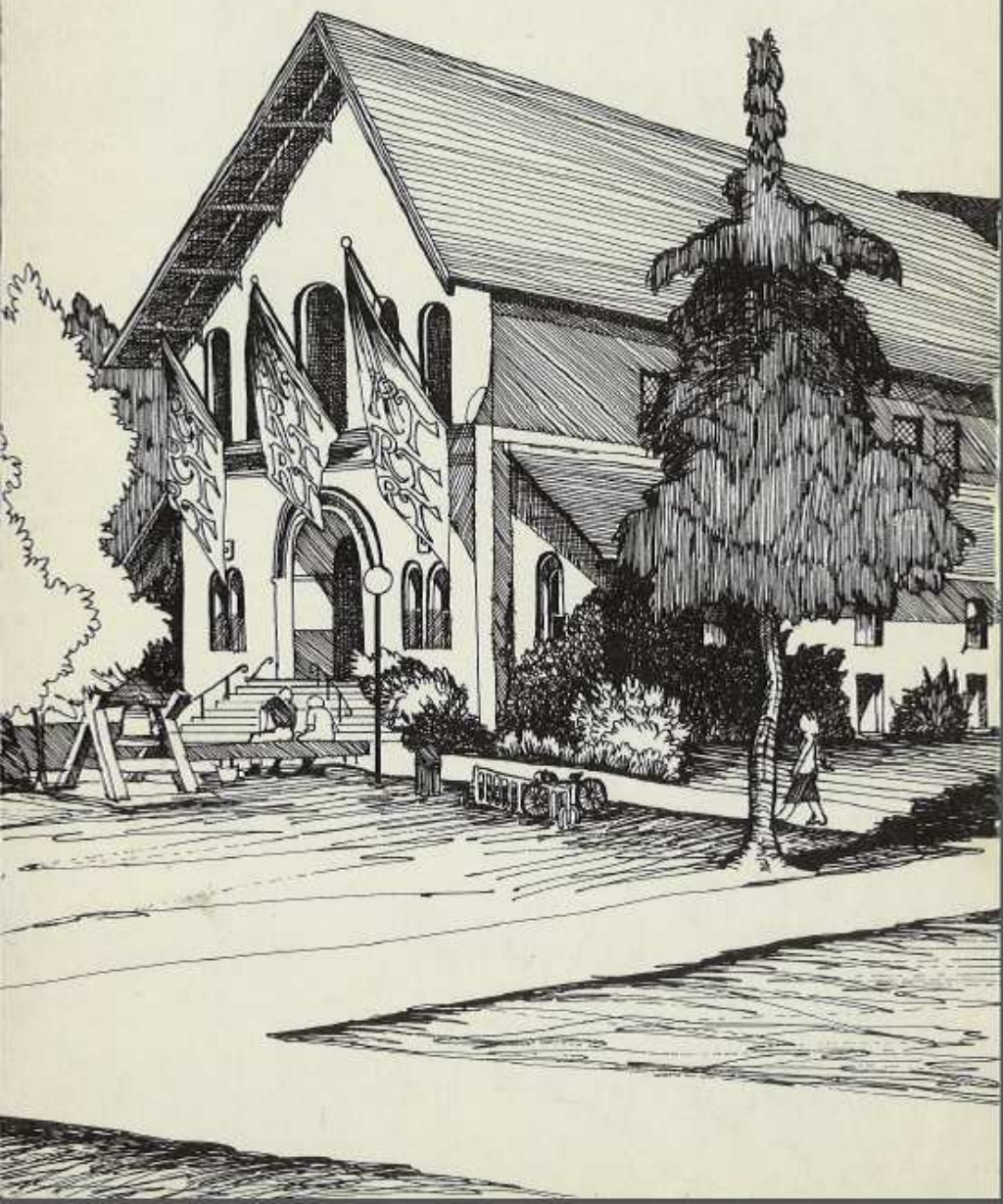


The University of Vermont

1978-79 Catalog



FOUNDED 1791

BURLINGTON, VERMONT

THE CATALOGUE 1978-1979

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

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

It is the policy of the University of Vermont not to discriminate against any person on the basis of sex, race, national origin, color, religion, age, or physical/mental handicap, in accordance with Title VI of the Civil Rights Act of 1964, Title VII of the Civil Rights Act of 1972 (Executive Order 11246), Title IX of the Higher Education Act of 1972, the Age Discrimination Act of 1967 (as amended), and Section 504 of the Rehabilitation Act of 1973. Inquiries regarding affirmative action policies and/or programs should be directed to the Assistant to the President for Human Resources.

The University has embarked on a program to remove architectural barriers to make facilities accessible to and usable by the handicapped. Questions should be referred to the Office of Architectural Barrier Control.

Produced by the Office of Public Relations in cooperation with the Office of the Vice President for Academic Affairs. William A. Carey, Director. Editing: Wendy Smith, Marion Phillips. Design: Arnolds Vilcins. Typeset: Denise (Daignault) Tansey

CORRESPONDENCE

Admissions

Requests for a catalogue, or information concerning admissions policies and procedures, rooms and tuition *Director of Admissions*

Academic Divisions

College of Agriculture	<i>Dean</i>
College of Arts and Sciences	<i>Dean</i>
College of Education and Social Services	<i>Dean</i>
College of Engineering, Mathematics and Business Administration	<i>Dean</i>
School of Home Economics	<i>Director</i>
School of Natural Resources	<i>Director</i>
Environmental Program	<i>Director</i>
Graduate College	<i>Dean</i>
Division of Health Sciences	<i>Dean</i>
College of Medicine	<i>Dean</i>
School of Nursing	<i>Director</i>
School of Allied Health Sciences	<i>Director</i>
Continuing Education	<i>Dean</i>
Summer Session	<i>Assistant Dean</i>
Evening Division	<i>Director</i>

ACCREDITATIONS

UNIVERSITY: New England Association of Schools & Colleges.

NATURAL RESOURCES: Forestry Program —
Society of American Foresters.

ENGINEERING, MATHEMATICS & BUSINESS ADMINISTRATION:
Engineering Programs (Mechanical, Electrical, Civil) — Engineer's Council
for Professional Development.

ALLIED HEALTH SCIENCES: Dental Hygiene — American Dental Association.
Medical Technology — National Accrediting Agency for Clinical Laboratory.
Sciences — Council on Medical Education, American Medical Association.
Physical Therapy — American Physical Therapy Association — American
Medical Association.
Radiological Technology — American College of Radiology, American Society of
Radiologic Technologists, American Medical Association.

NURSING: Professional Nursing — National League for Nursing.
Technical Nursing — National League for Nursing

ARTS & SCIENCES: Speech Pathology — American Speech & Hearing Association.
Music — National Association of Schools of Music.
Clinical Psychology — American Psychology Association.

MEDICINE: American Medical Association, Association of American
Medical Colleges.

AGRICULTURE: Occupational Education — National Council for Accreditation
of Teacher Education.

EDUCATION: National Council for Accreditation of Teacher Education.

Introduction

The earliest public action concerning a university in Vermont was the inclusion in the constitution of the Independent Republic of Vermont of a section dealing with education. In this act adopted at Windsor, July 2, 1777, Section 40 states in part that "one grammar school in each county and one university in the state ought to be established by direction of the General Assembly." No action was taken by the Assembly to establish a University except that in granting charters to towns, it did require that one right of land be established for the endowment of a college or university.

By 1785 there was a substantial amount of public sentiment in favor of establishing a college or university in Vermont. In that year Elijah Paine of Williamstown offered the General Assembly the sum of 2,000 pounds. Four years later Ira Allen offered the sum of 4,000 pounds. These and other offers caused the General Assembly to appoint a committee to study the matter and to canvass the state in order to determine where the university should be located. This committee reported to the session of 1791 at which time the General Assembly decided that a university was to be founded to serve the state. A ballot was taken on the question of location and a decision was made in favor of Burlington, presumably because of the substantial support offered by Ira Allen, the Rev. Samuel Williams, and their associates. The General Assembly further voted to create a committee to draft a charter of the University. The report of the committee was adopted with amendments on November 3, 1791, as the charter law of The University of Vermont. The University became the twentieth college in the United States and the fifth in New England chartered to confer the bachelor's degree. It is of worthy note that the University is the second to be established by a state legislature after the formation of the United States. The action of the 1791 Legislature also makes The University of Vermont the oldest institution of higher education in the Green Mountain State.

Thus did the founding Legislature of Vermont establish a university which was to develop like no other in the fledgling nation.

While the enabling legislation provided for funding to come from rents, those were often fixed at "\$.25 per acre as long as grass is green and water runs," and in any event were not reliably collectable.

One result is the tradition, born of necessity, which has seen The University of Vermont develop in many of the same ways as the private institutions of the country have developed, with a substantial reliance on alumni and other private philanthropy.

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 — still in use today — 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.

Other buildings made possible by private philanthropy include Waterman Memorial, Southwick, Fleming Museum, Converse, Dewey and Lafayette Halls.

Medical alumni and other friends raised approximately \$7,000,000 to match federal grants to make possible the Given Medical Building, its Medical Alumni Building wing, and the Dana Medical Library. In addition to a challenge grant from the Dana Foundation, the project attracted a \$2,000,000 grant from the Given Foundation, the single largest building gift the University has received to date.

Alumni and other friends also raised more than \$1,000,000 of the \$3,000,000 cost of the Patrick Gymnasium, Gutterson Field House, and Forbush Pool complex. The remainder is being paid by students, through retirement of a bond issue. In like fashion, student rents have made possible most of the campus residence halls, which currently house about 4,000 of the University's 7,600 undergraduates.

Currently a \$1,000,000 campaign for private support is being conducted for support of the \$4,300,000 addition to Bailey Library. J. Warren and Lois H. McClure have pledged \$500,000 in matching funds for the drive and the addition will be named for Mrs. McClure's father, David W. Howe, a 1914 alumnus and long time publisher of The Burlington Free Press.

The University of Vermont 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 Emeritus 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 non-military institution to have offered engineering courses, and early alumni of the University included men such as John Kasson who was instrumental in founding the international postal system; and Henry Raymond, a founder of The New York Times.

Tucked in the northwest corner of the Ira Allen Chapel grounds is a memorial to a late 19th century graduate of this University, philosopher John Dewey, whose ideas about practical education are still debated with passionate vigor.

Ten Academic Divisions

By contemporary standards, The University of Vermont is a relatively small university.

Its 7,600 undergraduates enrolling in eight colleges and schools — the Colleges of Agriculture; Arts and Sciences; Education and Social Services; and Engineering, Mathematics and Business Administration; and the Schools of Allied Health Sciences; Home Economics; Natural Resources; and Nursing — share the 420 acre main campus with some 900 students enrolling in the Graduate College and another 320 in the College of Medicine.

The Division of Continuing Education offers courses on campus and in many communities throughout the State of Vermont during the fall and spring semesters and during the Summer Session.

The largest single share (about 30 per cent) of the University's current total operating budget of \$77 million is obtained from student tuitions.

Grants and contracts (the University is among the top 100 U.S. institutions of higher learning in competition for federal research, training and equipment grants) account for about 25 per cent of the budget.

The state appropriation is currently about 17 per cent of the total budget.

The remainder comes from a variety of sources, including alumni and other private philanthropy, endowment, sales and services and auxiliary enterprises.

Endowed Chairs

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, honoring Azarias Williams of Concord, Vt., 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, established in 1867 to honor James Marsh, distinguished UVM president and philosopher of the 1830's. Many alumni contributed to the fund which established this chair.

The Pomeroy Professorship of Chemistry, 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, established in 1881 by John Purple Howard, a Burlington resident who was a generous benefactor both of the University and of the City of Burlington.

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

The Converse Professorship in Commerce and Economics, 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.

The Thayer Professorship of Anatomy, 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.

The McCullough Professorship of Political Science, established in 1926 through grants made by Gov. and Mrs. John G. McCullough of Bennington, Vt. 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.

The Perkins Professorship of Zoology, established in 1931 to honor George H. Perkins, for sixty-four years as 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, Mass.

The Shipman Professorship of Ophthalmology, established in 1934 by a bequest from Dr. Elliot W. Shipman, M.D., 1885. After beginning his practice in Vergennes, Vt., and studying ophthalmology in Berlin, Dr. Shipman practiced medicine in Richmond Hill, N.Y., for thirty-five years.

The Corse Professorship of English Language and Literature, 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 Stalingrad (Petrograd) for seventeen years before the Russian Revolution of 1917.

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

The Sanders Professorship, established in 1968 as a chair endowed by the alumni, honoring the Rev. Daniel Clarke Sanders, first president of the University.

Statement of Purpose

THE UNIVERSITY OF VERMONT

The University of Vermont is a community of scholars, and it exists to promote the survival and enrichment of man and his environment by contributing to the improvement in the quality of life in Vermont and the larger society . . . broadly conceived to encompass the educational, cultural, social, medical, economic, and technological dimensions of human experience.

The University aspires to contribute to the improvement in the quality of human experience and the conservation of the environment through the performance of three broad missions.

These include transmission of knowledge and understanding through its education programs;

Expansion and organization of knowledge and understanding through research and other creative endeavors; and

Dissemination of knowledge and understanding and the application of such knowledge and understanding to solving problems of importance to Vermont, the region, and society at large.

Together, these missions comprise the public service role of the University of Vermont and they provide the basis for its general educational goals.

The University Libraries

In the Guy W. Bailey 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 the 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 state and the federal government. Space will nearly double with the completion of the Howe addition to the Bailey

Library, expected to open in the fall of 1979.

A separate Physics and Chemistry Library is located in the Cook Physical Science 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.

Conferences and Institutes

An increasing number of groups hold educational conferences, institutes and seminars on the campus of the University, which is pleased to cooperate in making its facilities available for this purpose whenever it is possible to do so. Charges are made to cover costs to the University.

Further information may be obtained through the Office of Conferences and Institutes.

VERMONT EDUCATIONAL TELEVISION

Vermont Educational Television is the public television network owned and operated by the University of Vermont, serving the state.

With studios and offices on the Fort Ethan Allen campus, the network provides an instructional service to schools, college courses for credit, programs for children out-of-school, and a broad spectrum of Eastern Educational Network and Public Broadcasting Service programs for Vermonters. Locally produced programs address the concerns and issues.

Programs are broadcast over WETK-TV, channel 33, Burlington; WVTB, channel 20, St. Johnsbury; WVER, channel 28, Rutland; WVTA, channel 41, Windsor; and on channels 74, 76, 79 at Manchester, Wilmington, and Bennington.

Student Life

STUDENT PERSONNEL SERVICES

A STATEMENT OF MISSION

Until recently, the student personnel function at most universities was thought to be a function of control of student behavior through rule enforcement and strict discipline. As modern universities began to re-evaluate their missions they assessed the total educational experience on their campuses. This led to a concern about the quality of student life on campus and the impact of campus environments on students. Such was the beginning of Student Personnel Services as they are known today. As a result, student personnel educators began to develop programs to meet some specific developmental needs that were common to college age young adults.

It should be recognized that students are going through a period of rapid personal growth while on the college campus. In addition to developing new academic skills, they are being challenged to pursue new ideas, evaluate their values systems, change existing attitudes, and investigate new life styles. They are exploring future career options and learning social and interpersonal skills.

Therefore, the broad focus of the Student Personnel Services at the University of Vermont is to provide support services to students during this time of intense personal development and intellectual growth, in addition to playing a leadership role in developing experiences, policies, and programs to provide learning and leadership opportunities for students in concert with the formal instructional mission of the institution.

To accomplish this mission the student life areas are divided into various functional departments and programs. Each of these provides or coordinates support services and educational experiences to meet student needs.

COUNSELING AND TESTING CENTER

The Counseling and Testing Center is a human resource center available on a no-fee basis to UVM matriculated students and on a limited basis to faculty and staff. The Center is concerned with increasing the power of individuals and groups to live more effectively and more confidently through greater understanding of the self, others, and the nature of change. A professional staff offers confidential individual and group counseling for a wide range of concerns — educational, vocational, personal and social. The Center also provides a testing service ranging from vocational testing to national exams. Also available is an outreach program with a variety of growth experiences; study skills workshops, women's groups, life style planning, values clarification, and such. Referral to other appropriate specialties such as Psychiatric Services, Reading Center, and Career Planning and Placement is also available.

146 South Williams Street
(802) 656-3340

CAREER PLANNING AND PLACEMENT

The Office of Career Planning and Placement is organized to provide all students with comprehensive assistance in exploring and implementing their career objectives. This function consists of two major efforts. The first is to provide direct assistance to students in clarifying career objectives based on their own skills, interests, needs and abilities. The primary emphasis is through self-awareness, occupational awareness, skill development, and finally entry into the career areas which are complementary to their desired lifestyles. This process is accomplished through one-to-one counseling and/or small group workshops. Along with providing career counseling, students will find the information contained in the Career Resource Library helpful in developing their career goals. The library, which is located within this office, contains literature on various fields, occupational outlooks, salary surveys which are updated four times per year, government opportunities at all levels, as well as a variety of literature describing current career opportunities in both large and small corporations in the private sector. For those students contemplating further graduate study, the library contains two complete guides to all graduate programs in the country and a variety of graduate school catalogues from other universities. This information is expanding and being updated continuously in the belief that effective choices must be based on current and reliable information.

After helping a student to develop some tentative goals the office can assist in his/her attempts to implement these goals. The office has a very active on-campus recruiting program which brings local and national employer representatives to campus for employment interviews. All part-time and summer employment opportunities are posted and made available to students attempting to offset a portion of their educational expenses or gain experience in a field of their interest. To assist students in their employment search, the staff will provide help in developing an effective resume, conducting employment interviews, developing a credential file, and assist in drafting an overall employment search program.

Students are encouraged to make use of the Office of Career Planning and Placement early in their educational program. Having a goal or direction to his/her education will enable the student to make effective career-related decisions.

109 South Prospect Street
(802) 656-3450

FINANCIAL AID

In order to be eligible to apply for financial aid you must be a U.S. citizen or in the U.S. for other than a temporary purpose and intend to become a permanent resident. You must also be at least a half-time student enrolled in a degree program. Students enrolled (or planning to enroll) in at least six credit hours, who believe they are unable to meet college expenses, are urged to apply to the Office of Financial Aid for assistance in the form of grants, loans, and employment. Entering undergraduate students who wish to apply for aid may do so by: (1) indicating their intention on the Admissions Application Form, and (2) submitting the Family Financial Statement directly to the American College Testing Program in Iowa City, Iowa.

The Family Financial Statement Forms may be obtained from local high

schools or by request to the Office of Financial Aid, 330 Waterman Building, University of Vermont, Burlington, VT 05405. Forms should be submitted to American College Testing no later than March 1.

Undergraduates seeking fellowships for graduate study, such as The Danforth Graduate Fellowship and The Rhodes Scholarship, should make initial inquiries in the The Dean's Office of The College of Arts and Sciences or in The Office of The Graduate College.

ALL STUDENTS REQUESTING AID SHOULD ALSO APPLY TO THE FOLLOWING SOURCES:

A. The Basic Educational Opportunity Grant Program (BEOG).

Check the appropriate section of the Family Financial Statement.

B. State Agencies.

1. **Vermonters:** Vermont residents must apply to the Vermont Student Assistance Corporation, 5 Burlington Square, Burlington, VT 05401.

2. **Non-Vermonters:** The University has very little scholarship/grant aid for non-resident applicants; thus, aid usually is in the form of long-term loans and/or work-study assistance. Non-residents should explore scholarship opportunities available in their home states and communities.

ALL STUDENTS MUST REAPPLY FOR AID EACH YEAR: Continuing students can obtain an Upperclass Financial Aid Application from the Office of Financial Aid. They must also submit the Family Financial Statement to the American College Testing Program. Both forms are available early in the Spring semester from the Office of Financial Aid. Preference is given to those students who have complete applications on file by May 1. Applications received after that date will be processed in chronological order according to the date received, subject to the availability of funds.

