
- Fisher, John M. (1993). B.S., 1981, *Yale University*. M.D., 1985, *University of Vermont*. Assistant Professor of Anesthesiology.
- Fishman, Laura T. (1976). B.A., 1959, *Pembroke College*; M.A., 1966, *University of Chicago*; Ph.D., 1984, *McGill University*. Associate Professor of Sociology.
- Fitzgerald, John M. (1988). B.A., 1975; M.D., 1979, *University of Vermont*. Clinical Assistant Professor of Medicine.
- Fitzgerald, Martha D. (1970). A.S., 1955, *Forsyth School for Dental Hygiene*; B.S., 1958; M.Ed., 1969, *University of Vermont*; Ed.D., 1979, *Boston University*. Associate Professor of Education.
- Fives-Taylor, Paula M. (1976). B.S., 1958, *Saint Thomas Aquinas College*; M.S., 1965, *Villanova University*; Ph.D., 1973, *University of Vermont*. Professor of Microbiology and Molecular Genetics.
- Flanagan, Martin E. (1962). B.S., 1952, *Saint Michael's College*; M.D., 1956, *University of Vermont*. Professor of Neurosurgery.
- Flanagan, Ted B. (1961). B.S., 1951, *University of California, Berkeley*; Ph.D., 1955, *University of Washington*. Professor of Chemistry and Mechanical Engineering.
- Fleming, Shari B. (1970). B.M., 1958, *Peabody Conservatory*; M.M., 1966, *New England Conservatory of Music*. Lecturer in Music.
- Flowerdew, Richard M. (1993). M.B.B.S., 1970, *University of London*; F.F.A.R., 1975, *Royal College of Surgery*; L.M.C.C., 1976, *Medical Council of Canada*. Clinical Instructor in Anesthesiology.
- Flynn, Brian S. (1980). B.A., 1966, *Tufts University*; Sc.D., 1980, *Johns Hopkins University*. Research Associate Professor of Family Practice.
- Foley, Marion R. (1980). B.S., 1970, *University of Vermont*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Fonda, Bruce J. (1980). B.S., 1972, *Saint Lawrence University*; M.S., 1975, *University of Vermont*. Lecturer in Anatomy and Neurobiology.
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- Foote, Richard M. (1981). B.S., 1972, *University of Toronto*; Ph.D., 1976, *University of Cambridge*. Professor of Mathematics.
- Forcier, Lawrence K. (1977). A.B., 1966, *Dartmouth College*; M.F.S., 1968; Ph.D., 1973, *Yale University*. Associate Professor of Natural Resources.
- Ford, Dorothy E. (1968). B.S., 1950, *Washington State University*; M.D., 1954, *Washington University*. Clinical Associate Professor of Orthopaedics and Rehabilitation.
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- Forehand, Cynthia J. (1987). B.S., 1975, *University of Nebraska*; Ph.D., 1981, *University of North Carolina*. Associate Professor of Anatomy and Neurobiology.
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- Foss, Donald C. (1966). B.S., 1960, *University of New Hampshire*; M.S., 1961, *University of Wisconsin*; Ph.D., 1966, *University of Massachusetts*. Professor of Animal and Food Sciences.



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- Foster, Margaret (1992). B.A., 1982, *Trinity College*; M.S.W., 1983, *Adelphi University*. Clinical Instructor in Family Practice.
- Fourre, Mark W. (1990). B.S., 1981; M.D., 1985, *University of Minnesota*. Clinical Assistant Professor of Surgery.
- Fowler, Arthur J. (1995). B.A., 1992, *Castleton State College*. Adjunct Instructor in Education.
- Fowler, Nicholas K. (1982). A.B., 1969, *Fordham University*; M.D., 1978, *University of Connecticut*. Clinical Assistant Professor of Pediatrics.
- Fox, Kathryn J. (1994). B.A., 1985, *University of Tulsa*; M.A., 1989; Ph.D., 1994, *University of California, Berkeley*. Assistant Professor of Sociology.
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- Francis, Gerald P. (1980). B.M.E., 1958, *University of Dayton*; M.M.E., 1960; Ph.D., 1965, *Cornell University*. Professor of Mechanical Engineering.
- Francke, Bertold R. (1990). M.D., 1969, *University of Munich*. Clinical Assistant Professor of Psychiatry.
- Francklyn, Christopher S. (1991). B.A., 1979; M.A., 1983; Ph.D., 1988, *University of California, Santa Barbara*. Assistant Professor of Biochemistry.
- Frankowski, Barbara L. (1985). B.S., 1976, *Fairfield University*; M.S., 1985, *University of Rochester*; M.D., 1980, *Johns Hopkins University*. Associate Professor of Pediatrics.
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- Fraser, Gilles L. (1992). B.S., 1975, *University of Connecticut*; Ph.D., 1980, *University of Minnesota*. Instructor in Medicine.
- Frederick, Philip P. (1987). B.A., 1979, *Hamilton College*; M.D., 1983, *University of Rochester*. Clinical Instructor in Medicine.
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- Fritz, Marian E. (1993). B.A., 1976, *University of North Carolina, Chapel Hill*; M.B.A., 1982, *University of Pittsburgh*. Lecturer in Community Development and Applied Economics.
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- Froelich, Peter K. (1994). B.S., 1980; M.S. 1984, *South Dakota State University*. Adjunct Instructor in Psychology.
- Froeliger, Eunice H. (1994). B.S., 1971, *University of Connecticut*; M.Ed., 1977; Ph.D., 1988, *University of Vermont*. Research Associate Professor of Plant and Soil Science.
- Frohlich, Bruno (1994). B.S., 1973, *University of Copenhagen*; M.S., 1976; Ph.D., 1979, *University of Connecticut*. Adjunct Assistant Professor of Anthropology.
- Frost, Richard B. (1985). B.A., 1969, *Wesleyan University*; M.D., 1973, *Duke University*. Clinical Associate Professor of Medicine.
- Fry, Leslie S. (1991). B.A., 1975, *University of Vermont*; M.F.A., 1991, *Bard College*. Lecturer in Art.
- Frymoyer, John W. (1969). B.A., 1959, *Amherst College*; M.S., 1964; M.D., 1964, *University of Rochester*. Professor of Orthopaedics and Rehabilitation.
- Fuhr, Peter L. (1985). B.S., 1979, *Beloit College*; M.S., 1983; Ph.D., 1986, *Johns Hopkins University*. Associate Professor of Electrical Engineering.
- Fujii, Satoshi (1994). B.S., 1977; M.D., 1981; Ph.D., 1987, *Hokkaido University*. Associate Professor of Medicine and Molecular Physiology and Biophysics.
- Fukuda, Christopher S. (1993). B.S., 1980, *Tufts University*; M.D., 1985, *University of Vermont*. Clinical Assistant Professor of Surgery.
- Fuller, Bradbury (1994). B.A., 1978, *Harvard University*; M.D., 1982, *Cornell University*. Clinical Assistant Professor of Surgery.
- Fullmer, Richard A. (1992). B.S., 1985, *University of Idaho*. Assistant Professor of Military Studies.
- Fulwiler, Laura (1994). B.A., 1966; M.S., 1974, *University of Wisconsin*; Ed.D., 1989, *University of Vermont*. Lecturer in Education.
- Fulwiler, Toby E. (1983). B.S., 1965; M.S., 1966; Ph.D., 1973, *University of Wisconsin*. Professor of English.
- Furney, Katharine S. (1990). B.A., 1978, *Middlebury College*; M.Ed., 1985; C.A.S., 1990, *University of Vermont*. Lecturer in Education.
- Gade, Daniel W. (1966). B.A., 1959, *Valparaiso University*; M.A., 1960, *University of Illinois*; M.S., 1961; Ph.D., 1967, *University of Wisconsin*. Professor of Geography.
- Gagne, Margaret P. (1993). B.S.N., 1979, *McGill University*; M.S., 1985, *University of Arizona*. Lecturer in Technical Nursing.
- Galbraith, Richard A. (1995). M.D., 1974, *Kings College University*; Ph.D., 1981, *Medical University of South Carolina*. Professor of Medicine.
- Galbreath, Durward H. (1994). B.S., 1976, *Auburn University*; M.A., 1983, *Central Michigan University*. Professor of Military Studies.
- Gallagher, Connell B. (1970). B.A., 1966, *Pace College*; M.A., 1970, *University of Wisconsin*; M.S., 1978, *University of Illinois*. Library Professor in Bailey/Howe Library.
- Gallagher, John J. (1987). A.B., 1976, *Bowdoin College*; M.D., 1980, *University of Vermont*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Galvin, Joseph M. (1994). M.B.B.S.Ch., 1988, *Royal College of Surgeons*. Clinical Instructor in Medicine.
- Gannon, David E. (1988). B.S., 1976, *Tufts University*; M.D., 1980, *University of Connecticut*. Assistant Professor of Medicine.
- Gannon, Jane M. (1987). B.N., 1982, *Dalhousie University*; M.S.N., 1987, *University of Miami*. Clinical Instructor in Obstetrics and Gynecology.
- Gardner, Pamela K. (1990). B.A., 1980, *University of South Carolina*; M.Ed., 1985, *University of Vermont*. Lecturer in Education.
- Garger, Gabriela M. (1993). B.A., 1975, *University of Catolica, Chile*; M.E.D., 1992, *University of Portland*. Lecturer in Romance Languages.
- Garnett, Michael D. (1994). B.A., 1975, *University of Chicago*; M.D., 1979, *St. Louis University*. Clinical Assistant Professor of Psychiatry.
- Gaschnig, Mary Ann K. (1994). B.A., 1978, *Boston University*; M.S.W., 1981, *University of Pennsylvania*. Adjunct Assistant Professor of Social Work.
- Gatti, James F. (1972). A.B., 1965, *Union College*; M.A., 1968; Ph.D., 1972, *Cornell University*. Associate Professor of Business Administration.

- Gause, Francis G. (1995). A.B., 1980, *St. Joseph's University*; Ph.D., 1987, *Harvard University*. Assistant Professor of Political Science.
- Gautam, Shiva P. (1992). B.S., 1978, *Tribhuvan University*; M.S., 1987; Ph.D., 1990, *University of Texas, Dallas*. Research Assistant Professor of Statistics.
- Gayer, Diane E. (1994). B.A., 1975; M.A., 1979, *University of Colorado*. Lecturer in Community Development and Applied Economics.
- Gazda, Thomas D. (1985). B.S., 1975; M.D., 1979, *University of Illinois*. Clinical Associate Professor of Psychiatry.
- Gedeon, Shirley J. (1981). B.A., 1973, *Northwestern University*; M.A., 1976; Ph.D., 1982, *University of Massachusetts*. Associate Professor of Economics.
- Geiger, Sylvia M. (1993). B.S., 1980, *Cornell University*; M.S., 1983, *Oklahoma State University*. Lecturer in Nutritional Sciences.
- Geiger, William E., Jr. (1974). B.S., 1965, *Canisius College*; Ph.D., 1969, *Cornell University*. Professor of Chemistry.
- Geller, Berta M. (1981). B.S., 1968, *State University of New York, New Paltz*; M.Ed., 1981; Ed.D., 1992, *University of Vermont*. Research Assistant Professor of Family Practice.
- Gennari, F. John (1979). B.S., 1959; M.D., 1963, *Yale University*. Professor of Medicine.
- Genova, Paul A. (1994). B.A., 1975, *Harvard University*; M.D., 1979, *Dartmouth College*. Clinical Assistant Professor of Psychiatry.
- Gentry, Stokes (1962). B.A., 1951, *Swarthmore College*; M.D., 1955, *Temple University*. Clinical Professor of Pediatrics.
- Geoghegan, Thomas (1983). Lecturer in Music.
- Geraghty, Sheila (1987). B.A., 1982; M.S., 1984, *University of Vermont*. Adjunct Instructor in Communication Sciences.
- Geran, Kathleen R. (1988). B.S., 1971, *University of Vermont*; M.S., 1980, *Texas Woman's University*. Adjunct Assistant Professor of Technical Nursing.
- Gerson, William T. (1988). A.B., 1978, *Harvard University*; M.D., 1982, *Johns Hopkins University*. Clinical Assistant Professor of Pediatrics.
- Gianguco, Michael F. (1988). B.S.Ed., 1978, *State University of New York, Buffalo*; M.Ed., 1981, *University of Vermont*; Ed.S., 1983, *University of Virginia*; Ph.D., 1989, *Syracuse University*. Research Assistant Professor and Lecturer in Education.
- Giasson, Susan (1985). B.S., 1977, *Merrimack College*. Instructor in Radiologic Technology.
- Gibbard, Bruce A. (1978). B.A., 1958; M.D., 1961, *Queens University*. Clinical Associate Professor of Psychiatry.
- Gibbons, Walter R. (1971). B.S., 1961; Ph.D., 1967, *Washington University*. Professor of Molecular Physiology and Biophysics.
- Gibson, Cheryl A. (1988). B.S., 1977; M.D., 1985, *University of Vermont*. Clinical Assistant Professor of Obstetrics and Gynecology.
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- Gibson, Kenneth S. (1964). M.S., 1953, *University of New Hampshire*. Extension Professor of Animal and Food Sciences.
- Gibson, William A. (1986). B.S., 1970, *Georgia Institute of Technology*; M.B.A., 1974; Ph.D., 1977, *University of California, Berkeley*. Associate Professor of Economics.
- Gibson, William S. (1988). B.S., 1985, *University of Vermont*. Extension Instructor in Extension Service.
- Gierzynski, Anthony G. (1992). B.A., 1983; M.A., 1986, *Northern Illinois University*; Ph.D., 1989, *University of Kentucky*. Assistant Professor of Political Science.
- Gilbert, Alphonse H. (1969). B.S., 1961; M.S., 1963, *Michigan State University*; Ph.D., 1969, *Colorado State University*. Associate Professor of Natural Resources.
- Gilbert, Carol (1994). B.S.N., 1966; M.S.N., 1969, *University of Pennsylvania*; Ph.D., 1980, *University of Michigan*. Associate Professor of Professional Nursing.
- Gilbert, Stuart, G. (1981). A.B., 1962, *Colgate University*; M.D., 1966, *Tufts University*. Clinical Associate Professor of Radiology.
- Gilbertson, Elsa (1995). B.A., 1980, *Wellesley College*; M.S., 1982, *Columbia University*. Lecturer in History.
- Gilligan, Michael W. (1984). B.S., 1970, *Salem State College*. Lecturer in Education.
- Gillis, Marilyn B. (1994). B.S., 1969, *State University of New York, Plattsburgh*; M.Ed., 1983, *University of Vermont*. Lecturer in Integrated Professional Studies.
- Gilmartin, Gregory, M. (1990). B.S., 1978, *Michigan State University*; Ph.D., 1983, *University of Virginia*. Assistant Professor of Microbiology and Molecular Genetics.
- Gilmore, Edward B. (1993). A.B., 1961, *Wesleyan University*; M.D., 1965, *Harvard University*. Clinical Associate Professor of Medicine.
- Gilmore, James A. (1975). B.S., 1967, *Ohio State University*; M.S., 1973; Ph.D., 1977, *North Carolina State University*. Associate Professor of Animal and Food Sciences.
- Ginger, Claire A. (1994). A.B., 1981, *University of Chicago*; M.S.L., 1987, *Vermont Law School*; M.S., 1992, *University of Michigan*. Associate Professor of Natural Resources.
- Giroux, Sandra N. (1985). B.S., 1977, *City University of New York, Hunter College*; M.S., 1992, *Saint Michael's College*. Clinical Instructor in Medical Technology.
- Givertz, Bernard (1981). B.S., 1953; M.D., 1957, *Case Western Reserve University*. Clinical Assistant Professor of Medicine.
- Glance, Laurent G. (1993). B.A., 1981, *Dartmouth College*; M.D., 1985, *Cornell University*. Assistant Professor of Anesthesiology.
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- Glesne, Corrine E. (1986). B.A., 1971; M.A., 1980; Ph.D., 1985, *University of Illinois*. Associate Professor of Education.
- Glitsman, Maynard W. (1994). B.A., 1955, *University of Illinois*; M.A., 1956, *Fletcher School*. Lecturer in Political Science.
- Glock, Jacob L. (1992). B.S., 1980, *University of Florida*; M.D., 1986, *St. Georges University*. Clinical Instructor in Obstetrics and Gynecology.
- Gockley, Karen L. (1995). B.S., 1973, *Widener University*; M.Ed., 1983, *University of Vermont*. Adjunct Instructor in Education.
- Goddard, Catherine F. (1988). B.S., 1974, *Livingston College*; M.L.S., 1984, *University of Rhode Island*. Library Assistant Professor in Dana Medical Library and Assistant Professor of Professional Nursing and Lecturer in Education.
- Godek, Joanne (1991). B.S., 1980; M.Ed., 1982, *University of Vermont*. Lecturer in Education.
- Goering, Ann (1995). B.A., 1985; M.D., 1991, *University of Vermont*. Clinical Assistant Professor of Family Practice.
- Goetschius, Suzanne K. (1992). B.S.N., 1980, *University of Delaware*; M.S., 1985, *University of Massachusetts, Lowell*. Lecturer in Technical Nursing.
- Gokin, Alexander P. (1993). Ph.D., 1990, *Ukrainian Academy of Science*. Visiting Assistant Professor of Anatomy and Neurobiology.
- Golaun, Herbert E. (1994). B.A., 1975, *Hampshire College*; M.B.A., 1979, *Rensselaer Polytechnic Institute*. Lecturer in Business Administration.
- Gold, Robert D. (1994). B.A., 1971, *Brandeis University*; M.D., 1976, *Boston University*. Clinical Instructor in Psychiatry.

- Goldberg, Joel M. (1982). A.B., 1978, Oberlin College; Ph.D., 1982, University of Michigan. Associate Professor of Chemistry.
- Golden, Gale H. (1982). B.A., 1961, Syracuse University; M.S.W., 1963, Bryn Mawr College. Clinical Assistant Professor of Psychiatry.
- Golden, Kenneth I. (1986). B.S., 1955, Northwestern University; S.M., 1956; M.E., 1957, Massachusetts Institute of Technology; Ph.D., 1964, University De Paris. Professor of Electrical Engineering and Mathematics.
- Golden, Lewis P. (1993). B.S., 1973, University of Michigan; M.D., 1977, State University of New York, Downstate Medical Center. Clinical Assistant Professor of Family Practice.
- Goldfarb, Walter B. (1982). B.A., 1955, Brown University; M.D., 1959, Tufts University. Clinical Assistant Professor of Surgery.
- Goldfine, Peter E. (1980). A.B., 1959, Union College; M.D., 1963, State University of New York, Downstate Medical Center. Clinical Associate Professor of Psychiatry.
- Goldhaber, Dale E. (1973). B.S., 1965, Roosevelt University; M.A., 1969; Ph.D., 1969, Syracuse University. Associate Professor of Integrated Professional Studies.
- Goldhaber, Jeanne D. (1984). B.A., 1969, Syracuse University; M.Ed., 1972, Antioch College. Assistant Professor of Integrated Professional Studies.
- Golodetz, Arnold (1985). B.A., 1948; S.M., 1969, Harvard University; M.D., 1953, University of Rochester. Clinical Associate Professor of Medicine.
- Gomez, Antonio J. (1970). B.A., 1955, Ateneo De Manila; M.D., 1960, University of Santo Tomas. Associate Professor of Neurology and Communication Sciences.
- Goodman, Jane B. (1995). B.A., 1973, Marietta College; M.Ed., 1978, University of Vermont; M.A., 1977, Middlebury College. Adjunct Instructor in Education.
- Goodman, Noel C. (1990). A.B., 1954; M.D., 1958, New York University. Clinical Assistant Professor of Psychiatry.
- Gonyea, Robert J. (1993). B.A., 1955, University of Minnesota; M.D., 1959, Yale University. Clinical Associate Professor of Medicine.
- Gooch, Kimberly K. (1993). B.S., 1974; M.D., 1980, University of Iowa. Clinical Assistant Professor of Medicine.
- Goodnight, Charles J. (1988). B.S., 1977, University of Michigan; M.S., 1979; Ph.D., 1983, University of Chicago. Associate Professor of Biology.
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- Goodwin, James H. (1988). B.S., 1974; B.A., 1974, Bucknell University; M.S., 1980, University of Colorado. Assistant Professor of Radiology.
- Gordon, Bernard J. (1994). B.S., 1976, Saint Peter's College; M.D., 1980, University of Kentucky. Clinical Assistant Professor of Psychiatry.
- Gordon, Lawrence R. (1970). A.B., 1963, Gettysburg College; M.A., 1967; Ph.D., 1970, University of North Carolina. Associate Professor of Psychology.
- Gordon, Margaret W. (1992). B.A., 1983; M.A., 1992, Middlebury College. Lecturer in Russian.
- Gordon, Robert J. (1979). B.A., 1970; M.A., 1972, University of Stellenbosch; Ph.D., 1977, University of Illinois. Professor of Anthropology.
- Gorman, Kathleen S. (1993). A.B., 1978, University of Notre Dame; M.A., 1982, Catholic University of Peru; Ph.D., 1987, University of Maryland College Park Campus. Assistant Professor of Psychology.
- Goss, Jacqueline R. (1993). B.A., 1979, University of Vermont. Clinical Instructor in Surgery.
- Gotelli, Nicholas J. (1992). B.A., 1980, University of California, Berkeley; M.S., 1982; Ph.D., 1985, Florida State University. Associate Professor of Biology.
- Gotlieb, Alan R. (1974). B.S., 1969, Eastern Nazarene College; M.S., 1972; Ph.D., University of Wisconsin. Extension Professor of Plant and Soil Science.
- Gottlieb, Charles D. (1980). B.A., 1968, University of Toledo; M.S., 1979, Adelphi University. Adjunct Assistant Professor of Social Work and Lecturer in Integrated Professional Studies.
- Gottlieb, Diane T. (1983). B.S., 1967, University of Wisconsin; M.S.W., 1969, Adelphi University; M.A., 1988; Ph.D., 1992, Fielding Institute. Lecturer in Integrated Professional Studies and Clinical Assistant Professor of Psychology.
- Goudreau, Robert J. (1995). B.S., 1967, Lyndon State College; M.A.T., 1973, Saint Michael's College; C.A.S., 1978, University of Vermont. Adjunct Instructor in Education.
- Gould, Tyler J. (1993). B.A., 1976, Dartmouth College; M.A., 1986, Saint Michael's College. Clinical Instructor in Family Practice.
- Grabowski, Eugene W. (1988). B.S., 1964, College of the Holy Cross; M.D., 1968, Tufts University. Clinical Assistant Professor of Surgery.
- Grace, Christopher J. (1987). B.S., 1975, University of Notre Dame; M.D., 1979, New York Medical College. Associate Professor of Medicine and Associate Professor of Family Practice.
- Graf, Cheryl A. (1991). B.S., 1978, Atlantic Union College; M.P.H., 1988, Loma Linda University. Clinical Instructor in Medical Technology.
- Graham, David B. (1990). B.S., 1984, Johnson State College. Assistant Professor of Military Studies.
- Graham, Valerie L. (1990). A.B., 1956, Radcliffe College; B.M.S., 1962, Dartmouth College; M.D., 1965, Harvard University. Clinical Instructor in Family Practice.
- Graham, William G. (1971). B.A., 1951, Harvard University; M.D., 1956, University of Pennsylvania. Professor of Medicine.
- Graman, Howard B. (1978). B.A., 1969, Queens College; M.D., 1973, State University of New York, Downstate Medical Center. Associate Professor of Medicine.
- Gramse, Richard R. (1994). B.A., 1970, Williams College; M.D., 1975, Loyola University. Clinical Associate Professor of Orthopaedics and Rehabilitation.
- Grant, Barbara W. (1984). A.B., 1973, Harvard University; M.D., 1978, Dartmouth College. Associate Professor of Medicine.
- Graves, Stuart M. (1991). B.A., 1968, Colgate University; M.D., 1972, University of Vermont. Clinical Associate Professor of Psychiatry.
- Gray, Judith E. (1994). B.A., 1963, University of Maine; M.S., 1970, University of Maryland. Lecturer in Technical Nursing.
- Grayson, Jane (1979). B.S., 1967, Cornell University; Ph.D., 1974, City University of New York. Clinical Assistant Professor of Psychiatry.
- Green, Carol A. (1989). B.S.N., 1967, University of Vermont; M.S.N., 1985, Russell Sage College. Adjunct Assistant Professor of Technical Nursing.
- Green, Janet E. (1987). B.A., 1964, Smith College; M.A., 1965; Ph.D., 1969, Emory University. Lecturer in Romance Languages.
- Greenberg, Hope A. (1993). B.A., 1988, State University of New York, Stony Brook. Lecturer in Computer Science.
- Green-Hernandez, Carol (1988). B.S., 1972, D'Youville College; M.S., 1982, Russell Sage College; Ph.D., 1987, Adelphi University. Associate Professor of Professional Nursing.
- Greenwood, Donna L. (1992). B.A., 1980, Amherst College; M.D., 1989, University of Vermont. Clinical Instructor in Medicine.
- Griffin, Christine G. (1988). A.S., 1975; B.S., 1977; M.S., 1988, University of Vermont. Lecturer in Medical Technology.

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- Griffin, Robert S. (1974). B.S., 1964; M.A., 1967; Ph.D., 1973, *University of Minnesota*. Associate Professor of Education.
- Griffiths, David J. (1994). B.Sc., 1967, *Concordia University*; M.S., 1970; D.Ed., 1972, *Pennsylvania State University*. Visiting Professor of Anatomy and Neurobiology.
- Grimes, Charles K. (1984). B.S., 1974, *Massachusetts Institute of Technology*; M.D., 1977, *University of Kansas Medical Center*. Clinical Associate Professor of Radiology.
- Grimes, Ellen B. (1984). A.S., 1979; B.S., 1981, *University of Bridgeport*; M.A., 1984, *Montclair State College*. Lecturer in Dental Hygiene.
- Grinnell, D. Jacque (1978). B.S., 1960; M.B.A., 1962, *Cornell University*; D.B.A., 1968, *Indiana University*. Professor of Business Administration.
- Groggel, Gerald C. (1989). B.A., 1970, *Calvin College*; M.D., 1974, *Wayne State University*. Associate Professor of Medicine.
- Gross, Cordell E. (1987). B.S., 1965; M.S., 1967; M.D., 1971, *University of Florida*. Professor of Surgery.
- Gross, Kenneth I. (1987). A.B., 1960; M.A., 1962, *Brandeis University*; Ph.D., 1966, *Washington University*. Professor of Mathematics.
- Gross, Margaret E. (1991). B.A., 1981, *Drew University*; M.S.W., 1986, *Boston University*. Clinical Instructor in Obstetrics and Gynecology.
- Grunberg, Steven M. (1993). A.B., 1971; M.D., 1975, *Cornell University*. Professor of Medicine.
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- Gruppi, Linda A. (1991). B.S.N., 1978; M.S.N., 1985, *City College of New York*, Hunter College. Adjunct Assistant Professor of Professional Nursing.
- Grzyb, Stanley E. (1990). B.S., 1968, *Dickinson College*; M.D., 1973, *University of Connecticut*. Clinical Instructor in Orthopaedics and Rehabilitation.
- Guarnaccia, Joseph F. (1994). B.A., 1978, *Ohio Wesleyan University*; B.S., 1984, *Manhattan College*; M.A., 1987; Ph.D., 1992, *Princeton University*. Research Assistant Professor of Civil and Environmental Engineering.
- Guerette, Sally C. (1969). B.Ed., 1964, *Plymouth State College*; M.S., 1969, *State University of New York, Cortland*. Lecturer in Education.
- Guiduli, Robert C. (1966). B.A., 1954; M.D., 1961, *University of Vermont*. Clinical Associate Professor of Ophthalmology.
- Guignon, Charles B. (1985). B.A., 1970; Ph.D., 1979, *University of California, Berkeley*. Professor of Philosophy.
- Guild, Judith P. (1992). A.S., 1985; B.S., 1987, *University of Vermont*. Lecturer in Dental Hygiene.
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- Guitar, Barry E. (1976). B.A., 1966, *Dartmouth College*; M.A., 1967, *Western Michigan University*; Ph.D., 1974, *University of Wisconsin, Madison*. Professor of Communication Sciences and Psychology.
- Gundel, Walter D. (1987). B.M.E., 1958, *Cornell University*; M.D.C.M., 1965, *McGill University*. Clinical Associate Professor of Medicine.
- Gunther, Peter G. (1985). B.A., 1978, *Williams College*; M.D., 1982, *Cornell University*. Associate Professor of Medicine.
- Gurdon, Michael A. (1980). B.A., 1971, *Queensland University*; Ph.D., 1979, *Cornell University*. Associate Professor of Business Administration.
- Gussner, Robert E. (1969). S.T.B., 1957, *Boston University*; B.A., 1953, *Hamline University*; Ph.D., 1973, *Harvard University*. Associate Professor of Religion.
- Gustafson, Melanie S. (1990). B.S., 1981, *University of Wyoming*; M.A., 1983, *Sarah Lawrence College*. Visiting Assistant Professor of History.
- Gustafson, Thomas J. (1978). B.S., 1975, *State University of New York, Geneseo*; M.A., 1976, *Bowling Green State University*. Lecturer in Education.
- Gutman, Stanley T. (1971). A.B., 1965, *Hamilton College*; M.A., 1968; Ph.D., 1971, *Duke University*. Professor of English.
- Gutmacher, Alan E. (1987). A.B., 1971; M.D., 1981, *Harvard University*. Associate Professor of Pediatrics.
- Hacker, Miles P. (1979). B.S., 1970, *Murray State University*; Ph.D., 1975, *University of Tennessee*. Professor of Pharmacology.
- Haddock, Joseph H. (1981). B.A., 1968; M.D., 1972, *Northwestern University*. Clinical Associate Professor of Medicine.
- Haddow, James E. (1980). B.A., 1957, *Harvard University*; M.D., 1961, *Tufts University*. Clinical Professor of Pediatrics and Clinical Associate Professor of Obstetrics and Gynecology.
- Haeberle, Joe R. (1988). B.A., 1973, *Depauw University*; Ph.D., 1981, *Indiana University*. Assistant Professor of Molecular Physiology and Biophysics.
- Hagan, Joseph F., Jr. (1979). B.S., 1972, *Saint Bonaventure University*; M.D., 1976, *Georgetown University*. Clinical Assistant Professor of Pediatrics.
- Hakmiller, Karl V. (1992). B.A., 1983, *Johns Hopkins University*; M.D., 1987, *Tufts University*. Clinical Instructor in Medicine.
- Hall, Ellen F. (1990). B.A., 1969; M.A., 1970, *University of Minnesota*. Library Assistant Professor in Dana Medical Library.
- Hall, Robert W. (1957). A.B., 1949; M.A., 1951; Ph.D., 1953, *Harvard University*. James Marsh Professor of Intellectual and Moral Philosophy.
- Hall, William J., III (1981). A.B., 1957, *LaSalle College*; M.D., 1961, *Temple University*. Clinical Associate Professor of Medicine.
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- Hamdy, Hosny I. (1994). B.Sc., 1971, *Alexandria University*; M.Sc., 1980, *Cairo University*; Ph.D., 1983, *Oklahoma State University*. Adjunct Associate Professor of Statistics.
- Hamel-Bissell, Brenda P. (1981). B.S., 1970, *University of Vermont*; M.S., 1974; Ed.D., 1981, *Boston University*. Associate Professor of Professional Nursing.
- Hamill, Robert W. (1993). B.S., 1964, *Springfield College*; M.D., 1968, *Wake Forest University*. Professor of Neurology.
- Hamilton, Ruth I. (1987). B.A., 1980; Ph.D., 1986, *University of Vermont*. Research Assistant Professor of Education and of Psychology.
- Hammond, Paulette B. (1984). B.S., 1974, *Juniata College*. Clinical Instructor in Medical Technology.
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- Hanley, Sean (1994). B.A., 1976, *Bowdoin College*; M.D., 1980, *Tufts University*. Clinical Assistant Professor of Orthopaedic Rehabilitation.