The aid programs administered by the Financial Aid Office fall into the general categories of federal and institutional grants, federal and institutional long-term loans, and the college work-study program. Specifically, the University participates in the Supplemental Educational Opportunity Grant Program, the National Direct Student Loan Program, the federal College Work-Study Program, both the Nursing Health Profession Grant and Nursing Health Profession Loan Program and the Medical Health Profession Loan Program. On the basis of your Financial Aid Application and the financial information accompanying it, you will be considered automatically for all such programs for which you are eligible. Aid is most often awarded in combinations or "packages" of the various types of aid. Almost all awards include some loan or work-study; the application lets you state a preference.

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

1. **STUDENT BUDGET**, comprised of tuition, required fees, room and board, books and supplies and moderate personal expenses.
2. **EXPECTED PARENTAL SHARE** of educational cost as determined by the financial aid application.
3. **STUDENT SELF-HELP**, usually from earnings or private loans or savings.

4. ASSISTANCE RECEIVED FROM OTHER SOURCES, such as private scholarships/grants, state agency awards, etc.

Standard student budgets for the 1978-79 academic year are shown below. Actual costs for subsequent years may be higher if tuition, fees and/or housing increase.

	In-State	SINGLE	Out-of-State
Tuition	\$1,300		\$3,735
Fees		160	
Room		970	
Board**		830	
Personal		500	
Books/Supplies	—	190	—
Totals	\$3,950		\$6,385

	In-State	MARRIED*	Out-of-State
Tuition	\$1,300		\$3,735
Fees		160	
Room		2,160	
Board**		1,305	
Personal		1,305	
Books/Supplies	—	190	—
Totals	\$6,420		\$8,855

* For dependent children the budget is increased by \$800 for each of the first two children, \$500 for each additional child.

** Average cost reflects additional allowance for meals above basic plan and is used for both on and off-campus students.

The University of Vermont awards financial aid without consideration of sex, race, color or national origin.

330 Waterman Building
(802) 656-3156

VETERAN AFFAIRS

This office provides support, coordination of services, and advising to any veteran or dependent eligible for benefits under Federal Law, Chapters 31, 34, or 35. Those persons eligible for these benefits should contact the office at least one month prior to registration each semester. Those persons wishing to register for benefits should be prepared to present their certificate of eligibility to the Veterans Coordinator.

It is important that all veterans and dependents keep in contact with this office for the latest information with regard to benefits and requirements.

Also, those students involved in the Veterans Program should contact this office in the event of any change in credit load, dependency status, address, or major.

318 Waterman Building
(802) 656-4220

READING CENTER

The University Reading Center, located in the Waterman Building, provides a free program for students who wish to improve their reading, vocabulary and study techniques. Some tutorial services are also available. The first semester classes are open primarily to freshmen whose college entrance examinations indicate such a need. However, other students who are in need of improvement are urged to enroll in the reading program. Students who enroll are expected to attend regularly throughout the semester.

406 Waterman Building
(802) 656-3838

SPEECH AND HEARING CENTER

Services of the Speech and Hearing Center, located in Allen House, are free to students in the University who have problems of speech, language, voice, and hearing: for example, problems of articulation, dialect, stuttering, inefficient voice production, hearing loss, and those problems associated with such conditions as cleft palate and cerebral palsy.

Allen House
(802) 656-3861

CENTER FOR SERVICE-LEARNING

The Center for Service-Learning assists students in participating in internships and volunteer work as a part of their educational program at the University.

The terms "service" and "learning" have been linked to emphasize that structured learning experiences, meeting personal, career, and academic needs simultaneously, can be developed in the context of a wide variety of community projects and tasks. Students may make significant contributions to an organization or project while deriving important educational value from the process of integrating service and learning.

Through service-learning students have worked in education, administration of justice, social services, health, economic development, environmental action, governmental, recreation or business settings.

Graduate, undergraduate and adult, "transition" students have utilized service-learning to achieve their goals. Students often become involved initially as volunteers, either through contract with a sponsoring agency or program or through a student project such as Big Brother/Big Sister, Council for Exceptional Children, Adopt-A-Grandparent, Vermont Special Olympics, GYST (Get Your Stuff Together), or coordinate a project as a part of the Student Community in Action (SCIA). SCIA is an organization of student project coordinators, funded by the Student Association, which works in "partnership" with CS-L to meet community needs. As volunteers, students gain valuable experience and explore personal and career interests as they perform community tasks.

Students may choose to integrate some of their academic and community interests as they select courses and programs that allow for service to be

combined with study. CS-L assists students and faculty in designing appropriate service-learning assignments. The Service-Learning Internship Program is provided for students who want to become involved on a more extensive basis (for example, for a semester or half-time for a year). CS-L assists in project planning and contracting arrangements and provides a seminar for student participants.

Interested students may apply for acceptance to the University Year for ACTION Program, which enables students to become totally involved in service-learning, full time, for a year. During the year prior to actual placement, students work with faculty and agencies to plan for involvement in UYA. The UYA Service-Learning design is tailored to meet the unique needs of each participant. During the actual UYA year, students work in agency projects under supervision of program staff while simultaneously fulfilling academic objectives and evaluation requirements with faculty. UYA's also receive a \$2,500 stipend to cover living costs.

Through the Volunteer program, the Service-Learning Internship Program and University Year for ACTION Program, CS-L assists students, faculty and agencies with information, project planning and technical assistance. CS-L also provides transportation, training, publicity, financial and personal support required to achieve student service-learning goals.

Mansfield House
25 Colchester Avenue
(802) 656-2062

PREMEDICAL/PREDENTAL ADVISING

The Premedical/Predental Advising Office, located within the Dean of Students' Offices, exists to provide assistance and support to all students preparing for entry to medical and dental schools. The office provides general counseling, advising and referral services to students with academic and non-academic questions and concerns.

Students are encouraged to use the office early in their careers in planning their undergraduate experience to ensure that specific pre-professional requirements are met and that the background they are obtaining best fulfills their individual educational and personal goals, while simultaneously meeting the requirements of medical/dental schools. Also, students not already assigned a premedical/predental academic advisor may request the assignment of an advisor through this office.

Information and advice is provided to students who are in the process of applying to medical, dental, and other health professional schools. The Premedical/Predental Advisor works in coordination with the Premedical/Predental Advisory Committee in preparing student letters of evaluation, as required by the majority of medical, dental, and health professional schools as part of the application process.

Materials for registration for the required pre-professional examinations and application services are available. A resource library is also maintained for the use of students, containing medical and dental school catalogues and catalogues for professional schools in related health fields, as well as miscellaneous health careers literature.

Students are encouraged to explore their personal and career goals through participation in small group discussions organized by this office.

316 Waterman Building
(802) 656-3380

Student Activities

Participation in student activities is a vital part of any student's education at the University. The Student Activities office serves as a resource center for students seeking direction and support for the development of experiences and programs that offer recreation, learning, and leadership opportunities. This office totally involves itself in working with students to verbalize their needs and interests, determine their own goals and objectives, develop and produce their own programs, and evaluate their own experiences in terms of personal growth and future program direction. This is the kind of participation in university life that students have found to be a vital part of their total education. However, it is left up to the individual to contact the Student Activities Office to take advantage of these opportunities.

There are approximately 70 student organizations that exist on the UVM campus. These organizations develop out of a unique interest area common to a group of students. Some of the larger organizations are listed below:

Alpha Lambda Delta	Meeting of the Ways
American Society of Civil Engineers	Modern Dance Workshop
American Society of Mechanical Engineers	Mortar Board
Anthropology Club	News and Weather
Ariel	Outing Club
Billings Center Governing Board	Panhellenic Council
Campus Crusade for Christ	Pershing Rifles
Catalina Club	Phi Chapter of Omicron Nu
Chi Epsilon Beta	Physical Education Majors & Minors
Christian Science Organization	Pre-Vet Club
Class Council '80	S.A. Concerts
Class Council '79	S.A. Films
Council for Exceptional Children	S.A. Speakers
Cunningham Newman Club	Sex Information Service
Cynic	Ski Club
East Asian Club	Speech-Hearing Club
El Club Hispanico	Student Advisory Committee
Ethan Allen Rifles	Student Art Club
Forestry Club	Student Chess
Friends of Geology	Student Community in Action
Gay Student Union	Student National Education Association
Geographic Forum	Student Photo Service
Home Economics	UVM Arts Collaborative
Horse Club	UVM Baptist Union
International Club	UVM Dairy Club
Inter-Varsity Christian Fellowship	UVM Environment Club
Student Pre-Law	UVM Skin & Scuba Diving
Student International	UVM Table Tennis
Meditation Society	UVM Tenants Association
Third World	UVM Volleyball
	UVM Waterski Club

University Players
 UVM Band
 UVM Folk Dance
 UVM Plant & Soil
 UVM Rescue
 UVM Rugby
 UVM Sailing
 John Dewey Philosophy Club
 Judo Club
 L'Amicale Francaise
 Lawrence Forensic
 L'chiam Club of UVM

UVM Wildlife
 UVM Women's Ice Hockey Club
 UVM Women's Squash
 UVM Wrestling
 Vermont Junior Association of
 Dental Hygiene
 Warren Austin Model United
 Nations
 WRUV — AM & FM
 The Way-Biblical Research &
 Training-Campus Outreach
 Women's Organization

THE BILLINGS CENTER

The Billings Center, formerly Billings Library, is the University of Vermont student center. As such, it is a multi-purpose building used as a focal point for student activities. The facilities of the building provide space for lectures, films, small theatre and musical presentations, small and large group meeting rooms, study and recreational lounges, and the Catamount Den, a snack bar facility. Billings also houses several student organization offices, i.e., Student Association, Greek Coordinating Council, Women's Organization, Gay Student Union, Billings Center Governing Board, Cynic, Ariel, Concert Bureau, Speakers Bureau, and Films Bureau.

The Student Activities Office, located in Billings Center, provides many services to students in addition to advice and information on program development and planning. The Voice of Billings provides information on campus events; more detailed information and referral services may be obtained by calling 656-2068. There is also a sales desk for newspapers, candy, bookstore supplies, etc., which is open on weekends and evenings.

UVM STUDENT ASSOCIATION

All students enrolled in the undergraduate colleges and schools are charged a student activities fee and thus become members of the UVM Student Association. Student Association serves as the all-campus student governing body. It assumes responsibility for voicing student concerns and interests in the political activities of the University community. S.A. also determines the recognition of student organizations on campus and the allocation of funds to a large number of student organizations. They provide publicity and supply services for their constituents, and assume a major role in all campus programming through their Concert Bureau, Film Bureau, and Speakers Bureau.

Each year S.A. holds elections for student senators who serve on S.A.'s standing committees. There are many opportunities for other students, as appointed by S.A., to serve on various University ad hoc committees throughout the year or work on the variety of programs S.A. involves itself with each year.

INTER-RESIDENCE ASSOCIATION (IRA)

The Inter-Residence Association is a government which represents the

students living in University residence halls. The government, consisting of an executive board, legislative council, and judicial board, provides leadership for residence hall students, representing their interests to other constituencies within the University community. IRA involves itself in all aspects of residence hall life, constantly seeking new ideas and avenues for the manifestation of these ideas to make the residence halls meet the needs of its residents.

FRATERNITIES AND SORORITIES

The Greek System is an active and viable part of student life. It has long been acknowledged as an integral part of the social and extracurricular life on campus. The governing body of the system is the Greek Coordinating Council. The GCC performs two vital functions for the collective. It serves as a vehicle for communication between houses and assumes responsibility for conveying Greek interests and concerns to the University. The Dean of Students, through the Office of Student Activities, works with fraternities and sororities to accomplish those goals established in the best interest of the Greek and University communities. The houses are private corporations and thus are treated so by the University excepting those situations having a direct effect on the University community as a whole.

The Fraternity Managers Association, 656-2066, offers a professional fiscal management service to each of the Greek houses. The office is maintained in Billings Center on the balcony level.

The following are active chapters of national and local fraternities: Acacia, Alpha Gamma Rho, Alpha Tau Omega, Delta Psi, Kappa Sigma, Lambda Iota, Phi Delta Theta, Phi Gamma Delta, Phi Mu Delta, Sigma Alpha Epsilon, Sigma Nu, Sigma Phi, Sigma Phi Epsilon, and Theta Chi. Chapters of the following national sororities are represented: Alpha Chi Omega, Alpha Delta Pi, Delta Delta Delta, Kappa Alpha Theta, and Pi Beta Phi.

ATHLETICS, CLUB SPORTS, INTRAMURALS & RECREATION

The University encourages and supports a variety of sports at a variety of participatory levels. The demands on the recreational facilities are great but that is due to the variety of athletic interests within the University community.

A program of intercollegiate competition for men is maintained in baseball, lacrosse, gymnastics, basketball, cross country, golf, hockey, indoor track, soccer, swimming, tennis, and track. The athletic policies of the University are under the recommendation of the Athletic Council, composed of members of the faculty, the student body, and alumni. Athletic relations are maintained with colleges and universities in New England and the eastern seaboard. The University is a member of the "Yankee Conference," which is composed of the State Universities in New England, the National Collegiate Athletic Association, the New England Intercollegiate Athletic Association, and the Eastern College Athletic Conference.

The Women's Intercollegiate Program offers a variety of team and individual activities which are open to all full-time female students of the University. Intercollegiate competition is on the local and regional level under the auspices of the Eastern Association for Intercollegiate Athletics for Women, and the Association for Intercollegiate Athletics for Women.

Varsity teams included in the program are as follows: field hockey, soccer, tennis, volleyball, basketball, swimming, synchronized swimming, gymnastics, skiing, lacrosse, softball, track and field, and cross country.

There are a number of club sports actively participating locally and regionally. These include the Judo Club, Rugby Club, Ski Club (snow), Volleyball Club, Women's Ice Hockey Club, and Squash Club.

The program of physical education offers an excellent program of intramural sports which provide for voluntary participation by students in all classes. Competition in nineteen different sports activities is arranged among fraternities, sororities, residence halls, independent groups, and individuals.

The facilities of Patrick Gymnasium are available at various times during the week for recreational free play in a wide variety of sports activities.

STUDENT PUBLICATIONS

The opportunity for journalistic, literary, and editorial expression is open to students interested in membership on one of the three major student publication staffs: the weekly newspaper, Vermont Cynic, the literary magazine, the News and Weather, and the yearbook, the Ariel. These publications have all made unique contributions to the life of the campus. Students need not be "professionals" to become involved in any aspect of the production of these publications. The only requirement is a commitment of interest, time and effort.

The Cynic and Ariel both have offices located in the downstairs of Billings Center. The News and Weather can be reached by leaving a message in their mailbox in the Student Association Office.

RADIO

There are two student-operated radio stations on campus. WRUV-AM has been broadcasting primarily to the campus since 1954. WRUV-FM began operation as a 100-watt educational station in 1965. Both stations are S.A.-recognized organizations and as such are student operated and programmed, offering full radio media services to the University community. These stations operate at a professional level, although they do have the informal atmosphere associated with a student organization. Any undergraduate interested in having a radio show or being involved in the stations' operations should drop by the stations, located at Pomeroy Hall.

DRAMA

The Royall Tyler Theatre is the home for the season of plays presented each year by the department of communication and theatre with the University Players, as well as the home for the annual Champlain Shakespeare Festival. The great periods of theatre history are covered during the course of four years in the Major Play Series. Workshop productions of original and experimental theatre forms are also produced as part of the regular course work in theatre as well as by students and faculty outside of the regularly scheduled course offerings. The departments of music, communication, theatre, and women's physical education collaborate periodically to produce a musical comedy or opera. Participation in drama activities is open to all members of the University.

DEBATE

The Lawrence Debate and Forensics Union (LFU) provides opportunities for participation in all types of forensic activities — debate, discussion, oratory and extemporaneous speaking. Members of The LFU appear before service clubs, farm organizations, high schools, and other groups throughout the state. The members of the LFU also participate in more than three hundred intercollegiate debates at more than twenty tournaments annually, with the beginners getting as much experience as the varsity members. The LFU travels to various tournaments throughout the United States. Outstanding performers receive recognition by election to Delta Sigma Rho-Tau Kappa Alpha, the national forensic honor society.

MUSICAL ACTIVITIES

Opportunities for participation and appreciation are provided for students with strong musical interests. The University Band, the University Choir and Choral Union, the University Madrigal Singers, the University Brass Ensemble, and the University Orchestra appear in public presentations many times during the year. An opera or musical show is generally presented each year and faculty, senior, and monthly department recitals are scheduled throughout the year.

The University Band appears at athletic events, presents formal concerts, and makes a spring concert tour. The University Choir and the Choral Union give three annual concerts and the Madrigal Singers sing for various groups around the state. The University Orchestra presents two annual concerts, and assists the Choir in a third.

The music department has acquired a new music building, located behind Redstone and Southwick on the Redstone Campus. The building houses the offices of the department as well as a beautiful recital hall accommodating one of the finest organs in the northeast. The new facility serves as a showcase for the musical talents of the department and its students, as well as those students seeking musical activity as a part of their extracurricular life on campus.

THE GEORGE BISHOP LANE ARTISTS SERIES

The George Bishop Lane Artists Series is one of the major collegiate artists series in the country, inaugurated in 1955 by a gift from the late Mrs. Lane, in honor of her husband, George Bishop Lane of the Class of 1883.

The Lane Series brings to the campus and community a continuing program of musical, theatrical, dance and other artistic productions.

The Series is planned and produced by a student-faculty committee, with townspeople serving with student and faculty members on an advisory committee.

The Lane Series has presented many of the world's finest artists, including the London Philharmonic, the Vienna Philharmonic, the Philadelphia Orchestra, the Cleveland Orchestra, the Chicago Symphony Orchestra, the Moscow Philharmonic Orchestra with David Oistrakh, the Royal Ballet of London, the American Ballet Theatre, Rudolph Serkin, Arthur Rubinstein, Van Cliburn, Isaac Stern, Nathan Milstein, Andres Segovia, the Vienna Boys Choir, the Weavers, the Robert Shaw Chorale, the Budapest String Quartet, Dave Brubeck, Errol Garner, Benny Goodman, Victor Borge, Al Hirt, Mantovani, Harry Belafonte, Joan Baez, Maurice

Chevalier, Bill Cosby, Ella Fitzgerald, Henry Mancini, Sir John Gielgud, Roberta Peters, the New York City Opera Company, the Metropolitan National Opera Company, the D'Oyly Carte Opera Company, Robert Merrill, George Solti (conducting the Chicago Symphony Orchestra), Lily Tomlin, Mary Travers, and a number of plays including *Tea and Sympathy*, *Li'l Abner*, *Camelot*, *Man for All Seasons*, *Look Homeward, Angel*, *J. B.*, *Hello, Dolly!*, *Hair*, *Jesus Christ Superstar*, *Godspell*, and *Applause*.

In addition to the major series, The Lane Series offers during each academic year several youth concerts, special events and a film series.

THE ROBERT HULL FLEMING MUSEUM

The Fleming Museum houses a distinguished teaching collection of art and ethnography. Originally founded as the Park Gallery in 1873, the collection owes much of its growth to the generosity of alumni and other friends. The O.B. Read American Plains Indian Collection and the David B. Pitman ('32) and Henry Schnakenberg Collections of American art are notable examples. The spacious Marble Court is devoted to European art. Rotating exhibits drawn from the collections are arranged in surrounding galleries given to Ancient, Oriental, Ethnographic, Modern, and American art. Changing exhibitions occur frequently, organized by faculty and students in museum studies, art history or studio art, and in collaboration with the departments of religion, history, anthropology and historic preservation.

Lectures, gallery talks, recitals, films, and children's tours serve the community at large; activities are supported by the Museum Association, whose membership is open to all. A center for the study of art history and museology, the Museum houses the art department collection of 75,000 slides and photographs, audio-visual class and seminar rooms, as well as a reference library for Museum research.

RELIGIOUS LIFE

The Religious Counselors Association is a federation of the leaders of the following religious communities on the University of Vermont campus:

B'nai B'rith Hillel Foundation
 Christian Scientists
 Cunningham Newman Center
 Episcopal Church (St. Anselm)
 Protestant Ministry

Though we have diverse religious traditions and ministries, we share a common goal: the welfare of the University community. Separately and together, we are working toward the goal by cooperating, sharing, and avoiding duplication of effort, wherever possible, in order to meet the needs of the University community.

Students desiring information on any of these groups should contact members of RCA. Father Dan Daley, Mr. Bob Paolino, Professor Barry Krikstone, and a representative from St. Anselm's Protestant Church may all be contacted through the Cunningham Newman Center at 862-8403.

Students seeking information on other religious groups on campus should contact the Office of Student Activities at Billings Center, 656-2060 or the Student Association Office, 656-2053.

HONORARY AND RECOGNITION SOCIETIES

Honorary and recognition societies exist on the University of Vermont campus to recognize student contributions to the University community and student leadership in campus life. There are a few local societies, i.e., Boulder Society, that acknowledge individuals by class.

National Honorary Societies represented on the University of Vermont campus include:

The Phi Beta Kappa Society established the Vermont Alpha Chapter at the University in 1848, and initiates are chosen primarily on the basis of high scholastic standing with emphasis on a broad distribution of liberal studies. A detailed statement of the criteria used is available from the chapter president. The local chapter was the first in Phi Beta Kappa to initiate women into membership.

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

The Society of the Sigma Xi, established at the University 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; Kappa Delta Pi, education; Tau Beta Pi, engineering; Omicron Nu, home economics; Delta Sigma Rho-Tau Kappa Alpha, debating; Sigma Phi Alpha, dental hygiene; National Collegiate Players, dramatics; Alpha Lambda Delta, freshman women's scholastic; Ethan Allen Rifles, outstanding students in the Reserve Officers Training Corps; Pershing Rifles, a military fraternity.

HOUSING

Full-time undergraduate students may apply to live in University residence halls. Upperclass students who are actives or pledges of a fraternity or a sorority may register for University residence hall housing or chapter housing. All freshmen students, except those living at home and commuting, or those living with their spouses, must live in University housing.

RESIDENCE HALLS

A residence hall is more than a place to sleep, store one's belongings, and study. It is a place where a student can take advantage of the various opportunities and experiences surrounding him or her. A diversity of residence halls and programs are offered. There are freshman halls, upperclass halls, coed halls, single sex halls, an environmental hall, a French house, and the Living and Learning Center (additional information on the Living and Learning Center is on page 128). Each residence hall is under the guidance and direction of a Hall Advisor who is assisted by specially selected undergraduate Resident Assistants. These staff members encourage the development of intellectual, social and cultural programs and

assist the residents in their growth toward maturity and responsible self-direction. Each student in the residence halls is a member of his or her residence hall student government which represents student opinion and provides educational and social programs for its constituents.

Contracts for room and board are binding for the college year unless cancelled for due cause with the approval of the Office of Residential Life. In August, each new student will receive notification of a housing assignment and the date of the opening of the residence halls. Rooms may not be occupied until the date specified. Each student is expected to leave the residence halls not later than twenty-four hours after his or her last examination at the close of each semester. All students living in the residence halls must have board contracts.

Student rooms are equipped for comfortable residence hall living. Each double room has two beds, with mattress pads, 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, window draperies, pillows, wastebaskets, bureau covers, desk lamps and reading lamps. Facilities for doing personal laundry are provided in residence areas as well as space for storage of trunks, baggage, bicycles and skis during the academic year.

FRATERNITIES AND SORORITIES

Chapters of Greek letter fraternities and sororities have long been recognized as part of the intellectual, social, and extracurricular life on the campus. These groups provide valuable experience for their members in the form of interfraternity athletic competition, dances, service projects, house operations, meal service, and educational programs. Fraternities and sororities are under the jurisdiction of the Dean of Students Office. Greek activities are coordinated by the Greek Coordinating Council, the central governing body of all of the Greek letter houses.

MARRIED STUDENT HOUSING

There are 131 University-owned apartments designated for married students, located just outside Winooski, Vermont at Fort Ethan Allen. About four miles from Campus, on Route 15, the apartments are close to shopping center, hospitals and educational institutions. These apartments are divided into two complexes.

County Apartments, completed in 1970, consist 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 eleven two-story buildings. Located in the center of these buildings is a Community Center containing laundry facilities and a large multi-purpose 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 apartments are heated electrically and each room is individually controlled.

The other section, called Ethan Allen Apartments, is former military officers' quarters built between 1895 and 1933. There are 15 buildings with one to five apartments in each. Thirty-one apartments in this complex have two bedrooms, and eleven have three bedrooms. Many have basement or at-

tic storage areas. Although these apartments have no carpeting, 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 fuel company.

Detailed rental information may be obtained from the Manager of Family Housing, 600 Dalton Drive, Fort Ethan Allen, Winooski, VT 05404.

OFF-CAMPUS HOUSING

University students eligible to live off-campus may utilize the facilities of the Residential Life Office in locating suitable housing in the greater Burlington area. This office provides a free listing service by which community landlords and rental agents are able to make known their housing availability to students at the University.

Students may examine up-to-date listings for available apartments, houses, rooms and roommate requests at the Billings Student Center or on a bulletin board just off the College Street entrance of Waterman Building on the main campus. The University is not responsible for the approval of off-campus housing facilities. It is impractical to send information concerning individual listings by mail. A catalogue of available listings is issued each May, August and December.

To reserve a catalogue, contact the Office of Residential Life, 25 Colchester Avenue, Burlington, VT 05405.

University Health Services

The University Health Service is located at 284 East Avenue where it remains open constantly. Each student who has paid the Health Services Fee is entitled to such routine medical care as is needed and the Health Service can render during the academic year. Two days of no-cost in-patient care are granted. Beyond two days, the student will be charged \$50.00 per day for in-patient care. Most resources for maintenance of emotional and physical health are available here. Provision is made for in-patient care, for gynecological, medical, surgical, orthopedic, and short-term psychiatric cases. Problems requiring prolonged and sophisticated care may be treated at the Medical Center Hospital of Vermont, or when feasible, at a hospital nearer the student's home. Long-term psychiatric care is to be accomplished through a local psychiatrist outside the Health Services and at the student's expense.

Athletic pre-participation physical examinations and care of athletes is supervised by Health Service Physicians and Trainers. The two Trainers are registered physical therapists supported by Student Trainers, administering their care at the University Health Center and the Patrick Gymnasium Training Room. Student trainers are selected by the Trainers and approved by the Director of the Health Services since they are compensated by the Health Services.

The University Health Service is staffed by a director, three full-time physicians, with consultants in most specialty areas from the University College of Medicine. The nursing staff is made up of an administrative supervisor with ten registered staff nurses. A receptionist, two secretaries, a part-time maid, and a custodian complete our staff. The University Health

Center is open at all times. On weekdays physicians are in attendance from 8 a.m. to 5 p.m. with one doctor on call in rotation for nights, weekends, and holidays for emergencies.

The University Rescue Squad is housed at the Health Center. This is a student-financed, -originated, -operated, and -staffed group of emergency medical technicians and others. Their primary area of service is to the University students, faculty, and staff in emergencies and transport. They serve as "back up" to the Burlington Fire Department Rescue Squad as well as to other area rescue squads. They are a tax-free group, completely volunteer. Arrangements have been made for certain of their personnel to have summer and vacation employment at the University Food Service.

Regular gynecological sessions are held at the University Health Services daily. Similarly, Orthopedic Clinic is held two half-days per week and is by appointment. The psychiatrist is here all day Monday, all day Thursday and Friday morning, with back-up at the other times from the Crisis Clinic at the Medical Center Hospital of Vermont.

A full-time laboratory technician is in attendance weekdays for routine studies. The radiology service is available on weekdays with technologists from the faculty of the School of Radiological Technology at the College of Medicine. Evening and weekend laboratory and x-ray needs will be met at the Medical Center Hospital of Vermont.

Medical excuses from class activities due to illness and injury must be administered by the University Health Services. A student treated by a hometown physician must have a note from that physician to the Health Service to accomplish this necessary excuse, or if treated by a Burlington physician the same procedure must be followed.

Admissions to the University

Applications and Deadlines

The University of Vermont welcomes applications from all interested students regardless of race, religion, nationality, or sex. Prospective freshmen and transfer students interested in applying for admission in either January or September can receive applications by writing to: Office of Admissions, University of Vermont, 194 South Prospect Street, Burlington, Vermont 05405. Applications for admission in January should be received in the Admissions Office by December 1, while applications for admission in September should be on file and complete by February 1. For transfer students, applications should be on file and complete by April 1 except for those applying to Dental Hygiene, Medical Technology, Physical Therapy, or Professional Nursing. These students have a February 1 completion date. Upon filing an application all candidates are required to pay a non-refundable \$20 application fee which is used to meet the cost of processing the application. Fall financial aid information should be submitted by March 1.

Early Notification for Vermont Students

An early notification program is available for prospective freshmen who are Vermont residents (see residency rules, page 43). Vermonters applying under this program will be notified concerning admission during the first week of December if the application, high school transcript, SAT scores and recommendations have been received by November 1. Students who receive offers of admission under this program will have until May 1 to respond.

Admissions Criteria

Qualification for admission is determined on the basis of the secondary school record, rank in graduating class, recommendations, and College Entrance Examination Board Scholastic Aptitude and Achievement Test results. Each application is carefully reviewed by the Admissions Office staff and in many cases by the College or School to which the student is applying. The candidate's record is thoroughly examined in order to determine whether the student has adequately prepared for the academic program of his choice.

Sons and daughters of alumni of the University of Vermont are encouraged to apply and are given special consideration. Increasing competition means that the University must evaluate the application of each alumni son or daughter in terms of the total number of applications, their relative qualifications, and the limitation which must be placed on the number of applicants who may be offered admission to the various academic programs which are available.

Most prospective freshmen present at least 16 high school units, including a minimum of four years of English, two years of mathematics, two years of a foreign language, two years of science, and two years of social sciences.

The two years of mathematics should be one year of algebra and one year of geometry. Students who plan to specialize in engineering, forestry, mathematics and science should present both a second year of algebra and a course in trigonometry for a total of four years of mathematics.

Students applying to Business Administration are expected to be enrolled in the college preparatory curriculum at the high school level. These students should present a strong background in mathematics and have a generous exposure to the sciences, social science and humanities. Students planning to major in nursing or an allied health science must have taken high school courses in biology and chemistry, while physics is highly recommended. Physics is required for all students planning to major in Physical Therapy.

Exceptionally qualified students may in some instances be admitted even though they do not meet the above requirements in full.

Additional courses in mathematics, history, science, the fine arts and music, and a third year in the foreign language are strongly recommended as desirable preparation for college. In evaluating the secondary school record, careful attention is given to the course load a student has been carrying and any advanced work is given special consideration. A student planning to major in music must arrange for an audition and interview with the chairman of the department prior to the deadline for completion of the application.

Interviews and Visits

The University differs from a number of other colleges in not requiring a personal interview. Students are encouraged to visit the campus to form their own first-hand impressions about the University. Prospective students may schedule an appointment with a current UVM student or a staff member on most weekdays during the academic year in order to gain information about the academic and non-academic aspects of undergraduate life.

On most Saturday mornings while the University is in session, information group sessions will be held on campus for interested students and parents. Students should write or call the Admissions Office (802-656-3370) for additional information about the group meetings or individual appointments.

New England Regional Student Program

The University of Vermont is an active participant with the Universities of Connecticut, Maine, Massachusetts, New Hampshire, and Rhode Island and with Lowell University, Southeastern Massachusetts University, and the public four-year and two-year colleges and technical institutes in a program of regional cooperation aimed at increasing educational opportunities for qualified young men and women of the New England States. Under the pro-

gram, New England residents are given tuition privileges in certain specialized curricula which are not offered by public institutions in their home state. New England students enrolled in regional student programs at the University of Vermont who are not residents of Vermont are charged 125 percent of the University's in-state tuition. A brochure detailing these specialized curricula has been prepared by the New England Board of Higher Education and is available through the Board, 40 Grove Street, Wellesley, Massachusetts 02181.

Under the New England Regional Student Program, the University of Vermont offers the following undergraduate programs for the 1978-79 academic year:

REGIONAL PROGRAMS OFFERED BY THE UNIVERSITY OF VERMONT TO STUDENTS FROM

	Conn.	Me.	Mass.	N.H.	R.I.
Canadian Area Studies	X		X	X	X
Classics		X			
Dairy Technology				X	X
Radiologic Technology*	X	X	X	X	X
Latin					X

* Two-year program

Types of Enrollment

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

NON-DEGREE 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 (see chapter on Continuing Education).

UNDERGRADUATE — Non-degree students, those seeking only undergraduate credit for course work taken, enroll through the Division of Continuing Education.

GRADUATE — Non-degree students, those who have at least a bachelor's degree at the time of enrollment, enroll through the Graduate College.

College Entrance Examinations

The College Entrance Examination Board will administer a series of scholastic aptitude and achievement tests during 1978-79. Complete information may be obtained from the College Entrance Examination Board, P.O. Box 592, Princeton, New Jersey 08540, or College Entrance Examination Board, Box 1025, Berkeley, California 94701.

Transferring to the University

Students interested in transferring to the University may apply for admis-

sion to the Fall or Spring semester. Applications for mid-year admission should be filed by December 1. Applications for Fall transfer should be complete by April 1, except for those students applying to Dental Hygiene, Medical Technology, Physical Therapy, or Professional Nursing. These students have a February 1 completion date. Transfer candidates should see that official transcripts of their high school and college records are sent to the Office of Admissions in time for prompt consideration. A transfer applicant may not disregard the record of any previous education received at another institution.

A student who transfers to the University from another accredited college or university may be given provisional credit for all courses satisfactorily completed, provided that similar courses are counted toward graduation at the University of Vermont. Transfer credit is not allowed for work completed with grade "D" or its equivalent, unless a more advanced course in the same subject has been passed with a higher grade in the institution from which the student transfers. Please note: GRADES do NOT transfer. The quality point average of transfer students is computed on the work taken at the University of Vermont only.

The credit is provisional, pending satisfactory completion of a semester's work at the University. The provisional transfer credits are fully granted if the student is in good standing at the end of the first semester.

Advanced Placement and Advanced Credit

The University of Vermont welcomes applications from high school students who have taken college level courses offered in their high schools under the Advanced Placement Program of the College Entrance Examination Board. Scores of three or higher on advanced placement examinations are awarded appropriate credit by the Registrar.

A student who has been granted Advanced Placement may, upon the recommendation of the department and the student's academic dean, use his Advanced Placement to satisfy distribution requirements for his concentration.

Students who received Advanced Placement may also receive course credit toward graduation requirements, upon approval of the department and the student's academic dean.

Credit by Examination

A degree student who wishes to do so may, under the following conditions, receive credit for a course by taking a special examination and paying the special examination fee charge of \$10 per credit hour.

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 chairman 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, nor have attempted a prior special examination in this course at the University of Vermont or at any other institution of higher education. Upon passing the special examination,

as determined by the examiner and the chairman 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.

College Level Examination Program

The University of Vermont will grant credit on passing the College Level Examination Program (CLEP) General Examinations at the 50th percentile or better based on the sophomore norms for those examinations which the relevant UVM departments have determined to be satisfactory. Departments may supplement CLEP results with their own examinations. The credit awarded will not exceed six (6) hours in each of five examinations for a total of thirty (30) hours. These credits may be applied toward distribution requirements and to the total hours specified for a particular degree program. No grade will be awarded and the number of credit hours will not be considered in determining cumulative average.

The University may grant credit for certain CLEP subject examinations if a student attains a minimum score equal to a grade of B on such examination. Credit will not be allowed for a CLEP subject examination if advanced courses in that discipline have been taken previously.

Pass-No Pass Option

Degree students, starting with the sophomore year, may elect to take certain of their courses on a pass-no pass option, with approval of their advisors. Please see page 37 for additional details.

Credit for Military Service

A veteran who has been accepted into a degree program may, upon presentation of DD Form 214, Report of Transfer or Discharge, receive certain credit for this experience in those Colleges in which credit for military science is allowed. If the student has completed more than one year of military service, up to twelve hours of credit may likewise be accepted. In addition, the individual will be exempt from the physical education requirement.

The University accepts all college level credits earned through the United States Armed Forces Institute providing that credit is applicable to the degree program and, in addition, credit is granted for service schools completed, as recommended by the American Council on Education.

Orientation Program

Orientation at the University of Vermont is an on-going process beginning with admissions acceptance and continuing throughout a several day on-

campus academic and social experience and on into the semester when activities and on-going academic events occur.

Entering students are required to take the College Entrance Examination Board Achievement Tests in mathematics and modern foreign language in all cases where these subjects are to be continued in the student's curriculum. It is recommended that students who expect to continue with biology take the College Entrance Examination Board Achievement Test in biology. The scores on all tests are used in advising students regarding the course of study and the selection of courses. Following acceptance, students must submit a statement of medical history and a physical examination record to the University Health Service. New students are also required to come to the campus for continuing orientation. Schedules and dates of these meetings are mailed in early spring.

Senior Citizens

Citizens of the state of Vermont, sixty-five years and older, upon presentation of proof of residence and age, are permitted to enroll for credit or audit in classes at the University without payment of tuition fees.

In each of these instances, such enrollment must have permission of the Dean of the College concerned or in the case of Evening Division and Summer Session, permission of the Dean of Continuing Education, in order to safeguard overcrowding of any one class to the detriment of the regularly matriculated students.

Student Expenses

The student expenses outlined in the following paragraphs are anticipated charges only for the academic year 1978-79. Changing costs may require adjustments of these charges before the beginning of the Fall semester.

Undergraduate Tuition and Fees

APPLICATION FEE

A non-refundable application fee of \$20 is charged each applicant for admission to a University degree program.

ORIENTATION FEE AND ADVANCED TUITION PAYMENT

All new undergraduate applicants who have been accepted by the University are required to pay \$175 in order to reserve a place in the next enrolling class. Students accepted for the Fall semester must pay the deposit by May 1, while students accepted for the Spring semester must pay the deposit not later than January 8. Of this amount, \$35 is used to cover the cost of the orientation program which is a requirement for all incoming undergraduate degree students. The remaining \$140 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 the estimated expenses (excluding transportation, laundry and spending money), based on the regular tuition for undergraduate students followed by an explanation of these charges.

	Resident	Non-Resident
Tuition	\$1,300	\$3,735
Housing (Double Room)	970	970
Meals (Base Plan)	764	764
Inter-Residence Association Fee	6	6
Library and Athletic Bond Fees	60	60
Student Health Service Fee	68	68
Student Accident & Sickness Insurance (Optional)	42	42
Student Association Fee	24	24
Books and Supplies (Estimated)	190	190
Total excluding personal and miscellaneous costs	\$3,424	\$5,859

TUITION

Vermont Residents: \$55 per credit hour through 11.5 hours. From 12-18 credit hours — \$650 per semester plus \$55 per credit hour for each hour in excess of 18 hours.

Non-Residents: \$155 per credit hour through 11.5 hours. From 12-18 credit

hours — \$1,867.50 per semester plus \$156 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 contracts include both room and board and are legally binding for the nine-month academic year. Each occupant is liable for the yearly rental, one half to be paid each semester. The room charge per person is \$770 for triple occupancy, \$970 for double occupancy and \$1,070 for a single room. Depending on vacancies, a limited number of large singles may be available at the rate of \$1,170 a year.

For residents in the Cooperative the room charge is \$130 less than the cost of the room charge indicated above, depending on the type of occupancy.

The base University meal plan is \$764 yearly, one half to be paid each semester. Although the number of coupons in the basic plan does not cover every meal during the semester, many students find the plan sufficient. Additional coupons may be purchased to meet individual needs at a cost of \$56.35 per book. Coupons may be used not only in University dining halls but in the various campus snack bars, restaurants and grocery stores. Questions regarding food services should be directed to the SAGA Food Service Office, Waterman Building.