- Hannah, Judith L. (1982). B.A., 1972; Ph.D., 1980, *University of California, Davis*. Associate Professor of Geology.
- Hannah, Matthew G. (1994). B.S., 1985, *University of Maryland*; M.S., 1988; Ph.D., 1992, *Pennsylvania State University*. Assistant Professor of Geography.
- Hannah, Peter R. (1967). B.S.F., 1959, *University of Maine*; M.F., 1960, *Yale University*; Ph.D., 1967, *University of Michigan*. Professor of Natural Resources.
- Hannemann, Joseph H. (1981). A.B., 1956, *Lafayette College*; M.D., 1960, *Jefferson Medical College*. Clinical Associate Professor of Radiology.
- Hannigan, Jeffrey P. (1993). B.Arc., 1972, *Cornell University*. Lecturer in Art.
- Happ, George M. (1978). B.S., 1958, *Principia College*; Ph.D., 1964, *Cornell University*. Professor of Biology.
- Harbage, Peter R. (1993). B.A., 1978, *University of Virginia*; M.D., 1982, *University of Maryland*. Clinical Assistant Professor of Medicine.
- Hard, Daphne H. (1993). A.S., 1982; A.S., 1983, *University of Vermont*. Clinical Instructor in Radiologic Technology.
- Hardesty, Vaughn A. (1980). B.A., 1965, *Washington College*; M.A., 1968; Ph.D., 1971, *West Virginia University*. Clinical Assistant Professor of Psychiatry.
- Hardin, Nicholas J. (1977). B.A., 1965, *Amherst College*; M.D., 1970, *Cornell University*. Professor of Pathology.
- Hardwick, Jean C. (1994). B.A., 1983, *Smith College*; Ph.D., 1988, *University of Vermont*. Research Associate in Anatomy and Neurobiology.
- Harlow, Seth P. (1994). B.A., 1980, *University of Vermont*; M.D., 1984, *University of Massachusetts*. Assistant Professor of Surgery.
- Harmatz, Alan S. (1994). B.S., 1983, *Pace University*; M.D., 1990, *New York Medical College*. Instructor in Surgery.
- Harper, James A. (1986). B.A., 1974, *Yale University*; M.D., 1978, *University of Illinois*. Instructor in Family Practice.
- Harper, Wendy S. (1989). B.S., 1980, *University of Maine, Orono*; M.S., 1986, *Pennsylvania State University*; Ph.D., 1992, *University of Vermont*. Lecturer in Plant and Soil Science.
- Harris, David E. (1995). B.S., 1975, *Salem State College*; Ph.D., 1990, *University of Vermont*. Lecturer in Biology.
- Harris, Douglas E. (1984). B.S., 1971, *California State College*; M.A., 1975, *West Virginia University*; Ph.D., 1982, *Kent State University*. Adjunct Professor of Education.
- Harris, Everett W. (1978). B.S., 1957, *University of Vermont*; M.S., 1970; Ed.D., 1973, *University of Illinois*. Extension Associate Professor of Community Development and Applied Economics.
- Harris, Stephen E. (1990). B.A., 1965; M.A., 1966; Ph.D., 1969, *University of Texas, Austin*. Adjunct Associate Professor in Biochemistry.
- Hart, Beth A. (1970). B.S., 1963, *Muhlenberg College*; M.S., 1966; Ph.D., 1969, *Cornell University*. Associate Professor of Biochemistry.
- Harvey-Berino, Jean R. (1991). B.S., 1981; M.S., 1984, *Pennsylvania State University*; Ph.D., 1991, *University of Pittsburgh*. Extension Assistant Professor of Nutritional Sciences.
- Harwood, Hugh F. (1993). A.B., 1976, *Middlebury College*; M.D., 1984, *New York Medical College*. Clinical Assistant Professor of Family Practice.
- Hasazi, Joseph E. (1970). A.B., 1965; M.A., 1968; Ph.D., 1970, *University of Miami*. Associate Professor of Psychology.
- Hasazi, Susan E. (1976). B.Ed., 1968, *University of Miami*; M.Ed., 1972, *University of Vermont*; Ed.D., 1978, *Boston University*. Professor of Education and Assistant Professor of Community Development and Applied Economics.
- Haskell, David W. (1981). A.B., 1967, *Colby College*; M.D., 1971, *University of Vermont*. Clinical Associate Professor of Family Practice.
- Hassler, Carol R. (1986). A.B., 1972, *Radcliffe College*; M.D., 1976, *University of Pennsylvania*. Clinical Assistant Professor of Pediatrics.
- Hatahet, Zafer (1994). B.S., 1983; M.S., 1984, *University of Detroit*; Ph.D., 1989, *McGill University*. Research Associate in Microbiology and Molecular Genetics.
- Haugh, Larry D. (1975). B.A., 1966, *Wabash College*; M.A., 1967; M.S., 1970; Ph.D., 1972, *University of Wisconsin, Madison*. Professor of Statistics and Orthopaedics and Rehabilitation.
- Haupt, Roy C. (1990). B.A., 1975, *University of Vermont*; M.A., 1978; Ph.D., 1980, *Cornell University*. Adjunct Lecturer in Public Administration and Lecturer in Sociology.
- Hautala, Robert M. (1992). B.S., 1969, *Springfield College*; M.A., 1974, *University of Denver*; Ed.D., 1984, *University of Northern Colorado*. Lecturer in Education.
- Haviland, William A. (1965). B.A., 1956; M.A., 1958; Ph.D., 1963, *University of Pennsylvania*. Professor of Anthropology.
- Hawkins, Robert E. (1992). B.S., 1978, *Rensselaer Polytechnic Institute*; M.D., 1982, *Albany Medical College*. Clinical Instructor in Surgery.
- Hawkins, Timothy C. (1991). B.A., 1980, *Cornell University*; M.D., 1988, *University of Southern California*. Clinical Instructor in Pediatrics.
- Hawksworth, Edith C. (1990). M.S.N., 1967, *Catholic University*. Adjunct Assistant Professor of Professional Nursing.
- Hayashi, Jun (1986). B.S., 1976, *Tokyo Metro University*; Ph.D., 1982, *University of Connecticut*. Adjunct Assistant Professor of Biology.
- Hayashi, Makoto (1995). B.A., 1976; M.A., 1979, *Tokyo University*. Visiting Associate Professor of Religion.
- Hayashi, Tomiko (1994). B.A., 1972; M.A., 1974, *Doshisha University*; M.A., 1983, *University of California, Los Angeles*. Instructor in History.
- Hayden, Jay G. (1983). B.A., 1962, *Harvard University*; M.D., 1966, *Yale University*. Clinical Assistant Professor of Anesthesiology.
- Hayden, Jonathan B. (1987). B.A., 1973, *Amherst College*; M.D., 1978, *University of Vermont*. Clinical Assistant Professor of Medicine.
- Hayden, Nancy J. (1991). B.S., 1980, *State University of New York, Syracuse*; M.S., 1987; Ph.D., 1991, *Michigan State University*. Assistant Professor of Civil Engineering.
- Hayes, Daniel M. (1985). B.S., 1968, *Fairfield University*; M.D., 1972, *Cornell University*. Clinical Instructor in Medicine.
- Hayes, Margaret E. (1966). B.S., 1965, *Michigan State University*; M.S., 1966, *Indiana University*. Lecturer in Education.
- Hayes, Stephen R. (1994). B.S., 1980, *Saint Lawrence University*; M.D., 1984, *University of Rochester*. Clinical Assistant Professor of Medicine.
- Hays, Bethany M. (1994). B.A., 1970, *Wellesley College*; M.D., 1974, *Baylor College*. Clinical Instructor in Obstetrics and Gynecology.
- Hayton, Anne S. (1992). A.B., 1981, *Dartmouth College*; M.D., 1986, *Brown University*. Assistant Professor of Radiology.
- Hayward, Robert G. (1987). B.A., 1969, *Saint Mary's College*; M.D., 1977, *Medical College of Virginia*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Hazard, Rowland G. (1981). B.A., 1971, *Harvard University*; M.D., 1978, *University of Vermont*. Associate Professor of Orthopaedics and Rehabilitation.
- Heading-Grant, Wanda R. (1990). B.S., 1987, *University of Vermont*; M.S.W., 1988, *Adelphi University*. Lecturer in Social Work.
- Heaps, Richard W. (1993). B.S., 1971; M.S., 1977, *University of Illinois*. Lecturer in Economics.

- Heath, Barry W. (1981). A.B., 1973, Dartmouth College; M.D., 1977, University of Vermont. Clinical Assistant Professor of Pediatrics.
- Heath, Gordon A. (1980). B.S., 1959, Emory University; A.B., 1962; M.D., 1964, Stanford University. Clinical Associate Professor of Psychiatry.
- Heath, Jennifer A. (1993). B.A., 1986, Dartmouth College. M.D., 1990, Columbia University. Clinical Assistant Professor of Pediatrics.
- Hebert, James C. (1982). B.A., 1973, College of the Holy Cross; M.D., 1977, University of Vermont. Associate Professor of Surgery.
- Heck, Marlene E. (1993). B.A., 1973, University of Texas; M.A., 1977, University of Virginia; M.A., 1981; Ph.D., 1988, University of Pennsylvania. Lecturer in Art.
- Hedden, David K. (1988). B.A., 1973, Indiana University; M.D., 1980, Wright State University. Clinical Instructor in Psychiatry.
- Hedstrom, Peter S. (1991). B.S., 1968, Boston College; B.M.S., 1970, Dartmouth College; M.D., 1972, Harvard University. Clinical Assistant Professor of Surgery.
- Hefferon, Lynne E. (1990). B.A., 1982; M.A., 1984, University of Connecticut. Lecturer in English.
- Hegner, Stephen J. (1982). B.S., 1971, University of Wisconsin; M.S., 1972, Michigan Technological University; Ph.D., 1977, University of Massachusetts. Associate Professor of Computer Science.
- Heilman, Richard S. (1968). A.B., 1955, Amherst College; M.D., 1959, University of Pennsylvania. Professor of Radiology.
- Heinrich, Bernard. (1980). B.S., 1964; M.A., 1966, University of Maine, Orono; Ph.D., 1970, University of California, Los Angeles. Professor of Biology.
- Heintz, Nicholas H. (1983). B.A., 1971, College of the Holy Cross; M.S., 1977; Ph.D., 1979, University of Vermont. Associate Professor of Pathology and Microbiology and Molecular Genetics.
- Heise, Beverly A. (1994). B.S., 1987, Johnson State College; M.A., 1990, Norwich University. Lecturer in Integrated Professional Studies.
- Heitzman, Mark R. (1985). B.A., 1974, Hamilton College; M.D., 1978, State University of New York, Upstate Medical Center. Clinical Instructor in Medicine.
- Held, Jean M. (1981). B.S., 1969, State University of New York, Downstate Medical Center; M.A., 1978; Ed.M., 1980; Ed.D., 1982, Columbia Teacher's College. Associate Professor of Physical Therapy.
- Helzer, John E. (1989). M.D., 1967, University of Utah, Salt Lake. Professor of Psychiatry.
- Hemenway, David R. (1974). B.S., 1965; M.S., 1967, University of Maine; M.S.E.E., 1971; Ph.D., 1974, University of North Carolina. Professor of Civil Engineering.
- Hemley, Marcia W. (1986). M.Ed., 1970; Ph.D., 1977; M.A., 1979, Columbia University. Adjunct Assistant Professor of Psychology.
- Henry, Sharon M. (1994). B.S., 1982; Ph.D., 1994, University of Vermont. Clinical Assistant Professor of Physical Therapy.
- Heppner, Thomas J. (1986). A.A., 1973, Waldorf Junior College; B.A., 1975, Gustavus Adolphus College; M.T., 1977, St. Joseph's School; Ph.D., 1986, Iowa State University. Research Associate in Pharmacology.
- Herbers, Joan M. (1980). B.S., 1973, University of Dayton; M.S., 1974; Ph.D., 1978, Northwestern University. Professor of Biology.
- Herbert, William E. (1992). B.A., 1972, Clark University; M.D., 1976, University of Rochester. Clinical Instructor in Surgery.
- Hernance, Clarke E. (1982). B.E., 1958, Yale University; M.A.Sc., 1960; M.A., 1961; Ph.D., 1963, Princeton University. Professor of Mechanical Engineering.
- Herrera, Ismael (1993). Ph.D., 1962, Brown University. Visiting Professor of Mathematics.
- Herschorn, Sally D. (1991). M.D.C.M., 1982, McGill University. Assistant Professor of Radiology.
- Herst, Laurence (1984). B.A., 1968, Stanford University; M.D., 1976, Georgetown University. Clinical Associate Professor of Psychiatry.
- Hescheler, Jurgen K (1992). M.D., 1984, University of Saarland. Visiting Associate Professor of Pharmacology.
- Hess, Steven A. (1993). B.A., 1976, Vanderbilt University; M.D., 1980, University of Louisville. Clinical Assistant Professor of Family Practice.
- Hession, Katharine (1981). B.A., 1967, Middlebury College; M.D., 1971, Tufts University. Clinical Instructor in Pediatrics.
- Heywood, John A. (1992). B.A., 1985, Whitman College; M.D., 1989, University of Washington. Clinical Instructor in Medicine.
- Higgins, Charles W., Jr. (1983). B.S., 1970, University of Michigan; M.D., 1974, Boston University. Clinical Assistant Professor of Anesthesiology.
- Higgins, Daniel W. (1969). B.A., 1964; M.F.A., 1968, University of Michigan. Associate Professor of Art.
- Higgins, George L., III (1985). B.A., 1969, Colby College; M.D., 1973, Tufts University. Associate Professor of Surgery.
- Higgins, John C. (1991). B.S., 1984, University of Richmond; M.D., 1988, University of Medicine and Dentistry of New Jersey. Clinical Instructor in Medicine.
- Higgins, Stephen T. (1986). B.S., 1975; M.S., 1978, Shippensburg University; M.A., 1982, Ph.D., 1983, University of Kansas. Associate Professor of Psychiatry and Research Assistant Professor of Psychology.
- Hilfrank, Brenda C. (1982). B.S., 1977, Ithaca College. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Hill, Douglas R. (1981). B.A., 1950, Bowdoin College; M.D., 1954, University of Rochester. Clinical Associate Professor of Family Practice.
- Hill, H. Charles (1972). B.S., 1965; D.D.S., 1969, University of Michigan; Associate Professor of Dental Hygiene.
- Hillman, Robert S. (1981). B.S., 1955, Tufts University; M.D., 1959, Columbia University. Professor of Medicine.
- Hills, Karen B. (1994). A.B., 1970, Boston University. Clinical Instructor in Medical Technology.
- Himmelfarb, Jonathan (1988). B.A., 1977, Brandeis University; M.D., 1983, George Washington University. Clinical Associate Professor of Medicine.
- Hindes, J. Churchill (1975). B.A., 1969, Saint Michael's College; M.A., 1972; Ph.D., 1977, University of Iowa. Clinical Assistant Professor of Medicine and Adjunct Lecturer in Public Administration.
- Hinkens, Andrew G. (1989). B.A., 1977, Allegheny College; M.D., 1981, University of Pennsylvania. Clinical Assistant Professor of Psychiatry.
- Hirth, David H. (1979). B.A., 1964, Bowdoin College; M.S., 1966, University of Massachusetts; Ph.D., 1973, University of Michigan. Associate Professor of Natural Resources.
- Hobbs, David W. (1989). B.A., 1965, Pomona College; M.D., 1969, University of Southern California. Clinical Instructor in Family Practice.
- Hochheiser, R. Margaret (1987). B.A., 1972, Bryn Mawr College; M.A., 1982, Rhode Island College. Clinical Instructor in Psychiatry.
- Hock, Michael L. (1994). B.S., 1971, University of Pennsylvania, Bloomsburg; M.Ed., 1985; C.A.S., 1986, Keene State College. Lecturer in Education.
- Hodgkin, William E. (1978). B.S., 1955, Bates College; M.D., 1959, University of Vermont. Clinical Associate Professor of Pediatrics.
- Hoffmann, James P. (1983). B.S., 1969, Cornell University; Ph.D., 1981, University of Wisconsin. Assistant Professor of Botany.

- Holland, Malai D. (1993). B.S., 1973, *James Madison University*; M.P.H., 1984, *University of Minnesota*. Lecturer in Education.
- Hollingshead Jr., Kossuth F. (1993). M.D., 1976, *University of Mississippi*. Assistant Professor of Surgery.
- Holmes, Frederick C. (1974). B.S., 1963, *Rensselaer Polytechnic Institute*; M.D., 1967, *University of Kentucky*. Clinical Assistant Professor of Pediatrics.
- Holmgren, Karin (1985). M.A., 1974, *Stockholm University*. Adjunct Lecturer in Communication Sciences.
- Holm-Hansen, Audrey M. (1995). A.S., 1994, *Champlain College*; B.S., 1978, *Rensselaer Polytechnic Institute*; M.S., 1984, *University of Vermont*. Adjunct Instructor in Computer Science.
- Holt, William S. (1991). B.S., 1963, *Bates College*; M.D., 1967, *Harvard University*. Clinical Assistant Professor of Surgery.
- Homans, Alan C. (1992). B.A., 1975, *Earlham College*; M.D., 1979, *Ohio State University*. Assistant Professor of Pediatrics.
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- Hood, Virginia L. (1977). M.B.B.S., 1970, *University of Sydney*. Professor of Medicine.
- Horbar, Jeffrey D. (1981). A.B., 1970, *Harvard University*; M.D., 1977, *State University of New York, Downstate Medical Center*. Associate Professor of Pediatrics.
- Hornus, Michael P. (1995). B.A., 1964, *Albion College*; M.A., 1971, *Wayne State University*. Adjunct Instructor in Education.
- Horton, Edward S. (1967). A.B., 1954, *Dartmouth University*; M.D., 1957, *Harvard University*. E.L. Amidon Professor of Medicine.
- Hoskin, Mark L. (1994). B.A., 1976, *Hampshire College*; M.D., 1988, *University of Vermont*. Clinical Instructor in Psychiatry.
- Hotelling, David R. (1981). B.A., 1960, *Reed College*; M.D., 1964, *University of Cincinnati*. Clinical Instructor in Medicine.
- Houghton, Martha (1970). B.S., 1962, *University of Vermont*; Ed.M., 1963, *Boston University*. Lecturer in Communication Sciences.
- Howard, Paula R. (1984). B.S., 1973, *University of New Hampshire*; M.S., 1984, *University of Vermont*. Associate Professor of Medical Technology.
- Howe, James G. (1978). B.A., 1969; M.D., 1973, *University of Vermont*. Professor of Orthopaedics and Rehabilitation.
- Howe, Linda M. (1992). A.B., 1972, *Boston University*; M.S., 1976, *University of Wisconsin*. Extension Associate Professor in Extension Service.
- Howell, David C. (1967). B.A., 1963, *Middlebury College*; M.S., 1965; Ph.D., 1967, *Tulane University*. Professor of Psychology.
- Howell, Douglas A. (1981). B.S., 1969, *Rutgers University*; M.D., 1973, *Temple University*. Clinical Associate Professor of Medicine.
- Hsieh, Alexander (1986). B.S., 1968, *University of Philippines*; Ph.D., 1974, *University of Illinois*. Adjunct Professor of Animal and Food Sciences.
- Hubbell, Richard N. (1986). B.A., 1976; M.D., 1980, *University of Vermont*. Associate Professor of Surgery and Assistant Professor of Pediatrics.
- Huber, Sally A. (1981). B.A., 1969, *Virginia Technical Institute*; M.S., 1972; Ph.D., 1975, *Duke University*. Associate Professor of Pathology.
- Huddle, David R. (1971). B.A., 1968, *University of Virginia*; M.A., 1969, *Hollins College*; M.F.A., 1971, *Columbia University*. Professor of English.
- Hudspeth, Thomas R. (1972). B.A., 1970, *Williams College*; M.S., 1972; Ph.D., 1982, *University of Michigan*. Associate Professor of Natural Resources and Environmental Studies.
- Hudziak, James J. (1993). B.S., 1979, *St. John's University*; M.D., 1988, *University of Minnesota, Minneapolis*. Assistant Professor of Psychiatry.
- Huempfer, Lisa J. (1990). B.A., 1987; M.A., 1989, *University of Arizona*. Lecturer in Romance Languages.
- Hughes, Carole G. (1993). B.A., 1961, *University of Michigan*; M.S., 1991, *Kent State University*; M.A., 1970; Ph.D., 1970, *Case Western Reserve University*. Adjunct Instructor in Psychiatry.
- Hughes, Jeffrey W. (1988). B.A., 1973, *University of Massachusetts*; M.S., 1982, *Miami University*; Ph.D., 1987, *Cornell University*. Assistant Professor of Natural Resources and Lecturer and Research Assistant Professor of Botany.
- Hughes, John R. (1985). B.S., 1971, *University of Mississippi*; M.D., 1975, *University of Massachusetts*. Professor of Psychiatry and Associate Professor of Psychology and Family Practice.
- Hull, Karla M. (1992). M.S., 1976, *Arizona State University*. Lecturer in Integrated Professional Studies.
- Hundal, Mahendra S. (1967). B.E., 1954, *Osmania University*; M.S., 1962; Ph.D., 1964, *University of Wisconsin*. Professor of Mechanical Engineering.
- Hunt, Allen S. (1961). B.S., 1951, *Saint Lawrence University*; M.A., 1953, *Texas Christian University*; M.S., 1957, *University of Michigan*; Ph.D., 1964, *Harvard University*. Professor of Geology.
- Hunt, Herbert G., III (1987). B.A., 1974; M.B.A., 1978, *University of Vermont*; D.B.A., 1982, *University of Colorado*. Associate Professor of Business Administration.
- Hunter, Deborah E. (1985). A.B., 1974, *Muhlenberg College*; M.S., 1976; Ph.D., 1985, *Indiana University*. Associate Professor of Integrated Professional Studies.
- Huot, Anne E. (1990). B.S., 1980, *University of New Hampshire*; M.S., 1987; Ph.D., 1990, *University of Vermont*. Assistant Professor of Medical Technology.
- Hurwitz, Craig A. (1993). B.A., 1978, *University of Texas, Austin*; M.D., 1982, *Southwestern Medical School*. Clinical Associate Professor of Pediatrics.
- Huston, Dryver R. (1987). B.S.E., 1980, *University of Pennsylvania*; M.A., 1982; Ph.D., 1986, *Princeton University*. Associate Professor of Mechanical Engineering.
- Hutton, Patrick H. (1968). A.B., 1960, *Princeton University*; M.A., 1964; Ph.D., 1969, *University of Wisconsin*. Professor of History.
- Hyman, Neil H. (1990). B.A., 1980, *University of Pennsylvania*; M.D., 1984, *University of Vermont*. Assistant Professor of Surgery.
- Ibragic-McCormick, Emina M. (1983). B.Sc., 1977; M.Sc., 1979, *Southern Illinois University*. Lecturer in Education.
- Incavo, Stephen J. (1988). A.B., 1979, *Colgate University*; M.D., 1983, *State University of New York, Upstate Medical Center*. Assistant Professor of Orthopaedics and Rehabilitation.
- Ireland, Anne M. (1993). B.N., 1984, *University of New Brunswick*; M.S.C.N., 1990, *University of Toronto*. Adjunct Assistant Professor of Professional Nursing.
- Irwin, Alan E. (1977). B.A., 1967; M.D., 1971, *University of Vermont*. Associate Professor of Surgery.
- Isenberg, Gail L. (1993). B.S., 1975, *University of Maryland*; M.S., 1982, *University of Vermont*; Ph.D., 1993, *University of Massachusetts*. Assistant Professor of Integrated Professional Studies.



- Isham, Betsy E. (1969). B.S., 1962, *University of Vermont. Clinical Instructor in Medical Technology.*
- Ishee, M. Nell (1995). B.A., 1970, *Antioch College*; M.A., 1980, *Antioch, New England Graduate School. Lecturer in Integrated Professional Studies.*
- Isikdag, Fatma (1989). B.S., 1981, *Middle East Technical University*; Ph.D., 1988, *University of California, Berkeley. Assistant Professor of Economics.*
- Iskow, Julie (1991). B.S., 1984, *University of California, Berkeley*; M.S., 1985; Ph.D., 1991, *University of California, Davis. Assistant Professor of Community Development and Resource Economics.*
- Isler, Robert J. (1981). B.A., 1970, *Franklin and Marshall College*; M.D., 1974, *University of Pennsylvania. Clinical Associate Professor of Radiology.*
- Isley, Elwood M. (1984). B.A., 1965, *Concordia College. Lecturer in Education.*
- Ittelman, Frank P. (1980). B.A., 1968, *Dartmouth College*; M.D., 1972, *University of Cincinnati. Associate Professor of Thoracic and Cardiac Surgery.*
- Iverson, Andrew P. (1990). M.D., 1966, *Tufts University. Clinical Associate Professor of Surgery.*
- Ives, John O. (1972). A.B., 1961, *Princeton University*; M.D., 1965, *Cornell University. Associate Professor of Psychiatry.*
- Ivey, Roger T. ((1992) B.S., 1969, *Presbyterian College*; M.P.H., 1982, *University of Minnesota*; D.D.S., 1973, *Medical College of Virginia. Assistant Professor of Dental Hygiene.*
- Izzo, Louis M. (1969). B.A., 1968, *University of Vermont*; M.S., 1969, *University of Miami. Associate Professor of Radiologic Technology.*
- Jackson, Pamela L. (1992). A.B., 1978, *Rudcliffe College*; M.D., 1985, *Harvard University. Clinical Assistant Professor of Pediatrics.*
- Jackson, Richard S. (1982). B.A., 1971, *University of New Hampshire*; M.D., 1975, *Jefferson Medical College. Associate Professor of Surgery.*
- Jackson, Thomas L. (1990). A.B., 1976; M.D., 1984, *Dartmouth College. Clinical Assistant Professor of Surgery.*
- Jacobsohn, Ulrich B. (1980). B.A., 1950, *Reed College*; M.D., 1954, *Washington University. Clinical Assistant Professor of Psychiatry.*
- Jaeger, Dominic A. (1993). B.A., 1986; B.S., 1986; *Emory University*; M.D., 1990, *University of North Carolina. Assistant Professor of Medicine.*
- Jaffe, Howard W. (1990). B.A., 1942, *Brooklyn College*; D.R.S.C., 1972, *University of Geneva. Adjunct Professor of Geology.*
- Jaken, Susan (1990). B.S., 1972, *Bowling Green State University*; M.S., 1974; Ph.D., 1977, *University of Michigan. Adjunct Assistant Professor of Biology.*
- James, Nathaniel W. (1987). B.S., 1977, *Loyola College*; M.D., 1983, *University of Maryland. Assistant Professor of Medicine.*
- Jamieson, Maria P. (1988). B.S., 1970, *Paolo E Imbriani-Avelinno. Lecturer in Romance Languages.*
- Janson, Anne E. (1988). B.M., 1983, *Hartt School of Music*; M.M., 1986, *Manhattan School of Music. Lecturer in Music.*
- Japikse, David (1994). B.Sc., 1965, *Case Western Reserve University*; M.Sc., 1968; Ph.D., 1969, *Purdue University. Adjunct Professor of Mechanical Engineering.*
- Jarrad, Jeffrey (1994). B.A., 1978, *Kalamazoo College*; M.A., 1983, *New School of Social Research. Lecturer in Anthropology.*
- Jarris, Yumi S. (1994). B.S., 1977; M.D., 1981, *University of Maryland. Clinical Associate Professor of Family Practice.*
- Jarvis, Heather L. (1994). A.S., 1993, *University of Vermont. Clinical Instructor in Radiologic Technology.*
- Jarvis, Lynville W. (1967). B.A., 1961, *Emerson College*; M.A., 1963, *University of Alabama. Extension Professor in Extension Service.*
- Jerman, Anne (1989). B.S.N., 1971, *Boston University*; M.S., 1989, *Russell Sage College. Clinical Assistant Professor of Psychiatry.*
- Jesse, Richard R. (1983). B.S.E., 1968, *Princeton University*; M.B.A., 1971; Ph.D., 1973, *Cornell University. Associate Professor of Business Administration.*
- Jevons, Jane M. (1991). B.S., 1982, *State University of New York, Genesee*; B.H.S., *Duke University. Clinical Instructor in Medicine.*
- Jewett, John G. (1977). A.B., 1958, *Harvard University*; Ph.D., 1963, *Massachusetts Institute of Technology. Professor of Chemistry.*
- Jiamachello, Thomas A. (1995). B.S.Ed., 1974, *Indiana University of Pennsylvania*; M.A.T., 1977, *University of Vermont. Adjunct Instructor in Education.*
- Jillson, Elizabeth H. (1994). B.S., 1973, *Tufts University*; M.S., 1976; M.M.A., 1977, *University of Rhode Island*; M.D., 1988, *University of Vermont. Clinical Instructor in Pediatrics.*
- Joffe, Justin M. (1969). B.A., 1959; M.A., 1962, *University of Witwatersrand*; Ph.D., 1965, *University of London. Professor of Psychology.*
- Johansson, Jan E. (1976). B.A., 1965; M.A., 1967, *University of Maine. Lecturer in Mathematics.*
- John, Alex (1993). B.A., 1979, *St Louis University*; M.D., 1984, *University of Missouri. Clinical Assistant Professor of Medicine.*
- Johnson, Beverly K. (1987). B.S.N., 1967, *University of Minnesota*; M.N., 1977, *Emory University*; Ph.D., 1986, *University of Texas. Assistant Professor of Professional Nursing.*
- Johnson, Charles L. (1980). B.A., 1968; M.D., 1972, *University of Michigan. Clinical Associate Professor of Psychiatry.*
- Johnson, David L. (1979). B.S., 1970; M.S., 1972, *University of Wisconsin*; M.D., 1976, *Medical College of Wisconsin. Associate Professor of Anesthesiology.*
- Johnson, Deborah H. (1995). B.S., 1971, *Buller University*; M.A., 1991, *Middlebury College. Adjunct Instructor in Education.*
- Johnson, Douglas I. (1988). B.S., 1978, *Miami University*; Ph.D., 1983, *Purdue University. Assistant Professor of Microbiology and Molecular Genetics.*
- Johnson, Julia V. (1990). B.S., 1976, *University of California, Davis*; M.D., 1984, *Medical College of Georgia. Assistant Professor of Obstetrics and Gynecology.*
- Johnson, Melissa F. (1985). B.S., 1976, *Towson State University*; B.S.N., 1980; M.S., 1985, *University of Maryland. Clinical Assistant Professor of Professional Nursing.*
- Johnson, Rachel N. (1991). B.S., 1974, *Pennsylvania State University*; M.P.H., 1980, *University of Hawaii*; Ph.D., 1991, *Pennsylvania State University. Assistant Professor of Nutritional Sciences.*
- Johnson, Robert E. (1985). B.S., 1931, *University of Washington*; B.A., 1934; D.Phil., 1935, *Oxford University*; M.D., 1941, *Harvard University. Visiting Professor of Molecular Physiology and Biophysics.*
- Johnson, Robert J. (1971). B.A., 1961, *Coe College*; M.D., 1964, *University of Iowa. McClure Professor of Musculoskeletal Research.*
- Johnston, Eileen M. (1994). B.A., 1987; M.D., 1991, *University of Virginia. Instructor in Medicine.*
- Jokela, William E. (1985). B.A., 1969, *Carleton College*; M.S., 1978; Ph.D., 1985, *University of Minnesota. Extension Associate Professor of Plant and Soil Science.*
- Jones, Michael A. (1992). B.A., 1977, *Bowdoin College*; M.D., 1983, *University of Cincinnati. Assistant Professor of Pathology.*