A written request is required of any student wishing to cancel a housing contract. Any student cancelling a housing contract after July 1 but before the beginning of the fall semester will be assessed a \$50 penalty. Unless specifically authorized by the Office of Residential Life, no room cancellations will be honored after the beginning of the fall semester.

Residence halls are closed during semester break and spring recess. Temporary room provisions for students may be made for exceptional cases at a nominal charge. Housing will be provided during Thanksgiving recess at no additional charge, but students will be required to consolidate due to security problems, energy conservation, and limited staff coverage.

KEY DEPOSIT

A room key deposit of \$5 per year is required and is returned upon the surrender of the key. This deposit will be added to room charges on the student's bill.

INTER-RESIDENCE ASSOCIATION (IRA) FEE

A \$6 per year (\$3 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 \$30 per year (\$15 per semester) is charged to all students enrolled for twelve hours or more except those registered in the College of Medicine. Students enrolled in less than twelve hours but more than three hours will be charged a fee of \$15 per year (\$7.50 per semester). Students enrolled in three hours or less per semester are not subject to the library fee. This fee is assessed by legislative act and is turned over to the State of Vermont each year to the extent necessary to retire the bond issue that was used to fund the construction of Bailey Library, and is subject to change in response to the financing for new construction onto this facility.

ATHLETIC BOND FEE

An athletic bond fee of \$30 per year (\$15 per semester) is charged to all students enrolled for twelve hours or more. This fee is assessed by legislative act and is turned over to the State of Vermont each year to the extent necessary to retire the bond issue that was used to fund the construction of Patrick Gymnasium, Forbush Pool and Gutterson Field House and is subject to change in response to the financing for new construction onto this facility.

STUDENT HEALTH SERVICE FEE

A fee of \$68 per year (\$34 per semester) is charged to all students enrolled for twelve hours or more. Part-time students will be eligible for health services by paying this fee. *Student Accident and Sickness Insurance* — Through an arrangement with a commercial insurance company, students are able to procure health insurance which is designed to provide coverage for services beyond those provided by the Student Health Service. The present cost for one year's coverage is \$42. Married students may procure coverage for their spouse and children. Further details may be obtained from the Infirmary. In order to participate in this insurance, the Student Health Service fee must be paid each semester.

STUDENT ASSOCIATION FEE

Undergraduate degree students enrolled for twelve or more hours are charged a fee of \$24 per year (\$12 per semester). This fee is allocated by the Student Association toward the support of student organizations and student activities.

BOOKS AND SUPPLIES

The estimated yearly cost of books and supplies at \$190 is a low average. Some particular curricula may require one-time purchases which will change this amount.

Engineering students, add about \$100 for instruments.

Dental Hygiene students, add about \$598 which will be collected during the first week of the fall semester.

Students majoring in Nursing, add about \$130 for uniforms and other expenses which is payable for Professional Nursing, at the beginning of the junior year, and Technical Nursing, at the beginning of the freshman year.

OPTIONAL FEES

Vermont Public Interest Research Group

In response to a student referendum, the University has agreed to bill each undergraduate degree student a special optional fee of \$6 per year (\$3 per semester). Funds collected help support the activities of the Vermont Public Interest Research Group.

Locker-Towel Fee

All students enrolled in physical education activity courses and others who wish to have an assigned locker must pay a \$4 locker-towel fee each year or any portion thereof. This fee provides a lock and a clean towel after each use of the gymnasium facility.

UNIQUE FEES

Credit by Examination

A fee of \$10 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 lessons are approximately one half hour in length with fifteen sessions being given each semester. \$75 per credit hour will be charged each student for such a course. This is in addition to the tuition charged and will be billed separately during the course of the semester.

School of Natural Resources Summer Programs

The tuition for the School of Natural Resources Summer Programs will be at the Summer session credit hour rate. In addition, there may be charges for transportation. This program is open only to Forestry, Recreation Management and Wildlife Biology Majors.

Late Registration Fee

Students who are allowed to register after classes begin will be charged a \$10 late registration fee.

Graduate Student Tuition and Fees

APPLICATION FEE

All applications for admission must be accompanied by a \$15 application fee. This is non-refundable.

TUITION

Rates for the academic year 1978-79 will be as follows:

Vermont Residents. \$55 per credit hour, \$650 flat rate for 12 hours, and \$55 per credit hour in excess of 12 hours.

Non-Residents: \$155 per credit hour, \$1,867.50 flat rate for 12 hours, and \$156 per credit hour in excess of 12 hours.

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

HOUSING

The University provides no housing for single graduate students. These students have traditionally found suitable housing in the greater Burlington area. A limited number of University-owned apartments are available for married students. Rental information may be obtained from the Office of Family Housing, 600 Dalton Drive, Winooski, VT 05404.

**LIBRARY BOND FEE, ATHLETIC BOND FEE,
AND STUDENT HEALTH FEE**

See page under listing of Undergraduate Expenses.

COMPLETION OF THESIS FEE

A fee of \$25 per semester is charged each graduate student who has already paid tuition for all credits required in his degree program but who has not completed or defended his thesis.

ADVANCED DEGREE FEE

A fee is charged to each recipient of an advanced degree according to the following schedule: Ph.D. \$25; Master Degree (with thesis) \$20; Masters Degree (no thesis) \$10.

This fee must be paid prior to the last date established for submission of theses in each of the three graduation periods.

It is the responsibility of the degree candidate to pay the appropriate account at the Cashier's Office and present the receipt to the Graduate College Dean in order to have a degree awarded.

Medical Student Tuition and Fees

APPLICATION FEE

Application is made only through the American Medical College Application Service. An additional application fee of \$20 is due the University of Vermont on request.

TUITION

Vermont Residents: \$1,200 per semester; \$2,400 per academic year.

Non-Residents: \$7,500 per academic year.

Residents of Maine, New York and Rhode Island will be assessed tuition based on

the cost of medical education and according to contractual agreements between those particular states and the University of Vermont. Interested students should request specific information from the College of Medicine's Office of Admissions, or from their own state legislature's Office of Education.

All tuition is subject to an increase of from \$100 to \$400 dependent on Federal capitation payments.

ATHLETIC BOND FEE AND STUDENT HEALTH FEE

See pages 31 and 32 under listing of Undergraduate Expenses.

ACTIVITY FEE

All students in the College of Medicine are charged a student activity fee of \$10 per year (\$5 per semester). This covers the cost of the medical yearbook and other student activities.

MICROSCOPE FEE

The microscope fee is assessed at the rate of \$73 for first year medical students and \$27 for second year medical students.

Payment of Obligations

All tuition, fees, room and board charges are payable in full upon notification and not later than the first day of classes unless otherwise announced. Advanced payments are accepted; checks should be made payable to the University of Vermont.

Students who cannot meet their financial obligations because of unusual circumstances should contact the Accounting Office as soon as possible before the due date.

Any student who has not satisfactorily completed financial arrangements by the announced due date will have his enrollment terminated.

The University reserves the right to withhold the academic record of any student who is in arrears in the payment of outstanding charges.

SENIOR CITIZENS

Vermont residents who are over sixty-five years of age may enroll for courses for credit or non-credit, without tuition charges, on a space available basis.

LATE PAYMENT FEE

Students who are allowed a payment postponement of all or a portion of their financial obligations will be charged a \$10 late payment fee.

BUDGETED PAYMENT

The University has made arrangements with the Knight Tuition Payment Plan for those who desire to budget annual costs in monthly installments. Information about the various payment programs is sent to each incoming student. For advance information, please write to:

Richard C. Knight Insurance Agency, Inc.
Knight Tuition Payment Plans
53 Beacon Street
Boston, Massachusetts 02108

FINANCIAL AID

Many worthy and deserving students are unable to meet college expenses and for them the University provides, so far as its resources permit, aid in the form of scholarships, loans, and employment. For further information see pages 9, 10 and 11.

Bill Adjustment

Bills will be adjusted at the end of the drop period and at mid-semester and students will be held liable for the total number of credit hours enrolled in at those times. If a course is dropped after mid-semester, no refund will be made.

At the end of the semester, an audit will again be made of each student's enrollment and if the number of courses, taken both for credit or audit, exceeds the number for which the student has been charged, a supplemental bill will be issued.

Tuition Refunds

CANCELLATIONS

Returning students who notify their Academic Dean and the Registrar in writing before the semester begins that they will not be attending the University that semester, will receive a refund. The refund will include all monies paid to the University for that semester.

WITHDRAWAL, MEDICAL WITHDRAWAL, SUSPENSION, DISMISSAL, CHANGES IN CREDIT HOUR LOAD

A student who withdraws for personal or medical reasons, is suspended, is dismissed, or changes enrollment will receive a refund of tuition and fees in accordance with the following schedule:

- If the action occurs prior to the sixteenth day of classes, (end of add/drop period) the student will receive a 100% refund.
- If the action occurs from the sixteenth day of classes through mid-semester (as defined in the Schedule of Courses) the student will receive a 50% refund.
- No refund will be allowed after mid-semester.

DEATH

In the case of death of a student, tuition and fees paid for the semester during which the death occurs will be fully refunded.

REFUND OF OTHER CHARGES

Room and board payments will be refunded on a pro-rata basis.

Note: The effective date of any cancellation or withdrawal is the date your Dean/Director receives such notification in writing.

Only in very extenuating circumstances, your Dean/Director may recommend to the Registrar an exception be made to this refund policy.

In no case will a refund be made after the first day of classes of the following semester.

All medical withdrawals must be approved by the University Physician.

If a student receiving financial aid is eligible for a refund for any of the reasons listed, an appropriate portion of the refund will be returned to each aid source on a pro-rata basis according to the proportion each aid amount is to the student's financial aid budget for the period for which the refund is being made.

STUDENTS RECEIVING FINANCIAL AID

For students receiving financial aid, change in student status or credit hour load may result in revision or loss of that financial aid, depending on the regulations of the particular aid programs involved; and, except when aid program regulations specify otherwise, any such change which reduces the student's University charges will usually result in a matching reduction of the financial aid award, with that reduction pro-rated among all aid sources making up the award. Such reduction of aid will usually require immediate repayment of the aid so reduced.

General Information

This section offers a summary of regulations and procedures for registration, change of enrollment, grades and advisement. It also gives a brief explanation of withdrawal, leave of absence, readmission rule, undergraduate degree requirements, and residency rules. The importance of these regulations and procedures cannot be underestimated.

REGISTRATION

Students in attendance must pre-register for the next semester at the designated time. Unless excused in advance by the dean of the college concerned, students who do not pre-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 pre-register for more than 18 credit hours.

ACADEMIC ADVISING

Effective academic advising involves an established rapport between student and teacher. Accordingly, each new student is assigned to 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 pre-registration period. To change academic advisors, students should contact the Dean of their college. 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 offices available to University undergraduates. They are:

The Academic Advising Center: assists students who are undecided about their academic plans. The Center also helps students with complaints and grievances about course instructions, scheduling, and other academically related problems.

Pre-Medical/Pre-Dental 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 catalogs, and pre-medical education journals.

Pre-Law Advising: the UVM Pre-Law 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 catalogs is maintained for interested students.

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

International Students and Scholars Advising: verifies immigration status, interprets immigration laws and immigration forms to foreign students, faculty, and scholars. American students planning to study abroad should also make their plans through this office.

Minority Student Advising: is an effort to meet the needs of students entering the University who demonstrate that additional support services are needed. Incoming freshman minority students may elect to take part in a "Summer Enrichment Program" held on campus for a month (3 credits).

Career Planning and Placement: assists students who are exploring a variety of potential career options early in their academic careers. A library of career informa-

tion and school catalogs is maintained.

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

CHANGE OF ENROLLMENT

A student may add courses during the first three weeks of classes and may drop courses without academic penalty during the first three weeks of classes. After the first week of classes, the instructor may refuse to allow the add if certain material may not be made up and the loss of this work would seriously affect the quality of educational experience gained by the student in the course. Courses dropped after the third week (except if the student is enrolled by administrative error) will be included in the student's record on a "Withdrawn passing" or "Withdrawn failing" basis. Change of enrollment forms and complete details may be obtained from the Registrar's Office.

PASS — NO PASS

PASS — NO PASS course enrollments were approved by the University Senate for implementation in September, 1968. The action was taken in two parts:

FIRST, that any degree program student, not on academic trial, be permitted to take as many as six courses (three courses for two year students; or as many courses as he has semesters remaining for future transfer students) during his undergraduate career on a pass-no pass basis, beginning in his sophomore year (second semester of his/her 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 have enrolled in ineligible distribution elective courses on a pass-no pass basis prior to September 1, 1974, shall not be penalized. The student must complete all work normally required in these courses and he will 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.

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 part of the six (6) standard courses described above."

Procedure —

1. Obtain a PASS — NO PASS Request Form from the Registrar's Office and consult your academic advisor.
2. Obtain your advisor's endorsement that the request conforms to the policy established by the University Senate. 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 dean.
3. Submit your request to be placed on pass-no pass status at the Registrar's Office during the first week of the semester. Requests to be removed from that status must be filed during the same period.

Note: Non-degree students cannot 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 and 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 Evening Division and Summer Session is necessary for auditing courses in those divisions.

REPEATED COURSES

A student who repeats a course loses any previous credit on record for that course. The previous grade remains on the student's permanent academic record and is included in computing his cumulative grade average.

ATTENDANCE

Class Attendance — Every student is expected to attend all regularly scheduled classes. This is a major responsibility of the student toward himself and toward the University. The primary penalty for non-attendance lies in the student's 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.

Absence from Classes — 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

Any student who believes that he has been unfairly treated in regard to absences may appeal to his Academic Dean.

PRIORITY OF UNIVERSITY EXERCISES

University academic responsibilities have priority over other campus events. Attendance at:

1. regularly scheduled classes has priority over special scheduled common hour examinations.
2. common hour examinations has priority over attendance at other activities.

FINAL EXAMINATIONS REGULATIONS

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 on request of the chairman of the department. No examinations shall be given during the last week of the semester except lab exams given in courses with specific lab sections.
3. The time and place of each final examinations 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 chairman 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. A student who is absent from a final examination for any reason must report that fact and the reason, in person or in writing, to his instructor within twenty-four 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.

6. If the absence is not reported as provided above, or is not excused by the instructor, the examination is regarded as failed.

GRADES

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

A Excellent	4 points per semester hour
B Good	3 points per semester hour
C Fair	2 points per semester hour
D Poor	1 point per semester hour
F Failure	0 points per semester hour

Other grades are:

AU	Audit.
Inc.	Incomplete. This grade applies to work of acceptable quality when the full amount is not completed because of illness or emergency. It can be awarded only with the permission of the student's college Dean. The Dean may set the limit of time when the work of the course is to be completed. In no case shall this time be set longer than the beginning of the corresponding semester of the next academic year.
XC	Extended Course. This grade is awarded at the end of the semester to a student who is enrolled in an identified course, the nature of which makes it unreasonable or impossible for the student to complete the required work within the regular semester.
NP	Not Passed, not used in grade point average computation.
P	Passed, not used in grade point average computation.
WP	Withdrawn, passing, not used in grade point average computation.
WF	Withdrawn, failing. This grade is weighted as an "F" in the computation of the grade point average.
M	Missing — Grade not turned in by the Instructor.

CLASS STANDING

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

Freshman	0 — 29.9 credit hours
Sophomore	30.0 — 59.9 credit hours
Junior	60.0 — 89.9 credit hours
Senior	90.0 and over credit hours

TRANSCRIPTS

Currently enrolled, as well as former undergraduate and graduate students, may obtain an official transcript of their permanent academic record by writing or telephoning the Office of the Registrar, 363 Waterman Building (802) 656-2045. The charge is \$2 for each transcript.

Please allow a minimum of one week for normal processing, and three weeks following the end of a semester.

The University reserves the right to withhold registration material and all information regarding the record of any student who is in arrears in the payment of fees or other charges, including student loans and dining and housing charges.

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 to be misleading, or containing information which is inaccurate, a hearing may be scheduled to seek appropriate modification. Requests for review of records should be made to the Registrar.

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 sixty hours (thirty 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 publish at the beginning of each semester the names of those full-time students who stood in the top 20% of each class of their college during the preceding semester. Full-time enrollment in this case shall amount to a minimum of twelve-credit hours in courses in which grades of A, B, C, D or F have been given.

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 on readmission to the University 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:

- a. Upon application to his or her 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.
- b. A leave of absence must be granted for a finite period of time.
- c. A leave of absence normally may not exceed four semesters.
- d. A leave of absence normally may not be granted for the current semester after the day on which courses can be dropped without penalty.
- e. A leave of absence may not be granted to students currently on academic trial or disciplinary probation.
- f. A leave of absence is distinct from withdrawing for medical reasons and is not granted for medical reasons.
- g. A leave of absence does not guarantee housing upon the student's return.
- h. A leave of absence guarantees readmission to the student's college in the University, if the student confirms his or her intent to return by the closing date for a normal readmission application (October 31 and March 31 preceding the appropriate semester).
- i. While on a leave of absence, an individual's student status is temporarily terminated. A leave of absence guarantees an individual's readmission only if he or she takes the appropriate action.
- j. Financial aid awarded but not used prior to a leave of absence 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.
- k. A leave of absence should be confirmed by the appropriate form signed by both the student and the Dean of the college involved.

WITHDRAWAL

A student who wishes to withdraw from college must first notify his academic Dean in person or in writing.

READMISSION

Any degree student who has left school for one semester or more must write to their write to his/her 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 may determine additional or supplementary requirements. Students with questions regarding their academic standing should consult with their college Dean.

1. "On Trial" —

- a. "On trial" is an intermediate status between good standing and dismissal. The student remains enrolled according to stated academic conditions of his/her college.
- b. A student is placed "on trial" by the Dean or the designated committee of the college 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) Any student who is readmitted to the University after having been dismissed for low scholarship re-enters "on trial."
 - (2) Generally a student is placed "on trial" if in any semester he has failed half or more of the hours of his enrollment but has been permitted to continue in college.
 - (3) A student whose record has been consistently below the graduating average or generally unsatisfactory in any semester may be placed "on trial" or continued "on trial" even though he/she does not come within the provisions of

Section (2).

- d. A student who has earned fewer than thirty semester hours of credit and is "on trial" is barred from participation in all athletic and other student activities.

2. Separation —

- a. A student is dismissed from the University if he/she receives grades below passing in one-half or more of the semester hours of his enrollment in any semester unless he/she is allowed to continue by action of the designated committee.
- b. A student who fails to meet the condition of his trial or whose record has been unsatisfactory and consistently below the graduation average may be dismissed for low scholarship even though he/she does not come within the provision above.
- c. A student dismissed for low scholarship must address his/her application for readmission to the college taking the action.
- d. Any student dismissed for academic or disciplinary reasons must receive written approval from his/her previous Academic Dean (or the Dean of Students for disciplinary cases) before enrolling in any University course.

INTERCOLLEGE TRANSFERS

A student who is or has been a member of any college of this University may transfer to another college of the University only with the consent of the Deans of the two colleges concerned. In the case of veterans receiving educational benefits through the Veterans Administration, the change must also be approved by the advisor to veterans in the Dean of Students Office.

UNDERGRADUATE DEGREE REQUIREMENTS

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

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 in which the student is

officially enrolled. 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 42 semester hours of credit (15 of the last 21 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 on recommendation of the Academic Council and in cases of undue hardship. 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 thirty hours, in addition to that taken to qualify for the first degree.

PHYSICAL EDUCATION

One year of physical education, normally completed during the freshman or sophomore years, 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 under General Information). 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 Student Health. The Physical Education requirement for students pursuing two-year degree programs shall be one credit of course work earned in activities instruction.

Students twenty-five years of age or older 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 does occur resulting in personal injury, the University can assume no responsibility except for medical care that is provided by the Student Health Service.

USE OF ENGLISH

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

Before they may be admitted to the University, foreign students must offer evidence that they are capable of reading and writing English on the college level.

STUDENT HEALTH INSURANCE

Through an arrangement with a commercial insurance company, students are able to procure a student health insurance policy.

Married students may procure coverage for their spouse and children. Further details may be obtained from the Infirmary.

POLICY STATEMENT ON DISCRIMINATION

It is the policy of the University of Vermont not to discriminate on the basis of race, religion, ethnic origins, sex or handicap.

Students who feel they have been discriminated against, or wish to obtain additional information, should contact the Dean of Students or the Assistant to the President for Human Resources.

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. All students, as responsible citizens, are required to observe and to share in the support of all local, state and federal regulations. Any student who fails to uphold these standards is subject to disciplinary action by the University.

The disciplinary authority of the University is vested in the President. In such cases as he considers proper, this authority may be delegated to the several Deans and to appropriate judicial bodies. The continuance of each student at the University, the receipt by him of academic credits, his 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 his registration at any time on any grounds, if it considers such action to be for the welfare of the institution.

University 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.

UNIVERSITY RESIDENCY REGULATIONS

The Vermont Legislature has established a lower rate of tuition for students who are Vermont residents. Such a policy appears to have as its objective the attempt to more evenly distribute the cost of operating and supporting the University of Vermont between Vermont residents whose taxes have previously supported the University and non-residents who have not done so.

The Legislature has stated that enrollment at an institution for higher learning or presence within the state for purposes of attending an institution of higher learning shall not constitute residence for tuition purposes.

IN-STATE STATUS REGULATIONS

Adopted by the Board of Trustees

December 14, 1974

The following requirements must be met by a student prior to being granted resident status for the purpose of admission, tuition and other University charges:

1. The applicant shall be domiciled in Vermont, said domicile having been continuous for one year prior to the date of application for a change in residency status. Changes in residency status shall become effective for the semester following the date of application.
2. Domicile shall mean a person's true, fixed and permanent home, to which he intends to return after absence. A residence established for the purpose of attending an educational institution or qualifying for resident status for tuition purposes shall not of itself constitute domicile. Domicile shall not be determined by the applicant's marital status.
3. The applicant must demonstrate such attachment to the community as would be typical of a permanent resident of his age and education.
4. Receipt of financial support from the applicant's family will create a rebuttable presumption that the applicant's domicile is with his family.
5. An applicant becoming a student at an institution of higher learning in Vermont within one year of first moving to the state shall have created a rebuttable presumption of residence in Vermont for the purpose of attending an educational institution.
6. A student who is eligible for tuition purposes to enroll as a resident student in another state shall not be enrolled as a "Vermont Resident."
7. A student enrolling at the University of Vermont shall be classified by the appropriate admissions officer (Director of Admissions, Dean of the Graduate College, Associate Dean of the College of Medicine) as a resident or non-resident for admission and tuition purposes. The decision by the officer shall be based upon information furnished by the student and other relevant information. The

officer is authorized to require such written documents, affidavits, verifications or other evidence as he deems necessary.

8. The burden of proof shall in all cases rest upon the student claiming to be a Vermont resident and shall be met upon a showing of clear and convincing evidence.
9. The decision of the admissions officer on the classification of a student as a resident or non-resident may be appealed in writing to the Committee on Residence whose decision shall be final.

The College of Agriculture

Agricultural Economics	Bachelor of Science
Agricultural Engineering Technology	Bachelor of Science
Animal Science	Bachelor of Science
Biochemical Science	Bachelor of Science
Biological Science	Bachelor of Science
Botany — Agriculture	Bachelor of Science
Dairy Technology	Bachelor of Science
Environmental Studies	Bachelor of Science
General Studies	Bachelor of Science
Occupational & Extension Education	Bachelor of Science
Plant and Soil Science	Bachelor of Science

The College of Agriculture performs four public functions: it teaches resident students, investigates problems, brings information to the people, and performs related services. These four areas of work are performed by the resident instruction division, the research division (Vermont Agricultural Experiment Station), the extension division (Vermont Cooperative Extension Service), and the Related Services Division.

The curricula of the resident instruction division prepare students for professional careers. Upon receiving the bachelor's degree, students usually enter management, specialized services, education, or research — all these in areas related to agriculture, basic biological sciences, conservation, and international service.

The evolution of society necessitates continual progress and change. Thus the challenge of preparing students to excel now, yet adjust to future changes, is being met through programs designed to give a foundation both in the social sciences and the humanities plus a fundamental technical education.

All programs in the College of Agriculture leading to the Bachelor of Science degree require 120 semester hours of prescribed and elective courses, plus two credit hours in physical education. The normal semester program includes fifteen to eighteen credit hours of courses.

In each area of study certain courses are prescribed, with allowance made for the election of additional courses, to provide a well-balanced and integrated educational program and to insure reasonable concentration. Faculty advisers counsel students in the selection of elective courses and educational problems.

PROGRAMS OF STUDY

The College of Agriculture awards the degree of Bachelor of Science in each of the following programs:

Agricultural Economics	Botany
Agricultural Engineering Technology	Dairy Technology
Animal Sciences	Environmental Studies
Biochemical Science	General Studies
Biological Science	Occupational and Extension Education
	Plant and Soil Science

The programs are broad and flexible, with sufficient areas of concentration and electives to meet the specific needs and desires of the student. Therefore, responsible departmental advising is important in the development of each student's program. Every candidate for a degree, in consultation with his/her advisor, must choose one of the above programs upon entering the college. The candidate must then fulfill the requirements stated below.

DEGREE REQUIREMENTS

- 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 (This is an increase from 1.70 and applies to all students admitted for Fall 1978 semester (Class of 1980 or new transfers). Students admitted prior to Fall 1978 are still under 1.70 minimum.)
- C. The successful completion of at least two courses in each of the following areas:
 1. Writing, communication and public address
 2. Science, mathematics and statistics
 3. Fine arts, philosophy, language and literature
 4. Social sciences
- D. Courses as specified in individual programs.

Applicability of courses to specific areas will rest with the advisor and if necessary, with the concurrence of the dean of the college. It is further recommended that courses chosen to fulfill these requirements be taken outside the department in which the student's program of study is located. Students desiring to complete teacher education programs and teacher certification must enroll in appropriate courses in the College of Education and Social Services (see College of Education and Social Services Advisor — 306 Waterman).

PREPROFESSIONAL PREPARATION

Students who are 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. Those interested in human medical sciences usually enroll in biological sciences while individuals interested in veterinary medicine usually enroll in either animal sciences or biological sciences. Any student indicating a specific professional interest will be assigned a faculty advisor knowledgeable in that area.

Competition for places in professional schools is very keen and a superior academic record throughout an undergraduate program is necessary to receive consideration for admission. Due to this intense competition, all potential candidates are encouraged to also complete the requirements in an area of secondary interest.

Students applying to the College of Agriculture, and expressing an interest in medicine or preveterinary medicine, should present evidence of high performance in high school level science and math courses, plus additional supporting documentation such as high SAT scores and strong letters of recommendation.

BIOLOGICAL SCIENCES CORE

Students initially interested in the broad area of biological sciences may enroll in this core curriculum for the freshman and sophomore years. The curriculum is designed to permit students to continue in basic biology or to transfer to one of the applied biology programs. In addition to the general college requirements listed, students should complete during the first two years the following courses or their equivalents: Biology 1, 2 or Zoology 9 and Botany 4; Math 19, 20 or Math 21; Chem 3, 16 or Chem 1, 2 and 16 or Chem 1, 2 and 131, 132; Microbiology and Biochemistry 55 (Microbiology). Course descriptions are listed under the appropriate departments.

Programs available upon completion of the core curriculum are listed below.

Students may wish to select offerings from these programs during the freshman and sophomore years in addition to the required courses stated above.

Freshman & Sophomore Years:
Junior & Senior Years:

Take Biological Science Core
Continue in Biological Science or transfer
to Animal Science, Biochemical Science*,
Botany or Plant and Soil Science

* See Microbiology & Biochemistry

A description of programs and concentrations follows. They are in alphabetical order along with the other programs of the College.

Agricultural and Resource Economics

The Department of Agricultural and Resource Economics offers two major programs of study: Agricultural Economics in the College of Agriculture and Resource Economics in the School of Natural Resources.

AGRICULTURAL ECONOMICS The options in the agricultural economics program provide students with basic work in agricultural economics, together with an exposure to courses in the liberal arts and the sciences. The graduates of this program have acquired quantitative skills and analytical concepts that can be applied to the problems of U.S. or world agriculture. Students will elect one of three options:

1. Food Production Economics: Courses prepare the student to manage a farm business or to work in the many service or educational fields related to agricultural production and finance.
2. Food Marketing and Agribusiness: Courses prepare the student for managerial, sales, or market analysis positions with businesses, especially those that supply agricultural inputs or market agricultural products. Students might also work in government statistical or market analysis programs.
3. International Agriculture: An option for students who are interested in a course of study that will prepare them to work in agricultural development in third world countries, or to work for agencies or private companies with international programs.

I. General Education Requirements:

A. Communication Skills

For all options:

ENGL	1 Written Expression
C&T	11 Public Speaking

B. Quantitative Skills

For all options:

MATH	18 Mathematics for Business, OR
MATH	19 Fundamentals of Calculus I
STAT	111 Elements of Statistics, OR
STAT	141 Basic Statistical Methods

C. Science

For Food Production Economics and Food Marketing and Agribusiness options:

A minimum of 9 hours, comprised of 1 laboratory science course, 1 course in animal science, and 1 course in plant science.

For the International Agriculture option:

CHEM 3 Outline of General Chemistry, plus 1 semester of another laboratory science

D. Arts and Humanities

For all options:

- PHIL 3 Introduction to Logic
1 unspecified course

E. Social Science

For all options:

- 1 course in political science
1 course in another social science, excluding economics

II. Option Requirements:**Food Production Economics**

- ECON 11, 12 Principles of Economics
AREC 2 World Food and Population
AREC 161 Agricultural Finance
AREC 166 Small Business Management
AREC 201 Farm Business Management
AREC 207 Markets, Food and Consumers
AREC 208 Agricultural and Food Policy
AREC 210 Marketing Institutions
AREC 254 Advanced Agricultural Economics

A minimum of an additional 15 hours from a list of restricted electives.

Food Marketing and Agribusiness

- ECON 11, 12 Principles of Economics
ECON 186 Microeconomics Theory
ECON 190 Macroeconomics Theory
AREC 166 Small Business Management
AREC 207 Markets, Food and Consumers
AREC 208 Agricultural and Food Policy
AREC 210 Marketing Institutions
AREC 264 Agricultural Price Analysis and Forecasting

A minimum of an additional 15 hours from a list of restricted electives.

International Agriculture**A. Agricultural Specialization:**

- ASCI 1 Introductory Animal Science
PSS 11 Principles of Plant Science
AREC 2 World Food and Population
VOTC 5 Introductory Agricultural Engineering
VOTC 112 Community and Extension Education

Each student must take at least 15 additional hours within a department of the College of Agriculture, 12 hours of which must be at or above the 100 level.

B. Area Specialization: Each student will elect to concentrate on either Latin America or Africa and will take the courses listed below.***Latin America Area**

- SPAN 1-2 Elementary AND/OR
SPAN 101, 102 Composition and Conversation
ANTH 21 Human Cultures
ANTH 161 Cultures of Latin American
GEOG 106 Latin America
HIST 104 Latin America History

African Area

- FREN 1-2 Elementary AND/OR
FREN 101, 102 Composition and Conversation
ANTH 21 Human Cultures
ANTH 162 Cultures of Africa

GEOG	101 Africa
HIST	116 African History

* With special permission, a student may elect to specialize in the language and culture of the Soviet Union or Southeast Asia. An approved internship in a third world country may substitute for 9 hours credit as required above.

RESOURCE ECONOMICS For a description of the program in Resource Economics, refer to the School of Natural Resources.

Animal Sciences

Each student majoring in programs offered with this department shall successfully complete a minimum of eight semester courses in Animal Science, including at least five of advanced standing. Additional courses must be selected in consultation with the departmental advisers in order that the selected program can be individualized to more nearly meet the professional aims and goals of the student.

DAIRY TECHNOLOGY This program has been designed to provide the scientific, technical, and practical instruction necessary to prepare the graduate for the numerous positions available in the dairy and food science field. The students who elect to place greater emphasis on the scientific aspect of Dairy Technology will find that they are prepared to work in quality control, research laboratories, and to do graduate study in dairy and food chemistry or bacteriology. The student who desires to place greater emphasis on business and the social sciences may become qualified for numerous supervisory and management positions in the dairy and food industry.

BASIC ANIMAL SCIENCE This program has been designed specifically for those individuals who are interested in careers in industrial research and development or university positions. The students who elect this program will be provided with the strong science background that is necessary for advanced study in such areas as physiology, nutrition, genetics, and related biological fields.

ANIMAL TECHNOLOGY This program provides formal training in the theories and practices of the animal sciences with special emphasis on management and technical competence. It prepares the student for employment as a farm owner, manager, or field work with state and federal extension services, breed associations, hatcheries, farm organizations, and various commercial companies.

ANIMAL INDUSTRY This program is primarily for those students who are interested in business. It prepares them for supervisory and management positions in industries related to Animal Science, such as those involved with the processing and sales of dairy, meat and poultry products; feed and fertilizer companies; farm equipment and supply agencies; advertising and public relations; and other areas of public service.

Biological Science

This program is designed to provide flexibility in developing a background in biological sciences. Students may fulfill their course requirements by selecting basic and applied courses from the several biologically oriented departments (Animal Science, Botany, Microbiology and Biochemistry, Plant and Soil Science, Zoology, and others).

Graduates of the program may continue their education in graduate school or professional schools or they may obtain employment in a variety of areas. Possible job opportunities would include basic and applied research in educational institutions and

governmental agencies, technical writing, employment with environmental consultants, etc.

The following courses are required of all students in the Biological Science program following completion of the core requirements: genetics (one semester), biochemistry (one semester), physics (two semester sequence), and statistics (one semester). In addition, all students must take six additional courses in basic or applied biology. These courses should be selected to include at least one course in botany or applied plant science, one course in zoology or applied animal science, one course in the area of evolution and diversity of life, one course in ecology, and two courses in physiology or biochemistry. Of these, at least one or more courses at the 200 level should be included. These courses are selected in consultation with the adviser from the diverse offerings of the various colleges and departments.

Botany

Students in the Colleges of Agriculture or Arts and Sciences may major in Botany. Each undergraduate plans a program in consultation with a personal departmental adviser. The emphasis on flexibility permits a choice of electives when planning for each individual's career. 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 is 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. Many other students 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 either case, close attention is given to increasing the student's 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: anatomy, cell botany, cytology, ecology, phycology, physiology, plant development, plant pathology, and taxonomy.

Required course: Mathematics 21, 21; or Mathematics 21 and Statistics; or Mathematics 19, 20, and Statistics, Physics 15, 16; Chemistry 16 or preferably 131, 132; Biology 1, 2; Botany 101, 104, 107, 108, and 109 or 160; two additional semester courses in Botany, one at the 200 level. Botany 4 and Zoology 9 may be substituted for Biology 1, 2.

Six hours of modern foreign language are strongly recommended. Students may petition the department to substitute other courses for certain requirements in the planning of individual programs.

Environmental Studies

The College of Agriculture participates in the interdisciplinary University Environmental Program as described on page 123. Most students select the Coordinate Major Program and fulfill the requirements in one of the major programs available in the College.

General Studies

This program is designed for students seeking a general rather than a specialized knowledge in the field of agriculture and related subjects. Through the proper selection of electives, a student may choose an area of concentration within the college and also select courses that contribute to a liberal education.

Required: In addition to the basic College requirements each student must satisfactorily complete forty credit hours in the College of Agriculture, twenty of which must

be at the 100 level or above. All additional courses must be selected in consultation with and have the approval of the student's advisor.

Microbiology and Biochemistry

BIOCHEMICAL SCIENCE Contemporary biology increasingly demands knowledge of events at the molecular level. Students who plan a career of research or teaching in biology are well-advised to concentrate on the principles and methods of biochemistry during their undergraduate years. To this end the program in "Biochemical Science" provides a coordinated sequence of study in chemistry, biology, and biochemistry. Depending on the student's future plans and capability, three areas of concentration are possible: (1) *Cellular Biochemistry* which emphasizes the physiological and metabolic reactions of organisms; (2) *Molecular Biology* which focuses on the chemical and physical structures of subcellular particles; and (3) *Nutritional Biochemistry* which emphasizes the synthesis and utilization of nutrients. Specialization in one of these concentrations normally commences in the Junior Year after completion of the Biological Sciences Core (p. 46). Students are required to complete a minimum of three hours of physical chemistry (or eight hours for the Molecular Biology option), twelve hours of biochemistry and three advanced biology courses, two of which would be in their specialty (e.g., Nutrition, Physiology, Genetics, etc.).

Plant and Soil Science

The Plant and Soil Science program is designed for students interested in horticultural crops, agronomic crops, soils, and insect pest management as they relate to the science of food, feed, and fiber production or to recreation and the environment. The program is flexible and allows students to place their primary emphasis in either science or agri-business. Suggested groupings of courses have been developed by the department to be used as guides for students interested in General Plant and Soil Science, Soil Science, Plant Science, Ornamental Horticulture and Landscape Design, Horticultural Therapy, and Insect Pest Management. Specific courses, in addition to the core courses, are worked out between the student and the advisor.

All students majoring in Plant and Soil Science must take Principles of Plant Science, Introductory Soil Science, Plant and Soil Career Orientation, Soil Fertility and Management, one semester of Seminar, two semesters of Chemistry (one semester of inorganic and one semester of organic), one semester of Mathematics or Statistics, Plant Pathology, and Insect Pest Management. A minimum of 6 additional courses in Plant and Soil Science at the 100 level or above are required, to be selected in the student's area of interest and approved by his or her advisor. Courses in related areas may be substituted for one or two of these 6 courses with the consent of the student's advisor.

Core Courses			Hours
P&SS 11	Principles of Plant Science		3
P&SS 61	Introductory Soil Science		4
P&SS 82	Plant and Soil Science Career Orientation		1
P&SS 106	Insect Pest Management		4
P&SS 162	Soil Fertility and Management		3
P&SS 281	Seminar		1
Botany 104	Plant Physiology		4
Botany 117	Plant Pathology		4
Mathematics or Statistics			3-4
Chemistry 3			4
Chemistry 16			4
6 Additional Plant and Soil Science courses at or above the 100 level			18-20

2 Courses in Fine Arts and/or Humanities	6
2 Courses in English and/or Communications and Theater	6
2 Courses in Social Sciences	6

70-74

Vocational Education and Technology

The VOTEC department offers two major programs, (1) Occupational and Extension Education and (2) Agricultural Engineering and Technology which provide an opportunity to choose from eight areas of professional concentration. The programs are flexible. Certain concentrations may be completed either as (1) a major in this department, (2) a dual major when combined with other programs in the University, and/or (3) without having to attend the University campus on a full-time basis. Courses of general interest are available to students majoring in other programs in the University.

OCCUPATIONAL AND EXTENSION EDUCATION Four areas of concentration prepare students for teaching certification. Students should contact this department regarding requirements for admission into the University teacher education program.*

* Teacher certification concentrations are offered in cooperation with the College of Education and Social Services. Selected programs have been approved under the Vermont State Department of Education's Program Approval Plan, and have reciprocity certification in selected states. Selected courses in the College of Education and Social Services will be included in teacher certification concentrations.

One concentration prepares students for educational responsibilities in governmental agencies, private organizations, business, or industry.

1. **Agricultural and Natural Resources Education:** Prepare to teach grades 7-12 general and vocational subjects, and may concentrate their studies in one of the many agricultural or renewable natural resource subject areas. Field experiences in schools are provided during the sophomore or junior year, and the senior year. Professional courses include VOTC 106, 152, 155, 251, 207 or 208, and 282, and two electives from VOTC 156, 157, 158, 159.