- Jones, S. Penelope V. (1991). B.S., 1982, *Liverpool University*; Ph.D., 1986, *Strathclyde University*; Assistant Professor of Psychiatry and Molecular Physiology and Biophysics.
- Jordan, Barbara R. (1995). B.S., 1957, *Springfield College*; M.Ed., 1984; M.S., 1987, *University of Vermont*. Lecturer in Education.
- Joy, Albert H. (1987). B.A., 1972, *Ohio University*; M.A., 1975, *Hebrew University*; M.S., 1986, *Simmons College*. Library Associate Professor in Bailey/Howe Library.
- Jozefowicz, Thaddeus H. (1983). B.S., 1964, *Saint Francis College*; M.D., 1970, *University of Bologna*. Clinical Assistant Professor of Neurology.
- Kadas, Zsuzsanna M. (1993). B.S., 1974, *Saint John's University*; M.S., 1976; Ph.D., 1982, *Rutgers University*. Visiting Associate Professor of Mathematics.
- Kahn, Frances A. (1987). B.A., 1966, *University of Oklahoma*; M.A., 1968, *University of Colorado*. Lecturer in Education.
- Kahn, Helen J. (1991). B.A., 1976, *San Francisco State University*; M.A., 1980, *San Jose State University*; M.A., 1986; Ph.D., 1989, *University of North Dakota*. Assistant Professor of Communication Sciences.
- Kahn, Richard J. (1993). B.A., 1962, *Rutgers University*; M.D., 1966, *Tufts University*. Clinical Assistant Professor of Medicine.
- Kahn, Robbie P. (1990). A.B., 1963, *Brandeis University*; M.P.H., 1980, *Boston University*; M.A., 1983; Ph.D., 1988, *Brandeis University*. Assistant Professor of Sociology.
- Kajenski, Peter J. (1994). B.S., 1984, *University of California, Los Angeles*; M.S., 1989; Ph.D., 1991, *University of Vermont*. Lecturer in Mechanical Engineering.
- Kalafatis, Michael (1994). Ph.D., 1989, *University of Paris*. Research Assistant Professor of Biochemistry.
- Kaiser, Elizabeth T. (1987). B.Mus., 1974, *Oberlin Conservatory of Music*; M.Mus., 1979, *Indiana University School of Music*. Lecturer in Music.
- Kaminow, Leonard C. (1993). B.A., 1978, *Dartmouth College*; M.S., 1980, *Columbia University*; M.D., 1985, *Rutgers University*. Clinical Assistant Professor of Neurology.
- Kane, Timothy V. (1992). B.A., 1983, *Hamilton College*; M.D.I.V., 1986, *Harvard University*; M.A.T., 1992, *Maryknoll School of Theology*. Lecturer in Education.
- Kapp, Bruce S. (1971). B.S., 1966, *Bucknell University*; M.S., 1968; Ph.D., 1971, *New York University*. Professor of Psychology.
- Kappas, Attallah (1993). A.B., 1947, *Columbia University*; M.D., 1950, *University of Chicago*. Visiting Professor of Pediatrics.
- Karatzas, George P. (1994). B.S., 1982, *Aristotelion University*; M.S., 1987; Ph.D., 1992, *Rutgers University*. Research Assistant Professor of Civil and Environmental Engineering.
- Karstens, Karla A. (1987). B.A., 1977, *College of Saint Benedict*; M.S., 1987, *University of Vermont*. Lecturer in Mathematics.
- Karstens, William IV. (1990). B.S., 1981, *University of Vermont*; M.A., 1983, *Brandeis University*; Ph.D., 1990, *University of Vermont*. Visiting Assistant Professor of Physics.
- Kasper, Keith J. (1992). B.A., 1984, *University of Vermont*; J.D., 1987, *Rutgers University, Camden*. Lecturer in Business Administration.
- Kasprisin, Christina A. (1993). B.S., 1972, *State University of New York, Stony Brook*; M.S., 1974, *Rutgers University*; M.S., 1980, *University of Illinois*. Lecturer in Professional Nursing.
- Kasprisin, Duke O. (1993). B.S., 1968, *City College of New York*; M.D., 1972, *Mount Sinai School of Medicine*. Clinical Associate Professor of Pediatrics.
- Kast, Richard (1991). B.S., 1968, *Roosevelt University*; M.S., 1972; M.D., 1978, *University of Copenhagen*. Clinical Instructor in Family Practice.
- Katz, Steven E. (1994). B.A., 1954, *Cornell University*; M.D., 1963, *Hahnemann University*. Clinical Professor of Psychiatry.
- Kaufman, David A. (1988). B.S., 1972, *Ithaca College*. Lecturer in Natural Resources.
- Kaufman, Lonnie (1994). B.A., 1984, *State University of New York, Stony Brook*; M.S., 1988, *San Diego State University*. Lecturer in Education.
- Kaufman, Robert G. (1992). B.A., 1977; M.A., 1978, *Columbia University*; J.D., 1983, *Georgetown University*; Ph.D., 1988, *Columbia University*. Assistant Professor of Political Science.
- Kaupilla, Dennis M. (1983). B.S., 1981; M.S., 1983, *University of Vermont*. Extension Assistant Professor in Extension Service.
- Kaups, Krista L. (1990). B.A., 1979, *Bethel College*; M.D., 1983, *University of Illinois*. Assistant Professor of Surgery.
- Kay, Pamela J. (1990). B.S., 1964, *Susquehanna University*; M.Ed., 1978, *University of Vermont*. Lecturer in Education.
- Kaza, Stephanie (1991). B.A., 1968, *Oberlin College*; M.A., 1970, *Stanford University*; M.Div., 1991, *Starr King School of Ministry*; Ph.D., 1979, *University of California, Santa Cruz*. Assistant Professor of Natural Resources.
- Keilson, Leonard M. (1981). B.A., 1968, *State University of New York, Buffalo*; M.D., 1972, *Albert Einstein College of Medicine*; M.P.H., 1978, *Johns Hopkins University*. Associate Professor of Medicine.
- Keilt, Christina (1993). R.N., 1969, *Englewood School of Nursing*; C.N.M., 1979, *University of Medicine and Dentistry of New Jersey*. Instructor in Obstetrics and Gynecology.
- Keleher, Kathleen C. (1979). B.A., 1969, *Northeastern University*; B.S.N., 1975, *University of Connecticut*; M.P.H., 1979, *Johns Hopkins University*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Keller, Gary A. (1986). B.A., 1973; M.D., 1981, *Tufts University*. Clinical Instructor in Psychiatry.
- Keller, Tony S. (1991). B.S., 1978, *Oregon State University*; M.S.E., 1983, *University of Washington*; Ph.D., 1988, *Vanderbilt University*. Associate Professor of Mechanical Engineering and Orthopaedics and Rehabilitation.
- Kellett, Mirle A. (1991). A.B., 1969, *Dartmouth College*; M.D., 1975, *George Washington University*. Clinical Associate Professor of Medicine.
- Kelley, Jason (1977). A.B., 1967, *Harvard University*; M.D., 1972, *University of Texas Southwestern*. Professor of Medicine.
- Kellogg, Thomas L. (1994). A.S., 1982; B.S., 1988, *University of Vermont*. Lecturer in Radiologic Technology.
- Kelly, Eileen M. (1994). B.S., 1984, *State University of New York, Plattsburg*; M.Ed., 1986; C.A.S., 1989, *University of Vermont*; Ph.D., 1994, *State University of New York, Albany*. Research Assistant Professor of Education.
- Kelly, John A. (1992). M.B.B.C., 1988, *Royal College of Surgeons*. Clinical Instructor in Medicine.
- Kelly, Judith J. (1993). B.S., 1956, *Northwestern University*; M.A., 1977, *University of Vermont*. Lecturer in Art.
- Kennedy-Kalafatis, Susan (1989). A.B., 1981, *Middlebury College*; M.A., 1984; Ph.D., 1992, *University of California*. Assistant Professor of Geography.
- Kenny, Nicholas (1991). B.Sc., 1980; Ph.D., 1985, *University of Hull*. Research Assistant Professor of Obstetrics and Gynecology.
- Kent, Brian P. (1992). B.A., 1979, *University of Wisconsin, Eau Claire*. Lecturer in English.
- Kent, Edward F., Jr. (1989). B.S., 1978, *Boston College*; M.D., 1983, *University of Pittsburgh*. Clinical Assistant Professor of Pediatrics.
- Keogh, William J. (1978). B.A., 1962, *Providence College*; M.A., 1974, *University of Kansas*. Assistant Professor of Education.

- Keroack, Brian J. (1992). B.A., 1980, Amherst College; M.D., 1985, Tufts University. Clinical Instructor in Medicine.
- Kessler, Dale L., Jr. (1985). A.B., 1968, Dartmouth College; M.D., 1974; Ph.D., 1974, Duke University. Clinical Assistant Professor of Pediatrics.
- Kessler, Marc (1969). B.A., 1963, City College of New York; Ph.D., 1969, University of Nebraska. Associate Professor of Psychology.
- Kete, Mary Lou (1994). B.A., 1986, University of Vermont; M.A., 1990; Ph.D., 1994, Harvard University. Assistant Professor of English.
- Kiedaisch, Jean L. (1982). B.A., 1963, Hope College; M.A., 1965, University of California, Berkeley. Lecturer in English.
- Kieliszek, Francis X. (1993). B.A., 1972, Yale University; B.S., 1978, Johns Hopkins University; M.D., 1986, University of Maryland. Clinical Instructor in Medicine.
- Kilby, Alan E. (1987). A.B., 1973; M.D., 1977, Cornell University. Clinical Assistant Professor of Medicine.
- Kilpatrick, C. William (1974). B.Sc., 1968; M.Sc., 1969, Midwestern State University; Ph.D., 1973, North Texas State University. Associate Professor of Biology.
- Kindstedt, Paul S. (1986). B.S., 1979; M.S., 1981, University of Vermont; Ph.D., 1986, Cornell University. Associate Professor of Animal Sciences and Food Sciences.
- King, John F. (1980). B.A., 1970, Miami University; M.D., 1975, Ohio State University. Clinical Assistant Professor of Psychiatry.
- King, Leslie A. (1984). B.A., 1966, University of British Columbia; M.Ed., 1970, University of Toronto; M.E.S., 1973, York University; Ph.D., 1983, London University. Associate Professor of Natural Resources and Environmental Studies.
- King, Patricia A. (1988). B.A., 1974; M.A., 1976, Miami University; Ph.D., 1982, Brown University. Research Assistant Professor and Instructor in Medicine.
- Kingstone, Peter R. (1994). B.A., 1986, Swarthmore College; M.A., 1988; Ph.D., 1994, University of California, Berkeley. Assistant Professor of Political Science.
- Kish, Karen B. (1995). B.A., 1970, Clark University; M.A.T., 1971, University of Vermont. Adjunct Instructor in Education.
- Kita, Michael W. (1986). B.A., 1971; M.D., 1975, Harvard University. Clinical Assistant Professor of Family Practice.
- Kleh, Thomas R. (1965). B.S., 1949, University of Maryland; M.D., 1953, George Washington University. Clinical Associate Professor of Ophthalmology.
- Klette, Douglas G. (1988). B.S., 1970, Ohio University; M.Ed., 1973, University of Vermont. Adjunct Lecturer in Integrated Professional Studies.
- Klikunas, Marvin F. (1992). B.A., 1977, Lawrence University; M.D., 1981, Medical College of Ohio. Assistant Professor of Medicine.
- Klimowski, Steven E. (1980). A.S., 1977, State University of New York, Purchase. Lecturer in Music.
- Kline, Antonie D. (1994). B.A., 1981, Wesleyan University; M.D., 1986, Jefferson Medical College. Assistant Professor of Pediatrics.
- Klopp, Donald W. (1983). B.S., 1962, Tusculum College; M.D., 1966, Temple University. Professor of Anesthesiology.
- Knapp, Burton B. (1981). B.A., 1969, Middlebury College; M.D., 1973, Case Western Reserve University. Clinical Associate Professor of Family Practice.
- Knight, Stephen C. (1973). B.S., 1948; M.S., 1950, University of Maine. Adjunct Professor of Civil Engineering.
- Knight, William S. (1994). B.A., 1987, Bucknell University; M.D., 1991, New York Medical College. Instructor in Medicine.
- Knisley, Patricia M. (1990). B.S., 1978, College of Mount Saint Joseph. Lecturer in Nutritional Sciences.
- Knodell, Jane E. (1986). B.A., 1976; Ph.D., 1984, Stanford University. Associate Professor of Economics.
- Knowland, Michael (1987). B.Sc., 1969; M.B.B.S., 1972, London University. Clinical Assistant Professor of Otolaryngology.
- Knowles, John E. (1982). B.A., 1955, University of Maine; M.D., 1959, Tufts University. Clinical Associate Professor of Surgery.
- Knox, Betsy S. (1994). B.S., 1984, State University of New York, Geneseo; M.Ed., 1989, State University of New York, New Paltz. Lecturer in Education.
- Koenemann, Edward J. (1981). B.S., 1956; M.S., 1958, Indiana University. Lecturer in Natural Resources.
- Koktowski, Wendy A. (1988). B.S., 1979; M.S., 1983, Li University. Clinical Instructor in Medical Technology.
- Kolodinsky, Jane M. (1987). B.S., 1981; M.B.A., 1983, Kent State University; Ph.D., 1987, Cornell University. Associate Professor of Community Development and Applied Economics.
- Koplewitz, Martin J. (1973). B.S., 1948, Queens College; M.D., 1952, University of Vermont. Associate Professor of Surgery.
- Kornblith, Hilary (1979). B.A., 1975, State University of New York, Buffalo; M.A., 1978; Ph.D., 1980, Cornell University. Professor of Philosophy.
- Korsen, Neil (1986). A.B., 1975, Dartmouth College; M.D., 1979, Hahnemann University. Clinical Assistant Professor of Family Practice.
- Kost, Larry L. (1973). B.S., 1965, University of Saint Thomas; M.S., 1968, University of Arizona. Lecturer in Mathematics.
- Kovacs, Richard J. (1988). B.A., 1976, University of Chicago; M.D., 1980, University of Cincinnati. Visiting Assistant Professor of Pharmacology.
- Kow, Yoke W. (1988). B.S., 1976, Nanyang University; Ph.D., 1981, Brandeis University. Research Associate Professor of Microbiology and Molecular Genetics.
- Krag, David N. (1991). B.A., 1977, University of the Pacific; M.D., 1980, Loyola University. Associate Professor of General Surgery.
- Krag, Martin H. (1981). B.S., 1970, Stanford University; M.D., 1975, Yale University. Associate Professor of Orthopaedics and Rehabilitation.
- Kramer, Mitchell B. (1992). B.A., 1971; M.S., 1973, Brooklyn College; Ph.D., 1977, Northwestern University. Adjunct Assistant Professor of Communication, Sciences.
- Kramer, Robert S. (1982). B.A., 1965; M.D., 1969, University of Vermont. Clinical Assistant Professor of Surgery.
- Krapcho, A. Paul (1960). B.S., 1953, Pennsylvania State University; M.A., 1955; Ph.D., 1958, Harvard University. Professor of Chemistry.
- Kraushaar, James M. (1981). B.S., 1967, Pennsylvania State University; M.S., 1969; Ph.D., 1975, Syracuse University. Associate Professor of Business Administration.
- Krawitt, Edward L. (1969). A.B., 1955; M.D., 1959, Cornell University. Professor of Medicine.
- Kreutz, Joseph M. (1988). B.S., 1978, Mankato State University; M.D., 1983, University of Wisconsin. Assistant Professor of Anesthesiology.
- Kristensen, Eva A. (1983). B.Sc., 1968, University of Guelph; M.D., 1976, McMaster University. Associate Professor of Anesthesiology.
- Kristiansen, Thomas K. (1983). B.A., 1972, Columbia University; M.D., 1978, State University of New York, Upstate Medical Center. Associate Professor of Orthopaedics and Rehabilitation.
- Kropf, Joseph C., Jr. (1989). B.S., 1982, Boston College; D.M.D., 1986, University of Connecticut. Clinical Instructor in Surgery.
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- Krusinski, Paul A. (1974). B.A., 1965; M.D., 1968, Ohio State University. Professor of Medicine.

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- Kuehne, Martin E. (1961). B.A., 1951, *Columbia College*; M.A., 1952, *Harvard University*; Ph.D., 1955, *Columbia University*. Professor of Chemistry.
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- Kunkle, Edward C. (1981). B.A., 1935, *Havard College*; M.D., 1939, *Cornell University*. Associate Professor of Neurology.
- Kupic, Edward A. (1966). M.D., 1960, *University of Vermont*. Professor of Radiology.
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- Kurkjian, Karen. (1987). B.A., 1978, *Dartmouth College*; M.D., 1984, *Boston University*. Instructor in Medicine.
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- Laber, Gene E. (1968). B.S., 1963; Ph.D., 1967, *University of Maryland*. Professor of Business Administration.
- Lacasse, Lloyd F. (1969). B.S., 1968; M.S., 1972, *University of Colorado*. Lecturer in Education.
- Lachapelle, Rene C. (1974). B.A., 1950, *Seminary of Joliette*; B.S., 1953, *University of Montreal*; M.S., 1957; Ph.D., 1962, *Syracuse University*. Associate Professor of Medical Technology.
- Lacroix, Lydia H. (1976). B.S., 1971; M.S., 1984, *University of Vermont*. Extension Assistant Professor in Extension Service.
- Laferriere, Mary E. (1983). B.S., 1963, *Boston College*; M.S., 1965, *University of Colorado*. Lecturer in Professional Nursing.
- Laflandra, Robert P. (1972). A.B., 1961, *Columbia University*; M.D., 1965, *Cornell University*. Clinical Instructor in Medicine.
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- Lamb, Dianne H. (1973). B.S., 1972, *University of Maine*; M.E.Ed., 1979, *University of Vermont*. Extension Associate Professor in Extension Service.
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- Lambrew, Jeanne M. (1994). B.A., 1989, *Amherst College*; M.S.P.H., 1991; Ph.D., 1993, *University of North Carolina, Chapel Hill*. Instructor in Medicine.
- Lamora, Christine M. (1982). B.S., 1973; M.S., 1976, *State University of New York, Fredonia*. Adjunct Instructor in Communication Sciences.
- Lampert, S. Henry (1986). B.A., 1950, *University of Illinois*; D.D.S., 1954, *New York University*. Clinical Instructor in Dentistry.
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- Lange, Janice L. (1967). B.S., 1961, *University of Wisconsin*; M.S., 1967, *University of Massachusetts*. Lecturer in Education.
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- Lannigan-Macara, Deborah A. (1991). B.Sc., 1980, *University of Guelph*; M.Sc., 1983, *University of Toronto*; Ph.D., 1987, *University of Rochester*. Assistant Professor of Biology.
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- Larkin, Rebecca A. (1992). B.S., 1990, *University of Vermont*. Lecturer in Education.
- Larned, Frederick S. (1981). B.A., 1962, *University of Michigan*; M.D., 1967, *Wayne State University*. Clinical Assistant Professor of Medicine.
- Larson, Karin B. (1980). B.S., 1961, *Tufts University*; A.M.T., 1962, *Harvard University*. Lecturer in Mathematics.
- Larson, Robert L. (1968). B.A., 1958, *University of Massachusetts*; M.Ed., 1960, *Bridgewater College*; Ed.D., 1968, *Boston University*. Professor of Education.
- Lasaponara, James R. (1990). B.S., 1984, *Boston College*; D.D.S., 1988, *State University of New York, Buffalo*. Clinical Instructor in Surgery.
- Lauber, Fay A. (1994). B.A., 1975, *University of Missouri*; M.A., 1984, *Webster University*. Lecturer in Community Development and Applied Economics.
- Lauzon, Carol R. (1991). B.S., 1983; M.Ed., 1985, *Springfield College*; Ph.D., 1991, *University of Vermont*. Lecturer in Agricultural Biochemistry.
- Laurence, Robert P. (1993). B.A., 1971, *University of New Hampshire*; M.D., 1975, *Tufts University*. Clinical Assistant Professor of Medicine.

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- Lavigne, Catherine K. (1992). A.S., 1982, *University of Vermont*; B.S., 1984, *Trinity College*; M.S., 1986, *University of Maryland, Baltimore. Lecturer in Dental Hygiene.*
- Lawlor, John C. (1974). A.B., 1969, *Bowdoin College*; M.S., 1974, *University of New Hampshire. Lecturer in Mathematics.*
- Lawlor, Peter P. (1971). M.D., 1958, *University of Ottawa. Clinical Associate Professor of Ophthalmology.*
- Lawrence, Gale (1988). A.B., 1966, *Earlham College*; M.A., 1968, *Emory University. Lecturer in English.*
- Lawrence, Leon (1991). B.A., 1976; M.Ed., 1978; *University of Vermont. Adjunct Lecturer in Education.*
- Lawson, Robert B. (1966). B.A., 1961, *Monmouth College*; M.A., 1963; Ph.D., 1965, *University of Delaware. Professor of Psychology.*
- Lax, Lisa K. (1994). B.A., 1976, *State University of New York, Potsdam*; M.S.W., 1983, *Adelphi University. Adjunct Instructor in Social Work.*
- Leaphart, Wilfreida L. (1994). B.S., 1986, *Valdosta State College*; M.D., 1990, *Mercer University. Clinical Instructor in Obstetrics and Gynecology.*
- Leary, Daniel P. (1993). *Instructor in Military Studies.*
- Leavitt, Bruce J. (1988). B.A., 1976, *University of Maine*; M.D., 1981, *University of Vermont. Assistant Professor of Thoracic Surgery.*
- Lee, Austin P. (1984). D.P., 1965, *McGill University*; F.R.C.P., 1965, *Royall College of Physicians and Surgeons of Canada*; M.B.C.H., 1951, *Edinburgh University. Clinical Associate Professor of Psychiatry.*
- Leeber, Donald A. (1981). B.S., 1959, *Georgetown University*; M.S., 1961, *University of Wyoming*; M.D., 1965, *Georgetown University. Professor of Medicine.*
- Leenstra, Willem R. (1980). B.S., 1969, *California State University*; Ph.D., 1979, *University of Washington. Associate Professor of Chemistry.*
- Leff, Herbert L. (1970). A.B., 1965, *University of North Carolina*; Ph.D., 1970, *Harvard University. Associate Professor of Psychology.*
- Leffler, Colleen M. (1992). A.S., 1988; B.S., 1989, *University of Vermont. Lecturer in Dental Hygiene.*
- Leffler, Stephen M. (1993). B.S., 1986; M.D., 1990, *University of Vermont. Assistant Professor of Surgery.*
- Leib, Edward S. (1979). M.D., 1971, *University of Michigan. Associate Professor of Medicine.*
- Leitenberg, Harold. (1965). B.A., 1960, *City College of New York*; Ph.D., 1965, *Indiana University. Professor of Psychology and Clinical Professor of Psychiatry.*
- Leitner, David W. (1984). M.D., 1975, *Wayne State University*; Associate Professor of Surgery.
- Leo, Kelly R. (1991). B.S., 1991, *University of Vermont. Lecturer in Education.*
- Leschey, William H., Jr. (1981). B.S., 1958, *Massachusetts Institute of Technology*; M.D., 1963, *Jefferson Medical College. Clinical Assistant Professor of Neurology.*
- Leslie, Kevin O. (1986). B.S., 1974, *Tulane University*; M.D., 1978, *Albert Einstein College. Associate Professor of Pathology.*
- Leverenz, Keith C. (1993). B.A., 1972, *Harvard University*; M.D., 1978, *Yale University. Assistant Professor of Anesthesiology.*
- Levi, Paul A., Jr. (1971). B.S., 1962, *Saint Lawrence University*; D.M.D., 1966, *Tufts University. Assistant Professor of Dental Hygiene and Clinical Assistant Professor of Oral Surgery.*
- Levine, Mark A. (1992). B.A., 1975, *University of Connecticut*; M.D., 1979, *University of Rochester. Associate Professor of Medicine.*
- Levine, Steve B. (1990). B.S., 1974; D.V.M., 1977, *Cornell University. Adjunct Assistant Professor of Animal and Food Sciences.*
- Levine, Suzanne N. (1992). B.A., 1972, *Western Washington University*; M.Sc., 1976; Ph.D., 1983, *University of Manitoba. Assistant Professor of Natural Resources.*
- Levitte, Richard A. (1980). A.S., 1972, *Stockbridge School of Agriculture*; B.S., 1975, *University of Massachusetts*; M.E.E., 1980, *University of Vermont. Extension Assistant Professor in Extension Service.*
- Levy, Arthur M. (1963). B.A., 1952, *Harvard University*; M.D., 1956, *Cornell University. Professor of Medicine and Pediatrics.*
- Lew, Richard R. (1993). A.S., 1976, *University of Vermont. Clinical Instructor in Radiological Technology.*
- Lewin, Carroll (1971). B.A., 1965, *Oberlin College*; Ph.D., 1971, *Brandeis University. Associate Professor of Anthropology.*
- Lewin, Henia (1983). M.Ed., 1983, *University of Vermont. Lecturer in Hebrew.*
- LeWinter, Martin M. (1985). A.B., 1965, *Columbia University*; M.D., 1969, *New York University. Professor of Medicine.*
- Lewis, Barbara (1986). A.B., 1957, *Mount Holyoke College*; M.A.T., 1975, *University of Vermont. Lecturer in Chemistry.*
- Lewis, John D. (1968). B.A., 1957, *Williams College*; M.D., 1961, *University of Pennsylvania. Associate Professor of Obstetrics and Gynecology.*
- Lewis, Winston (1992). B.S., 1961, *University of Illinois*; M.A., 1977, *Sangamon State University*; M.D., 1988, *Antioch New England Graduate School. Clinical Assistant Professor of Psychiatry.*
- Li, Xia (1991). B.A., *Beijing University*; M.L.S., 1991, *University of Washington. Library Instructor in Bailey/Howe Library.*
- Libby, John T. (1991). B.A., 1956, *Bowdoin College*; M.D., 1960, *Cornell University. Clinical Assistant Professor of Surgery.*
- Libman, Bonita S. (1993). B.S., 1983, *University of Southern California*; M.D., 1987, *University of Toronto. Assistant Professor of Medicine.*
- Licata, Anita L. (1993). B.A., 1983, *Miami University*; M.D., 1989, *Yale University. Assistant Professor of Medicine.*
- Liebs, Chester H. (1975). B.A., 1968, *City College of New York*; M.S., 1977, *Columbia University. Professor of History.*
- Light, Jeanene C. (1991). B.A., 1975, *State University of New York, Plattsburgh*; M.L.S., 1980, *State University of New York, Albany. Library Assistant Professor in Dana Medical Library.*
- Lin, Roxanne V. (1989). B.A., 1982; Ph.D., 1988, *University of California. Assistant Professor of English.*
- Lind, Aulis (1970). B.A., 1959, *Augustana College*; M.A., 1961, *Southern Illinois University*; Ph.D., 1968, *University of Wisconsin. Associate Professor of Geography.*
- Lind, Stuart E. (1994). A.B., 1972, *Cornell University*; M.D., 1976, *New York University. Associate Professor of Pathology.*
- Lindsay, John J. (1964). B.S.F., 1959, *University of Maine*; M.S., 1966, *University of Massachusetts*; Ph.D., 1971, *Utah State University. Associate Professor of Natural Resources.*
- Lini, Andrea (1995). M.A., 1988; Ph.D., 1994, *ETH-Zurich. Research Assistant Professor of Geology.*
- Linn, Audrey A. (1979). B.S., 1972, *Marillac College*; M.S., 1974, *University of Utah. Clinical Instructor in Obstetrics and Gynecology.*
- Lintilhac, Philip M. (1976). B.S., 1963, *University of Vermont*; Ph.D., 1971, *University of California, Berkeley. Research Associate Professor of Botany.*
- Linton, Peter C. (1964). A.B., 1952, *Wesleyan University*; M.D., 1956, *Albany Medical College. Associate Professor of Surgery.*
- Lipke, William C. (1970). B.A., 1958, *Albion College*; M.A., 1963, *Wayne State University*; Ph.D., 1966, *University of Wisconsin. Professor of Art.*