2. **Industrial Education:** Industrial Arts and Vocational fields are included in this concentration. Industrial Arts Field — prepare to teach six I.A. subject areas commonly found in grades 7-12. Vocational Field — prepare to teach a specialized trade or industrial subject in grades 11-12. At least two years of acceptable experience in business, industry, or the military is required before the degree can be awarded in the vocational field.** Professional courses include VOTC 106, 152, 155, 207 or 208, 251, and 282, and two electives from VOTC 156, 157, 158, 159. Industrial Arts students will also complete required laboratory courses.

3. **Diversified Occupations Education:** Prepare to teach life relevant subjects to grades 9-12 special needs pupils, when combined with a teaching field specialization in occupational education. Students may receive initial certification in secondary special education. Individualized study and field experiences are included. Professional courses include VOTC 207 or 208, 270, 277 and two courses from 271, 272, and 274.

4. **Health Occupations Education:** Prepare to teach occupationally oriented subjects in grades 10-14. Available only to students who have completed a recognized training program in a health occupation and are licensed. A minimum of two years of experience in a health occupation is required before a degree is awarded.** Professional

courses include VOTC 106, 152, 155, 207 or 208, 251, and 282, and two electives from VOTC 156, 157, 158, 159.

****** Several paths lead either to a degree, teacher certification, or both. A degree may be earned on a full-time basis, or on a part-time basis while employed in industry or teaching. Persons entering teaching directly from industry may earn teacher certification through the Transition Into Education (T.I.E.). Qualified individuals may start as non-degree students and seek admission to a degree program after satisfactorily completing specified courses.

Persons having two or more years of appropriate work or military experience may qualify for up to 30 credits by successfully completing National Occupational Competency Institute Examinations. Students with less than two years experience may qualify for the off-campus technical internship.

Qualified non-degree students seeking teacher certification will usually complete professional courses, 152, 153-154, 156, 157, 158, 159, 207 or 208, and 251, plus selected courses in the College of Education and Social Services.

5. Extension Education: Prepare for educational responsibilities in government agencies, private organizations, business, or industry by majoring in another program in the University and complete this concentration concurrently. Field practicum experiences are provided. Professional courses include VOTC 104, 112, 156, and 253.

AGRICULTURAL ENGINEERING AND TECHNOLOGY This program offers students a choice of two concentrations, one leading to a Bachelor of Science degree and one which provides the first two years of a Bachelor of Science in Agricultural Engineering degree.

1. Agricultural Engineering Technology: Technical and practical instruction related to building, utilities, machinery, soil and water; including relevance to problems of environmental concern. Preparation for employment in agri-business and public service. Courses include VOTC 5, 102, 121, 131, 140, and 162.

2. Professional Agricultural Engineering — B.S.A.E.: The first two years of a professional engineering curriculum. The last two years of the professional program must be completed at an institution offering a Bachelor of Science in Agricultural Engineering degree. Vermont resident students in good standing may complete their studies at the University of Maine, under a special arrangement which allows them to pay the same tuition rate as Maine residents.

Preparation for professional engineering work in soil and water control, agricultural machinery and equipment, agricultural structures, the application of electricity and refrigeration to agriculture, and rural water supply and sanitation. The graduate is also prepared for research and graduate study in agricultural engineering.***

******* Freshman admission (at the Maine-resident tuition rate) to this curriculum at the University of Maine will be allowed for Vermont-resident students wishing to take all four years at one institution.

The College of Arts and Sciences

Anthropology	Bachelor of Arts
Area Studies	Bachelor of Arts
Art History	Bachelor of Arts
Art — Studio	Bachelor of Arts
Biology	Bachelor of Arts
Botany — Arts and Sciences	Bachelor of Arts
Chemistry	Bachelor of Arts or Bachelor of Science
Classical Civilization	Bachelor of Arts
Communication Science & Disorders	Bachelor of Arts
Communication Studies	Bachelor of Arts
Economics	Bachelor of Arts
English	Bachelor of Arts
French	Bachelor of Arts
Geography	Bachelor of Arts
Geology	Bachelor of Arts or Bachelor of Science
German	Bachelor of Arts
Greek	Bachelor of Arts
History	Bachelor of Arts
Latin	Bachelor of Arts
Mass Communication	Bachelor of Arts
Mathematics — Arts and Sciences	Bachelor of Arts
Music	Bachelor of Arts or Bachelor of Music
Philosophy	Bachelor of Arts
Physics	Bachelor of Arts or Bachelor of Science
Political Science	Bachelor of Arts
Psychology	Bachelor of Arts
Religion	Bachelor of Arts
Russian	Bachelor of Arts
Sociology	Bachelor of Arts
Spanish	Bachelor of Arts
Theatre	Bachelor of Arts
Zoology	Bachelor of Arts
Individually Designed Major — Arts and Sciences	Bachelor of Arts
Undecided — Arts and Sciences	No Degree

The College of Arts and Sciences aims to provide the opportunity for men and women to acquaint themselves with man and his environment; the natural, social and cultural environment and its relationship to man's intellectual and creative achievements; to provide an atmosphere of free inquiry in order to be able to perceive the kinds of alternatives available to man with respect to the problems, challenges and opportunities of life by means of continuous probing, weighing and evaluation prior to — but not necessarily in lieu of — choosing courses of thought and action while at the same time recognizing the increasing sense of humility that such learning imposes; above all, to deal with men and women as humans and only in a complementary fashion as job aspirants.

The overall mission of the College of Arts and Sciences is to provide the highest possible caliber of undergraduate general education in the liberal arts and sciences. This ranges from the utilization of intellectual tools and skills (articulative, quantitative, scientific and creative) to the theoretical

exploration of man and his natural, social and cultural environment. It is accomplished through critical analysis, which the educated mind is trained to bring to bear upon that environment and interrelationships among elements of the environment and student's years on campus and thereafter. The core missions are:

- To provide opportunities for undergraduates to concentrate in specific disciplinary approaches (i.e., majors), which may lead to pre-professional preparation, graduate studies, general education as a citizen who contributes to rather than draws upon the society, or a combination of these.

- To provide through distribution requirements an awareness of how the diverse intellectual, cultural and creative aspects of the liberal arts and sciences approach the study of man and his environment:

- The humanities, through the study of the great individual creative geniuses of mankind, past and present, in literature, the arts and philosophy.

- The performing arts, by providing opportunities for self expression through active participation in fields such as music, art, theatre and creative writing.

- The social sciences, through their focus upon the human experience and behavior, individual and collective, via the application of analytical methods and their concern with the human species and its relationships with the various environments evolved through time, and with the diversity of the human conditions at any time.

- The natural sciences, through an understanding of the order of nature, the organization of the universe from the microcosm to the macrocosm, their relationship to man and his powers of observation, imagination, ratiocination and consequent understanding and appreciation of the scope, logic, precision and limitations of scientific methods, principles and challenges.

- Further, to provide graduate training in selected areas in which local, regional or national needs coincide with and complement strengths of particular undergraduate departments or programs, as well as in selected areas where our position as an institution of higher learning benefits intellectually and educationally from the presence of more specialized, rigorous and advanced study for the further development of educated mind.

- To carry out quality scholarly activity and research as a continuing contribution to the world's knowledge and understanding of humanity and the universe. As a necessary prerequisite to the maintenance of the intellectual competence required of a faculty providing an environment for mutual intellectual stimulation, curiosity, and growth.

It must be emphasized that the integrity of the whole College effort requires the continued emphasis on the excellence of each of the missions above.

Degree Requirements and Academic Regulations

I. All candidates for degrees awarded by the College of Arts and Sciences must present a total of 122 semester hours of credit, including 2 semester hours of credit in

physical education. Of the minimum 122 credits, at least 96 must be taken in courses offered by the College of Arts and Sciences; and for the Bachelor of Arts, no more than 45 credits may be in the major discipline, while for the Bachelor of Science, no more than 50 may be in the major discipline.

In order to receive a degree from the College of Arts and Sciences, students must have a minimum cumulative average of 2.00. Students must also complete 30 of the last 42 hours of credit in residence at the University of Vermont, and as matriculated students in the College of Arts and Sciences.

Every candidate for a degree must complete the appropriate distribution requirements, and a major program.

II. DISTRIBUTION REQUIREMENTS

A. Language and Literature

NO STUDENT MAY FULFILL THIS CATEGORY WITHOUT OFFERING A FOREIGN LANGUAGE AT THE INTERMEDIATE LEVEL OR ABOVE.

English	Hebrew	General Literature
French	Latin	Classics 42
German	Russian	Latin 22
Greek	Spanish	Linguistics 101, 102

B. Fine Arts and Philosophy

Art	Music	Classics 42
Communications	Philosophy	Linguistics 101, 102
Communication	Religion	
Science and	Theater	
Disorders		

C. Social Sciences

Anthropology	Political Science
Economics	Psychology
Geography	Sociology
History	Linguistics 101, 102

D. Sciences and Mathematics

Biology/Botany/Zoology*	Physics
Chemistry	Mathematics
Geology	

* count as one discipline

Only courses offered in the disciplines listed above may be used to satisfy distribution requirements. All courses must be valued at 3 or more credit hours, and may not be taken on a pass/no pass basis. Courses taken to fulfill distribution requirements may also be applied to the major. The specific requirements are as follows:

BACHELOR OF ARTS: Each student must present nine semester courses by choosing three courses from 3 of the categories A, B, C, and D above. In any given category, no more than two courses may be chosen from one discipline.

BACHELOR OF SCIENCE: Each student must present six semester courses selected from two of the categories A, B, and C above.

BACHELOR OF MUSIC: same as Bachelor of Arts

III. MAJOR REQUIREMENTS

All students in the College of Arts and Sciences must complete a major program. At least one half of the major requirements must be taken at the University of Vermont, and only with the approval of the department chairman will courses taken at another institution be applied toward completion of the major. All students must maintain an average in the major field of 2.0 or better, and may not apply the pass/no pass option to any course required for completion of the major, or the related field.

Of the minimum 122 credits, Bachelor of Arts candidates may take no more than 45 credits in the major, and Bachelor of Science candidates may take no more than 50 in the major.

The College of Arts and Sciences offers students, whose needs and interests are not met by currently offered major programs, the opportunity to initiate an individually designed, non-departmental major. Students wishing to pursue this option should contact the Dean's Office, and will need to secure approval from the Committee on Honors and Individual Studies.

Students may elect more than one major by consulting the Dean's Office, and the departments involved. By the date of graduation, the student must complete the major requirements of each department, although courses taken to satisfy the related field requirement may overlap when deemed appropriate.

For specific major requirements, see the following pages.

IV. ELECTIVES

Students will select elective courses in consideration of the following limitations. Courses offered by other colleges or schools at the University may be taken by Arts and Sciences students, but only 24 hours of such credit may be applied to the minimum 122 required. Courses offered by other colleges or schools at the University by departments which offer majors in the College of Arts and Sciences, are excepted from the 24 credit limitation. (At present, these include courses in Botany, Mathematics, and the Environmental Program.)

MILITARY STUDIES courses may be taken by students in the College of Arts and Sciences, but only 8 such credits may be applied to the minimum 122 required. Military Studies credits will be counted as outside of the College of Arts and Sciences. In general, the College does not grant credit for Military Service.

PHYSICAL EDUCATION courses, beyond the two required of all students, may be taken as elective degree credit, and will be counted as outside of the College of Arts and Sciences.

READINGS AND RESEARCH or independent study credits, may be elected in any field including the major discipline. There is no limit on the number of Readings and Research credits which may be earned, but if a student elects 9 or more such credits during any given term, the student must secure approval from the Committee on Honors and Individual Studies.

V. TRANSFER

Students wishing to transfer to 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. Applications may be filed in the Dean's Office, and will be acted upon at

the end of each term. All students receiving a degree from the College of Arts and Sciences must earn 30 of the last 42 credits in the College, therefore, students wishing to transfer should make application by no later than the end of the junior year.

Transfer students from other institutions should note that 30 of the last 42 credits, and one half of the major credits must be earned at the University of Vermont, and as a student in the College of Arts and Sciences. Although the physical education requirement may be waived for transfer students, the minimum required number of credits remains 122. Transfer credit will be initially evaluated by the Registrar, although judgment as to the applicability of credit toward satisfaction of degree requirements rests with the Dean's Office, and the chairman of the major department. Transfer credit from other institutions is not used in the calculation of the University of Vermont grade point average.

VI. SPECIAL PROVISIONS CONCERNING CREDIT

Credit will not be given for the following combinations:

Biology 1, 2 and Biology 3
 Biology 1, 2 and Botany 4
 Chemistry 1, 2 and Chemistry 11, 12
 Chemistry 1, 2 and Chemistry 3, 4
 Chemistry 141, 142 and Chemistry 140
 Mathematics 2 and Mathematics 10
 Mathematics 9 and Mathematics 10
 Mathematics 19 and Mathematics 21
 Mathematics 20 and Mathematics 21
 Music 5 and Music 9
 Music 1, 2 and Music 10
 Physics 11, 12 and Physics 15, 16
 Zoology 5, 6 and Zoology 104
 Zoology 9 and Zoology 5, 6 or Biology 1, 2
 Zoology 104 and Anatomy 9 and/or Physiology 10

VII. ACADEMIC STANDARDS

The following criteria for academic trial and dismissal, while making allowances for the student in the freshman year, are designed to encourage academic work of quality equal to or greater than the minimum average required for graduation.

Credit accumulated:	Placed on trial if semester or cumulative average is below:	During the next semester the student must earn:
1-20	1.5	1.7
21-36	1.7	2.0
37 et seq.	2.0	2.0
	or if he/she has failed two or has not made two grades of C- or better in academic subjects	AND 1) have no more than one failure 2) enroll in no course on a pass/no pass basis 3) maintain a full program of courses (12 or more hours)

A student on trial who fails to meet the established conditions of trial is dismissed for low scholarship unless he/she is permitted to continue by action of the Committee on Academic Standing.

A student not on trial who fails (F, NP, WF) half or more of his/her credits (not including Physical Education and Military Studies) during any semester is dismissed for low scholarship unless he/she is permitted to continue by action of the Committee on Academic Standing.

VIII. COMMITTEE ON ACADEMIC STANDING

The Committee on Academic Standing reviews all requests for special consideration in regard to College regulations, changes in enrollment, curriculum standards, and graduation requirements. Students may petition to this Committee through the Dean's Office.

IX. SPECIFIC DEPARTMENTAL REQUIREMENTS

For the Bachelor of Arts degree the major field must include a minimum of 36 semester hours, at least 18 of which must be in the major discipline. Concentration requirements, including courses and necessary prerequisites may not exceed 60 semester hours. For the Bachelor of Science degree the major field must include a minimum of 36 semester hours, at least 18 of which must be in the major discipline. No more than 94 semester hours of the total program, including distribution requirements and major field, may be in specifically designated courses.

ANTHROPOLOGY Anthropology 21 and two of the following three: 24, 26, 50. In addition, Anthropology 225 (normally in the senior year), 228, and four other advanced courses. Every student must take at least three courses in other disciplines related to anthropology. Consult the Department on this last point.

AREA AND INTERNATIONAL STUDIES Entering students are invited to consider the option of concentrating in Area & International Studies. Courses in several academic disciplines can be combined so as to focus on a particular area of the world, thus providing an opportunity to test generalizations against the particular reality of a geographical area and its people.

Undergraduates who major in Area Studies usually accumulate sufficient credit to enable them to also fulfill department requirements in one of the social sciences, humanities, or foreign languages.

The four areas presently available for concentration are: CANADA, LATIN AMERICA, RUSSIA/EAST EUROPE, EUROPE (Western, Northern, Mediterranean). Courses in ASIAN Area Studies are available to interested students as indicated on the following page. However, they are not currently being offered as a major field of concentration.

This relatively novel method of 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.

Students who plan on majoring in Area Studies should take during their freshman and/or sophomore years the required foreign language courses of the selected area, as well as humanities, which are beginning courses in the social sciences and humanities which are prerequisites of subsequent required courses and do also meet the general distribution requirements.

Students interested in concentrating in Area Studies are urged to contact the Director, Area & International Studies, Extension 4062.

Specific requirements of the individual programs (with the exception of ASIAN) are as follows:

ASIAN STUDIES

(currently not available as a major field)

WESTERN ASIA
Anthropology 166

Peoples of the Middle East

Anthropology 170
 History 35
 History 36
 History 105
 Religion 114
 Religion 116
 Religion 145

SOUTH AND SOUTHEAST ASIA

Anthropology 163
 Anthropology 165
 Geography 109
 Religion 131
 Religion 132

Religion 168
 Religion 196

EAST ASIA
 Geography 108
 History 131
 History 132

Political Science 175
 Religion 132

Religion 141
 Religion 145
 Religion 166

Pastoral Peoples
 The Rise of Islam
 Modern Middle East
 History of the Ancient Near East
 Hebrew Scriptures
 Judaism
 Primitive Christianity

Peoples of Oceania
 Peoples of South Asia
 Southeast Asia and India
 Hindu Tradition
 Buddhist Tradition (Religion 21,
 Introduction to Asian Religions, is
 recommended as a prerequisite.)
 Contemporary Spiritual Life
 Man and Nature in East and West

China, Korea, and Japan
 Modern China (1800-1949)
 Peoples Republic of China (1949-present)
 History 31 (Traditional Chinese
 Civilization) and History 32 (History of
 Japan) are recommended as pre-
 requisites)
 Asian Political Systems (China, Japan)
 Buddhist Tradition (Religion 21,
 Introduction to Asian Religions, is
 recommended as a prerequisite)
 Religion in Japan
 Religion in China
 Buddhist Tradition

CANADIAN STUDIES

I. Eighteen hours representing at least four different disciplines selected from the following courses:

Anthropology 167
 Anthropology 196
 Anthropology 267
 Area & Int'l Studies 91
 Communication 293
 English 135,136
 French 287,288

Geography 102
 Geography 221

History 75,76
 History 195
 History 284
 History 285
 Political Science 173
 Sociology 167

Cultures of Canada
 Bilingualism and Biculturalism
 The Franco-Americans
 Introduction to Canadian Studies
 Canadian Mass Media
 Canadian Literature
 Literature of the French of North
 America
 Geography of Canada
 Special Topics in Regional
 Geography-Canada
 History of Canada
 Canadian-American Relations
 Seminar in Canadian History
 Seminar in French Canada
 Canadian Politics
 Social Structure of Canada

II. French language through the Intermediate level.

III. An additional six hours from the above list and/or courses recommended by the Program.

IV. An additional twelve hours from related courses chosen in consultation with advisor.

Canadian Studies cosponsors a Summer Program in Quebec and encourages its students to enroll. Courses taken in this program are applicable to the appropriate category, I, II, III, or IV, as listed above.

LATIN AMERICAN STUDIES

I. Twelve hours as follows:

Anthropology 161

History 33

Geography 106

Political Science 174

Two additional semester courses selected from Area & International Studies, 193, 194; 195, 196; 197, 198; or 297, 298; History 134, 133; or from courses recommended by the Program of Latin American Studies.

II. Plus six hours of advanced Spanish (Spanish 185, 186; 285, 286; or 293).

III. An additional 12 hours from related courses chosen in consultation with advisor.

RUSSIAN/EAST EUROPEAN STUDIES*

A minimum of 40 semester hours, to include:

Economics 290 (11, 12 prerequisites)

History 154, and

Geography 103

Political Science 172

Six semester hours of other courses recommended by the Program of Russian and East European Studies; and two years of a Slavic language (usually Russian 1-2 and 11, 12). At least 18 hours must be taken from 100 level courses and above.

Recommended Courses

AIS 91: Introduction to Russia and East Europe

POL SCI 212: History of Political Thought

ECON 185: Comparative Economic Systems

POL SCI/HIST 278: Foreign Policy of the U.S.S.R.

ECON/POL. SCI 258: Problems of Communism

GLIT 181: Russian Literature in Translation

HIST 54: History of Russia and Eastern Europe

GLIT 182: Soviet Literature in Translation

Courses in Area and International Studies as well as in advanced Russian, while recommended, are not included within the 40 hours minimum requirements.