- Lipson, Marjorie Y. (1985). B.S., 1969, *University of Wisconsin*; M.Ed., 1976, *University of Vermont*; Ph.D., 1981, *University of Michigan*. Associate Professor of Education.
- Little, David N. (1978). A.B., 1971, *Harvard University*; M.D., 1975, *University of Vermont*. Associate Professor of Family Practice.
- Livingston, Joy A. (1993). B.A., 1971, *University of California, Los Angeles*; M.A., 1979; Ph.D., 1983, *University of Vermont*. Lecturer in Economics.
- Lockwood, Julia D. (1985). B.A., 1971, *Radcliffe College*; M.D., 1977, *University of Pennsylvania*. Clinical Instructor in Pediatrics.
- Loeb, Don (1991). B.A., 1978, *Brandeis University*; M.A., 1986; J.D., 1982; Ph.D., 1991, *University of Michigan*. Assistant Professor of Philosophy.
- Loewald, Elizabeth L. (1994). A.B., *University of California, Berkeley*; M.D., 1948, *Johns Hopkins University*. Clinical Assistant Professor of Psychiatry.
- Loewen, James W. (1975). B.A., 1964, *Carleton College*; M.A., 1967; Ph.D., 1968, *Harvard University*. Professor of Sociology.
- London, Marshall G. (1970). A.B., 1951; M.D., 1955, *University of Vermont*. Clinical Associate Professor of Medicine.
- London-Hinman, Miriam (1994). B.A., 1977, *Stanford University*; Ph.D., 1983, *Yale University*. Clinical 992, *University of Amsterdam*. Adjunct Assistant Professor of Psychology.
- Long, George L. (1986). B.S., 1966, *Pacific Lutheran University*; Ph.D., 1971, *Brandeis University*. Professor of Biochemistry.
- Long, John G. (1978). D.D.S., 1952, *University of Pennsylvania*; M.P.H., 1966, *Columbia University*. Assistant Professor of Dental Hygiene.
- Long, John G. (1979). B.S., 1971, *University of Massachusetts*; M.D., 1975, *University of Vermont*. Clinical Instructor in Pediatrics.
- Lopez, Debra A. (1983). B.S., 1975, *University of Florida*; M.D., 1978, *University of Southern Florida*. Clinical Instructor in Psychiatry.
- Lopez, Oralia V. (1994). B.A., 1972, *Our Lady of the Lake University*. Lecturer in Natural Resources.
- Lord, Clifton F. (1990). B.S., 1974, *Stonehill College*; M.D., 1978, *University of Vermont*. Clinical Instructor in Orthopaedics and Rehabilitation.
- Losey, Lawrence J. (1980). B.S., 1976; M.D., 1976, *Loma Linda University*. Clinical Assistant Professor of Pediatrics.
- Loughridge, Sara B. (1981). B.A., 1966, *Smith College*; M.A., 1969; Ph.D., 1977, *Cornell University*. Clinical Associate Professor of Psychiatry.
- Love, John C. (1985). B.A., 1972; M.D., 1978, *Boston University*. Clinical Assistant Professor of Medicine.
- Lovett, Richard D. (1990). A.S., 1976; M.D., 1985, *University of Vermont*. Assistant Professor of Radiology.
- Low, Elizabeth S. (1991). A.B., 1963, *College of Wooster*; M.S., 1983, *University of Vermont*; Ph.D., 1968, *University of Chicago*. Lecturer in Statistics.
- Low, Robert B. (1970). A.B., 1963, *Princeton University*; Ph.D., 1968, *University of Chicago*. Professor of Molecular Physiology and Biophysics.
- Lubker, James F. (1984). B.S., 1960, *Mankato State University*; M.A., 1964; Ph.D., 1967, *University of Iowa*. Professor of Communication Sciences and Neurology and Psychology.
- Lucey, Jerold, F. (1956). A.B., 1948, *Dartmouth College*; M.D., 1952, *New York University*. Professor of Pediatrics.
- Ludewig, Victor W. (1973). B.A., 1959, *Swarthmore College*; M.D., 1964, *University of Pennsylvania*. Clinical Associate Professor of Medicine.
- Ludwig, Ann S. (1993). B.A., 1979, *Yale University*; M.D., 1987, *University of Vermont*. Clinical Assistant Professor of Family Practice.
- Luetmer, Paul A. (1993). B.S., 1980, *St. John's University*; M.D., 1984, *University of Minnesota*. Clinical Instructor in Medicine.
- Lukas, Patricia A. (1992). B.A., 1977, *Southern Connecticut State University*; M.A., 1986, *University of Texas, Austin*. Adjunct Instructor in Communication Sciences.
- Luke, Barbara A. (1981). B.S., 1965; M.D., 1969, *University of Michigan*. Clinical Assistant Professor of Radiology.
- Lund, John M. (1994). B.A., 1991, *Susquehanna University*. Lecturer in History.
- Lunde, John H. (1987). B.S., 1976; M.D., 1980, *University of Vermont*. Clinical Associate Professor of Pathology.
- Luria, Scott D. (1987). B.S., 1976, *Massachusetts Institute of Technology*; M.D., 1981, *George Washington University*. Assistant Professor of Medicine.
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- Lynan, Theodore (1983). B.A., 1973, *Harvard University*; M.F.A., 1981, *University of California*. Associate Professor of Art.
- Lynch, Barbara H. (1990). B.S., 1977, *Central Michigan University*; M.P.A., 1989, *University of Vermont*. Clinical Instructor in Family Practice.
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- Lyons, Linda B. (1994). B.A., 1983, *Evergreen State College*; M.S., 1990, *Cornell University*. Lecturer in Nutritional Sciences.
- Macara, Ian G. (1991). B.Sc., 1970; Ph.D., 1974, *University of Sheffield*. Professor of Pathology and Associate Professor of Microbiology and Molecular Genetics.
- MacDonald, Rebecca J. (1992). A.S., 1968, *University of Vermont*. Research Assistant Professor of Dental Hygiene.
- MacDonald, Virginia M. (1992). B.A., 1982, *University of Chicago*; M.A., 1986; Ph.D., 1992, *University of California, Los Angeles*. Lecturer in Psychology.
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- MacLaughlin, Winthrop S., Jr. (1982). B.S., 1966, *Fordham University*; M.D., 1970, *George Washington University*. Clinical Assistant Professor of Surgery.
- Maclean, Charles D. (1988). B.S., 1978, *University of New Hampshire*; M.D., 1982, *McGill University*. Assistant Professor of Medicine.
- MacLennan, Birdie (1990). B.A., 1979, *University of Massachusetts, Amherst*; M.S., 1988, *Simmons College*. Library Assistant Professor in Bailey/Howe Library.
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- Macleod, Cathel A. (1981). B.Sc., 1949, *University of New Zealand*; M.B.C.H., 1953, *University of Otago*; M.R.C.P., 1957; F.R.C.P., 1967, *Royal Australian College of Physicians*. Clinical Assistant Professor of Medicine.
- MacPherson, Brian V. (1980). B.S., 1969, *University of Notre Dame*; M.S., 1974, *University of Vermont*. Lecturer in Statistics.
- MacPherson, Bruce R. (1974). B.A., 1962, *Colby College*; M.S., 1967; M.D., 1967, *University of Vermont*. Associate Professor of Pathology.
- Maddalena, John (1995). B.S., 1980, *University of Notre Dame*; M.Ed., 1991, *University of Massachusetts*; Ph.D., 1990, *University of Vermont*. Adjunct Instructor in Education.

- Maddox, David A. (1980). B.A., 1966, *Blackburn College*; Ph.D., 1973, *University of Iowa*. Research Associate Professor of Medicine and Molecular Physiology and Biophysics and Instructor in Medicine.
- Madigan, Mark J. (1991). B.A., 1983, *St. Michael's College*; M.A., 1987, *University of Vermont*; Ph.D., 1991, *University of Massachusetts*. Lecturer in English.
- Madison, Joan G. (1972). B.S., 1951, *Bucknell University*; M.D., 1955, *Temple University*. Clinical Assistant Professor of Medicine.
- Magdoff, Frederick R. (1973). B.A., 1963, *Oberlin College*; M.S., 1965; Ph.D., 1969, *Cornell University*. Professor of Plant and Soil Science.
- Magistrale, Anthony S. (1981). B.A., 1974, *Allegheny College*; M.A., 1976; Ph.D., 1981, *University of Pittsburgh*. Associate Professor of English.
- Magrane, Diane M. (1986). B.A., 1974; M.D., 1978, *University of Iowa*. Associate Professor of Obstetrics and Gynecology.
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- Mahler, Sarah J. (1992). B.A., 1982, *Amherst College*; M.A., 1986; M.Phil., 1989; Ph.D., 1992, *Columbia University*. Assistant Professor of Anthropology.
- Mahoney, Dennis F. (1979). B.A., 1971, *College of the Holy Cross*; M.A., 1973; Ph.D., 1977, *University of Massachusetts*. Professor of German.
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- Maier, James H. (1982). B.A., 1969, *Amherst College*; M.D., 1973, *Tufts University*. Clinical Assistant Professor of Psychiatry.
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- Malghani, Mohammad S. (1991). B.Sc., 1972; M.Sc., 1974, *University of Baluchistan*; M.Sc., 1983, *University of New Brunswick*; Ph.D., 1991, *University of Vermont*. Lecturer in Physics.
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- Malone-Rising, Dorothy (1995). B.S.N., 1976, *Boston College*; M.S., 1988, *University of Lowell*. Clinical Instructor in Medicine.
- Malseptic, Ronald G. (1989). B.A., 1969, *Boston University*; M.D., 1975, *Universita Degli Studi Di Roma*. Clinical Assistant Professor of Medicine.
- Mamolen, Margaret (1993). B.A., 1978, *University of California, Santa Cruz*; M.D., 1983, *University of California, San Francisco*. Clinical Assistant Professor of Family Practice.
- Manchel, Frank. (1967). A.B., 1957, *Ohio State University*; M.A., 1960, *City University of New York, Hunter College*; Ed.D., 1966, *Columbia University*. Professor of English.
- Mangiulli, Joan L. (1988). B.A., 1976, *University of Maine*; M.S., 1980, *University of Illinois*. Adjunct Instructor in Communication Sciences.
- Manley, Don L. (1991). B.S., 1952, *Pacific University*; M.A., 1954, *University of Oregon*. Lecturer in Physics.
- Mann, Jack P., Jr. (1980). B.A., 1973, *Kent State University*; M.D., 1976, *Ohio State University*. Clinical Assistant Professor of Pediatrics.
- Mann, Kenneth G. (1984). B.S., 1963, *Manhattan College*; Ph.D., 1967, *University of Iowa*. Professor of Biochemistry.
- Mann, Laura K. (1995). B.A., 1980, *Yale University*; M.S., 1984, *Pace University*; F.N.M., 1989, *Frontier School of Midwifery and Family Nursing*. Instructor in Family Practice.
- Mann, William E. (1974). B.A., 1962; A.M., 1964, *Stanford University*; Ph.D., 1971, *University of Minnesota*. Professor of Philosophy.
- Manning, Kathleen (1989). B.A., 1976, *Marist College*; E.D.S., 1978, *State University of New York, Albany*; M.S., 1985, *Emerson College*; Ph.D., 1990, *Indiana University*. Associate Professor of Integrated Professional Studies.
- Manning, Robert E. (1976). B.S., 1968, *Washington State University*; M.S., 1973; Ph.D., 1975, *Michigan State University*. Professor of Natural Resources.
- Manock, Jerrold C. (1995). B.S., 1966; M.S., 1968, *Stanford University*. Adjunct Instructor in Mechanical Engineering.
- Marcy, Theodore W. (1993). B.A., 1976, *Stanford University*; M.D., 1980, *Yale University*. Associate Professor of Pulmonary Medicine.
- Mardeusz, Patricia E. (1987). B.A., 1977; B.A., 1978, *University of Massachusetts*; M.S., 1987, *Simmons College*. Library Assistant Professor in Bailey/Howe Library.
- Marks, David A. (1988). B.A., 1978, *Providence College*; M.S., 1980; Ph.D., 1983, *Washington State University*. Clinical Assistant Professor of Psychiatry.
- Marschke, Charles H. (1972). B.A., 1966, *Hope College*. Lecturer in Radiologic Technology.
- Marsh, Marianne (1994). B.S., 1985, *University of California, Davis*; M.D., 1989, *University of Vermont*. Clinical Instructor in Psychiatry.
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- Martin, Jeffrey S. (1995). B.A., 1974; M.Ed., 1977, *University of Vermont*; Ph.D., 1986, *Kansas State University*. Lecturer in Integrated Professional Studies.
- Martin, Luther H., Jr. (1967). A.B., 1959, *Western Maryland College*; S.T.M., 1962; M.Div., 1963, *Drew University*; Ph.D., 1972, *Claremont Graduate School*. Professor of Religion.
- Martin, Pamela A. (1992). B.A., 1973, *Montclair State College*; M.A., 1990, *University of Vermont*. Lecturer in Education.
- Martin, Rebecca R. (1990). B.A., 1973, *University of California, Santa Cruz*; M.A., 1975, *San Jose State University*. Library Professor in Bailey/Howe Library and Assistant Professor of Public Administration.
- Martin, Thomas A., Jr. (1982). M.D., 1964, *Tufts University*. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Mason, Anne B. (1984). A.B., 1968, *Connecticut College*; Ph.D., 1979, *Boston University*. Research Associate Professor of Biochemistry.
- Massanari, David L. (1984). B.A., 1971, *Goshen College*; M.D., 1975, *University of Illinois*. Clinical Instructor in Family Practice.
- Mathiesen, Ellisiv B. (1993). M.D., 1981, *University of Tromsø*. Visiting Assistant Professor of Neurology.
- Mathis, William J. (1990). B.S., 1965; M.S., 1967, *University of Tennessee*; Ph.D., 1973, *University of Texas*. Adjunct Associate Professor of Education.
- Matthew, John D. (1982). B.S., 1967, *Clemson University*; M.D., 1971, *Vanderbilt University*. Clinical Assistant Professor of Family Practice.
- Mattia, Anthony R. (1994). B.S., 1981, *University of Miami*; M.D., 1985, *Tufts University*. Assistant Professor of Pathology.

- Maughan, David W. (1974). B.S., 1964, *Washington State University*; Ph.D., 1971, *University of Washington*. Research Professor of Molecular Physiology and Biophysics.
- Maura, Juan F. (1989). B.A., 1983, *University of Texas*; M.A., 1984; Ph.D., 1987, *University of New Mexico*. Associate Professor of Romance Languages.
- Mawe, Gary M. (1988). B.S., 1978, *Pennsylvania State University*; Ph.D., 1984, *Ohio State University*. Assistant Professor of Anatomy and Neurobiology.
- Maxwell, Robert A. (1962). A.B., 1951, *Syracuse University*; M.A., 1952; Ph.D., 1954, *Princeton University*. Visiting Professor of Pharmacology.
- Maxwell, William H. (1982). B.S., 1961, *Middlebury College*; M.D., 1966, *Boston University*. Clinical Assistant Professor of Surgery.
- May, Victor (1989). B.A., 1976, *Johns Hopkins University*; Ph.D., 1983, *Northwestern University*. Associate Professor of Anatomy and Neurobiology.
- Mayer, Melinda A. (1994). B.S., 1985, *University of Dayton*. Lecturer in Education.
- Mayer, Paul J. (1974). B.A., 1965, *Amherst College*; M.D., 1969, *University of Rochester*. Clinical Associate Professor of Medicine.
- Mazdzer, Edward J. (1994). B.A., 1975, *Williams College*; M.D., 1980, *State University of New York, Upstate Medical School*. Assistant Professor of Neurology.
- Mazur, John R. (1973). B.A., 1961, *University of Pennsylvania*; M.D., 1965, *Hahnemann Medical College*. Clinical Associate Professor of Obstetrics and Gynecology.
- Mazzoni, Cristina M. (1993). B.A., 1985, *University of California, San Diego*; M.P.H.I., 1989; Ph.D., 1991, *Yale University*. Assistant Professor of Romance Languages.
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- McArtor, Robert E. (1993). B.A., 1961; M.P.H., 1984, *University of Michigan*; M.D., 1965, *Duke University*. Professor of Family Practice.
- McBean, Judith H. (1991). B.A., 1981; M.D., 1987, *University of Vermont*. Assistant Professor of Obstetrics and Gynecology.
- McCann, B. Cairbre (1981). M.B.B.C., 1952, *National University of Ireland*. Professor of Orthopaedics and Rehabilitation.
- McCann, Eithne C. (1981). M.B.B.C., 1952, *National University of Ireland*. Associate Professor of Orthopaedics and Rehabilitation.
- McCann, Harold G. (1974). B.A., 1964, *Allegheny College*; M.A., 1966; Ph.D., 1974, *Princeton University*. Associate Professor of Sociology.
- McCann, William J. (1985). B.A., 1971, *Michigan State University*; M.A., 1979, *University of Northern Colorado*. Clinical Assistant Professor of Psychiatry.
- McCarthy, Edward A., Jr. (1980). M.D., 1971, *Tufts University*. Clinical Associate Professor of Psychiatry.
- McCarthy, Kathy A. (1981). Clinical Instructor in Radiologic Technology.
- McCauley, Rebecca J. (1986). B.S., 1973, *Louisiana State University*; M.A., 1974; Ph.D., 1981, *University of Chicago*. Associate Professor of Communication Sciences.
- McCay, Carole H. (1992). B.S.N., 1979, *Widener University*; M.S.N., 1983, *University of Pennsylvania*. Lecturer in Technical Nursing.
- McClellan, Nancy J. (1991). B.A., 1970, *Wheaton College*; B.S.N., 1980; M.P.H., 1971; M.S., 1985, *University of Minnesota*. Clinical Instructor in Obstetrics & Gynecology.
- McConaughy, Stephanie H. (1981). B.A., 1967, *University of Michigan*; Ph.D., 1980, *University of Vermont*. Research Associate Professor of Psychiatry.
- McCormack, John J., Jr. (1966). B.S., 1959, *Boston College*; Ph.D., 1964, *Yale University*. Professor of Pharmacology.
- McCraun, Donald J., Jr. (1980). B.A., 1963, *Yale University*; M.D., 1967, *Tufts University*. Clinical Associate Professor of Obstetrics and Gynecology.
- McCrane, Elaine D. (1985). B.A., 1978, *Ohio State University*; Ph.D., 1985, *University of Massachusetts*. Associate Professor of Economics.
- McDay, John B. (1980). B.S., 1972, *Drexel University*; M.D., 1976, *Temple University*. Assistant Professor of Radiology.
- McDonald, Iris S. (1989). B.S., 1964, *University of Vermont*; M.S., 1982, *Russell Sage College*. Adjunct Assistant Professor of Professional Nursing.
- McDonald, Jill A. (1992). B.A., 1976, *Hampshire College*; M.S.P.H., 1982; Ph.D., 1986, *University of Washington*. Research Assistant Professor of Statistics.
- McDowell, Kimberley G. (1993). B.A., 1989, *Boston College*; M.A., 1992, *Columbia University*. Lecturer in Mathematics and Statistics.
- McEachen, Ronald W. (1985). A.S., 1966, *Mitchell College*; B.S., 1968, *West Virginia University*; M.S., 1973, *West Chester University*. Lecturer in Education.
- McElvany, Norman D. (1991). B.A., 1968, *Allegheny College*; M.B.A., 1973, *University of Nebraska, Lincoln*. Lecturer in Community Development and Applied Economics.
- McElwain, Lorraine L. (1993). B.A., 1985; M.D., 1989, *University of Vermont*. Clinical Instructor in Pediatrics.
- McEvoy, Thomas J. (1981). B.S., 1975, *Michigan University*; M.S., 1978, *Virginia Polytechnic Institute and State University*. Extension Associate Professor of Natural Resources.
- McFarlane, William R. (1992). B.A., 1965, *Earlham College*; M.D., 1970, *Columbia University*. Professor of Psychiatry.
- McFaul, Richard C. (1980). B.S., 1966, *Iowa Wesleyan College*; M.D., 1970, *University of Illinois*. Clinical Associate Professor of Pediatrics.
- McFeeters, Donald J. (1963). B.S., 1963, *University of Vermont*; M.S., 1968, *Michigan State University*; Ph.D., 1986, *University of Vermont*. Extension Professor in Extension Service.
- McGettigan, Marie C. (1993). B.A., 1975, *Fordham University*; M.A., 1978, *Medical College of Virginia*; M.D., 1986, *Jefferson Medical College*. Clinical Assistant Professor of Pediatrics.
- McGovern, Lisa M. (1993). A.S., 1991, *University of Vermont*. Clinical Instructor in Radiologic Technology.
- McGowan, Julie J. (1991). A.B., 1969, *Randolph-Macon Woman's College*; M.L.S., 1970, *University of Maryland*; M.A., 1981; Ph.D., 1991, *University of South Carolina*. Library Professor in Dana Medical Library.
- McGrath, Helen M. (1989). B.S., 1966; M.S., 1967, *University of California, San Francisco*; Ph.D., 1977, *Union Graduate School*. Professor of Professional Nursing.
- McGrory-Klyza, Sheila (1991). B.A., 1986, *Wake Forest University*; M.A., 1988, *College of William and Mary*. Lecturer in English.
- McGuire, Stuart W. (1990). B.S., 1954, *Ohio State University*; M.D., 1962, *University of Michigan*. Clinical Associate Professor of Surgery.
- McIntosh, Alan W. (1985). B.S., 1966; M.S., 1968, *University of Illinois*; Ph.D., 1972, *Michigan State University*. Professor of Natural Resources.
- McIntosh, Barbara R. (1984). B.S., 1968, *University of Illinois*; M.I.J.R., 1972, *Michigan State University*; Ph.D., 1979, *Purdue University*. Associate Professor of Business Administration.
- McIntyre, Lynda R. (1978). B.F.A., 1970; M.Ed., 1972; Ed.D., 1975, *University of Massachusetts*. Associate Professor of Art and Education.
- McIsaac, Mary L. (1994). B.A., 1984; M.A., 1988, *University of Vermont*; Ph.D., 1994, *Yale University*. Assistant Professor of History.
- McKechnie, Jeffrey R. (1980). D.M.D., 1973, *University of Pennsylvania*. Instructor in Dental Hygiene.



- McKenna, Carol A. (1990). B.A., 1983, *University of Rhode Island*; Ph.D., 1989, *University of Vermont*. Clinical Assistant Professor of Psychiatry and Psychology.
- McKenna, Kevin J. (1984). B.A., 1970, *Oaklahoma State University*; M.A., 1971; Ph.D., 1977, *University of Colorado*. Associate Professor of Russian.
- McKeon, Barbara J. (1984). B.A., 1979, *Rutgers University*; M.S., 1982, *University of Vermont*. Adjunct Instructor in Communication Sciences.
- McLean, Allan C. (1981). B.A., 1970, *Dartmouth College*; M.D., 1977, *University of Vermont*. Clinical Assistant Professor of Obstetrics and Gynecology.
- McMains, William D. (1992). B.A., 1967, *Oklahoma City University*; M.D., 1971, *University of Oklahoma*. Clinical Professor of Psychiatry.
- McMaster, William J. (1989). A.S., 1974, *Springfield Technical Community College*; B.S., 1977, *University of Massachusetts*; M.Ed., 1979, *Springfield College*. Extension Assistant Professor in Extension Service.
- McNeil, George N. (1980). B.A., 1967, *Amherst College*; M.D., 1971, *Columbia University*. Clinical Associate Professor of Psychiatry and Family Practice.
- McNeil, James M. (1995). B.S., 1982, *University of Vermont*. Adjunct Instructor in Education.
- McSherry, Joseph W. (1977). B.A., 1965, *Harvard University*; M.D., 1971; Ph.D., 1971, *Baylor College of Medicine*. Associate Professor of Neurology.
- McVety, Donna J. (1990). B.N., 1964, *University of Manitoba*; M.S., 1969, *University of Wisconsin, Madison*; Ph.D., 1989, *Walden University*. Research Assistant Professor of Family Practice.
- Mead, Philip B. (1971). A.B., 1959, *Hamilton College*; M.D., 1963, *Cornell University*. Clinical Professor of Obstetrics and Gynecology.
- Meals, Donald W., Jr. (1991). B.A., 1972, *Dartmouth College*; M.S., 1977, *University of Vermont*. Research Associate in Natural Resources.
- Medd, William L. (1993). B.S., 1964, *Westeyn University*; M.D., 1968, *University of Rochester*. Clinical Associate Professor of Medicine.
- Meeker, C. Irving (1980). B.A., 1950, *Middlebury College*; M.D., 1954, *Cornell University*. Professor of Obstetrics and Gynecology.
- Megathlin, Keith N. (1980). B.A., 1964; M.S., 1966, *Middlebury College*; M.D., 1970, *University of Vermont*. Clinical Associate Professor of Pediatrics and Clinical Instructor in Medicine.
- Mehalic, Thomas F. (1982). B.A., 1963, *Saint Vincent College*; M.D., 1967, *Georgetown University*. Clinical Assistant Professor of Surgery.
- Mehl, Lewis E. (1993). B.A., 1972, *Indiana University*; M.D., 1975, *Stanford University*; Ph.D., 1980, *Psychology Studies Institute*. Research Assistant Professor of Psychiatry.
- Mehrtens, Charlotte J. (1981). B.A., 1974, *State University of New York, Plattsburgh*; M.S., 1976; Ph.D., 1979, *University of Chicago*. Associate Professor of Geology.
- Mekkelsen, Jane E. (1987). B.S., 1973, *University of Vermont*; M.S., 1974, *Syracuse University*; C.A.S., 1984, *University of Vermont*. Lecturer in Education.
- Melamede, Robert J. (1988). B.A., 1969; M.A., 1972; Ph.D., 1980, *City University of New York, Lehman*. Research Assistant Professor of Microbiology and Molecular Genetics.
- Melvin, Christina S. (1992). B.S., 1974, *University of Vermont*; M.S., 1979, *Boston College*. Lecturer in Professional Nursing.
- Mercier, Charles E. (1992). B.S., 1981, *Tufts University*; M.D., 1985, *University of Connecticut*. Assistant Professor of Pediatrics.
- Mercier, Susan M. (1974). A.S., 1971; B.S., 1974; M.Ed., 1977, *University of Vermont*. Clinical Associate Professor of Dental Hygiene.
- Messier, Randall S. (1991). B.S., 1986, *University of Vermont*. Clinical Instructor in Medical Technology.
- Metcalfe, Marion E. (1966). A.R.C.M., 1952, *Royal Conservatory of Music*; B.A., 1958, *University of Toronto*. Lecturer in Music.
- Metcalfe, William C. (1963). B.A., 1958, *University of Toronto*; M.A., 1959; Ph.D., 1967, *University of Minnesota*. Professor of History.
- Meyer, Diane H. (1985). B.A., 1958, *Russell Sage College*; Ph.D., 1972, *University of Vermont*. Research Assistant Professor of Microbiology and Molecular Genetics.
- Meyer, Marjorie C. (1988). B.A., 1980, *Wesleyan College*; M.D., 1984, *University of Florida*. Assistant Professor of Obstetrics and Gynecology.
- Meyer, William L. (1962). B.S., 1956, *Yale University*; Ph.D., 1962, *University of Washington*. Professor of Biochemistry.
- Meyers, Herman W. (1971). A.B., 1965, *Montclair State College*; M.A., 1968; Ph.D., 1971, *University of Connecticut*. Associate Professor of Education.
- Michl, Keith W. (1993). A.B., 1977, *Middlebury College*; M.D., 1981, *University of Cincinnati*. Clinical Assistant Professor of Medicine.
- Mickey, Ruth M. (1984). B.S., 1976, *University of California, Davis*; M.S.Ph., 1978; Ph.D., 1983, *University of California, Los Angeles*. Associate Professor of Statistics.
- Mieder, Wolfgang (1971). B.A., 1966, *Olivet College*; M.A., 1967, *University of Michigan*; Ph.D., 1970, *Michigan State University*. Professor of German.
- Mierse, William E. (1988). B.A., 1976, *University of California, Berkeley*; M.A., 1983; Ph.D., 1987, *Brown University*. Associate Professor of Art and Classics.
- Milder, Daniel C. (1993). B.A., 1981, *Cleveland State University*; M.A., 1986, *University of Michigan*. Lecturer in Political Science.
- Milhou, Raymond L. (1968). B.A., 1957, *Lafayette College*; M.D., 1961, *University of Pennsylvania*. Professor of Orthopaedics and Rehabilitation.
- Millay, Donna J. (1989). B.A., 1977, *University of Maine, Orono*; M.D., 1981, *Medical College of Virginia*. Assistant Professor of Otolaryngology.
- Millay, Robert H. (1989). B.S., 1976, *University of Maine*; M.D., 1980, *Medical College of Virginia*. Assistant Professor of Ophthalmology.
- Miller, Albert A. (1987). B.A., 1968, *Williams College*; M.D., 1972, *University of Vermont*. Clinical Instructor in Medicine.
- Miller, Buell A. (1980). B.S., 1955, *Lehigh University*; M.D., 1962, *University of Pennsylvania*. Clinical Professor of Obstetrics and Gynecology.
- Miller, Carol T. (1979). B.A., 1975; M.S., 1977; Ph.D., 1979, *Purdue University*. Associate Professor of Psychology.
- Miller, Denise M. (1989). B.A., 1977; M.S., 1982, *University of New Hampshire*; M.D., 1983, *Tufts University*. Clinical Instructor in Pediatrics.
- Miller, Donald B., Jr. (1976). B.A., 1966; M.D., 1972, *University of Vermont*. Clinical Assistant Professor of Family Practice.
- Miller, Frederick S. (1987). A.B., 1968, *Harvard University*; M.D., 1976, *Case Western Reserve University*. Clinical Assistant Professor of Ophthalmology.
- Miller, J. Daniel (1980). B.A., 1964, *Denison University*; M.D., 1968, *Wayne State University*. Clinical Associate Professor of Pediatrics.
- Miller, Marc L. (1984). A.B., 1973, *Cornell University*; M.D., 1977, *University of Pennsylvania*. Clinical Assistant Professor of Medicine.
- Miller, Willard M. (1969). B.A., 1966; M.A., 1968; Ph.D., 1969, *University of Illinois*. Assistant Professor of Philosophy.
- Milne, James R. (1978). B.A., 1965; M.D., 1969, *University of Vermont*. Clinical Instructor in Pediatrics.



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- Mindell, Howard J. (1967). M.D., 1962, *University of Illinois*. Professor of Radiology.
- Mintz, Beth (1977). B.A., 1970, *City College of New York*; M.A., 1975; Ph.D., 1977, *State University of New York, Stony Brook*. Professor of Sociology.
- Mirchandani, Gagan S. (1968). B.Sc., 1953, *North Wadia College*; B.S., 1958, *Worcester Polytechnic Institute*; M.S., 1960, *Syracuse University*; Ph.D., 1968, *Cornell University*. Professor of Electrical Engineering.
- Misselbeck, Wayne J. (1988). A.B., 1979, *Franklin and Marshall College*; M.D., 1983, *Hahnemann University*. Associate Professor of Surgery.
- Mitchelides, John (1995). B.A., 1968, *University of Vermont*. Adjunct Instructor in Education.
- Mitchell, Charles H. (1994). A.B., 1979, *Dartmouth College*; M.D., 1984, *East Tennessee State University*. Clinical Instructor in Psychiatry.
- Mitchell, John J. (1987). B.A., 1972; B.S., 1972, *University of Hartford*; Ph.D., 1979, *University of Connecticut*. Research Assistant Professor of Molecular Physiology and Biophysics and Assistant Professor of Biology.
- Mitchell, Joyce A. (1993). B.S., 1983, *University of Texas*. Clinical Assistant Professor of Orthopaedic Rehabilitation.
- Mitchell, William E. (1965). B.A., 1950, *Wichita State University*; M.A., 1954; M.A., 1957; Ph.D., 1969, *Columbia University*. Professor of Anthropology.
- Moats, Louisa C. (1991). B.A., 1966, *Wellesley College*; M.A., 1969, *Peabody College*; Ed.D., 1982, *Harvard University*. Adjunct Assistant Professor of Communication Sciences.
- Modereger, Jeffrey R. (1993). B.F.A., 1971, *Augustana College*; M.F.A., 1975, *University of Utah*. Assistant Professor of Theatre.
- Moehring, Joan M. (1973). B.S., 1961, *Syracuse University*; M.S., 1963; Ph.D., 1965, *Rutgers University*. Research Professor of Microbiology and Molecular Genetics.
- Moehring, Thomas J. (1968). B.S., 1961, *Fairleigh Dickinson University*; M.S., 1963; Ph.D., 1965, *Rutgers University*. Professor of Microbiology and Molecular Genetics.
- Mohler, Beth A. (1982). B.S., 1969, *Mansfield State College*; M.Ed., 1973, *Pennsylvania State University*; Ed.D., 1990, *University of Vermont*. Lecturer in Education.
- Molin, Melinda R. (1992). M.D., 1980, *University of Pennsylvania*. Clinical Assistant Professor of Surgery.
- Molind, Samuel E. (1972). B.S., 1962, *Springfield College*; D.M.D., 1966, *University of Pennsylvania*. Clinical Assistant Professor of Oral Surgery and Instructor in Dental Hygiene.
- Moller, Kenneth (1982). B.A., 1969, *Harvard University*; B.M.S., 1971, *Dartmouth College*; M.D., 1974, *University of Washington*. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Molofsky, Jane (1995). B.S., 1983, *Cornell University*; M.S., 1988, *University of Illinois*; Ph.D., 1993, *Duke University*. Assistant Professor of Botany.
- Moloney, John F. (1988). B.A., 1980, *Dartmouth College*; M.D., 1985, *University of Massachusetts*. Clinical Assistant Professor of Medicine.
- Monahan, John D., Jr. (1986). B.S., 1970, *U.S. Air Force Academy*; J.D., 1980, *University of Maine*. Lecturer in Business Administration.
- Mongeon, Maurice E. (1964). B.S., 1954, *Saint Michael's College*; M.D., 1959, *University of Vermont*. Clinical Assistant Professor of Medicine.
- Mousey, Robert D. (1992). B.A., 1982, *Princeton University*; M.D., 1986, *University of Washington*. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Montegut, Alain J. (1991). B.A., 1973, *Ohio Wesleyan University*; M.D., 1977, *University of California, Los Angeles*. Clinical Assistant Professor of Family Practice.
- Mooney, Thomas G. (1994). B.S., 1983, *University of Michigan*; M.D., 1991, *Rush Medical College*. Clinical Instructor in Medicine.
- Moore, Marleen M. (1989). M.S., 1979, *University of Colorado*. Assistant Professor of Radiology.
- Moore, Molly F. (1976). M.A., 1965, *University of Connecticut*. Lecturer in English.
- More, Thomas A. (1987). B.S., 1968; M.S., 1970, *University of Massachusetts*; Ph.D., 1973, *University of Michigan*. Adjunct Associate Professor of Natural Resources.
- Moretti, Gino (1995). Ph.D., 1939, *University of Torino*. Adjunct Professor of Mathematics.
- Morency, David C. (1973). B.S., 1961, *U.S. Naval Academy*; M.A., 1971, *University of Cincinnati*. Lecturer in Mathematics.
- Morgan, Chris L. (1981). B.S., 1975, *University of Vermont*. Clinical Instructor in Medical Technology.
- Morgan, Patricia L. (1988). B.A., 1974, *Alfred University*; M.S.Ed., 1982, *University of Vermont*. Lecturer in Education.
- Morley, Patricia B. (1994). A.S., 1976, *University of Vermont*. Clinical Instructor in Radiologic Technology.
- Moroz, Kathleen J. (1991). B.A., 1971, *University of Tennessee*; M.S.W., 1976, *University of Arkansas*; D.S.W., 1982, *University of Utah*. Assistant Professor of Social Work.
- Morrell, Marcia M. (1995). B.A., 1970, *Elmira College*. Adjunct Instructor in Education.
- Morrison, Scott W. (1992). B.S., 1982, *Wichita State University*; Ph.D., 1987, *University of Wisconsin*. Assistant Professor of Biochemistry.
- Morris, Christopher S. (1991). B.A., 1981, *Ohio Wesleyan University*; M.S., 1990, *Ohio State University*; M.D., 1985, *Case Western Reserve University*. Assistant Professor of Radiology.
- Morris, Jonathan E. (1987). B.S., 1978, *Stanford University*; M.D., 1982; M.Ph., 1987, *University of North Carolina*. Clinical Associate Professor of Psychiatry.
- Morris, Joyce L. (1993). B.S., 1966, *City University of New York*; M.A., 1970, *New York University*. Lecturer in Education.
- Morrisseau, Paul M. (1970). B.A., 1960; M.D., 1964, *University of Vermont*. Associate Professor of Urology.
- Morrison, Camellia M. (1994). B.S.W., 1983, *Loma Linda University*; M.S.W., 1986, *University of Southern California*. Lecturer in Social Work.
- Morrow, Doreen L. (1984). B.A., 1975, *University of Pennsylvania*; M.D., 1979, *Pennsylvania State University*. Clinical Assistant Professor of Pediatrics.
- Morrow, Paul L. (1981). B.A., 1971, *Haverford College*; M.D., 1976, *University of Vermont*. Clinical Associate Professor of Pathology.
- Morse, Mary O. (1981). B.S., 1956, *Simmons College*; M.D., 1961, *Tufts University*. Clinical Assistant Professor of Medicine.
- Morse, Robert L. (1985). A.B., 1955, *Dartmouth College*; M.D., 1958, *Harvard University*. Clinical Assistant Professor of Medicine.
- Morton, George L. (1988). B.A., 1964, *University of Maine*; M.D., 1968, *McGill University*. Clinical Assistant Professor of Medicine.
- Morton, Jeremy R. (1982). A.B., 1957, *Princeton University*; M.D., 1961, *Johns Hopkins University*; Clinical Assistant Professor of Surgery.
- Moseley, Thomas A., III (1983). A.B., 1968; M.Sc., 1975, *Harvard University*; M.D., 1979, *University of Vermont*. Clinical Instructor in Pediatrics.
- Mosenthal, James H. (1990). B.A., 1971, *Cornell University*; M.A., 1974, *Columbia Teachers College*; M.A., 1976, *University of Arizona*; Ph.D., 1983, *University of Illinois*. Assistant Professor of Education.
- Moses, Peter L. (1995). B.A., 1981, *Lake Forest College*; M.D., 1990, *Case Western Reserve University*. Assistant Professor of Medicine.

- Mossman, Brooke T. (1975). B.A., 1968; M.S., 1970; Ph.D., 1977, *University of Vermont*. Professor of Pathology.
- Mount, Sharon L. (1994). B.A., 1980, *Princeton University*; M.D., 1988, *University of Texas*. Assistant Professor of Pathology.
- Moyser, George H. (1987). B.A., 1966, *University of Manchester*; M.A., 1968, *University of Essex*; M.A., 1972; Ph.D., 1976, *University of Michigan*. Professor of Political Science.
- Mroz, Ingrid B. (1994). B.S., 1979, *University of Maine*; M.S., 1992, *University of Vermont*. Adjunct Assistant Professor of Professional Nursing.
- Mueller, Patricia H. (1988). M.Ed., 1981; C.A.S., 1987, *University of Vermont*. Lecturer in Education.
- Muhr, Diane I. (1982). B.S., 1975, *Ohio University*; M.S., 1976, *University of New Mexico*; M.Ed., 1981, *University of Vermont*. Adjunct Instructor in Communication Sciences.
- Mulieri, Louis A. (1975). B.E.E., 1958, *Brooklyn Polytechnic Institute of New York*; Ph.D., 1968, *University of Vermont*. Research Associate Professor of Molecular Physiology and Biophysics.
- Mulligan, Moira A. (1989). M.S., 1986, *University of Vermont*. Adjunct Instructor in Communication Sciences.
- Mullin, Lenore M. (1990). B.S., 1974, *State University of New York, Newpaltte*; M.S., 1978; Ph.D., 1988, *Syracuse University*. Adjunct Associate Professor of Computer Science.
- Munson, Richard G. (1990). S.B., 1968, *Massachusetts Institute of Technology*; M.S., 1971, *University of Nebraska*; B.M.S., 1973, *University of South Dakota*; M.D., 1975, *State University of New York, Brooklyn*. Clinical Assistant Professor of Psychiatry.
- Murad, Joanne (1983). B.A., 1966, *Lake Erie College*. Lecturer in Romance Languages.
- Murad, Timothy (1971). B.A., 1966; Ph.D., 1975, *Rutgers University*. Associate Professor of Romance Languages.
- Murphy, Christine M. (1993). B.A., 1990; M.A., 1992, *University of Vermont*. Lecturer in Communication Sciences.
- Murphy, Francis V., Jr. (1995). B.A., 1972; M.Ed., 1973, *Boston College*. Adjunct Instructor in Education.
- Murphy, William M. (1979). B.S., 1965; M.S., 1969; Ph.D., 1972, *University of Wisconsin*. Professor of Plant and Soil Science.
- Murray, Barbara L. (1968). B.S., 1962, *Boston University*; M.S., 1967, *City College of New York, Hunter College*. Associate Professor of Professional Nursing.
- Murray, John J. (1968). A.B., 1958, *Boston College*; M.D., 1963, *University of Vermont*. Clinical Associate Professor of Pediatrics.
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- Musty, Richard E. (1968). B.A., 1966, *Carleton College*; M.A., 1965; Ph.D., 1968, *McGill University*. Professor of Psychology.
- Myers, John L. (1984). B.A., 1972, *Bowdoin College*; M.D., 1978, *Duke University*. Clinical Instructor in Medicine.
- Myott, Lawrence B. (1975). B.S., 1968; M.E.E., 1992, *University of Vermont*. Extension Assistant Professor in Extension Service.
- Mzamane, Mbulelo V. (1990). B.A., 1971; M.A., 1976, *University of Botswana*; Ph.D., 1984, *University of Sheffield*. Associate Professor of English.
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- Nadeau, Daniel A. (1991). B.A., *University of Maine, Fort Kent*; M.S., 1984; M.D., 1988, *Tufts University*. Clinical Instructor in Medicine.
- Najarian, Kenneth E. (1985). B.S., 1976, *Saint Lawrence University*; M.D., 1980, *University of Vermont*. Associate Professor of Radiology.
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- Nathan, Muriel H. (1990). B.S., 1972; M.S., 1974, *University of Michigan*; M.D., 1984, *Michigan State University*; Ph.D., 1979, *University of Michigan*. Assistant Professor of Medicine.
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- Naylor, Robert M. (1991). B.A., 1963, *University of North Texas*; M.D., 1967, *University of Texas*. Associate Professor of Radiology.
- Naylor, Thomas H. (1994). B.S., 1958, *Millsaps College*; B.S., 1959, *Columbia University*; M.B.A., 1961, *Indiana University*; Ph.D., 1964, *Tulane University*. Lecturer in Business Administration.
- Neal, Patrick A. (1988). B.A., 1977, *West Virginia University*; M.A., 1978, Ph.D., 1985, *University of Toronto*. Associate Professor of Political Science.
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- Nelson, Eliot W. (1991). A.B., 1974, *Harvard University*; M.D., 1979, *Stanford University*. Associate Professor of Pediatrics.
- Nelson, Garrison (1958). A.B., 1964, *Boston University*; M.A., 1966; Ph.D., 1973, *University of Iowa*. Professor of Political Science.
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- Nelson, Mark T. (1986). B.A., 1976, *Tufts University*; Ph.D., 1980, *Washington University*. Professor of Pharmacology and Molecular Physiology and Biophysics.
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- Nichols, Claude E. (1985). B.Sc., 1975, *Brown University*; M.D., 1979, *Temple University*. Assistant Professor of *Orthopaedics and Rehabilitation*.
- Nichols, Eric C. (1977). B.A., 1970; M.Ed., 1975; C.A.S., 1980, *University of Vermont*; Ph.D., 1984, *Arizona State University*. Extension Associate Professor of *Integrated Professional Studies*.
- Nichols, James B. (1990). B.S., 1961, *University of Alabama*; M.S., 1979, *Michigan State University*; D.V.M., 1973, *Auburn University*. Associate Professor of *Animal and Food Sciences*.
- Nicklas, Janice A. (1986). B.S., 1975, *California Institute of Technology*; M.A., 1977; Ph.D., 1981, *Princeton University*. Research Associate Professor of *Medicine and Instructor in Medicine*.
- Nishiyama, Ronald H. (1981). M.D., 1957, *University of Michigan*. Professor of *Pathology*.
- Nobles, Tsana W. (1994). B.A., 1992; M.S., 1994, *University of Vermont*. Lecturer in *Mathematics*.
- Noordewier, Thomas G. (1990). B.A., 1979; M.B.A., 1982; Ph.D., 1986, *University of Wisconsin*. Assistant Professor of *Business Administration*.
- Norford, Don P. (1990). B.S., 1955, *University of Illinois*; M.S., 1956; M.A., 1963; Ph.D., 1967, *Columbia University*. Lecturer in *English*.
- Norris, Constance K. (1992). M.Ed., 1986, *University of Vermont*. Lecturer in *Education*.
- Northup, Christiane L. (1980). B.A., 1971, *Case Western Reserve University*; M.D., 1975, *Dartmouth College*. Clinical Assistant Professor of *Obstetrics and Gynecology*.
- Nosek, Laura J. (1990). B.S.N., 1961, *Case Western Reserve University*; M.S.N., 1981; Ph.D., 1986, *Case Western Reserve University*. Adjunct Associate Professor of *Professional Nursing*.
- Novotny, Charles P. (1968). B.S., 1959, *Wisconsin State College*; Ph.D., 1965, *University of Pittsburgh*. Professor of *Microbiology and Molecular Genetics*.
- Nummink, Johannes C. (1993). B.A., 1975, *Indiana University*; M.D., 1980, *University of Vermont*. Clinical Assistant Professor of *Medicine*.
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- Oberding, Michael J. (1993). B.S., 1979, *Saint Vincent College*; M.D., 1985, *State University of New York, Syracuse*. Assistant Professor of *Anesthesiology*.
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- O'Brien, Roberta (1991). B.A., 1978, *University of Massachusetts*; M.D., 1988, *Hahnemann University*. Clinical Instructor in *Medicine*.
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- Oliver, Kami. (1974). B.A., 1960, *McGill University*; M.Ed., 1974, *University of Vermont*. Assistant Professor of *Education*.
- Olshan, Jerrold S. (1991). B.A., 1980; M.D., 1984, *University of Chicago*. Clinical Assistant Professor of *Pediatrics*.
- Olson, James P. (1969). B.S., 1962; M.A., 1966, *Tufts University*; Ph.D., 1969, *North Carolina State University*. Associate Professor of *Civil Engineering*.
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- Oppenlander, Joseph C. (1969). B.S.C.E., 1953, *Case Institute of Technology*; M.S.C.E., 1957, *Purdue University*; Ph.D., 1962, *University of Illinois*. Professor of *Civil Engineering*.
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- Orsky, Lee A., (1995). B.S., 1983, *University of Massachusetts*; M.A., 1987, *Northeastern University*. Clinical Instructor in *Family Practice*.
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- Osborne, Steven F. (1981). B.S., 1967; M.S., 1970, *Rutgers University*; M.D., 1974, *Boston University*. Clinical Assistant Professor of *Pediatrics*.
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- Owre, Edwin M. (1969). B.F.A., 1963; M.F.A., 1964, *Yale University*. Professor of *Art*.
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- Pacun, David E. (1991). B.A., 1983, *Swarthmore College*; M.A., 1988, *University of Chicago*. Lecturer in *Music*.
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- Palmer, Mary Ellen (1958). B.S., 1953, *University of Vermont*; M.S., 1958, *Boston University*. Associate Professor of *Professional Nursing*.

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- Park, David R. (1969). B.A., 1959, *Geneva College*; M.D., 1963, *University of Rochester*. Clinical Associate Professor of Medicine and Family Practice.
- Parke, Edward L. (1977). B.A., 1969, *Drew University*; M.B.A., 1972, *Pennsylvania State University*; Ph.D., 1976, *University of Massachusetts*. Associate Professor of Business Administration.
- Parker, Bruce L. (1965). B.A., 1955, *University of Maine*; M.S., 1962; Ph.D., 1965, *Cornell University*. Professor of Plant and Soil Science.
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- Parker, Paul A. (1981). B.S., 1970, *University of Richmond*; M.D., 1974, *Medical College of Virginia*. Clinical Assistant Professor of Medicine.
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- Parks, Dean E. (1993). Instructor in Military Studies.
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- Parrish, Donna L. (1991). B.S., 1974, *Southeast Missouri State University*; M.S., 1984, *Murray State University*; Ph.D., 1988, *Ohio State University*. Research Associate Professor of Natural Resources.
- Parshley, Alan O. (1983). B.A., 1977, *Olivet College*; M.M., 1981, *University of Wisconsin*. Lecturer in Music.
- Parsons, Chester F. (1985). A.A.S., 1970, *State University of New York, College of Technology and Agriculture*; B.S., 1972, *University of Vermont*. Extension Assistant Professor in Extension Service.
- Parsons, Rodney L. (1967). A.B., 1962, *Middlebury College*; Ph.D., 1965, *Stanford University*. Professor of Anatomy and Neurobiology and Molecular Physiology and Biophysics.
- Parsons, Willis G., III (1994). B.A., 1983, *Amherst College*; M.D., 1989, *Vanderbilt University*. Instructor in Medicine.
- Parsons-Reinhardt, Elizabeth. (1987). B.S., 1979, *Skidmore College*. Lecturer in Education.
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- Patt, Laurel A. (1993). A.S., 1982; B.S., 1983, *Northeastern University*. Clinical Associate Professor of Radiologic Technology.
- Patterson, Deborah M. (1993). B.A., 1973, *Trinity College*; M.E.D., 1987, *University of Vermont*. Lecturer in Education.
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- Patterson, Thomas F., Jr. (1973). B.A., 1967, *Middlebury College*; M.E.Ed., 1978, *University of Vermont*; Ph.D., 1984, *Indiana University*. Extension Associate Professor and Lecturer in Community Development and Applied Economics.
- Paulding, Stephen B. (1981). B.S., 1963, *Houghton College*; M.D., 1967, *Boston University*. Clinical Assistant Professor of Family Practice.
- Payne, Stephen R. (1988). B.A., 1977; M.A., 1978, *Tufts University*; M.D., 1983, *University of Vermont*. Clinical Assistant Professor of Surgery.
- Pederson, David S. (1988). A.B., 1976, *University of Chicago*; M.S., 1980, Ph.D., 1983, *University of Rochester*. Associate Professor of Microbiology and Molecular Genetics.
- Pellett, Norman E. (1967). B.S., 1958, *Iowa State University*; M.S., 1964; Ph.D., 1965, *University of Minnesota*. Professor of Plant and Soil Science.
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- Pendlebury, William W. (1984). A.B., 1972, *Brown University*; M.D., 1976, *University of Vermont*. Buttlers Professor of Pathology and Professor of Neurology.
- Pennings, Timothy J. (1995). B.S., 1979; M.S., 1981, *University of North Dakota*; Ph.D., 1987, *Iowa State University*. Visiting Associate Professor of Mathematics.
- Pennoyer, Douglas C. (1982). A.B., 1950, *Harvard University*; M.D., 1954, *Columbia University*. Clinical Associate Professor of Surgery.
- Pereboon, Derk. (1985). B.A., 1978, *Calvin College*; M.A., 1979, Ph.D., 1985, *University of California, Los Angeles*. Associate Professor of Philosophy.
- Perkins, Timothy D., (1991). B.A., 1984, *University of Vermont*. Research Assistant Professor of Botany.
- Pero, Barbara A. (1994). B.S., 1976; M.D., 1983, *University of Wisconsin, Madison*. Associate Professor of Anesthesiology.
- Perrault, Nancy L. (1993). B.S., 1978, *University of Connecticut*; M.S., 1992, *University of Vermont*. Lecturer in Technical Nursing.
- Perrine, Mervyn W. (1992). B.A., 1953, *University of Connecticut*; M.A., 1957; Ph.D., 1958, *Princeton University*. Research Professor of Psychiatry.
- Perry, Leonard P. (1981). B.S., 1977, *Auburn University*; M.S., 1979; Ph.D., 1981, *Cornell University*. Extension Associate Professor of Plant and Soil Science.
- Perry, Melissa J. (1992). B.A., 1988, *University of Vermont*; M.H.S., 1989; S.C.D., 1992, *Johns Hopkins University*. Research Assistant Professor and Lecturer in Psychology.
- Peters, Wayne E. (1978). B.S., 1957; M.D., 1961, *University of Iowa*. Clinical Instructor in Pediatrics.
- Peterson, James A. (1966). B.S., 1958; M.Ed., 1962, *South Dakota State University*; Ed.D., 1968, *Boston University*. Professor of Integrated Professional Studies.
- Peterson, Jon N. (1988). B.S., 1983, *Cornell University*; Ph.D., 1987, *Johns Hopkins University*. Research Assistant Professor of Molecular Physiology and Biophysics.
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- Petri, Carl B. (1994). B.S., 1976, *Western Illinois University*; M.D., 1979, *Stritch Loyola School of Medicine*. Clinical Assistant Professor of Surgery.

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- Petterson, Paul R. (1995). B.A., 1984, Saint Lawrence University; M.A., 1993, University of Massachusetts, Amherst. Lecturer in Political Science.
- Peyser, Janis M. (1976). B.S., 1972, Denison University; Ph.D., 1976, University of Vermont. Clinical Associate Professor of Psychology and Psychiatry.
- Pezzuti, Roger T. (1985). A.B., 1966, Dartmouth College; M.D., 1970, University of Pennsylvania. Clinical Associate Professor of Radiology.
- Philbin, Paul P. (1987). B.A., 1976, Colby College; M.S., 1978, Columbia University. Library Associate Professor in Bailey/Howe Library.
- Pierattini, Robert A. (1986). B.A., 1978, Washington and Jefferson College; M.D., 1982, Yale University. Associate Professor of Psychiatry.
- Pierce, Judith A. (1994). B.S., 1964, Columbia University; M.A., 1986, University of Vermont. Adjunct Assistant Professor of Integrated Professional Studies.
- Pierce, Mary S. (1993). B.A., 1975, University of Vermont; M.S.W., 1986, Boston University. Clinical Instructor in Family Practice.
- Piirak, Ene (1992). B.S., 1966, Syracuse University; M.S., 1972, Boston College; Ph.D., 1990, University of Vermont. Clinical Instructor in Family Practice.
- Pilcher, David B. (1969). B.A., 1956, Amherst College; M.D., 1961, University of Rochester. Professor of Surgery.
- Pinder, George F. (1989). B.Sc., 1965, University of Western Ontario; Ph.D., 1968, University of Illinois. Professor of Civil and Environmental Engineering and Mathematics.
- Pinette, Michael G. (1990). A.B., 1979, Bowdoin College; M.D., 1982, Dartmouth College. Assistant Professor of Obstetrics and Gynecology.
- Pinette, Sheila M. (1993). B.A., 1980, University of New Hampshire; B.S., 1983, George Washington University. Instructor in Obstetrics and Gynecology.
- Pintauro, Stephen J. (1981). B.S., 1974; M.S., 1978; Ph.D., 1981, University of Rhode Island. Associate Professor of Nutritional Sciences.
- Pinter, Nicholas (1993). B.A., 1986, Cornell University; M.S., 1988, Pennsylvania State University; Ph.D., 1992, University of California, Santa Barbara. Adjunct Professor of Geology.
- Pitcher, Mark A. (1990). B.A., 1983; M.D., 1987, University of Rochester. Assistant Professor of Medicine.
- Pittaway, Kathleen C. (1992). B.S., 1983, Keene State College; M.D., 1988, University of Vermont. Clinical Assistant Professor of Psychiatry.
- Plante, Dennis A. (1983). B.A., 1975; M.D., 1979, University of Vermont. Associate Professor of Medicine.
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- Podhajski, Blanche R. (1983). B.S., 1967, Boston University; M.S., 1969, University of Vermont; Ph.D., 1980, Northwestern University. Adjunct Instructor in Communication Sciences and Clinical Associate Professor of Neurology.
- Poger, Sidney B. (1962). A.B., 1957, Tufts University; M.A., 1959; Ph.D., 1965, Columbia University. Professor of English.
- Politis, Ioannis (1993). B.S., 1981, University of Athens; M.A., 1987; Ph.D., 1989, McGill University. Assistant Professor of Animal and Food Sciences.
- Polk, Janet E. (1981). B.M.U.S., 1975, University of Massachusetts; M.A., 1986, University of New Hampshire. Lecturer in Music.
- Pollard Jeffrey K. (1993). B.S.E., 1984, Duke University; M.D., 1988, Pennsylvania State University. Clinical Instructor in Obstetrics and Gynecology.
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- Popenoe, Ellen J. (1988). B.A., 1980, Bard College; M.A., 1982; Ph.D., 1984, California School of Professional Psychology. Clinical Assistant Professor of Psychiatry.
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- Porter, Monica B. (1969). B.A., 1957, Sweet Briar College; M.E.E., 1976, University of Vermont. Extension Associate Professor in Extension Service.
- Posada, James A. (1993). B.S., 1985, Eastern Connecticut State University; Ph.D., 1989, University of Vermont. Research Assistant Professor of Molecular Physiology and Biophysics.
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- Powden, Charles O. (1981). A.S., 1974; B.S., 1976, University of Vermont. Clinical Instructor in Medical Technology.
- Power, Marjory W. (1974). B.S., 1965; Ph.D., 1975, Indiana University. Associate Professor of Anthropology.
- Powers, Patricia A. (1972). B.A., 1964, Beaver College; Ph.D., 1970, Hahnemann University. Associate Professor of Anatomy and Neurobiology.
- Prairie, John E. (1989). B.S., 1969, United States Naval Academy; M.S., 1978, University of Wyoming; M.D., 1982, Albany Medical College. Clinical Assistant Professor of Surgery.
- Prelock, Patricia A. (1994). B.S., 1976; M.A., 1977, Kent State University; Ph.D., 1983, University of Pittsburgh. Research Associate Professor of Communication Sciences.
- Prince, Richard N. (1995). B.A., 1970; M.Ed., 1977, University of Vermont. Adjunct Instructor in Education.
- Pringle, James O. (1982). B.S., 1960, Pennsylvania State University; M.D., 1970, Case Western Reserve University. Clinical Assistant Professor of Surgery.
- Pringle, Jane P. (1981). B.A., 1967, Denison University; M.D., 1971, Case Western Reserve University. Clinical Instructor in Medicine.
- Pritchett, Elizabeth F. (1995). B.A., 1969, Middlebury College; M.S., 1992, University of Vermont. Lecturer in History.
- Proulx, Raymond J. (1990). B.S., 1965, Johnson State College; M.A., 1969, Saint Michael's College; E.Ed., 1987, University of Vermont. Adjunct Associate Professor of Education.
- Prue, Jennifer F. (1993). B.A., 1989, University of Vermont; M.A., 1992, Saint Michael's College. Lecturer in Education.
- Pruesse, Gara (1993). B.S.C., 1988, University of Victoria; M.S.C., 1990; Ph.D., 1993, University of Toronto. Assistant Professor of Mathematics and Computer Science.
- Pryzant, Rodger M. (1993). B.A., 1983, Duke University; M.D., 1987, Baylor college of Medicine. Clinical Assistant Professor of Radiology.
- Pugh, Ann D. (1985). B.S., 1974, Union College; M.S.W., 1975, Washington University. Lecturer in Social Work.
- Punia, David T. (1977). B.S.E.E., 1976; M.S.E.E., 1992, University of Vermont. Lecturer in Electrical Engineering.
- Purchase, David M. (1986). A.S., 1981; B.A., 1971, University of Vermont. Clinical Instructor in Medical Technology.