NOTE: The Program offers also an interdisciplinary individual-design major in Russian and East European Studies and Economics, requiring normally four courses in Russian or Serbo-Croatian, four courses in Economics, two area courses in disciplines other than Economics, two courses in Business Administration, and two approved electives at the 100 level or above.

* A graduate certificate in Russian and East European Studies is offered in conjunction with a Master's Degree program in a particular discipline.

EUROPEAN STUDIES (Northern, Western, Mediterranean)

I. At least eighteen hours of advanced courses in one European Area or Topic determined through consultation with an advisor and approval of the European Studies subcommittee of the Area & International Studies Program. (e.g. Medieval and Renaissance Studies.)

II. Fifteen hours of additional advanced courses related to Europe.

The total of I and II shall include nine hours of advanced courses in European Literature and Fine Arts and nine hours of advanced courses in Social Science relating to Europe.

III. Six hours of a European foreign language related to the area or topic of I and at the 200 level. Those who have concentrated on a foreign language in I shall offer six hours of a second foreign language at the 100 level or above in addition to the requirements of II.

Variants in the language requirement may be made by the advisor, depending upon the area of interest. (e.g. Ancient/Medieval History or Archaeology, where an ancient and a modern language would be required.)

IV. The student would, of course, also fulfill the Arts and Sciences general distribution requirements and would be encouraged to do so through a broad selection of courses dealing with Europe.

ART Students may major in one of the following:

Studio Art Twenty-four hours in studio, including 2, 3, 4, with three different instructors; four at the 100 level, and 281 in the senior year; nine hours in Art History, including 179 preceded by either 5, 6 or 9, 172; and six hours of related advanced critical, social or creative studies.

ART HISTORY Twenty-four hours in art history, including 5, 6; four courses at the 100 level and two at the 200 level, one of the latter in the senior year; six hours in the department chosen from 2, 3, 4 and 9; nine hours of related advanced historical and/or critical studies; and satisfaction of Group A in college requirements.

BIOLOGY Chemistry 1, 2 or 11, 12 to be taken the freshman year if possible; Physics 11, 12 or preferably 15, 16; Mathematics 19, 20, or Mathematics 21, or Statistics 111, or Statistics 141, 211. Thirty-six hours including Biology 1, 2, 101, 102, 103; Zoology 104, Botany 108; and three advanced courses selected in consultation with the advisor from among the offerings of several biologically oriented departments.

BOTANY Mathematics 21, 22; or Mathematics 21 and Statistics 111; or Mathematics 19, 20 and Statistics 111; Physics 15, 16; Chemistry 16 or preferably 131, 132; Biology 1, 2; Botany 101, 104, 107, 108, and 109 or 160, and two additional semester courses in Botany, one at the 200 level. Six credits of modern foreign language are strongly recommended. Students may petition the department to substitute other courses for certain requirements in the planning of individual programs.

CHEMISTRY Students may select either of two degree programs:

Bachelor of Arts: Chemistry 11, 12 (or 1, 2 and 123), 131 (3 credits), 132 (3 credits), 134, 135, 141, 142, 201, 202, and 212; Mathematics 21, 22, 121 (or equivalent); Physics 15, 16 or 24, 25.

Bachelor of Science: Chemistry 11, 12, 131 (3 credits); 132 (3 credits), 134, 135,

141, 142, 184, 201, 202, 212, 213; nine hours of advanced chemistry, or biochemistry elective, which may include Chem 197, 198; Physics 15, 16 or 24, 25; Math 21, 22, 121 (or equivalent), Math 271; proficiency in German equivalent to the completion of Intermediate German (German 15, 16). A student with intermediate level proficiency in French or Russian can substitute one year of German (German 1-2).

CLASSICS Students may major in:

Latin: Twenty-seven hours in courses numbered above 100 among which 111, 112 are required, one course in literature in translation numbered above 100 and one course in Greek above 100 are applicable; History 107, Roman History; a second foreign language (either six hours of Greek at least through 12 or six hours of a modern European language of which at least three hours are at the 100 level or above).

Greek: Twenty-seven hours in courses numbered above 100 among which 111, 112 are required, one course in literature in translation numbered above 100 and one course in Latin above 100 are applicable; History 106, Greek History; a second foreign language (either six hours of Latin at least through the intermediate level or six hours of a modern European language of which at least three hours are at the 100 level or above).

Classical Civilization: Forty-two hours consisting of thirty in the Major Discipline, and twelve 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 (9, 105, 106, 107) and the following language study are required: three hours of Latin or Greek at the 200 level OR six hours of Latin or Greek at the 200 level OR six hours of Latin at the 100 level and six hours of Greek at the intermediate level (11, 12) OR three hours of Latin at the 200 level and three hours of a modern foreign language at the 100 level. (The three hours of the modern foreign language are not to be counted as part of the Major Discipline but as a Related Course.) Strongly recommended as part of the Major Discipline are Classics 42 (Mythology), Art 51 (Greek Art), Classics 153, 154, 155, 156 (Greek and Latin Literature in Translation), Classics 22 (Etymology) is applicable, but not together with Classics 42. Also recommended are History 106 and 107.

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 Students may major in:

Communication Studies: 11; seven advanced level courses in Mass Communication, at least three of which must be at the 200 level; two additional courses in the department; plus nine hours of related courses.

Mass Communication: 63; eight advanced level courses in Mass Communication, at least five of which must be at the 200 level; plus nine hours of related courses.

COMMUNICATION SCIENCE AND DISORDERS: One from (11, 14, 41, 81); 74, 101, 270, 271 or 272, 273, 281; one additional course in the Department; plus eleven hours of related courses.

ECONOMICS Thirty hours in Economics including 11, 12, 186, 190, three courses at the 100 number level and three courses at or above the 200 level. In addition, students must select nine hours from the other social sciences.

ENGLISH Twenty-four hours of advanced courses distributed to departmental group requirements; satisfaction of the Group A College requirement; 12 hours (6 in courses numbered 100 or above) in a related field; students are encouraged to take advanced courses in history and classical and modern foreign languages and literature.

ENVIRONMENTAL STUDIES Students in the College of Arts and Sciences may select a major in the Environmental Program. Consult the appropriate section of this catalog.

GEOGRAPHY Twenty-seven hours in Geography (including Geography 11, 12, 171, 281, an additional six semester hours at the 200 level and nine other semester hours in Geography); four semester courses in approved related fields.

GEOLOGY Students may select either of two degree programs:

Bachelor of Arts: Twenty-seven hours of Geology, including twelve hours at 100 level, and nine hours at 200 level. Twelve hours in Physical Science, Biological Science, Mathematics (Calculus or above), or Engineering. Field experience (105, or 238 or equivalent) strongly recommended. B.S. program described on page 97.

Bachelor of Science: Students who elect this curriculum are encouraged to combine geology with one or more related disciplines in order to develop strong scientific backgrounds. Examples of such interdisciplinary fields include geochemistry, geophysics, oceanography, geology engineering, geomathematics, environmental studies, and geobiology.

	1st Semester hrs.	2nd Semester	hrs.
The Freshman Year			
Mathematics 21	4	Mathematics 22	4
Chemistry 11 or	5	Chemistry 12 or	5
Chemistry 1	4	Chemistry 2	4
Geology 1	4	Geology Elective	3
Elective	3	Elective	3
		Physical Education	1
	<hr/> 16(15)		<hr/> 16(15)
The Sophomore Year			
Geology 105	3	Geology 111	4
Geology 145a, b	2	Physics 16	4
Physics 15	4	Computer Science 11	3
Electives	6	or Statistics 111	
Chemistry 123*		Electives	3
	<hr/> 15		<hr/> 14
The Junior Year			
Geology 155	3	Geology 166	4
Geology 156	4	Geology 270	3
Biology 1	4	Geology 277	3
or Zoology 9		Biology 2	4
Computer Science 11	3	or Botany 4	
or Statistics 111			
Physical Education	1		
	<hr/> 15		<hr/> 14
The Senior Year			
Geology 238	4	Geology 198	4
Geology 197	3	Geology Elective	3
Geology Elective	3	Electives	9
Electives	6		
	<hr/> 16		<hr/> 16

* Chemistry 123, if Chemistry 1, 2 was taken.

GERMAN Ten semester courses of advanced level including 101, 102; 281, 282; four semester courses of English; two semester courses of European history to be selected from 16, 5, 6, 52, 125, 152; an advanced related course to be selected in consultation with the department.

HISTORY Thirty hours in history including at least 3 courses at the advanced (100) level, and 1 course at the seminar (200) level. Within the major, students must select an 18-hour area concentration, including at least one advanced course and a seminar. Concentration areas designated by the department include: Traditional Societies; Modern Europe; The Third World; The Western Hemisphere; and Historiography, Methodology, and History of Ideas. Students may design other concentrations, to meet individual interests, with the advice and consent of their advisors and the department. The balance of the departmental major requirement (12 hours) should be fulfilled through courses outside the concentration area. Other requirements: a foreign language pursued to the level of reading knowledge (usually a minimum of one semester at the university intermediate level or demonstration of competence by taking an examination), or a year's work in statistics and quantitative methods (usually Sociology 100 and History 121). Twelve hours of work in another discipline, or in Area Studies, of which six must be at the 100 level or above.

MATHEMATICS Thirty-six semester hours of courses numbered 21 or higher, including 124 and at least fifteen semester hours in Mathematics or Statistics courses numbered 200 or above.

MUSIC Students may select either of two degree programs:

Bachelor of Arts: 15, 16, 21, 22, 115, 116, 121, 122 and six hours of performance study plus senior recital; piano until functional piano facility is achieved (see p. 239); six hours in another discipline as approved by the department. Students who wish to meet accreditation requirements of the National Association of School of Music will also complete one of the following combinations:

- (a) 203, 205 and four advanced courses in music literature.
- (b) 203, 205, 208, 215 and two advanced courses in music literature.
- (c) 208, advanced course in music literature and twelve additional hours of performance study.

One foreign language through the intermediate level is required of students on combinations (a) or (b).

Bachelor of Music: This degree, with a concentration in performance of theory, is the initial pre-professional collegiate music degree, designed for students who wish to pursue a career in music as performers, scholars, or private teachers. Such students must develop the skills, concepts, and sensitivity essential to the professional life of a musician. To earn the degree they must demonstrate not only technical competence but also broad knowledge of music and musical literature, sensitivity to musical style, and an insight into the role of music in society. Candidates should possess a high degree of talent, well-developed musicianship, artistic sensibilities and a strong sense of commitment. Graduates will ordinarily continue their studies through post-graduate work before they are fully qualified as professionals. Admission to the performance major requires an audition with the music department. Admission to the theory major requires evidence of a particular aptitude for, and potential in, musical theory, and will normally occur after the freshman year.

PERFORMANCE MAJOR

	1st	2nd		1st	2nd
Freshman Year	SEMESTER		Junior Year	SEMESTER	
Performance Study	2	3	Performance Study	4	4
Ensemble	1	1	Ensemble	1	1 + 2
Keyboard*	1	1	Form and Analysis	-	3

Music History I	3	3
Theory I	3	3
Non-music Electives	3	6
	<hr/>	<hr/>
	13	17

Counterpoint	3	-
Orchestration	3	-
Non-music Electives	6	6
	<hr/>	<hr/>
	17	16

	1st	2nd
Sophomore Year	SEMESTER	
Performance Study	3	3
Ensemble	2	2
Keyboard	1	1
Theory II	3	3
Music History II	3	3
Non-music Electives	3	3
	<hr/>	<hr/>
	15	15

	1st	2nd
Senior Year	SEMESTER	
Performance Study	4	5**
Ensemble	1 + 1	1 + 1
Conducting	-	3
Music Electives	3	
Non-music Electives	6	3
	<hr/>	<hr/>
	15	13

REQUIRED FOR GRADUATION:	121
plus physical education	2
	<hr/>
	123

* Until functional piano facility achieved (see page 239).

** (Recital)

THEORY MAJOR

	1st	2nd
Freshman Year	SEMESTER	
Theory I	3	3
Music History I	3	3
Performance Study*	2	2
Non-music Electives	6	6
	<hr/>	<hr/>
	14	14

	1st	2nd
Junior Year	SEMESTER	
Ensemble	1	1
Orchestration	3	3
Form & Analysis I	-	3
Counterpoint I & II	6	-
Brass Class	1	-
Percussion Class	-	1
Performance Study*	2	2
Conducting	-	3
Non-music Electives	3	3
	<hr/>	<hr/>
	16	16

	1st	2nd
Sophomore Year	SEMESTER	
Ensemble	1	1
Theory II	3	3
Period or Genre	3	3
String Class	1	-
Woodwind Class	-	1
Performance Study	2	2
Music History II	3	3
Non-music Electives	3	3
	<hr/>	<hr/>
	16	16

	1st	2nd
Senior Year	SEMESTER	
Composition	3	-
Form & Analysis II	3	-
Performance Study	2	2
Independent Study	3	3
Non-music Electives	3	9
	<hr/>	<hr/>
	14	14

REQUIRED FOR GRADUATION:	120
plus physical education	2
	<hr/>
	122

* Including piano until functional piano facility is achieved (see page 239).

PHILOSOPHY Twenty-seven hours including (a) 3 or 113 or 213, (b) 101 and 102, (c) 201 or 202, (d) at least one of 4, 140, 142, 144, 152, or 240, and (e) a total of at least three 200 level courses in philosophy. An additional nine hours in a related discipline or disciplines is required. Students considering graduate work are urged to study a foreign language.

PHYSICS Students may select either of two degree programs:

Bachelor of Arts: Twenty-five hours in physics, including 15, 16, or 24, 25; 128, 201 or 202 (not required of students taking 220 and 222 with laboratory), 211 and 213; mathematics through 121. An additional laboratory science and a reading knowledge of French, German or Russian are strongly recommended.

Bachelor of Science: Physics 24, 25 (or 15, 16), 128, 201, 202, 211, 213, 214, 265 (or 15, 16), 128, 201, 202, 211, 213, 214, 265 (or equivalent), 273, nine hours of approved physics electives, and three hours of advanced laboratory credits in physics or a related science (such as an additional semester of 201 or a combination of 1 credit each from Physics 220, 222 and one other course); Math 21, 22, 121 and six hours of approved mathematics electives; eight hours of chemistry, exclusive of Chemistry 3, 4 or 7; by midway in the Junior year, a student must demonstrate proficiency in computer programming equivalent to completion of CS 11.

POLITICAL SCIENCE Twenty-seven hours including nine hours selected from the "core" courses (13, 21, 51, 71, 81) and fifteen hours at the level of 100 or above, of which at least nine hours must be at the 200 level; nine hours in a related discipline, of which six must be in courses numbered 100.

PSYCHOLOGY Requirements for the major in psychology are Psychology 1, 109, 110, 119, and a minimum of 18 additional credit hours in psychology, with a minimum of 12 credit hours at the 200 level or above. At least three credit hours must be taken from each of the categories A, B, and C as follows:

Category A = Psych. 205, 206, 207, 210, 220, 221, 222, 264, 267.

Category B = Psych. 230, 233, 234, 261, 262, 263.

Category C = Psych. 250, 251, 253.

A minimum of 9 credit hours in the social and/or natural sciences at the 100 level or above are also required. Courses to fulfill this requirement will be determined by consultation with the major advisor.

RELIGION Twenty-seven hours in religion, including 71; two courses chosen from among 101, 104, 108; one course from the 110-129 range (Western traditions); one course from the 130-149 range (Asian traditions); 201; plus nine hours in a related discipline.

ROMANCE LANGUAGES Thirty hours of advanced level courses in French or Spanish, of which at least twelve must be in literature and at least twelve must be in courses numbered above 200. Related area: a minimum of twelve hours of courses from another department or departments chosen in consultation with departmental major advisors and specifically approved by them.

RUSSIAN Nine semester courses at the advanced level to be chosen in consultation with a faculty member teaching in the Russian language curriculum, four semester

courses of another language which may consist of combinations of 2 semester courses in English or comparative literature and two semester courses of a foreign language at the 11, 12 level, plus three semester courses from the Russian and East European Area Studies program (chosen in consultation with major advisor).

SOCIOLOGY Thirty hours in sociology, including a minimum of fifteen hours at the 200 level and six hours in the related fields of anthropology, communications and theatre, economics, geography, history, political science or psychology. Required courses include 100, normally taken by the end of the sophomore year, and one of the following: 273, 274, 275, 278, or 279.

THEATRE: Thirty-three hours of Theatre courses, including 1, 5, 6, 10, 15, 40, 115 or 140; 125 or 126; two courses selected from 127, 128, 129 and 130; 250; plus nine hours of related courses, six of which are numbered 100 and above. A summer's participation in the Champlain Shakespeare Festival or comparable company strongly recommended.

ZOOLOGY One semester of calculus; Physics 11, 12 or preferably 15, 16; Chemistry 1, 2 or 11, 12 to be taken the freshman year if possible. Thirty hours of biology and zoology including Biology 1, 2; 101, 102, 103; Zoology 104; plus seven hours chosen from Biology 105 and/or 200 level Zoology courses.

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 so to direct their four-year undergraduate courses as 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 wished 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 premedical and pre dental programs.

The concentration consists of a year of elementary biology and single-semester courses in genetics, ecology, cellular biology, animal structure and function, and plant structure and development. This core is followed by three elective courses selected from a wide range of offerings in biologically oriented departments at the University. A year of chemistry, a year of physics, and mathematics (calculus or statistics) are also required.

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, in mass communication, 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 which is requisite for admission, but the student is advised to develop a command of the English language as well as a comprehension of American politics, social, and

economic institutions. For further details, kindly consult: Professor D.N. Hoffman, Department of Political Science; Professor V.P. Clark, Department of English; Professor R.E. Stanfield, President's Office (Department of Sociology); or Professor P.H. Hutton, Department of History.

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 and religion, psychology, and social studies.

OPTOMETRY The requirements for admission to schools of optometry vary, but typically they include courses in English, mathematics, physics, chemistry and zoology with a minimum of two years of college work.

PHARMACY Under the Regional Plan (page 25) Vermont residents may prepare for pharmacy school at Connecticut or Rhode Island. This is a five-year program with two years of preprofessional work which includes English, mathematics, botany, chemistry, zoology, physics, social science, a course in fine arts, and orientation to pharmacy.

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. It is strongly urged that a student desiring to enter medical college should during his sophomore year consult catalogues of colleges to which he expects to apply, and arrange to include in his program courses required by those schools.

Each student, in consultation with his 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:

- a) Mathematics 21, 22 (recommended for able students)
- b) Mathematics 19, 20 (recommended)
- c) Mathematics 21 (adequate)
- d) Mathematics 9, 19 (adequate)
- e) Mathematics 9, 2; 21 or 19, 20 (suggested for students not immediately prepared to enter calculus)
- f) Mathematics 7, 8 (not acceptable)

Chemistry, two years minimum, *with laboratory*

Chemistry 1, 2 or 11, 12 (recommended for potential Chemistry majors)

Chemistry 131, 132 (required)

Physics, one year minimum, *with laboratory*

Physics 15, 16 or 24, 25 (recommended for students concentrating in the physical sciences or engineering)

Biology, one year minimum, *with laboratory*

Biology 1, 2

Students who enter an accredited medical college after three years (90 hours) of undergraduate work may, on application and after completing one year of medical study, qualify as candidates for a Bachelor of Science degree.

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. A student should consult

catalogues of the dental colleges to which he expects 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, biochemistry. 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 may, upon application to the Dean of Education, be accepted into the teacher training program for secondary education. Application should be made before the end of the sophomore year. The prescribed courses in education, up to 24 credit hours, can count as electives towards the Bachelor of Arts. Students completing this program are eligible for Secondary Teacher's Certification.

College Honors

The honors program at both the junior and senior level is designed for the superior student with unusual initiative and intellectual curiosity, and provides an opportunity to pursue a special project without the restrictions of classroom routine. Such a student enters a program of reading, research, or creation under the direction of the department of his choice. A student may take honors in either or both years.