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- Purnal, Andrei, A. (1990). M.S., 1978; Ph.D., 1984, *Moscow State University*. Research Associate in Microbiology and Molecular Genetics.
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- Raessler, Kenneth L. (1993). B.A., 1964, *Fresno State University*; M.D., 1968, *Loma Linda University*. Professor of Anesthesiology.
- Rahelich, Donald (1988). B.A., 1966, *Drury College*; M.Div., 1970, *Andover Newton Theological School*; M.S.W., 1973, *Boston University*. Clinical Instructor in Psychiatry.
- Rainville, Anne M. (1993). B.A., 1982, *University of Maine, Orono*; M.D., 1986, *University of Vermont*. Clinical Instructor in Obstetrics and Gynecology.
- Ralston, Matthew D. (1989). B.A., 1977, *Dartmouth College*; M.D., 1982, *Duke University*. Clinical Assistant Professor of Radiology.
- Ramagopal, Krishnamurthy (1992). B.A., 1977; M.A., 1979, *University of Madras*; M.A., 1987; M.Phil., 1989, Ph.D., 1991, *Indiana University*. Assistant Professor of Business Administration.
- Ramsay, Allan M. (1980). M.D., 1973, *Emory University*. Associate Professor of Family Practice and Medicine.
- Rand, Peter W. (1981). A.B., 1951; M.D., 1955, *Harvard University*. Assistant Professor of Medicine.
- Rankin, Jerry D. (1994). B.A., 1961, *Drew University*; M.D., 1965, *New York University*. Clinical Assistant Professor of Surgery.
- Rankin, Joanna M. (1980). B.S., 1965, *Southern Methodist University*; M.S., 1966, *Tulane University*; Ph.D., 1970, *University of Iowa*. Professor of Physics.
- Raper, Carlene A. (1983). B.S., 1946; M.S., 1948, *University of Chicago*; Ph.D., 1977, *Harvard University*. Research Associate Professor of Microbiology and Molecular Genetics.
- Rathbone, Charles (1970). M.A., 1965; Ph.D., 1970, *Syracuse University*. Associate Professor of Education.
- Rathmell, James P. (1993). B.S., 1982, *Pennsylvania State University*; M.S., 1984; M.D., 1988, *Wake Forest University*. Assistant Professor of Anesthesiology.
- Ratkovits, Bela L. (1974). M.D., 1962, *University of Chicago*. Associate Professor of Radiology.
- Ratkus, Victor L. (1976). D.D.S., 1967, *University of Michigan*. Clinical Instructor in Oral Surgery.
- Ray, Ferris S. (1982). B.A., 1950, *University of Maine*; M.D., 1954, *Tufts University*. Clinical Professor of Surgery.
- Razza, Mary L. (1992). B.A., 1974, *University of Massachusetts, Amherst*; M.Ed., 1982, *University of Massachusetts, Boston*. Lecturer in Education.
- Read, Evelyn R. (1969). B.M., 1963; M.M., 1964, *Peabody Conservatory*. Lecturer in Music.
- Read, Frank W. (1991). B.A., 1959, *Williams College*; M.D., 1963, *Tufts University*. Clinical Associate Professor of Surgery.
- Read, Helen P. (1988). B.A., 1984; M.S., 1988, *University of Vermont*. Lecturer in Mathematics.
- Read, Thomas L. (1967). B.M., 1960, *Oberlin Conservatory*; M.M., 1962, *New England Conservatory*; D.M.A., 1971, *Peabody Conservatory*. Professor of Music.
- Reardon, Debra R. (1990). A.S., 1979; B.S., 1981, *University of Vermont*. Clinical Instructor in Medical Technology.
- Reardon, Mildred A. (1971). B.A., 1963, *Northeastern University*; M.D., 1967, *University of Vermont*. Clinical Professor of Medicine.
- Rech, Susan A. (1992). B.A., 1979, *Swarthmore College*; M.D., 1984, *New Jersey Medical School*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Record, Duane C. (1978). B.A., 1965, *Colby College*; M.D., 1969, *University of Vermont*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Reed, Brian V. (1982). B.A., 1972; B.S., 1974, *University of Vermont*; Ph.D., 1985, *Temple University*. Associate Professor of Physical Therapy.
- Reed, J., Patrick. (1973). B.A., 1969, *University of Rochester*; M.S., 1975, *University of Vermont*. Associate Professor of Medical Technology.
- Reed, Richard R. (1969). M.S., 1967, *University of Buffalo*; D.D.S., 1963, *McGill University*. Clinical Assistant Professor of Oral Surgery and Instructor in Dental Hygiene.
- Reese, Jeffrey C. (1993). B.A., 1979, *Washington University*; M.D., 1983, *Saint Louis University*. Assistant Professor of Surgery.
- Reeves, John R.T. (1994). B.A., 1965; M.D., 1968, *George Washington University*. Professor of Medicine.
- Reid, Laura J. (1994). B.S., 1984; M.D., 1989, *State University of New York, Stony Brook*. Assistant Professor of Anesthesiology.
- Reid, Mark D. (1993). B.S.R.T., 1982, *Wayne State University*. Clinical Instructor in Radiologic Technology.
- Reid, Richard R. (1991). B.A., 1977, *Saint Michael's College*; M.Ed., 1980, *University of Massachusetts, Boston*; C.A.S., 1987, *University of Vermont*. Adjunct Professor of Education.
- Reidel, Carl H. (1972). B.S., 1958, *University of Minnesota*; M.P.A., 1964, *Harvard University*; Ph.D., 1969, *University of Minnesota*. Professor of Natural Resources and Environmental Studies.
- Reinhardt, Paul T. (1968). B.S.E., 1968, *State University of New York, Cortland*; M.S., 1975, *Springfield College*. Lecturer in Education.
- Reiss, Paul J. (1991). B.S., 1979, *Fordham University*; M.D., 1983, *University of Rochester*. Clinical Assistant Professor of Family Practice.
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- Relation, Stephen A. (1993). Clinical Instructor in Radiologic Technology.
- Renre, Songjie (1994). B.C., 1982, *Anhui University*; M.A., 1990; Ph.D., 1994, *University of Rochester*. Lecturer in Mathematics.
- Renfrew, Roger A. (1993). B.A., 1970, *Bowdoin College*; M.D., 1974, *University of Vermont*. Clinical Associate Professor of Medicine.
- Renstrom, Per A. (1988). M.D., 1972; M.D., 1977; Ph.D., 1981, *University of Goteborg*. Professor of Orthopaedics and Rehabilitation.
- Resi, Nancy I. (1992). A.D.N., 1973, *Castleton State College*; B.S.N., 1986, *Norwich University*; M.S.N., 1988, *Case Western Reserve University*. Adjunct Assistant Professor of Technical Nursing.

- Reynolds, Cynthia A. (1995). B.A., 1989, *University of Vermont*; B.A., 1991, *Trinity College*. Adjunct Instructor in Education.
- Reynolds, John R., Jr. (1994). B.S., 1987, *Boston College*; M.D., 1991, *University of Vermont*. Clinical Instructor in Medicine.
- Reynolds, Lynn A. (1992). B.S., 1981, *Michigan State University*; M.S., 1987; Ph.D., 1991, *University of Florida*. Clinical Assistant Professor of Pediatrics and Psychology.
- Ricci, Michael A. (1989). B.A., 1978, *Hamilton College*; M.D., 1982, *State University of New York, Upstate Medical Center*. Assistant Professor of Surgery.
- Rice, Tom W. (1983). B.A., 1979, *Iowa State University*; M.A., 1981; Ph.D., 1983, *University of Iowa*. Associate Professor of Political Science.
- Richards, Susan L. (1992). A.B., 1978, *Grove City College*; M.A., 1980, *Clarion University*; M.L.S., 1982, *Kent State University*. Library Associate Professor in Bailey/Howe Library.
- Richardson, Bruce A. (1993). B.A., 1963, *Johnson State College*; M.A., 1979, *University of New Hampshire, Keene*. Adjunct Assistant Professor of Education.
- Richardson, George M. (1973). B.S., 1967, *University of Notre Dame*; D.D.S., 1971, *Georgetown University*. Clinical Instructor in Oral Surgery.
- Richardson, Jean. (1978). B.S., 1965, *University of Newcastle, Tyne*; M.S., 1967; Ph.D., 1970, *University of Wisconsin, Madison*. Associate Professor of Natural Resources and Environmental Studies.
- Richel, Veronica C. (1969). B.S.L., 1961, *Georgetown University*; M.A., 1964; Ph.D., 1968, *Yale University*. Associate Professor of German.
- Riddick, Daniel H. (1985). A.B., 1963; M.D., 1967; Ph.D., 1967, *Duke University*. Professor of Obstetrics and Gynecology.
- Riechel, James W. (1983). B.A., 1964, *Occidental College*; M.D., 1968, *University of California, San Francisco*. Clinical Associate Professor of Anesthesiology.
- Riess, Marc I. (1992). B.A., 1973, *State University of New York, Stony Brook*; M.A., 1975; Ph.D., 1977, *University of Florida*. Adjunct Assistant Professor of Psychology.
- Rietsema, Wouter J. (1994). B.A., 1980, *Middlebury College*; M.D., 1985, *University of Connecticut*. Clinical Assistant Professor of Medicine.
- Riker, Richard R. (1993). B.S., 1980, *University of Maine*; M.D., 1984, *University of Vermont*. Clinical Assistant Professor of Medicine.
- Rimmer, Jeffrey M. (1981). B.A., 1971, *Yale University*; M.D., 1976, *University of Connecticut*. Associate Professor of Medicine.
- Rinker, Marilyn A. (1992). B.S., 1985, *University of Vermont*; M.S.N., 1987, *Anna Maria College*. Adjunct Assistant Professor of Technical Nursing.
- Rintel, Theodor D. (1990). B.A., 1974, *Antioch College*; M.D., 1978, *George Washington University*. Clinical Associate Professor of Anesthesiology.
- Rioux, Stephen D. (1987). B.S., 1975, *Stonehill College*; M.D., 1979, *University of Vermont*. Clinical Assistant Professor of Pediatrics and Neurology.
- Richie, Robert F. (1985). M.D., 1960, *University of Rochester*. Professor of Medicine.
- Ritter, Mary Lee B. (1994). B.S.N., 1979, *Northeastern University*. Clinical Instructor in Pediatrics.
- Rizvi, Saiyid A. (1987). A.B., 1981, *Vassar College*; M.A., 1986; Ph.D., 1990, *New School for Social Research*. Associate Professor of Economics.
- Rizzo, Donna Marie (1995). B.S., 1983, *University of Connecticut*; M.S., 1990, *University of California*; Ph.D., 1994, *University of Vermont*. Research Assistant Professor of Civil and Environmental Engineering.
- Roberts, Julie L. (1994). B.S., 1973, *West Virginia University*; M.S., 1978, *Emerson College*; Ph.D., 1994, *University of Pennsylvania*. Assistant Professor of Communication Sciences.
- Roberts, Stephen M. (1995). B.A., 1976, *The Colorado College*; M.Ed., 1983, *University of Vermont*. Adjunct Instructor in Education.
- Robertson, Craig A. (1982). B.A., 1961; M.A., 1965, *University of Kansas*; Ph.D., 1971; M.L.S., 1980, *Rutgers University*. Library Associate Professor in Bailey/Howe Library.
- Robinson, Edward H. (1984). M.D., 1949, *Jefferson College*. Clinical Assistant Professor of Psychiatry.
- Robinson, Girard E. (1987). B.A., 1971, *Ohio Wesleyan University*; M.D., 1981, *State University of New York, Buffalo*. Clinical Associate Professor of Psychiatry.
- Roche, Susan E. (1991). B.A., 1974, *Northeastern Illinois University*; M.S.W., 1981, *University of Louisville*; Ph.D., 1991, *Rutgers University*. Assistant Professor of Social Work.
- Rockefeller, Richard G. (1984). B.A., 1971; Ed.M., 1974; M.D., 1979, *Harvard University*. Clinical Assistant Professor of Family Practice.
- Rodgers, Margaret M. (1995). B.S., 1969, *Cardinal Cushing College*; M.Ed., 1989, *Saint Michael's College*. Adjunct Instructor in Education.
- Rodgers, Robert H. (1979). B.A., 1966; Ph.D., 1970, *Harvard University*. Associate Professor of Classics.
- Roe, Linda R. (1981). B.S., 1970, *Muhlenberg College*; M.D., 1974, *Rutgers University*. Associate Professor of Radiology.
- Roediger, John H. (1982). B.S., 1964, *Duke University*; M.D., 1968, *Cornell University*. Clinical Assistant Professor of Surgery.
- Rogers, David L. (1992). A.A., 1969, *Suffolk Community College*; B.A., 1970, *Adelphi University*. Lecturer in Animal and Food Sciences.
- Rogers, Frederick B. (1990). B.A., 1976, *Williams College*; M.S., 1986, *University of Illinois*; M.D., 1989, *University of Vermont*. Assistant Professor of Surgery.
- Rogers, Glenn F. (1982). B.S., 1973; M.S., 1975, *University of Vermont*. Extension Associate Professor in Extension Service.
- Roland, Thomas A. (1978). B.S., 1969, *Ohio University*; M.D., 1973, *University of Cincinnati*. Professor of Radiology.
- Romeyn, Dirk (1967). B.S., 1955, *Tufts University*; M.D., 1962, *Boston University*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Roof-Nunley, Gayle E. (1988). B.A., 1981, *Dartmouth College*; M.A., 1982, *Middlebury College*; M.A., 1985; Ph.D., 1990, *Princeton University*. Associate Professor of Romance Languages.
- Roomet, Andres (1978). A.B., 1966, *Princeton University*; M.D., 1970, *University of Pennsylvania*. Clinical Associate Professor of Neurology.
- Rosa, Alfred F. (1969). B.A., 1964, *University of Connecticut*; M.A., 1966; Ph.D., 1971, *University of Massachusetts*. Professor of English.
- Rosas Santos, Juan M. (1994). Ph.D., 1994, *University of the Bosque Country*. Research Assistant Professor of Psychology.
- Rosen, James C. (1976). A.B., 1971, *University of California*; Ph.D., 1976, *University of Nevada*. Professor of Psychology and Professor of Psychiatry.
- Rosenfield, Howard T. (1994). B.A., 1968, *Brandeis University*; M.D., 1981, *Columbia University*. Clinical Assistant Professor of Psychiatry.
- Rosenthal, Guy L. (1988). Sc.B., 1980, *Brown University*; Ph.D., 1984, *University of California*. Assistant Professor of Chemistry.
- Rosmus, Stephen M. (1982). B.A., 1971; M.D., 1975, *University of Vermont*. Clinical Assistant Professor of Family Practice.



- Ross, Donald S. (1991). B.S., 1977; M.S., 1981; Ph.D., 1990, *University of Vermont. Research Assistant Professor and Lecturer in Plant and Soil Science.*
- Ross, Jane K. (1979). B.S., 1968, *Michigan State University; M.S., 1972, Purdue University; Ph.D., 1979, Oregon State University. Associate Professor of Nutritional Sciences.*
- Ross, Joel P. (1994). B.S., 1962; M.Ed., 1964, *Wagner College; M.S., 1967; Ph.D., 1972, University of Vermont. Visiting Associate Professor of Physics.*
- Ross, Lyman B. (1990). B.A., 1981, *Kenyon College; M.A., 1986; M.P.H.I., 1989, Columbia University; M.I.S., 1990, Rutgers University. Library Assistant Professor in Bailey/Howe Library.*
- Ross, Stephen A. (1993). A.B., 1960, *Williams College; M.D., 1964, Cornell University. Clinical Associate Professor of Medicine.*
- Ross-Allen, Jane E. (1988). B.A., 1974, *Lake Erie College; M.S., 1978, Northwestern University. Lecturer in Integrated Professional Studies.*
- Rossi, Victor H. (1988). B.S., 1980, *Colorado State University. Lecturer in Mechanical Engineering and Civil and Environmental Engineering.*
- Rothblum, Esther D. (1982). B.A., 1976, *Smith College; M.S., 1979; Ph.D., 1980, Rutgers University. Professor of Psychology.*
- Rothfeld, Jeffrey M. (1993). B.S., 1986; M.D., 1990, *Johns Hopkins University. Clinical Instructor in Medicine.*
- Rothwell, Marilyn G. (1973). B.S., 1954, *University of Rochester. Clinical Assistant Professor of Medicine.*
- Rovner, Arthur S. (1992). B.S., 1979, *University of Michigan; Ph.D., 1986, University of Virginia. Research Assistant Professor of Molecular Physiology and Biophysics.*
- Rowe, S. Ellen (1970). B.S., 1970, *Ohio State University; M.S., 1988, University of Vermont. Extension Associate Professor in Extension Service.*
- Rowell, Gayle M. (1977). A.D., 1956, *University of Vermont. Lecturer in Dental Hygiene.*
- Rowley, Judith J. (1992). B.S., 1984, *University of Vermont. Clinical Instructor in Medical Technology.*
- Roy, Michael A. (1987). B.A., 1976, *University of New Hampshire; M.D., 1980, Tufts University. Clinical Assistant Professor of Medicine.*
- Rubaud, Jeanne N. (1986). B.A., 1983, *Trinity College; M.A., 1986, University of Vermont. Lecturer in Romance Languages.*
- Rubin, Alan S. (1974). A.B., 1964, *Columbia University; M.D., 1968, New York University School of Medicine. Assistant Professor of Medicine.*
- Rubin, Cynthia B. (1990). B.A., 1972, *Antioch College; M.F.A., 1977, Maryland Institute of Art. Assistant Professor of Art.*
- Rubin, Cynthia J. (1990). B.S., 1964, *University of Vermont; M.Ed., 1968, New York University; M.S.W., 1981, Adelphi University. Clinical Instructor in Medicine and Psychiatry.*
- Rubin, Deborah Z. (1991). A.B., 1978, *Goddard College; M.D., 1984, University of Colorado. Assistant Professor of Radiology.*
- Rubin, Ronald L. (1993). B.A., 1969, *Brooklyn College. Lecturer in Education.*
- Rubman, Jeffrey W. (1974). B.A., 1967, *Brandeis University; M.D., 1971, University of Vermont. Clinical Assistant Professor of Medicine.*
- Rude, Catherine S. (1991). A.B., 1979, *Smith College; M.D., 1983, Pennsylvania State University. Assistant Professor of Pediatrics.*
- Rude, Suzanne D. (1994). B.S., 1977, *McGill University; M.B.A., 1983, University of Vermont. Lecturer in Business Administration.*
- Ruess, Johanna M. (1973). M.D., 1956, *University of Leiden. Associate Professor of Orthopaedics and Rehabilitation.*
- Ruoff, Paul A. (1978). B.A., 1966, *Cornell University; M.D., 1972, University of Rochester. Clinical Associate Professor of Psychiatry.*
- Rushmer, Tracy A. (1995). B.A., 1981, *University of California, Berkeley; M.S., 1985; Ph.D., 1991, ETH-Swiss Federal Institute of Technology. Research Assistant Professor of Geology.*
- Russo, Joseph N. (1968). B.S., 1941, *Trinity College; M.D., 1945, University of Vermont. Clinical Assistant Professor of Obstetrics and Gynecology.*
- Ryan, Francis P. (1971). B.S., 1957, *Fordham University; M.D., 1961, McGill University. Clinical Instructor in Pediatrics.*
- Ryan, William J. (1970). B.S., 1959, *Manhattan College; M.D., 1963, New York University. Clinical Associate Professor of Medicine and Family Practice.*
- Ryder, Richard A. (1967). B.S., 1956, *University of Rochester; M.D., 1963, Columbia University. Clinical Associate Professor of Medicine.*
- Saad, Abubaker M. (1989). B.A., 1966, *University of Libya; M.A., 1974, Portland State University; Ph.D., 1987, University of Washington. Assistant Professor of History.*
- Saferstein, Susan L. (1989). B.A., 1975, *University of Rochester; M.D., 1979, State University of New York, Stony Brook. Clinical Assistant Professor of Family Practice.*
- Saffer, Jeffrey M. (1981). B.A., 1969, *Dartmouth College; M.D., 1973, George Washington University. Clinical Assistant Professor of Family Practice.*
- Saba, Madhumita (1992). M.D., 1982, *Calcutta Medical College. Clinical Instructor in Medicine.*
- Saia, John J. (1980). B.S., 1961, *Bowdoin College; M.D., 1966, University of Vermont. Associate Professor of Family Practice.*
- Saideman, Stephen M. (1993). B.A., 1988, *Oberlin College; M.A., 1991; Ph.D., 1993, University of California, San Diego. Visiting Assistant Professor of Political Science.*
- Salembier, George B. (1980). B.A., 1973, *Curry College; M.Ed., 1978; Ed.D., 1992, University of Vermont. Assistant Professor of Education.*
- Salvo, Anthony F. (1981). A.B., 1963, *Harvard University; M.D., 1967, Tufts University. Clinical Assistant Professor of Radiology.*
- Sample, Sally (1990). A.A., 1951, *Bradford Junior College; B.S., 1954, Johns Hopkins University; M.N., 1972, University of Washington. Adjunct Associate Professor of Professional Nursing.*
- Sampson, Samuel F. (1972). B.A., 1960; M.A., 1961, *University of Oklahoma; Ph.D., 1968, Cornell University. Professor of Sociology.*
- Sansom, Karel J. (1990). B.S., 1967, *University of Groningen; M.B.A., 1969, University of Pennsylvania; Ph.D., 1990, Nijenrode University. Lecturer in Business Administration.*
- Sanborn, Linda F. (1984). B.S., 1974, *Michigan State University; M.D., 1978, University of Illinois. Clinical Assistant Professor of Family Practice.*
- Sanborn, Stephen D. (1995). B.Ed., 1969, *Plymouth State College; M.Ed., 1978; C.A.S., 1987; Ed.D., 1994, University of Vermont. Adjunct Instructor in Education.*
- Sandoval, Dolores S. (1971). B.S.D., 1960, *University of Michigan; M.S., 1968; Ph.D., 1970, Indiana University. Associate Professor of Education.*
- Sands, Jonathan W. (1986). B.A., 1977, *Harvard University; M.A., 1979; Ph.D. 1982, University of California, San Diego. Associate Professor of Mathematics.*
- Sands, Peggy (1994). B.S., 1982, *Wichita State University; M.S., 1989, University of North Carolina, Chapel Hill. Clinical Assistant Professor of Physical Therapy.*
- Sansonetti, Robert D. (1993). B.S., 1984, *Trinity College; M.D., 1988, University of Connecticut. Clinical Instructor in Obstetrics and Gynecology.*



- Sato, John D. (1990). B.S., 1974, *Sussex University*; Ph.D., 1980, *Oxford University*. Adjunct Assistant Professor of Biology.
- Saucier, John R. (1985). B.A., 1970, *Saint Michael's College*; M.D., 1974, *University of Vermont*. Clinical Assistant Professor of Surgery.
- Saule, Mara R. (1985). B.A., 1974, M.A., 1976, *Bowling Green State University*; M.L.S., 1980, *University of California, Berkeley*. Library Associate Professor in Bailey/Howe Library.
- Savadove, Maureen S. (1980). B.S., 1962, *Cornell University*; M.D., 1966, *Albany Medical College*. Clinical Assistant Professor in Pediatrics.
- Savitt, Ronald (1985). A.B., 1961; M.B.A., 1963, *University of California, Berkeley*; Ph.D., 1967, *University of Pennsylvania*. Beckley Professor of Business Administration.
- Saylor Rodgers, Barbara (1979). A.B., 1969, *Brown University*; M.A., 1974; M.A., 1976; Ph.D. 1978, *University of California, Berkeley*. Associate Professor of Classics.
- Scafa, Gina A. (1984). B.S., 1975; M.S., 1976, *Ithaca College*. Adjunct Instructor in Communication Sciences.
- Scannell, Elizabeth (1985). B.A., 1971, *Central College*; M.A., 1976, *Montclair State College*; Ph.D., 1982, *University of Wisconsin, Madison*. Extension Associate Professor of Community Development and Applied Economics.
- Schaeffer, Warren I. (1967). M.S., 1962; Ph.D., 1964, *Rutgers State University*. Professor of Microbiology and Molecular Genetics.
- Schall, Joseph J. (1980). B.S., 1968, *Pennsylvania State University*; M.S., 1972, *University of Rhode Island*; Ph.D., 1976, *University of Texas*. Professor of Biology.
- Schapiro, Howard M. (1987). B.A., 1976; M.S., 1977, *State University of New York, Buffalo*; M.D., 1980, *University of Vermont*. Assistant Professor of Anesthesiology.
- Scharf, Craig S. (1994). B.S., 1976; M.S., 1980, *Southern Connecticut State University*; Ph.D., 1985, *University of Alberta*. Lecturer in Natural Resources.
- Schenk, William M. (1965). B.F.A., 1962; M.A., 1965, *Ohio State University*. Associate Professor of Theatre.
- Schepp, Kay F. (1974). B.A., 1957, *College of New Rochelle*; M.A., 1964, *Syracuse University*; Ed.D., 1968, *University of Tennessee*. Assistant Professor of Integrated Professional Studies.
- Scherbatskoy, Timothy D. (1990). B.A., 1973, *Antioch College*; M.S., 1980; Ph.D., 1989, *University of Vermont*. Research Assistant Professor of Natural Resources.
- Schetky, Diane H. (1987). B.A., 1961, *Sarah Lawrence College*; M.D., 1966, *Case Western Reserve University*. Clinical Associate Professor of Psychiatry.
- Schimmele, Paul R. (1992). B.S., 1977, *Indiana University*; M.A., 1982, *Central Michigan University*. Lecturer in Dental Hygiene.
- Schirmer, Julie M. (1993). B.A., 1975, *Miami University*; M.S.W., 1979, *Catholic University*. Clinical Assistant Professor of Family Practice.
- Schirmer, William F. (1986). M.A., 1971 *Colby College*; M.S., 1973; M.D., 1980, *Georgetown University*. Assistant Professor of Family Practice.
- Schlunk, Robin R. (1967). A.B., 1958, *Muhlenberg College*; Ph.D., 1964, *University of Cincinnati*. Professor of Classics.
- Schmidt, Frederick E. (1970). M.S., 1969; Ph.D., 1973, *Cornell University*. Associate Professor of Community Development and Applied Economics and Sociology and Extension Associate Professor in Extension Service.
- Schneider, David J. (1994). B.A., 1982, *University of Notre Dame*; M.D., 1986, *University of Cincinnati*. Assistant Professor of Medicine.
- Schneider, Karen A. (1984). B.A., 1977, *Glassboro State College*; M.F.Ed., 1989, *University of Vermont*. Extension Assistant Professor in Extension Service.
- Schneider, Kathleen M. (1992). B.A., 1978, *University of Vermont*; M.F.A., *University of Massachusetts*. Assistant Professor of Art.
- Schneider, Wayne J. (1993). B.M., 1971, *University of Colorado*; A.M., 1978, *Harvard University*; M.A., 1982; Ph.D., 1985, *Cornell University*. Assistant Professor of Music.
- Schnell, Lisa J. (1992). B.A., 1984, *University of Alberta*; M.A., 1985, *University of Western Ontario*; Ph.D., 1989, *Princeton University*. Assistant Professor of English.
- Scholan, John V. (1982). A.B., 1956, *Providence College*; M.D., 1960, *New Jersey College of Medicine*. Clinical Assistant Professor of Family Practice.
- Schreckenberger, Helga. (1986). M.A., 1980; M.Phil., 1981; M.A., 1984; Ph.D., 1985, *University of Kansas*. Associate Professor of German.
- Schrieffer, John H. (1991). B.A., 1982, *Albion College*; M.D., 1986, *University of Michigan*. Clinical Instructor in Medicine.
- Schroll, Alayne L. (1994). B.A., 1978, *Russell Sage College*; Ph.D., 1986, *University of Minnesota*. Visiting Associate Professor of Pathology.
- Schultz, Mark S. (1984). B.A., 1972, *Columbia University*; M.A., 1976, *University of Colorado*; M.D., 1980, *Case Western Reserve University*. Clinical Assistant Professor of Psychiatry.
- Schwartz, James M. (1993). B.A., 1982, *University of Washington*; Ph.D., 1989, *University of Tennessee*. Research Associate in Biology.
- Scollins, Mary E. (1974). A.B., 1965, *Emmanuel College*; M.D., 1969, *Boston University*. Clinical Assistant Professor of Neurology.
- Scollins, Michael J. (1974). B.S., 1965, *College of the Holy Cross*; M.D., 1969, *Boston University*. Professor of Pharmacology and Clinical Associate Professor of Medicine.
- Scotton, David W. (1981). B.A., 1964; M.D., 1968, *University of Vermont*. Clinical Assistant Professor of Medicine.
- Scrase, David A. (1972). B.A., 1962, *Bristol University*; Ph.D., 1972, *Indiana University*. Professor of German.
- Seager, Joni K. (1992). B.A., 1976, *University of Toronto*; M.A., 1982; Ph.D., 1988, *Clark University*. Assistant Professor of Geography.
- Searles, John S. (1992). B.S., 1979, *University of Wisconsin, Milwaukee*; Ph.D., 1986, *University of California, Berkeley*. Research Assistant Professor of Psychiatry.
- Secker-Walker, Roger H. (1981). B.A., 1956, *Clare College*; M.B.B., 1959, *University College Hospital of Medicine*; M.R.C.P., 1963, *Royal College of Physicians*. Professor of Medicine.
- See, Scott W. (1985). B.A., 1972, *Muskingum College*; B.A., 1978; M.A., 1980; Ph.D., 1984, *University of Maine*. Associate Professor of History.
- Seitz, Christopher B. (1981). B.S., 1965, *University of Colorado, Boulder*; M.D., 1969, *University of Colorado, Denver*. Clinical Associate Professor of Radiology.
- Sekerak, Robert J. (1972). B.S., 1963, *John Carroll University*; M.S., 1972, *Case Western Reserve University*. Library Associate Professor in Dana Medical Library.
- Senecal, Andre J. (1978). B.A., 1968; M.A., 1971; Ph.D., 1976, *University of Massachusetts*. Professor of Romance Languages.
- Sepulveda, Debra (1993). B.A., 1978, *Lehigh University*; M.Ph., 1981; M.D., 1986, *University of Texas*. Instructor in Obstetrics and Gynecology.
- Serrero, Ginette (1986). B.S., 1973; Ph.D., 1975, *University of Marseille*; Ph.D., 1982, *University of Nice*. Adjunct Assistant Professor of Biology.
- Sethi, Rajiv (1993). B.S.C., 1984, *Southampton, United Kingdom*; M.A., 1991; Ph.D., 1993, *New School for Social Research, New York*. Assistant Professor of Economics.

- Sewall, Kate. (1983). B.A., 1961, Radcliffe College; M.D., 1965, Johns Hopkins University. Clinical Associate Professor of Anesthesiology.
- Seward, Catherine (1994). B.S., 1977, Bucknell University; M.S., 1982, Syracuse University. Lecturer in Education.
- Seward, Elizabeth A. (1990). B.A., 1977; M.S., 1985; M.D., 1985, University of Vermont. Clinical Assistant Professor of Medicine.
- Seybolt, Peter J. (1969). B.A., 1956, University of Cincinnati; M.A.T., 1960; Ph.D., 1970, Harvard University. Professor of History.
- Seyller, John W. (1986). B.A., 1977; M.A., 1980, University of California, Berkeley; Ph.D., 1986, Harvard University. Associate Professor of Art.
- Shackford, Steven R. (1989). B.A., 1968, University of Southern California; M.D., 1973, St. Louis University. Professor of Surgery.
- Shalan, Gary S. (1993). B.A., 1985, Sarah Lawrence College; M.D., 1990, University of Chicago. Clinical Instructor in Pediatrics.
- Shane, John B., Jr. (1991). B.S., 1980; M.S., 1988, University of Vermont. Lecturer in Natural Resources.
- Shane, Susan P. (1991). B.A., 1978, Smith College; M.D., 1984, State University of New York, Upstate Medical College. Clinical Assistant Professor of Family Practice.
- Shapiro, Jeryl R. (1977). B.S., 1972, Pennsylvania State University; M.D., 1974, Jefferson Medical College. Associate Professor of Anesthesiology.
- Shapiro, Stanley M. (1985). B.A., 1972, Case Western Reserve University; M.D., 1980, Rush University. Clinical Assistant Professor of Medicine.
- Sharp, John F. (1978). B.A., 1967, Alfred University; M.S., 1973, Ball State University. Lecturer in Chemistry.
- Shatos, Marie A. (1984). A.B., 1965, Regis College; M.S., 1971; Ph.D., 1980, Catholic University of America. Research Assistant Professor of Biochemistry.
- Shaw, Peter K. (1981). B.S., 1968, Muhlenberg College; M.D., 1972, Columbia University. Clinical Assistant Professor of Medicine.
- Shea, Lauren M. (1993). A.S., 1986, University of Vermont. Clinical Instructor in Radiologic Technology.
- Sheard, Nancy F. (1994). B.S., 1975, Miami University; M.S., 1979, University of California, Davis; S.C.D., 1984, Boston University. Associate Professor of Nutritional Sciences.
- Sheehy, Michael J. (1994). B.S., 1967, Boston College; M.B.A., 1970, Northeastern University. Lecturer in Community Development and Applied Economics.
- Sheldon, Sallie P. (1990). B.A., 1975; M.A., 1978, State University of New York, Buffalo; Ph.D., 1984, University of Minnesota. Adjunct Assistant Professor of Natural Resources.
- Shelton, Lawrence G. (1971). A.B., 1964, Harvard University; M.A., 1967; Ph.D., 1970, University of Minnesota. Associate Professor of Integrated Professional Studies.
- Shen, Zheng (1994). B.A., 1963, Psychological Institute of Academy, Sinica. Visiting Professor of Psychology.
- Shepherd, Allen G., III (1965). A.B., 1958, Harvard University; A.M., 1960, Brown University; Ph.D., 1965, University of Pennsylvania. Professor of English.
- Sheporaitis, Leo P. (1992). B.S.M.E., 1960, Lehigh University; M.A., 1965, Villanova University; Ph.D., 1969, University of Pennsylvania. Adjunct Professor of Mechanical Engineering.
- Shepp, Margaret A. (1981). B.A., 1967, Radcliffe College; M.D., 1971, Thomas Jefferson University. Clinical Instructor in Medicine.
- Sheridan, Patricia E. (1985). B.A., 1970, Regis College; M.S., 1982, University of Vermont. Adjunct Instructor in Communication Sciences.
- Sheridan, Sylvester R. (1994). A.B., 1951, Fordham University; M.D., 1955, Columbia University. Clinical Assistant Professor of Psychiatry.
- Shiman, David A. (1971). B.A., 1961, Yale University; M.A.T., 1962, Vanderbilt University; M.A., 1966; Ph.D., 1970, University of California, Los Angeles. Professor of Education.
- Shinozaki, Tamotsu (1962). M.D., 1958; D.M.S., 1961, Okayama University. Professor of Anesthesiology.
- Shirland, Larry E. (1976). B.S., 1964, University of Maine; M.S., 1971; Ph.D., 1972, Oregon State University. Professor of Business Administration.
- Shreeve, Steven M. (1985). B.Sc., 1974; Ph.D., 1980, University of Aston. Associate Professor of Pharmacology.
- Shuman, Brian D. (1986). B.A., 1978, Haverford College; D.M.D., 1982, University of Pennsylvania. Clinical Instructor in Surgery.
- Shuman, William P. (1992). B.A., 1969, Yale University; M.D., 1973, State University of New York, Syracuse. Professor of Radiology.
- Siegel, Andrew. (1974). B.A., 1963, Haverford College; M.D., 1968, University of Pennsylvania. Clinical Associate Professor of Psychiatry.
- Siegle, John H. (1983). A.B., 1970, Bowdoin College; M.A., 1973, Johns Hopkins University; M.D., 1977, Georgetown University. Clinical Assistant Professor of Anesthesiology.
- Sigler, Robert W. (1984). B.S., 1965, Michigan State College; M.D., 1969, University of Michigan. Clinical Instructor in Medicine.
- Silberg, Nancy T. (1993). B.A., 1984, Lafayette College; Ph.D., 1990, University of Vermont. Adjunct Assistant Professor of Psychology.
- Silver, George F. (1992). B.S., 1964; M.S., 1981, University of Vermont. Adjunct Lecturer in Community Development and Applied Economics.
- Silverman, Jonathan (1991). B.S., 1973; M.S., 1982, University of Vermont. Lecturer in Education.
- Silverstein, Gerald C. (1985). B.S., 1972, University of Maryland; M.S., 1976; Ph.D., 1980, Rutgers University. Lecturer in Microbiology and Molecular Genetics.
- Simon, Andrew I.. (1984). B.A., 1971, Carleton College; M.A.T., 1984, University of Vermont. Lecturer in Romance Languages.
- Simone, Reno T., Jr. (1968). B.A., 1965, Dartmouth College; M.A., 1967; Ph.D., 1972, Claremont Graduate School. Associate Professor of English.
- Sinkula, James M. (1983). B.B.A., 1973; M.B.A., 1975, University of Wisconsin; Ph.D., 1982, University of Arkansas. Associate Professor of Business Administration.
- Sites, Cynthia K. (1992). B.S., 1982; M.D., 1986, Ohio State University. Assistant Professor of Obstetrics and Gynecology.
- Sjogren, Robert E. (1967). B.S., 1953, Cornell University; M.S., 1960; Ph.D., 1967, University of Cincinnati. Associate Professor of Microbiology and Molecular Genetics.
- Skinner, Margaret (1988). B.A., 1972, Ohio Wesleyan University. M.S., 1987; Ph.D., 1993, University of Vermont. Research Assistant Professor of Plant and Soil Science.
- Smail, David F. (1978). A.B., 1966, Bowdoin College; M.D., 1970, Tufts University. Associate Professor of Anesthesiology.
- Smallwood, Franklin (1989). A.B., 1951 Dartmouth College; M.P.A., 1953; Ph.D., 1958, Harvard University. Visiting Professor of Public Administration.
- Smith, Christopher R. (1995). B.S., 1977, University of Vermont; M.B.A., 1980, Northwestern University. Lecturer in Business Administration.
- Smith, David Y. (1986). B.S., 1956, Rensselaer Polytechnic Institute; Ph.D., 1962, University of Rochester. Professor of Physics.
- Smith, Dennis L. (1995). Clinical Instructor in Medicine.
- Smith, Dianna C. (1990). B.S., 1971, Purdue University; M.S., 1978, Auburn University. Lecturer in Integrated Professional Studies.
- Smith, Gary S. (1985). B.S., 1969, University of Vermont; M.S., 1982, University of Michigan. Lecturer in Natural Resources.

- Smith, Joan M. (1990). B.A., 1964, *Roosevelt University*; M.S., 1966, *Illinois Institute of Technology*; Ph.D., 1971, *New York University*. Professor of Sociology.
- Smith, Robert P., Jr. (1988). B.A., 1971; M.P.H., 1980, *Harvard University*; M.D., 1975, *Johns Hopkins University*. Clinical Associate Professor of Medicine.
- Smith, Susan F. (1980). B.Sc., 1969; M.D., 1976, *University of Michigan*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Smith, Timothy L. (1994). B.A., 1983, *Grinnell College*; M.A., 1988, *Johns Hopkins University*. Lecturer in Political Sciences.
- Smith, William G. (1990). B.A., 1963; M.D., 1968, *University of Western Ontario*. Associate Professor of Obstetrics and Gynecology.
- Smith-Williams, Pamela A. (1973). B.A., 1971; M.S., 1981, *University of Vermont*. Extension Professor in Extension Service.
- Snapp, Robert R. (1990). A.B., 1978, *University of California, San Diego*; Ph.D., 1987, *University of Texas, Austin*. Assistant Professor of Electrical Engineering.
- Snider, Alfred C. (1982). B.A., 1972, *Brown University*; M.S., 1976, *Emerson College*; Ph.D., 1983, *University of Kansas*. Associate Professor of Theatre.
- Sniffen, Charles J. (1992). B.S., 1960, *Ohio State University*; M.S., 1967, *University of New Hampshire*; Ph.D., 1970, *University of Kentucky*. Adjunct Professor of Animal and Food Sciences.
- Snow, William C. (1969). B.S., 1968, *University of Massachusetts*; M.F.E., 1987, *University of Vermont*. Extension Associate Professor in Extension Service.
- Snyder, Laura E. (1992). M.S., 1988, *University of Vermont*; Ph.D., 1984, *Wells College*; Ph.D., 1992, *University of Colorado*. Research Associate in Biology.
- Sobel, Burton E. (1994). A.B., 1958, *Cornell University*; M.D., 1962, *Harvard University*. E.I. Amidon Professor of Medicine.
- Sobel, Daniel B. (1989). B.A., 1969, *University of Michigan*; M.A., 1971; M.D., 1978, *Temple University*. Clinical Assistant Professor of Pediatrics.
- Sobel, Susan R. (1994). A.B., 1960, *Boston University*; M.A., 1961, *Brandeis University*; M.S.W., 1973, *San Diego State University*. Assistant Professor of Psychiatry.
- Socinski, Mark A. (1992). B.A., 1979; M.S., 1983; M.D., 1984, *University of Vermont*. Clinical Assistant Professor of Medicine.
- Sofferman, Robert A. (1975). B.A., 1963, *Lehigh University*; M.D., 1967, *University of Maryland*. Professor of Otolaryngology.
- Soll, Roger F. (1984). B.A., 1975, *Cornell University*; M.D., 1978, *Chicago Medical School*. Associate Professor of Pediatrics.
- Solomon, Laura J. (1982). B.A., 1975, *University of North Carolina, Chapel Hill*; M.S., 1977; Ph.D., 1981, *Virginia Polytechnic Institute and State University*. Research Associate Professor of Psychology.
- Solomon, Paul R. (1987). B.A., 1970; M.A., 1972, *State University of New York, New Paltz*; Ph.D., 1976, *University of Massachusetts*. Adjunct Associate Professor of Pathology.
- Solomon, Samuel (1968). B.S., 1947; M.S., 1951; Ph.D., 1953, *McGill University*. Visiting Professor of Obstetrics and Gynecology.
- Soltan, Susan A. (1995). B.S., 1977; M.Ed., 1984, *University of Vermont*. Adjunct Instructor in Education.
- Sommer, Robert G. (1981). B.S., 1955, *Trufts University*; M.D., 1959, *University of Rochester*. Clinical Assistant Professor of Medicine.
- Son, Mun S. (1984). B.A., 1975, *Sung Kyun Kwan University*; M.S., 1982; M.S., 1984; Ph.D., 1984, *Oklahoma State University*. Associate Professor of Statistics.
- Soons, Karen L. (1991). B.A., 1981, *St. Michael's College*; Ph.D., 1987, *University of Connecticut*. Research Assistant Professor of Family Practice.
- Soper, Judith M. (1994). A.S., 1980, *University of Vermont*. Clinical Instructor in Obstetrics and Gynecology.
- Sortino, Susan A. (1994). B.S., 1974, *State University of New York, Plattsburgh*; M.Ed., 1993, *University of Vermont*. Lecturer in Integrated Professional Studies.
- Soule, Sarah A. (1995). B.A., 1989, *University of Vermont*; M.A., 1991; Ph.D., 1995, *Cornell University*. Lecturer in Sociology.
- Southall, Roger C. (1982). B.A., 1958, *Williams College*; M.D., 1962, *Temple University*. Clinical Assistant Professor of Orthopaedics and Rehabilitation.
- Spartalian, Kevork (1979). A.B., 1968, *Princeton University*; M.S., 1970; Ph.D., 1974, *Carnegie Mellon University*. Associate Professor of Physics.
- Spaulding, Laurie (1991). B.S., 1979, *Wheaton College*; M.D., 1984, *University of Vermont*. Assistant Professor of General Surgery.
- Spillman, William B., Jr. (1992). A.B., 1968, *Brown University*; M.S., 1972; Ph.D., 1977, *Northeastern University*. Adjunct Professor of Physics.
- Spinney, Pamela S. (1988). B.S., 1970, *Bridgewater State College*. Lecturer in Education.
- Spratt, Daniel I. (1986). B.S., 1973, *Stanford University*; M.D., 1977, *University of Michigan, Ann Arbor*. Associate Professor of Medicine.
- Sproul, Marga S. (1980). B.A., 1968, *Radcliffe College*; M.S., 1976, *Bank Street College*; M.D., 1976, *University of Vermont*. Associate Professor of Family Practice.
- Squires, Kyle D. (1991). B.S., 1984, *Washington State University*; M.S., 1985; Ph.D., 1990, *Stanford University*. Assistant Professor of Mechanical Engineering.
- Stackpole, James W. (1962). B.A., 1950, *Bowdoin College*; M.D., 1956, *University of Vermont*. Clinical Professor of Pediatrics.
- Standage, Jeanette C. (1973). B.S., 1967, *Old Dominion University*. Clinical Instructor in Medical Technology.
- Standen, Nicholas B. (1987). B.A., 1971; M.A., 1974; Ph.D., 1974, *University of Cambridge*. Visiting Professor of Pharmacology.
- Stanfield, Robert E. (1969). B.A., 1957, *City College*; A.M., 1961; Ph.D., 1963, *Harvard University*. Professor of Sociology.
- Stanger, Catherine (1991). B.S., 1983, *Georgetown University*; M.S., 1987, *Rutgers University*. Research Assistant Professor of Psychiatry.
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- Stanley, Rolfe S. (1964). B.A., 1954, *Williams College*; M.S., 1955; Ph.D., 1962, *Yale University*. Professor of Geology.
- Stanton, Michael N. (1971). B.A., 1968, *University of Vermont*; Ph.D., 1971, *University of Rochester*. Associate Professor of English.
- Starer, Marc J. (1994). B.S., 1982; M.D., 1986, *Tulane University*. Clinical Instructor in Pediatrics.
- Stavarakakis, Ioanis (1988). B.Sc., 1983, *Aristotle University*; Ph.D., 1988, *University of Virginia*. Associate Professor of Electrical Engineering.
- Stavarakis, Peter J. (1986). B.A., 1978, *University of Delaware*; M.A., 1980; Ph.D., 1986, *University of Wisconsin, Madison*. Associate Professor of Political Science.
- Steele, Cherie J. (1994). A.B., 1985, *Harvard University*; M.A., 1991; Ph.D., 1995, *University of California, Los Angeles*. Assistant Professor of Political Science.
- Steen, M. Dale (1984). B.S., 1965; M.A.T., 1989, *University of Vermont*. Extension Assistant Professor in Extension Service.

- Steffens, Henry J. (1969). A.B., 1963; M.A., 1965; Ph.D., 1968, *Cornell University*. Professor of History.
- Stein, Holly J. (1990). B.S., 1976, *Western Illinois University*; M.S., 1978; Ph.D., 1985, *University of North Carolina, Chapel Hill*. Adjunct Professor of Geology.
- Steinbauer, Daniel H. (1994). B.A., 1968, *Concordia University*; M.Div., 1972, *Concordia Seminary*. Clinical Instructor in Family Practice.
- Steingard, Sandra (1993). B.A., 1977, *Harvard University*; M.D., 1981, *Tufts University*. Clinical Assistant Professor of Psychiatry.
- Steinmetz, Clara H. (1993). B.M., 1976, *Central Michigan University*; M.M., 1978, *Northwestern University*; M.D., 1988; *Rush Medical College*. Clinical Instructor in Surgery.
- Stephany, William A. (1968). A.B., 1965, *Lemoyne College*; M.A., 1967; Ph.D., 1969, *University of Delaware*. Professor of English.
- Stern, Paul (1992). M.D., 1965, *University of Chile*. Professor of Pediatrics.
- Stern, Peter (1987). B.A., 1965, *University of Vermont*; M.B.A., 1969, *University of New Hampshire*, Amos Tuck; M.D., 1981, *University of Vermont*. Assistant Professor of Anesthesiology.
- Stetson, Joanne K. (1994). B.A., 1979, *Eastern Connecticut State College*; M.S., 1987, *University of Vermont*. Clinical Instructor in Family Practice.
- Stevens, James L. (1990). B.S., 1974, *Macalester College*; Ph.D., 1980, *University of Minnesota*. Adjunct Assistant Professor of Biology.
- Stevens, Lori (1988). B.A., 1979, *University of Delaware*; M.S., 1981; Ph.D., 1986, *University of Illinois, Chicago*. Associate Professor of Biology.
- Stevenson, Samuel C. (1980). B.A., 1960, *Birmingham Southern College*; M.A., 1962, *Furman University*; Ph.D., 1979, *University of Connecticut*. Associate Professor of Education.
- Stifler, David E. (1981). B.A., 1971, *Amherst College*; M.D., 1976, *Georgetown University*. Clinical Assistant Professor of Pediatrics.
- Stürwalt, William S. (1979). B.S., 1959; M.S., 1960, *George Williams College*; Ph.D., 1967, *University of Chicago*. Associate Professor of Molecular Physiology and Biophysics and Obstetrics and Gynecology.
- Stocks, Joseph F. (1981). B.S., 1951, *Tufts University*; M.D., 1955, *Columbia University*. Clinical Associate Professor of Pathology.
- Stockwell, Sally A. (1987). B.A., 1970; M.D., 1974, *University of Vermont*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Stoian, Alexander A. (1991). M.D., 1977, *University of Bucharest*. Clinical Assistant Professor of Medicine.
- Stokes, Ian A. (1980). B.A., 1971, *Cambridge University*; Ph.D., 1975, *Polytechnic of Central London*. Research Professor of Orthopaedics and Rehabilitation and Mechanical Engineering.
- Stoler, Mark A. (1970). B.A., 1966, *City College of New York*; M.A., 1967; Ph.D., 1971, *University of Wisconsin*. Professor of History.
- Stoltenberg, Wendy B. (1986). B.A., 1971, *Wesleyan University*; M.D., 1977, *Columbia University*. Clinical Instructor in Psychiatry.
- Stouch, William H. (1967). B.A., 1957, *Princeton University*; M.D., 1961, *Columbia University*. Clinical Associate Professor of Medicine.
- Stout, Neil R. (1964). A.B., 1954, *Harvard University*; M.S., 1958; Ph.D., 1962, *University of Wisconsin*. Professor of History.
- Strates, Elene (1994). B.A., 1981, *University of Chicago*; M.D., 1990, *Rush Medical College*. Clinical Instructor in Obstetrics and Gynecology.
- Strauss, Michael J. (1968). B.S., 1962, *San Jose State College*; Ph.D., 1967, *University of California*. Professor of Chemistry.
- Streeter, Thomas G. (1989). A.B., 1977, *Brown University*; M.A., 1982; Ph.D., 1986, *University of Illinois*. Associate Professor of Sociology.
- Strickler, Jennifer A. (1993). B.A., 1984, *University of Vermont*; M.A., 1991; Ph.D., 1993, *Princeton University*. Assistant Professor of Sociology.
- Strojny, Linda A. (1991). B.A., 1978, *Bridgewater State College*; M.S., 1980, *Boston University*. Adjunct Instructor in Communication Sciences.
- Stryker, Barent W., III (1969). B.S., 1966; M.S., 1969, *University of Vermont*. Extension Professor in Extension Service.
- Stubblefield, Phillip G. (1988). B.A., 1962; M.D., 1966, *Harvard University*. Professor of Obstetrics and Gynecology.
- Sturges, Robert A. (1981). B.S., 1969; M.D., 1973, *Tufts University*. Clinical Assistant Professor of Medicine.
- Sturgis, Gary H. (1994). B.A., 1977, *Wesleyan University*; D.V.M., 1983, *Tufts University*. Adjunct Assistant Professor of Animal and Food Sciences.
- Sturtevant, Norman (1984). B.S., 1976, *Massachusetts Institute of Technology*; M.D., 1980, *University of Vermont*. Associate Professor of Radiology.
- Sugarman, Nancy A. (1994). B.F.A., 1974, *Boston University*; M.Ed., *Rhode Island College*. Lecturer in Integrated Professional Studies.
- Sugarman, Richard I. (1970). B.A., 1966; M.A., 1969, *Yale University*; Ph.D., 1976, *Boston University*. Associate Professor of Religion.
- Sugarman, William W. (1991). B.S., 1979, *Lyndon College*; M.Ed., 1987, *University of Vermont*. Lecturer in Education.
- Sukantarat, Wichada (1994). B.A., 1978, *Chulalongkorn University*; M.S.L.S., 1983, *Case Western Reserve University*. Library Assistant Professor in Bailey/Howe Library.
- Sullivan, Anne M. (1971). B.A., 1967, *College of Our Lady of Elms*; M.S., 1971, *University of Vermont*. Associate Professor of Medical Technology.
- Sullivan, Gerald A. (1994). B.S., 1985, *University of Vermont*; M.S., 1987; Ph.D., 1991, *Rensselaer Polytechnic Institute*. Visiting Assistant Professor of Mechanical Engineering.
- Sullivan, John K. (1987). B.S., 1972; M.D., 1976, *Georgetown University*. Clinical Assistant Professor of Neurology.
- Sullivan, Monica A. (1988). B.S., 1978, *University of Vermont*. Clinical Instructor in Medical Technology.
- Sullivan, Pauline M. (1991). B.S., 1975, *Marymount College*; M.A., 1980, *San Francisco State University*. Assistant Professor of Community Development and Applied Economics.
- Supple, William F., Jr. (1990). B.A., 1981, *Marist College*; Ph.D., 1986, *Dartmouth College*. Research Assistant Professor of Psychology.
- Sussman, Betsy L. (1988). B.A., 1977, *University of Colorado*; M.D., 1981, *University of Vermont*. Associate Professor of Radiology.
- Sussman, Ted L. (1993). B.S., 1973, *State University of New York, Stony Brook*; M.D., 1977, *Tufts University*. Clinical Assistant Professor of Medicine.
- Swartz, Donald R. (1967). A.B., 1959, *Earlham College*; M.D., 1963, *West Virginia University*. Clinical Professor of Pediatrics.
- Sweeney, Paul W. (1981). B.A., 1971, *Harvard University*; M.D., 1975, *University of Massachusetts*. Clinical Assistant Professor of Medicine.
- Sweterlitsch, Richard C. (1974). B.A., 1964; M.A., 1967, *Duquesne University*; Ph.D., 1976, *Indiana University*. Associate Professor of English.
- Swift, Peter D. (1984). B.A., 1970, *University of Colorado*; B.S., 1972, *University of California, San Bernardino*; M.D., 1977, *State University of New York, Upstate Medical Center*. Associate Professor of Radiology.

- Sze, Karl C. (1981). M.D., 1972, Cornell University. Clinical Assistant Professor of Medicine.
- Szilva, Jean (1994). B.S., 1973; M.D., 1975, Northwestern University. Lecturer in Anatomy and Neurobiology.
- Taatjes, Douglas J. (1989). B.S., 1980, University of Lowell; M.S., 1982, Kansas State University; Ph.D., 1987, University of Basel. Research Assistant Professor of Pathology.
- Taft, Marilee M. (1995). B.S., 1968, University of Vermont. Adjunct Instructor in Education.
- Talbot, Susan B. (1985). B.A., 1972, Stanford University; M.D., 1979, University of Vermont. Clinical Assistant Professor of Pediatrics.
- Talley, Carol A. (1988). B.A., 1978, Kalamazoo College; M.D., 1983, Michigan State University. Assistant Professor of Orthopaedics and Rehabilitation.
- Tallmadge, James M. (1995). B.S., 1978, Xavier University; M.S., 1983, Marquette University; Ph.D., 1988, Miami University. Lecturer in Psychology.
- Tampas, John P. (1962). B.S., 1951; M.D., 1954, University of Vermont. Professor of Radiology.
- Tandan, Rup (1985). M.B.B.S., 1970; D.C.P., 1973, University of Lucknow; M.R.C.P., 1979, Royal College of Physicians. Associate Professor of Neurology.
- Tang, Mary E. (1993). B.A., 1980; M.D., 1984, University of Vermont. Assistant Professor of Pathology.
- Tangedal, Brett A. (1994). B.A., 1985, University of California, San Diego; M.S., 1987, University of Colorado, Boulder; C.Ph., 1991; Ph.D., 1994, University of California, San Diego. Visiting Assistant Professor of Mathematics.
- Tanner, John S. (1970). B.S., 1951, Colgate University; M.D., 1955, Albany Medical College. Clinical Instructor in Pediatrics.
- Tanner, Timothy H. (1993). B.A., 1980, Colgate University; M.P.H., 1985; M.D., 1985, Yale University. Clinical Assistant Professor of Medicine.
- Tarrazo, Hector M. Jr. (1990). B.A., 1977; M.D., 1981, Harvard University. Assistant Professor of Obstetrics and Gynecology.
- Tarule, Jill M. (1992). B.A., 1964, Goddard College; M.Ed., 1969; Ed.D., 1978, Harvard University. Professor of Integrated Professional Studies.
- Tashman, Leonard J. (1978). B.B.A., 1969, City College of New York; Ph.D., 1969, Brown University. Associate Professor of Business Administration.
- Taylor, James M. (1984). B.A., 1960, Amherst College; M.P.H., 1971, Harvard University; M.D., 1964, State University of New York, Buffalo. Clinical Assistant Professor of Medicine.
- Taylor, Robert P. (1986). B.A., 1980, Wesleyan University; M.A., 1985; M.P.H., 1985; Ph.D., 1986, Rutgers University. Associate Professor of Political Science.
- Terrien, Christopher M., Jr. (1973). B.A., 1963; M.D., 1967, University of Vermont. Clinical Associate Professor of Medicine.
- Terrien, Timothy J. (1974). B.A., 1964; M.D., 1968, University of Vermont. Clinical Associate Professor of Medicine.
- Tessier, Tracy L. (1994). A.S., 1991, University of Vermont. Clinical Instructor in Dental Hygiene.
- Tessman, Brenda V. (1987). B.S., 1973; M.S., 1980, University of Vermont. Lecturer in Microbiology and Molecular Genetics.
- Thaler, Martin A. (1983). B.A., 1980, Saint Michael's College; M.F.A., 1983, Pennsylvania State University. Associate Professor of Theatre.
- Thanassi, John W. (1967). B.A., 1959, Lafayette College; Ph.D., 1963, Yale University. Professor of Biochemistry.
- Thanassi, Natalie M. (1980). B.S., 1959, City College of New York; Ph.D., 1963, Yale University. Research Associate Professor of Biochemistry.
- Thayer, Carol L. (1991). B.S., 1977, Cornell University; M.D., 1983, University of Vermont. Clinical Assistant Professor of Family Practice.
- Thibault, Marlene P. (1979). B.S., 1957; M.A.T., 1973, University of Vermont. Extension Associate Professor in Extension Service.
- Thibodeau, Lee L. (1991). M.D., 1982, Tufts University. Clinical Assistant Professor of Neurological Surgery.
- Thomas, Everett D. (1983). B.S., 1965, University of Connecticut; M.S., 1967, Cornell University. Adjunct Professor of Animal and Food Sciences.
- Thomas, Hilaire D. (1969). F.I.M.L., 1965, Institute of Medical Laboratory Technology; B.S., 1980, University of Vermont. Clinical Instructor in Medical Technology.
- Thomas, Peter A. (1978). B.A., 1966, University of Massachusetts; M.A., 1969, University of Wisconsin; M.A., 1973; Ph.D., 1979, University of Massachusetts. Research Associate Professor of Anthropology and Lecturer in Anthropology.
- Thompson, Lee. (1972). B.A., 1968, University of Winnipeg; M.A., 1969, University of Manitoba; Ph.D., 1975, Queen's University. Professor of English.
- Thompson, Ronald L. (1988). B.M., 1980, University of Waterloo; M.B.A., 1983, McMaster University; Ph.D., 1989, University of Western Ontario. Associate Professor of Business Administration.
- Thomsen, Jeffrey W. (1987). B.A., 1984, Middlebury College. Lecturer in Education.
- Thomson, Ross D. (1991). B.A., 1970, Arizona State University; M.Ph., 1972; Ph.D., 1976, Yale University. Associate Professor of Economics.
- Thor, Ann D. (1994). M.D., 1981, Vanderbilt University. Associate Professor of Pathology.
- Thousand, Jacqueline S. (1981). B.S., 1972, University of Wisconsin; M.Ed., 1978, University of Vermont. Research Associate Professor of Education.
- Thweatt, Gregory P. (1991). B.A., 1985, St. Michael's College. Clinical Instructor in Surgery.
- Tierney, Mary L. (1993). B.S., 1976, Marywood College; Ph.D., 1983, Michigan State University. Associate Professor of Botany and Microbiology and Molecular Genetics.
- Till, George W. (1991). B.A., 1974, Harverford College; M.D., 1981, University of Pennsylvania. Clinical Assistant Professor of Obstetrics and Gynecology.
- Timblin, Cynthia R. (1993). B.S., 1981; M.S., 1983, Washington State University; Ph.D., 1988, University of Maryland. Research Associate in Pathology.
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- Tischler, Marc D. (1991). B.A., 1982, Swarthmore College; M.D., 1986, Harvard University. Assistant Professor of Medicine.
- Titcomb, Stephen (1983). B.S., 1976; M.S., 1978; Ph.D., 1983, Lehigh University. Associate Professor of Electrical Engineering.
- Tkatch, Peter J. (1992). B.A., 1964, State University of New York, Albany; M.F.A., 1971, Temple University. Assistant Professor of Theatre.
- Tockman, Richard S. (1984). B.S., 1971, University of Michigan; M.D., 1975, University of Illinois. Clinical Instructor in Family Practice.
- Tomasi, Thomas B. (1992). A.B., 1950, Dartmouth College; M.D., 1954, University of Vermont; Ph.D., 1965, Rockefeller University. Visiting Professor of Medicine.
- Tonino, Richard P. (1983). B.A., 1973, Amherst College; M.D., 1977, Mount Sinai School of Medicine. Associate Professor of Medicine.

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- Toshach, Joseph M. (1993). B.A., 1986, *College of the Holy Cross*; M.D., 1990, *New York Medical College*. Clinical Instructor in Pediatrics.
- Towne, Bradford M. (1984). B.S., 1973, *University of Arizona*; D.M.D., 1977, *Tufts University*. Clinical Instructor in Oral Surgery.
- Townsend, Robert L. (1974). B.A., 1965, *Union College*; M.S., 1974, *University of Massachusetts*. Extension Professor in Extension Service.
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- Tracy, Russell P. (1984). B.S., 1971, *Lemoyne College*; Ph.D., 1978, *Syracuse University*. Associate Professor of Pathology and Assistant Professor of Biochemistry.
- Trainor, Kevin, M. (1989). B.A., 1974, *Colgate University*; M.Div., 1981, *Union Theological Seminary*; M.P.H.I., 1984; Ph.D., 1990, *Columbia University*. Assistant Professor of Religion.
- Tritton, Louise M. (1991). B.A., 1971, *University of Wisconsin*; Ph.D., 1980; M.F.S., 1986, *Yale University*. Adjunct Associate Professor of Natural Resources.
- Tritton, Thomas R. (1985). A.B., 1969, *Ohio Wesleyan University*; Ph.D., 1973, *Boston University*. Professor of Pharmacology.
- Trotter, Samuel J. (1990). B.S., 1977; M.D., 1981, *University of Illinois*. Clinical Assistant Professor of Surgery.
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- Tsakiridou, Sophia I. (1994). B.S., 1985, *Aristotle University*; Ph.D., 1994, *University of Vermont*. Visiting Assistant Professor of Electrical Engineering.
- Tubbs, James W. (1991). A.B., 1973; J.D., 1975, *Indiana University, Bloomington*; Ph.D., 1989, *Johns Hopkins University*. Assistant Professor of Political Science.
- Tuerk, Francine L. (1994). B.A., 1978, *Wesleyan University*; M.F.S., 1981, *Yale University*; D.V.M., 1986, *Tufts University*. Adjunct Assistant Professor of Animal and Food Sciences.
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- Tumlelewicz, Edward B. (1993). A.S., 1991, *University of Vermont*. Clinical Instructor in Radiologic Technology.
- Turmel, Jon P. (1995). B.S., 1974; M.S., 1976, *University of New Hampshire*. Lecturer in Plant and Soil Science.
- Turner, Robert J. (1994). B.S., 1975, *University of Connecticut*; M.S., 1989, *University of Vermont*. Lecturer in Natural Resources.
- Turner, Terry L. (1971). B.S., 1962, *University of Maine*; M.S., 1964, *University of Vermont*. Lecturer in Natural Resources.
- Tutschka, Barbara G. (1989). M.D., 1962, *Academy of Medicine*. Clinical Assistant Professor of Pathology.
- Tuxbury Vernon W., Jr. (1966). B.S., 1956, *University of Rhode Island*; M.E.Ed., 1971, *University of Vermont*. Extension Associate Professor of Community Development and Applied Economics.
- Twardy, Edward S. (1990). B.A., 1976, *Trenton State College*; M.A., 1978; Ph.D., 1983, *University of Virginia*. Associate Professor of Public Administration.
- Tyler, Loretta C. (1990). B.A., 1976; M.S.C., 1982, *McGill University*. Lecturer in Professional Nursing.
- Tyrnauer, Gabrielle (1994). B.A., 1952, *Brooklyn College*; M.A., 1966; Ph.D., 1969, *Cornell University*. Lecturer in Sociology.
- Tyzbir, Robert S. (1973). B.S., 1966; Ph.D., 1971, *University of Rhode Island*. Associate Professor of Nutritional Sciences.
- Ullrich, Robert C. (1974). B.S., 1968, *University of Minnesota*; A.M., 1969; Ph.D., 1973, *Harvard University*. Professor of Botany.
- Ultee, Reinier F. (1989). B.A., 1975; M.D., 1983, *University of Virginia*. Clinical Assistant Professor of Medicine.
- Unger, Paul S. (1994). B.A., 1981, *Wesleyan University*; M.D., 1986, *Harvard University*. Clinical Assistant Professor of Medicine.
- Uphold, Ruth E. (1981). B.S., 1967, *University of California, San Francisco*; M.D., 1974, *Tufts University*. Associate Professor of Surgery.
- Vaitkus, Paul T. (1992). B.A., 1983; M.D., 1983, *Boston University*. Assistant Professor of Medicine.
- Valente, Colleen A. (1992). B.A., 1973; M.A., 1975, *Florida State University*; M.A., 1987, *University of Iowa*. Library Assistant Professor in Bailey/Howe Library.
- Valenti, August J. (1985). B.S., 1968, *Saint Peter's College*; M.D., 1972, *Cornell University*. Clinical Associate Professor of Medicine.
- Van Buskirk, David (1990). B.A., 1953, *Yale University*; M.D., 1957, *Harvard University*. Associate Professor of Psychiatry.
- Van Hengel, Anne Marie E. (1993). B.Sc., 1984, *Brown University*; M.D., 1988, *University of Vermont*. Instructor in Obstetrics and Gynecology.
- Van Tuinen, Craig R. (1990). B.A., 1976, *Hope College*; M.D., 1981, *Michigan State University*. Clinical Assistant Professor of Psychiatry.
- Vanburen, Peter C. (1992). B.A., 1982; M.D., 1987, *University of Vermont*. Clinical Instructor in Medicine.
- Vane, Dennis W. (1990). B.A., 1970, *Cornell University*; C.S.M., 1974; M.D., 1978, *University of Brussels*. Associate Professor of Surgery and Pediatrics.
- VanHouten, Judith L. (1980). B.S., 1972, *Pacific Lutheran University*; Ph.D., 1976, *University of California*. Professor of Biology.
- VanSlyke, Gretchen J. (1983). B.A., 1974; M.A., 1976, *University of Minnesota*; Ph.D., 1984, *University of Pennsylvania*. Associate Professor of Romance Languages.
- Vardamis, Alex A. (1988). B.S., 1957, *United States Military Academy*; M.A., 1967; Ph.D., 1970, *Columbia University*. Lecturer in English.
- Varhue, Walter J. (1988). B.S., 1979, *University of Connecticut*; M.S., 1981; Ph.D., 1984, *University of Virginia*. Associate Professor of Electrical Engineering.
- Vecchio, James A. (1987). B.A., 1975, *Colgate University*; M.D., 1980, *McGill University*. Associate Professor of Medicine.
- Venmar, Richard S. (1980). B.S., 1975, *Grove City College*; D.M.D., 1979, *University of Pittsburg*. Instructor in Dental Hygiene.
- Ventriss, Curtis, L. (1986). B.A., 1973; B.S., 1973, *San Jose State College*; M.P.A., 1976; Ph.D., 1980, *University of Southern California*. Professor of Public Administration and Associate Professor of Natural Resources.
- Verlee, Thomas R. (1983). B.S., 1967, *University of Michigan*; M.D., 1971, *Wayne State University*. Clinical Assistant Professor of Anesthesiology.
- Viani, Bruce A. (1987). B.A., 1979, *Colby College*; M.D., 1983, *Northwestern University*. Assistant Professor of Anesthesiology.
- Viapiano, James (1993). B.S.N., *D'Youville College*; M.M.S.C., 1981, *Emory College*; M.D., 1988, *University of Vermont*. Assistant Professor of Anesthesiology.
- Vieco, Pedro T. (1991). B.Sc., 1977, *McGill University*; M.D., 1985, *State University of New York, Upstate Medical Center*. Assistant Professor of Radiology.

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- Vijayakumaran, Edathoot (1992). M.B.B.S., 1973, *Medical College of Calicut, Kerala*; M.D., 1976, *Post Graduate Institute Chandigarh*. Clinical Instructor in Pediatrics.
- Vilaseca, Armando D. (1995). B.A., 1979, *University of Vermont*; M.Ed., 1987, *Lesley College*. Adjunct Instructor in Education.
- Villandry, Philip J. (1983). M.D., 1963, *University of Vermont*. Clinical Associate Professor of Anesthesiology.
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- Visser, Thomas D. (1988). B.S., 1973, *University of New Hampshire*; M.S., 1986, *University of Vermont*. Research Associate Professor of History and Lecturer in History.
- Vissering, Jean E. (1993). M.S., 1972, *University of Massachusetts*; M.L.A., 1975, *North Carolina State University*. Lecturer in Natural Resources.
- Von Turkovich, Branimir F. (1971). B.S., 1947, *University of Naples*; M.S., 1951, *University of Madrid*; Ph.D., 1962, *University of Illinois*. Professor of Mechanical Engineering.
- Voss, Carlyle B. (1980). B.A., 1961, *Colgate University*; M.D., 1965, *Baylor Medical School*. Clinical Professor of Psychiatry.
- Wackernagel, Frederick W.H. (1984). A.B., 1972, *Dartmouth College*; M.S., 1979; Ph.D., 1983, *Cornell University*. Extension Assistant Professor of Community Development and Applied Economics, and Resource.
- Wadhams, Emily E. (1995). B.S., 1972; M.S., 1981, *University of Vermont*. Lecturer in History.
- Wadsworth, Thomas S. (1993). B.A., 1965, *Whittier College*; M.B.A., 1976, *Boston University*. Clinical Assistant Professor of Medical Technology.
- Waite, Ann P. (1994). B.A., 1983, *Mount Holyoke College*; M.D., 1990, *University of Rochester*. Instructor in Surgery.
- Wald, Steven L. (1981). B.S., 1970; M.D., 1975, *University of Nebraska*. Associate Professor of Neurosurgery and Pediatrics.
- Walker, H., Alan (1969). B.A., 1960; M.D., 1963, *University of Vermont*. Clinical Assistant Professor of Medicine.
- Wallace, Kevin L. (1989). B.A., 1976, *Amherst College*; M.D., 1983, *University of Virginia*. Clinical Assistant Professor of Surgery.
- Wallace, Susan S. (1988). B.S., 1959, *Marymount College*; M.S., 1961, *University of California, Berkeley*; Ph.D., 1965, *Cornell University*. Professor of Microbiology and Molecular Genetics.
- Walsh, Brian J. (1995). B.A., 1980, *William Paterson College*; M.A., 1993, *University of Vermont*. Adjunct Instructor in Education.
- Walsh, Roberta W. (1981). B.S., 1966, *Framingham State College*; M.S., 1970, *Cornell University*; Ph.D., 1988, *Brandeis University*. Associate Professor of Community Development and Applied Economics.
- Walsh, Susanna M. (1993). B.A., 1983; M.D., 1987, *University of Washington*. Clinical Instructor in Obstetrics and Gynecology.
- Walters, Carol P. (1972). A.B., 1963, *Albion College*; Ph.D., 1972, *University of Vermont*. Clinical Associate Professor of Pediatrics.
- Walworth, Candace C. (1984). B.A., 1966, *Smith College*; M.D., 1970, *Columbia University*. Clinical Assistant Professor of Medicine.
- Wang, Deane (1989). B.A., 1973, *Harvard University*; M.S., 1977, *Cornell University*; Ph.D., 1984, *Yale University*. Associate Professor of Natural Resources.
- Wang, Hongjie (1993). B.A., 1982, *Sichuan University*; M.A., 1991, *Iowa State University*; M.L.I.S., *Brigham Young University*. Library Instructor in Dana Medical Library.
- Wang, Jue-Fei (1992). B.A., 1977, *Inner Mongolian Teachers College*; M.Ed., 1981, *Beijing Normal University*; M.Ed., 1987, *University of Vermont*. Lecturer in Education.
- Ward, Carol R. (1990). B.A., 1973; M.D., 1977, *Case Western Reserve University*. Clinical Instructor in Obstetrics and Gynecology.
- Ward, Norman S. (1987). B.A., 1977, *University of Rhode Island*; M.D., 1981, *Brown University*. Associate Professor of Family Practice.
- Ware, Donald E. (1993). B.A., 1964, *Wesleyan University*; M.D., 1968, *Albany Medical College*. Clinical Associate Professor of Medicine.
- Warhol, Robyn R. (1983). B.A., 1977, *Pomona College*; Ph.D., 1982, *Stanford University*. Professor of English.
- Waring, Gary L. (1982). S.E., 1968, *Princeton University*; M.S.E., 1970, *University of California, San Diego*; M.D., 1974, *Pennsylvania State University*. Clinical Assistant Professor of Family Practice.
- Warner, Klaran W. (1990). B.S., 1965, *University of Michigan*; M.S., 1968, *Syracuse University*; Ph.D., 1989, *University of Texas, Dallas*. Adjunct Instructor in Communication Sciences.
- Warshaw, David M. (1983). B.S., 1973; M.S., 1975, *Rutgers University*; Ph.D., 1978, *University of Vermont*. Professor of Molecular Physiology and Biophysics.
- Wasserman, Richard C. (1983). B.A., 1971, *Williams College*; M.P.H. 1982, *University of Washington*; M.D., 1976, *Jefferson Medical College*. Associate Professor of Pediatrics.
- Waterhouse, Robert B. (1982). B.S., 1967, *Middlebury College*; M.D., 1971, *Thomas Jefferson University*. Clinical Associate Professor of Surgery.
- Waterman, G. Scott (1994). A.B., 1978, *Harvard University*; M.D., 1982, *University of Michigan*. Visiting Assistant Professor of Psychiatry.
- Waters, Brenda L. (1984). A.A., 1970, *Pine Manor College*; B.S., 1972; M.D., 1977, *University of Vermont*. Associate Professor of Pathology.
- Watkins, Matthew W. (1991). B.A., 1977, *Williams College*; M.D., 1985, *University of Pennsylvania*. Assistant Professor of Medicine.
- Watson, Frank J. (1971). B.A., 1958, *State University of New York, Cortland*; M.A., 1964, *Michigan State University*. Lecturer in Education.
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- Weaver, Donald L. (1990). B.A., 1979; M.D., 1984, *University of Vermont*. Assistant Professor of Pathology.
- Weaver, Margaret A. (1992). B.S.W., 1981, *University of Vermont*; M.S.W., 1984, *Boston University*. Adjunct Assistant Professor of Social Work.
- Weaver, Sheila O. (1990). B.S., 1982; M.S., 1984, *University of Illinois*. Lecturer in Statistics.
- Webb, George D. (1966). A.B., 1956, *Oberlin College*; M.A.T., 1957, *Yale University*; Ph.D., 1962, *University of Colorado*. Associate Professor of Molecular Physiology and Biophysics.
- Webber, Peter B. (1981). B.A., 1954, *Boxdoin College*; M.D., 1958, *University of Vermont*. Clinical Assistant Professor of Medicine.
- Webber-Jones, Joan E. (1991). B.S., 1963, *Moravian College*; Ed.M., 1968, *Boston University*. Adjunct Assistant Professor of Professional Nursing.
- Weber, Nancy B. (1992). B.A., 1965, *Wellesley College*; M.S., 1984, *University of Vermont*. Clinical Instructor in Family Practice.

- Wehry, Susan (1994). B.A., 1975; M.S., 1979; M.D., 1979, *University of Louisville*. Assistant Professor of Psychiatry.
- Weigand, Dori E. (1991). B.S.N., 1979, *University of Colorado*. Clinical Instructor in Obstetrics and Gynecology.
- Weiger, John G. (1964). B.A., 1955, *Middlebury College*; M.A., 1957, *University of Colorado*; Ph.D., 1966, *Indiana University*. Professor of Romance Languages.
- Weinberg, Donald N. (1991). B.S., 1977; M.D., 1986, *University of Vermont*. Clinical Assistant Professor of Medicine.
- Weiner, Sheldon (1970). B.A., 1960; M.D., 1964, *University of Vermont*. Professor of Psychiatry.
- Weisberg, Tracey F. (1991). A.B., 1979, *Mount Holyoke College*; M.D., 1983, *State University of New York, Stony Brook*. Clinical Instructor in Medicine.
- Weise, Wolfgang J. (1993). M.D., 1980, *University of Tubingen*. Assistant Professor of Medicine.
- Weisman, Lee F. (1994). B.S., 1971, *Ohio University*; M.S., 1976; M.D., 1986, *University of Vermont*. Assistant Professor of Family Practice.
- Weiss, Adam (1995). B.S., 1983, *Colby College*; Adjunct Instructor in Education.
- Welander, Charles E. (1991). B.S., 1967, *Wheaton College*; M.D., 1971, *University of Chicago*. Professor of Obstetrics and Gynecology.
- Welch, James G. (1968). B.S., 1955, *Cornell University*; M.S., 1957; Ph.D., 1959, *University of Wisconsin*. Professor of Animal and Food Sciences.
- Welch, Nancy E. (1995). B.A., 1988, *University of Massachusetts*; M.A., 1990, *University of Nebraska*. Assistant Professor of English.
- Welkowitz, Julie A. (1992). B.A., 1984, *Cornell University*; Ph.D., 1993, *University of Vermont*. Lecturer in Education.
- Weller, David L. (1967). B.S., 1962, *Rochester Institute of Technology*; Ph.D., 1966, *Iowa State University*. Professor of Agricultural Biochemistry.
- Wells, Christine A. (1988). B.A., 1981, *Mount Holyoke College*; M.A., 1984; Ph.D., 1987, *Clark University*. Adjunct Assistant Professor of Psychology.
- Wells, Joseph. (1968). B.S., 1956, *University of Rhode Island*; Ph.D., 1959, *Duke University*. Professor of Anatomy and Neurobiology.
- Weltin, Eugen E. (1966). D.Sc., 1959; Dipl., 1959, D.S., 1963, *Swiss Federal Institute of Technology*. Associate Professor of Chemistry.
- Wennberg, David E. (1994). M.Ph., 1992, *Harvard University*; M.D., 1987, *McGill University*. Instructor in Medicine.
- Wertheimer, Alan P. (1968). A.B., 1964, *New York University*; Ph.D., 1968, *Case Western Reserve University*. McCullough Professor of Political Science.
- Wesseling, Bernice F. (1986). B.A., 1959, *University of Illinois*; M.A., 1965, *University of Wisconsin*. Lecturer in Romance Languages.
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- Westenfeld, Fred W. (1990). A.S., 1981; B.S., 1983, *University of Vermont*. Clinical Instructor in Medical Technology.
- Westphal, Robert G. (1971). B.S., 1964, *University of Wisconsin*; M.D., 1967, *Case Western Reserve University*. Clinical Professor of Medicine.
- Wetzel, Daniel M. (1993). B.A., 1977, *Alfred University*; Ph.D., 1982, *Princeton University*. Research Assistant Professor of Neurology.
- Wexler, Richard M. (1984). B.A., 1971, *University of Pennsylvania*; M.D., 1975, *Johns Hopkins University*. Clinical Assistant Professor of Medicine.
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- Wheeler, John C. (1978). D.M.D., 1966, *University of Pennsylvania*; M.D., 1969, *Albany Medical College*. Clinical Assistant Professor of Plastic Surgery.
- Whitaker, Timothy M. (1988). B.A., 1979, *Duke University*; M.D., 1984, *Bowman Gray School of Medicine*. Associate Professor of Psychiatry.
- Whitcomb, Phyllis E. (1970). B.S., 1965, *Castleton State College*; M.Ed., 1970; C.A.S., 1977, *University of Vermont*; Ed.D., 1980, *Boston University*. Professor of Social Work and Education.
- White Jr., E. Chandlee (1993). A.B., 1963, *Earlham College*; M.E.D., 1973, *Antioch University*; M.S., 1989, *Simmons College*. Library Assistant Professor in Bailey/Howe Library.
- White, Brenda M. (1986). B.S., 1974, *Meredith College*; M.D., 1978, *Bowman Gray School of Medicine*. Clinical Assistant Professor of Pediatrics.
- White, Jonathan C. (1993). B.S., 1974, *Massachusetts Institute of Technology*; M.D., 1984; Ph.D., 1979, *Stanford University*. Clinical Assistant Professor of Radiology.
- White, Richard L. (1982). B.A., 1955, *Carleton College*; B.S., 1957, *University of South Dakota*; M.D., 1959, *University of Minnesota*. Clinical Assistant Professor of Surgery.
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- Whitmore, David G. (1995). B.A., 1968, *Johns Hopkins University*; Ph.D., 1974, *University of Vermont*. Lecturer in Business Administration.
- Whitney, John F. (1993). B.S., 1986, *Cornell University*; M.D., 1990, *Albany Medical College*. Clinical Instructor in Medicine.
- Whitney, Philip G. (1981). A.B., 1955; M.D., 1960, *University of Vermont*. Clinical Associate Professor of Medicine.
- Whitney, Stuart L. (1987). B.S., 1981, *Saint Joseph's College*; M.S., 1987, *University of Arizona*. Lecturer in Professional Nursing.
- Widrick, Gary C. (1985). B.A., 1969, *Syracuse University*; M.S.W., 1974, *State University of New York*; M.A., 1986; Ph.D., 1989, *University of Vermont*. Research Assistant Professor of Psychology and Lecturer in Social Work.
- Wigness, Clyde, R. (1970). B.M.E., 1959, *Morningside College*; M.M., 1961, *Boston University*; D.M.A., 1970, *University of Iowa*. Professor of Music.
- Wilberg, James W. R. (1991). B.S., 1978, *Western Illinois University*; M.D., 1983, *University of Illinois*. Clinical Assistant Professor of Obstetrics and Gynecology.
- Wilcke, Burton W. (1990). B.A., 1969, *Harvath College*; M.S., 1971, *Wagner College*; Ph.D., 1976, *Temple University*. Clinical Instructor in Medical Technology.
- Wilcox, Gilbert M. (1993). B.S., 1966, *Brown University*; M.S., 1967, *University of Wisconsin*; M.D., 1971, *Tufts University*. Clinical Instructor in Medicine.
- Wilkinson, Barbara J. (1980). B.A., 1969, *University of Maine, Orono*; M.D., 1973, *Boston University*. Clinical Assistant Professor of Pediatrics.
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- Wilks, Joseph L. (1980). B.S., 1965; M.D., 1969, *University of Michigan*. Clinical Associate Professor of Obstetrics and Gynecology.



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- Williams, Arthur G. (1995). B.C.E., 1955, Rensselaer Polytechnic Institute; M.S., 1964, University of Bridgeport. Adjunct Instructor in Education.
- Williams, Byron K. (1990). B.S., 1967; M.A., 1971, Oklahoma University; M.S., 1979; Ph.D., 1979, Colorado State University. Research Associate Professor of Natural Resources.
- Williams, Robert K. (1993). B.S., 1978, Cornell University; M.D., 1982, Pennsylvania State University. Assistant Professor of Pediatrics and Anesthesiology.
- Williams, Ronald W. (1970). B.S., 1962, Christian Brothers College; Ph.D., 1966, Iowa State University. Professor of Electrical Engineering.
- Williams, Stuart E. (1980). B.A., 1972, Hamilton College; M.D., 1975, Albert Einstein College of Medicine. Clinical Assistant Professor of Family Practice.
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- Williams, Wayne W. (1976). B.A., 1970, Lawrence University; M.A., 1972; Ph.D., 1975, University of Wisconsin. Professor of Education.
- Williams, William B. (1986). B.S., 1977, Southwestern Oklahoma State University; M.D., 1982, University of New Mexico. Assistant Professor of Medicine.
- Williamson, James T. (1993). B.A., 1981, Connecticut College; M.A., 1990, University of Vermont. Lecturer in English.
- Williamson, Kathy T. (1995). B.S., 1972, Plymouth State College. Adjunct Instructor in Education.
- Willmuth, Lewis R. (1970). B.S., 1963; M.D., 1963, University of Arkansas. Associate Professor of Psychiatry.
- Willmuth, Mary E. (1978). B.A., 1969, Sussex University; M.F.A., 1972, Maryland Institute College of Art; Ph.D., 1987, University of Vermont. Clinical Associate Professor of Psychiatry and Clinical Associate Professor of Psychology.
- Wilson, Donald W. (1982). B.A., 1961, Harvard University; M.D., 1965, Cornell University. Clinical Assistant Professor of Surgery.
- Wilson, James M. (1986). B.A., 1977, California Institute of Technology; M.A., 1979; Ph.D., 1981, University of California, Los Angeles. Associate Professor of Mathematics.
- Wilson, Lynn M. (1985). B.S., 1978; M.S., 1985, University of Wisconsin, Stout. Extension Instructor in Community Development and Applied Economics.
- Wilson, Nathan E. (1993). B.S., 1978, University of Massachusetts, Amherst; M.D., 1982, University of Massachusetts. Clinical Assistant Professor of Medicine.
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- Wilson, Paula A. (1990). B.A., 1978; Ph.D., 1989, University of Washington. Assistant Professor of Business Administration.
- Winchenbach, Curtis L. (1984). B.A., 1972, Northeastern University; M.D., 1977, George Washington University. Clinical Assistant Professor of Medicine.
- Wing, Delight A. (1979). B.A., 1971, Stanford University; M.D., 1975, University of Vermont. Clinical Instructor in Pediatrics.
- Winget, Joseph F. (1994). B.A., 1981, Denison University; M.D., 1986, Tufts University. Assistant Professor of Medicine.
- Winn, Washington C., Jr. (1977). B.A., 1963, Yale University; M.D., 1967, University of Virginia. Professor of Pathology.
- Winslow, Mary E. (1994). B.A., 1987, University of Maine; M.S., 1990, University of Vermont. Lecturer in Communication Sciences.
- Winstead-Fry, Patricia E. (1988). B.S.N., 1965, Saint John College; M.A., 1970; Ph.D., 1974, New York University. Professor of Professional Nursing.
- Winter, Kari J. (1992). B.A., 1981, Indiana University; Ph.D., 1990, University of Minnesota. Assistant Professor of English.
- Witkin, Stanley L. (1991). A.A., 1967, Miami Dade Junior College; B.A., 1969, University of Minnesota; M.S.S.W., 1974; Ph.D., 1976, University of Wisconsin. Professor of Social Work.
- Witmer, William T. (1992). B.A., 1984, Ohio Wesleyan University; M.D., 1988, Vanderbilt University. Clinical Instructor in Medicine.
- Wolk, Arthur D. (1970). B.S., 1941; M.D., 1943, University of Vermont. Clinical Instructor in Pediatrics.
- Wollensak, Richard C. (1989). B.S., 1982, University of Vermont; D.D.S., 1987, Loyola University of Chicago. Clinical Instructor in Surgery.
- Wood, Beatrice J. (1978). M.A., 1971, University of Fribourg. Lecturer in German.
- Wood, Sandra G. (1994). B.S.N., 1985, University of Florida; B.S.N., 1989, University of Pennsylvania. Clinical Instructor in Obstetrics and Gynecology.
- Woodman, Martha (1984). B.S., 1970, University of Kansas; M.B.A., 1978, University of Missouri, Kansas City. Lecturer in Business Administration.
- Woods, Steven (1993). B.S., 1987; M.A., 1989, Kansas State University. Lecturer in Theatre.
- Woodworth, Robert C. (1961). B.S., 1953, University of Vermont; Ph.D., 1957, Pennsylvania State University. Professor of Biochemistry.
- Woolf, Arthur G. (1980). B.A., 1973, Cornell University; M.S., 1979; Ph.D., 1980, University of Wisconsin. Associate Professor of Economics.
- Woolfson, A. Peter. (1970). B.A., 1958; M.A., 1961, University of Toronto; Ph.D., 1967, State University of New York, Buffalo. Associate Professor of Anthropology.
- Wootton, Dorothy J. (1973). B.S., 1957, Cortland State Teachers College; M.S., 1969, Columbia University. Associate Professor of Dental Hygiene.
- Worden, John K. (1970). B.A., 1962, Bates College; M.S., 1963; Ph.D., 1971, Syracuse University. Research Professor of Family Practice.
- Worley, Ian A. (1970). B.S., 1964; B.A., 1964, Youngstown State University; M.S., 1966, Canterbury University; Ph.D., 1972, University of British Columbia. Professor of Botany.
- Wright, Robert K. (1966). A.B., 1963, Middlebury College; M.A., 1964; Ph.D., 1966, Columbia University. Professor of Mathematics.
- Wright, Stephen F. (1991). B.S., 1978, Pennsylvania State University; M.S., 1988; Ph.D., 1988, University of Minnesota. Lecturer in Geology.
- Wright, William C. (1974). B.A., 1962, Yale University; M.D., 1966, University of Pennsylvania. Clinical Assistant Professor of Pediatrics.
- Wu, Jun-Ru. (1987). M.S., 1981; Ph.D., 1985, University of California, Los Angeles. Associate Professor of Physics and Mechanical Engineering.
- Xing, Zhiquan (1994). B.A., 1983, Shanxi University; M.A., 1988, Eastern Michigan University; Ph.D., 1993, University of Michigan. Visiting Assistant Professor of History.
- Xue, Guoliang (1993). B.S., 1981; M.S., 1984, Qufu Normal University; Ph.D., 1991, University of Minnesota. Assistant Professor of Computer Science.
- Yadav, Dharam P. (1970). B.S., 1957, St. Stephen's College; M.A., 1960, Delhi University; Ph.D., 1967, Michigan State University. Associate Professor of Psychology.
- Yamasaki, Chitose (1994). B.A., 1988, Kansai University; M.A., 1994, University of Nebraska, Kearney. Lecturer in History.

- Yandell, David W. (1993). B.A., 1978, *University of Colorado, Boulder*; S.M., 1983; S.C.D., 1987, *Harvard University*. Associate Professor of Pathology.
- Yang, Jianke (1994). B.S., 1989, *Tsinghua University*; Ph.D., 1994, *Massachusetts Institute of Technology*. Assistant Professor of Mathematics.
- Yang, Jie (1994). B.S., 1982, *Nanjing University*; M.A., 1983; Ph.D., 1987, *Princeton University*. Assistant Professor of Physics.
- Yang, Yuanyuan (1992). B.S., 1982; M.S., 1984, *Tsinghua University*; M.S.E., 1989; Ph.D., 1992, *Johns Hopkins University*. Assistant Professor of Computer Science.
- Yano, Junji (1995). B.S., 1973; M.D., 1975, *Kanazawa University*; Ph.D., 1984, *Hiroshima University*. Research Associate in Biology.
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- Yates, Renwick L. (1993). *Instructor in Military Studies*.
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- Yoe, James T. (1993). B.S., 1979, *Old Dominion University*; M.A., 1985; Ph.D., 1990, *University of Vermont*. Adjunct Assistant Professor of Psychology.
- Young, Jeffrey A. (1991). B.S., 1973; M.S., 1976, *Purdue University*; M.D., 1980, *University of Kentucky*. Clinical Assistant Professor of Radiology.
- Young, Linda W. (1986). B.A., 1976; Ph.D., 1987, *University of California, Berkeley*. Assistant Professor of Economics.
- Young, Stacey L. (1994). B. A., 1989, *University of Texas, Arlington*; M.A., 1991; Ph.D., 1994, *University of California, Los Angeles*. Assistant Professor of Psychology.
- Youngblood, Denise J. (1988). B.A., 1974, *Wright State University*; M.A., 1975; Ph.D., 1980, *Stanford University*. Associate Professor of History.
- Yu, Jun (1990). B.S., 1982, *Nanjing Institute of Meteorology*; Ph.D., 1988, *University of Washington*. Associate Professor of Mathematics.
- Yuan, Susan J. (1988). B.A., 1964, *Occidental College*; D.I.P., 1978, *St. Nicholas College*; C.A.S., 1985, *University of Hong Kong*. Lecturer in Education.
- Zablotsky, Nevin (1990). B.A., 1970, *Brooklyn College*; D.M.D., 1974, *Tufts University*. Clinical Instructor in Dental Hygiene.
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- Zarate, Armando E. (1970). B.A., 1951, *Colegio Nacional, Cordoba*; M.A., 1957, *University of Cordoba*; M.A., 1968; Ph.D., 1970, *University of California, Riverside*. Professor of Romance Languages.
- Zarka, Matthew A. (1994). B.A., 1980; M.A., 1982, *University of California, Santa Barbara*; M.D., 1986, *St. Louis University*. Assistant Professor of Pathology.
- Zheng, Shiping (1992). M.A., 1986; M.A., 1988; M.Phil., *Yale University*, 1992. Assistant Professor of Political Science.
- Zhu, Zheming (1994). B.S., 1964, *Nanjing University*. Research Associate Professor of Physics.
- Zieff, Ralph (1994). A.B., 1962, *Harvard University*; Ph.D., 1971, *University of North Carolina, Chapel Hill*. Clinical Assistant Professor of Psychiatry.
- Zimmermann, Paul A. (1991). B.S., 1984, *Georgetown University*; M.D., 1988, *State University of New York, Syracuse*. Clinical Instructor in Medicine.
- Zimmerman, Steven H. (1995). B.A., 1969, *Swarthmore College*; M.D., 1973, *Tufts University*. Assistant Professor of Medicine.
- Zimny, Nancy J. (1980). B.S., 1970, *University of Pennsylvania*; M.S., 1979, *Boston University*. Associate Professor of Physical Therapy.
- Zingeser, James A. (1990). D.V.M., 1979, *Michigan State University*; M.P.H., 1990, *University of Michigan*. Adjunct Assistant Professor of Animal and Food Sciences.
- Ziskin, Marvin C. (1979). A.B., 1958; M.D., 1962, *Temple University*; M.S., 1965, *Drexel University*. Adjunct Professor of Physics.
- Zsoldos, Frank J. (1995). A.B., 1960; M.D., 1965, *West Virginia University*. Clinical Instructor in Medicine.
- Zucker, Barbara M. (1979). B.S., 1962, *University of Michigan*; M.F.A., 1975, *College Art Association*; M.A., 1977, *Hunter College*. Professor of Art.
- Zwick, Daniel S. (1982). B.S., 1972, *Hebrew University*; M.S., 1975; Ph.D., 1980, *University of Oregon*. Associate Professor of Mathematics and Electrical Engineering.

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