A student in the College of Arts and Sciences who, at the end of his junior year, has an average of 3.00 or above for the work of the sophomore and junior years may become an applicant for college honors in a particular subject. His program for the senior year must be approved not later than the end of the junior year by the department in which honors are sought and by the Committee on Honors, and he must present a satisfactory written report and pass an oral examination on the field of special study.

A program called junior honors, which may be considered introductory to but distinct from college honors, is available to juniors who have a sophomore average of 3.00 or above and who have the permission of their department chairmen. The program for each junior honors candidate will be determined by the department chairman concerned.

Departmental Honors

A senior whose overall average is 2.50 or above, or who has been specially recommended by the department in which he is concentrating, is eligible to take a comprehensive examination. Upon successfully completing the examination he will be granted his degree "with Departmental Honors." Some departments have instituted seminars or other programs designed to help the student gain the requisite breadth and depth of knowledge.

The Center for Area Studies

The Center for Area and International Studies is an inter-department activity, with a director and five programs, each of which has its own director. The purposes of the Center are to encourage and coordinate interdisciplinary and comparative study and research for selected foreign areas. The Center also sponsors interdisciplinary seminars and guest lectures. The Center for Area Studies administers the program of concentration in Area Studies and offers the B.A. degree in the College of Arts and Sciences, based on the successful completion of courses in several academic disciplines with concentration in one of five foreign areas: Canada, Latin America,

Russia, and Eastern Europe and Western Europe. Requirements for concentration include the general distribution requirements in the College of Arts and Sciences, the foreign language of the selected area usually through the intermediate level; several options of courses in the social sciences and humanities related to the selected area; and specialized area courses, reading and research, college honors, and area seminars based on team teaching and supervised research. Special courses offered for Area Studies include: "Introduction to the Area" (91); "College Honors"; "Special Topics"; "Readings and Research"; and "Seminar."

The Government Research Center

Social Science Research Center

The Government Research Center provides research and informational services for students, state and local officials, members of civic groups, and the public. Activities include: developing opportunities for students to become acquainted with, and to gain practical experience in, the operation of government, maintaining liaison with state and local officials relative to the use of University resources in the study of problems in state and local government, and conducting research projects.

The Social Science Research Center is operated by the political science department and the Academic Computing Center as data archives, a research facility, and a teaching resource. The Center is the depository of data sets made available to the University of Vermont by the Inter-University Consortium for Political and Social Research, and also holds several data sets from other sources (including UVM researchers). The Center's historical, social, economic, and political archives are available to any student or faculty member. Computer analysis may be done at the Research Center which contains three terminals and two keypunch machines. Advanced students provide assistance for faculty and student projects. The director of the Center will aid researchers using SPSS (Statistical Packet for the Social Sciences). Many students enrolled in social science courses learn data analysis and use of the computer at the Research Center. Anyone who feels that the Research Center's resources might be of use is urged to drop by or to contact the director.

The College of Education and Social Services

Social Welfare	Bachelor of Science
Art Education	B.S. in Art Education
Early Childhood Education — Kindergarten & Primary	B.S. in Education
Elementary Education — General	B.S. in Education
Elementary Education — Reading Concentration	B.S. in Education
Elementary Education — Special Educ. Concentration	B.S. in Education
Music Education	B.S. in Music Education
Physical Education	B.S. in Education
Secondary Education — English	B.S. in Education
Secondary Education — Communication & Theatre	B.S. in Education
Secondary Education — General	B.S. in Education
Secondary Education — Language	B.S. in Education
Secondary Education — Mathematics	B.S. in Education
Secondary Education — Science	B.S. in Education
Secondary Education — Social Sciences	B.S. in Education
Individually Designed Major — Education	B.S. in Education
Interdisciplinary — Social Services & Education	B.S. in Education
Undecided — Education	No Degree

The College of Education & Social Services offers four-year curricula leading to the following degrees: Bachelor of Science, Bachelor of Science in Education, Bachelor of Science in Music Education and Bachelor of Science in Art Education.

Undergraduate programs are offered in:

Art Education — Gr. K-12	Physical Education — Gr. K-12
Elementary Education — Gr. K-6	Secondary Education — Gr. 7-12
Music Education — Gr. K-12	Social Work

These curricula are designed to prepare teachers for the kindergarten-elementary level, junior high schools, and assignments calling for subject specialties in elementary, secondary, and twelve-grade situations. Programs are composed of general education, professional education, and professional laboratory experiences.

The College of Education and Social Services has developed course clusters in the area of reading-language arts, early childhood, and special education. The American Primary Experimental Program (A.P.E.X.) is a program that prepares teachers for grades kindergarten through third (K-3). The Responsive Teacher Program is designed to prepare elementary and secondary regular classroom teachers with special competencies for enhancing the social, personal and academic growth of handicapped learners. Any student who desires early childhood or responsive teacher education certification endorsement must be enrolled in the College of Education and Social Services. The faculty-student advising process individualizes the program to the student's specific interests and career goals. Upon completion of their sophomore year, students may enter one of these specialized programs for the last two years of their undergraduate career. Additional in-

formation may be obtained from Mr. Zacharie Clements — Reading and Language Arts; Mr. Charles Rathbone — Early Childhood and A.P.E.X.; and Mrs. Carol Burdett — Responsive Teacher Program. Programs are also available for individually designed majors and for careers in interdisciplinary social services and education.

Effective with the Class of 1977 the required graduation cumulative average is 2.0. It is required that students achieve a cumulative average of 2.50 in the major field and education class work, as a prerequisite to approval for student teaching, also effective with the Class of 1977.

Candidates for a degree at the University of Vermont who desire initial Vermont Teacher Certification should plan to include formal study of the teaching of reading in their programs. The Regulations Governing the Certification of Educational Personnel prescribe the completion of six semester hours in reading for all secondary school teachers (Gr. 7-12) and nine semester hours for all elementary school teachers (K-6).

The College of Agriculture and the School of Home Economics offer, in cooperation with the College of Education and Social Services, programs in Home Economics Education, Occupational and Extension Education and Applied Technology and Agricultural Engineering. For further information refer to sections in this bulletin describing the College of Agriculture, Department of Vocational Education and Technology, and School of Home Economics.

General Education Requirements

Each student in the College of Education & Social Services is required to select a minimum of sixty credit hours from the following five general areas, with the restriction that at least one course must be selected from each area, and taken for a letter grade. General Education courses required for certification such as English and Social Science or the University requirement of two semesters of Physical Education activities may be used to satisfy the general education requirement in that area. Students may also apply required courses in their major and minor, broad field, or area of concentration, to meet requirements in general education.

I. Arts and Letters

- a. Art
- b. Classics
- c. Communication and Theatre
- d. English
- e. Music

II. Science and Mathematics

- a. Biology
- b. Botany
- c. Chemistry
- d. Computer Science
- e. Geology
- f. Environmental Studies
- g. Mathematics
- h. Physics
- i. Statistics
- j. Zoology

III. Social Sciences

- a. Anthropology
- b. Economics
- c. Geography
- d. History
- e. Political Science
- f. Psychology
- g. Sociology

IV. Humanities

- a. Foreign Language
- b. Philosophy
- c. Religion

V. Health and Physical Education

- a. Health Education
- b. P.E. Methods
- c. Selected Activities

Students in each teacher education program, beginning with the Class of 1974 (with the exception of those in Music Education), are allowed to include in their program the "personal component" (Ed. 198). The personal component offers students an opportunity to pursue an activity under self-direction. Each student is required to state the objectives for his study, to make a contractual arrangement with his personal component advisor, and to fulfill the terms of the contract. Options such as education colloquia, community action experience, seminars and discussion groups, individual counseling and group counseling, are available — Ed. 198 is open only to UVM students enrolled in the Teacher Education Program. It is suggested for freshmen and sophomores, others with consent of the instructor.

ADMISSION AND ACCREDITATION

The College of Education & Social Services has the responsibility for maintenance of standards approved by the National Council for the Accreditation of Teacher Education (N.C.A.T.E.). Initial admission of students is to the University of Vermont College of Education and Social Services — admission to the teacher education program occurs after special tests in communication skills and other screening measures are administered. Students must also meet personal, academic, and professional criteria established for teacher education candidates. This admission procedure is in accordance with the College's standards as approved by the N.C.A.T.E.

All teacher education candidates are expected to complete admission procedures before the beginning of the junior year in order to fulfill degree requirements.

The programs to be described are the programs through which the UVM College of Education and Social Services achieves accreditation by the N.C.A.T.E. and the Vermont State Department of Education Program Approval Plan. Students completing an N.C.A.T.E. accredited program are qualified to receive certification in most states. Those completing a program evaluated through the Vermont State Department of Education's Program Approval Plan will have reciprocity certification in neighboring states. Further information may be obtained from the Center for Student and Field Services, Waterman Building.

ELEMENTARY EDUCATION

Kindergarten through Six

The elementary education program is designed to prepare teachers for assignments in grades kindergarten through six. The Bachelor of Science in Education is awarded upon satisfactory completion of our approved program. The program includes a planned sequence of professional courses and laboratory experience. Upon completion graduates are eligible for Vermont teaching certification.

Elementary teacher certification for prospective teachers in grades K-3 may be obtained by enrolling in the Early Childhood Education Program (A.P.E.X.) in the College of Education and Social Services. Early Childhood Development programs in the School of Home Economics provides certification for Grade K.

The elementary education curriculum includes a general component of sixty credits selected from the following academic areas: arts and letter, science and mathematics, social sciences, humanities, and health and physical education (two semesters of physical education activities are required). Electives may be used to build an area of concentration of twenty-four to thirty-three credits. Specific information about academic majors or general education requirements may be obtained from advisors or from Center for Student and Field Services, Waterman Building.

The professional programs begin by introducing the student to education as a field of study. The student is made aware of the social foundations and relationships of education as well as the resources available concerning the field. Emphasis is placed on the need for examining educational literature and research as part of the process of making critical judgments. Continuous field experiences are available throughout the four years. The program also includes special content courses for elementary teaching. Information concerning field experiences (deadlines, requirements, etc.) may be obtained from the Center for Student and Field Services, Waterman Building.

In addition to the academic and professional requirements, certain courses are recommended to meet specific state and national requirements in elementary education. These are specified in the typical program.

Freshman Year					
	1st	2nd		1st	2nd
	SEMESTER			SEMESTER	
Foundations of Ed. (Ed. 2)	3	or 3	Intro Geography (Geog. 11)	3	or 3
Comm 11, THE 1 or 5	3	or 3	General Electives and/or		
* English	3	or 3	approved electives in		
			Area of Concentration	-	-
Sophomore Year					
	1st	2nd		1st	2nd
	SEMESTER		Junior Year	SEMESTER	
Child and Community			Art 2, 3 or 4	3	or 3
(Ed. 3 or 4)	1	or 1	Language Arts and		
* Music Methods	3	-	Children's Literature		
* Fundamental Concepts of			(Ed. 134)	3	or 3
Elementary School			Teaching Science and		
Mathematics (Math 125 &			Social Studies (Ed. 144)	3	or 3
126)	3	3	Language Arts and Reading	3	or 3
* American History			* American Political Systems		
(Hist. 7 or 8)	3	or 3	(Pol. Sci. 21)	3	or 3
* English Literature Elective	3	or 3	General Education Electives		
Learning & Human			and/or approved electives in		
Dev. (Ed. 145 & 146)	3	3	Area of Concentration	-	-
Senior Year					
	1st	2nd		1st	2nd
	SEMESTER			SEMESTER	
Teaching Mathematics and			Senior Seminar (Ed. 190)	3	or 3
Critical Thinking (Ed. 160)	3	-	Student Teaching (Ed. 181)	8-12	or 8-12
Health and Physical			General Education electives		
Education for the			and/or approved		
elementary school (P.E.			electives in Area of		
100 and 116)	2	3	Concentration	-	-

A minimum of 127 approved semester hours is required for the degree.

* Recommended to meet specific state and national certification requirements.

SECONDARY EDUCATION

Seven through Twelve

The secondary education program is intended to prepare teachers for junior and senior high schools in Vermont and other states. The Bachelor of Science degree is awarded upon satisfactory completion of an approved program. Upon completion graduates are eligible for Vermont teaching certification.

The secondary education curriculum includes a general component of a minimum of sixty credits selected from the following five academic areas: arts and letters, science and mathematics, social sciences, humanities, and health and physical education (two semesters of physical education activities are required). The student must use electives during the four years to build major and minor fields of study or a broad field major. Students may apply required courses in their majors and minors or broad field to meet requirements in general education. Specific information about academic majors or general education requirements may be obtained from advisors or from the Center for Student and Field Services, Waterman Building. The program includes a planned sequence of professional courses and laboratory experiences.

TEACHING FIELDS

All teacher education candidates must have, prior to their student teaching, at least 30 credit hours in a teaching major and 18 hours in a teaching minor or at least 48-50 hours in a broad field major. The following are current approved majors, minors, and broad field majors (detailed outlines, developed in cooperation with the respective departments, are available at the Center for Student and Field Services, Waterman Building):

MAJORS Biological science, chemistry, communication and theater, earth science, English, French, geography, German, history, Latin, mathematics, physical science, physics, Spanish.

MINORS Anthropology, biology, chemistry, coaching, communication and theatre, earth science, economics, English, French, geography, German, health education, history, Latin, mathematics, physics, political science, psychology, religion, Russian, sociology, Spanish.

BROAD FIELD MAJORS Natural science, social studies, environmental studies.

Students should select majors and minors which are logically related and which commonly occur as teaching combinations in secondary schools. The major-minor or Broad Field program must include credits in advanced courses.

EXPERIENCES IN PUBLIC SCHOOLS Students in secondary education usually have direct experiences in public schools throughout the four-year curriculum. Students observe and participate as teacher assistants in local junior and senior high schools. During the senior year students devote sixteen continuous weeks to full-time teaching in public secondary schools. In most cases, students must arrange to live off-campus during the student teaching assignment.

Applications for all field experiences must be made one semester in advance of assignments, and the student must assume responsibility for meeting deadlines. Information about application and assignment procedures may be obtained from the Center for Student and Field Services, Waterman Building.

A typical program is as follows:

		Freshman Year			
		1st	2nd.		
		SEMESTER		1st 2nd	
				SEMESTER	
* English	3	or 3	One elective from the		
Com., THE 1 or 5	3	or 3	Science and		
Foundations of Education			Mathematics area	3	or 3
(Ed. 2)	3	or 3	One elective from the		
* Social Science (3 credits			Humanities area	3	or 3
of U.S. History and 3			Physical Education	1	or 1
credits of Pol. Sci. 21			General Education electives		
are recommended)	3	3	or approved electives in		
			major and minor or		
			Broad Field	-	-
		1st	2nd		
		SEMESTER		1st 2nd	
				SEMESTER	
Sophomore Year			Junior Year		
* English Literature			Participation (Ed. 15)	2	or 2
elective	3	or 3	Secondary Methods and		
Psychology I	3	or 3	Procedures (Ed. 178)	-	3

Learning and Human Dev. (Ed. 145, 146)	3	3	Special Subject Methods and procedures (Ed. 179) (Ed.-Eng. 182 for English majors and Ed. 294 for C & T majors)	-	3
General Education electives or approved electives in major and minor or Broad Field	-	-	General Education electives or Teaching Reading	3	3

Senior Year					
	1st	2nd		1st	2nd
	SEMESTER			SEMESTER	
Senior Seminar (Ed. 190)	3	or 3	General Education electives or approved electives in		
Student Teaching (Ed. 181)	8-12	or 8-12	major and minor or Broad Field	-	-

* Recommended to meet specific state and national certification requirements.

A minimum of 124 approved semester hours is required for the degree.

Students are responsible for obtaining information regarding teacher certification and degree requirements from the appropriate College of Education and Social Services offices.

ART EDUCATION

Kindergarten through Twelve

The program in Art Education qualifies candidates to teach art in grades K through 12. Students fulfill general education requirements and complete 42 hours in professional art education and required education courses, 45 hours minimum in studio art, art history, and related subjects. Graduates satisfy College of Education and Social Services requirements for teacher certification, 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 admittance to Graduate School.

Students must be enrolled in the College of Education and Social Services. Those admitted as freshmen 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 second semester of sophomore year.

A typical program is as follows:

Freshman Year			Junior Year		
	1st	2nd		1st	2nd
	SEMESTER			SEMESTER	
English	3	or 3	Curriculum and Practice in		
Com 11, THE 1 or 5	3	or 3	Art Ed. (EDAR 177)	4	-
Foundations of Ed. (EDSS 2)	3	or 3	Special Problems in Art Education (EDAR 184)	1-6	or 1-6
Social Science	3	3	Art History	3	or 3
One elective from the Science & Math area	3	or 3	Participation (EDSC 15)	2	or 2
One elective from the Humanities area	3	or 3	Studio Electives	-	-
Physical Education	1	1	Related electives	-	-
Art 2, 3 or 4	3	3	Teaching Reading	3	or 3
Art History (5 and 6)	3	3			
			Senior Year	1st	2nd
				SEMESTER	
			Practicum in Field Exper- ience (EDAR 141)	4	or 4

	1st	2nd		
Sophomore Year	SEMESTER		Current Issues in Art & Ed. (EDAR 183)	- 3
English literature elective	3	or 3	Directed Studies (Art 281) or Readings & Research (Art 197)	3 or 3
Psychology I	3	or 3	Issues in Contemporary Ed. (EDAR 292)	2-6 or 2-6
Learning & Human Dev. (EDSS 145, 146)	3	3	Student Teaching (EDSC 181)	8-12 or 8-12
Studio Electives	6	6	Studio Electives	- -
Related Electives	-	-	Related Electives	- -
			Senior Seminar (EDSS 190)	3 or 3

A minimum of 124 approved semester hours is required for the degree.

Students are responsible for obtaining information regarding teacher certification and degree requirements from the appropriate College of Education and Social Services office.

MUSIC EDUCATION

Kindergarten through Twelve

The curriculum in music education, leading to the degree of Bachelor of Science in Music Education, is recommended to students who have sufficient training and natural musical ability to justify a career in music. Graduates are qualified for positions as instructors and supervisors of music in the public schools.

The department of music is a member of the National Association of Schools of Music, and all its degree programs are accredited by the N.A.S.M.

The program includes a general component of sixty credits selected from the following five academic areas: arts and letters, science and mathematics, social sciences, humanities, and health and physical education (two semesters of physical education activities are required). Students may apply required courses in music to meet the general education requirements.

	1st	2nd		1st	2nd
Freshman Year	SEMESTER		Junior Year	SEMESTER	
Theory I	4	4	Orchestration	3	-
Performance (major, piano, string class)	3	3	Conducting	-	3
Major Ensemble	1	1	Elem. Mus. Methods	2	-
Electives	3	to 6	Second. Mus. Methods	-	2
Physical Education	1	1	Performance (major, brass class, guitar)	4	3
			Ensembles	2	2
			Participation	1	1
			Electives or Teaching Reading	6	6
	18	18		18	17

	1st	2nd		1st	2nd
Sophomore Year	SEMESTER		Senior Year	SEMESTER	
Theory II	4	4	Student Teaching	12	-
Music History II	3	3	Form and Analysis	-	3
Performance (major, piano, woodwind class, voice class)	5	5	Counterpoint	-	3
Major and Minor			Ensembles	-	2
			Performance (recital,		

Ensembles (or second major)	2	2	percussion class, repair class)	-	4
Learning and Human Dev. or Ed. Psych.	3	or 3	Basic Concepts in Music Education	-	3
Electives	3	or 3	Senior Seminar	3	
	<hr/>	<hr/>		<hr/>	<hr/>
	17	17		15	15

A minimum of 128 approved semester hours is required for the degree. Students should pass the piano facility examination prior to student teaching. Students are responsible for obtaining information regarding teacher certification and degree requirements from the appropriate College of Education and Social Services officers.

THE RESPONSIVE TEACHER PROGRAM

The Responsive Teacher Program is a two-year concentration for students majoring in elementary, secondary or physical education. This program trains regular classroom teachers with special education skills. The responsive teacher is trained to educate all children through individual teaching/learning procedures. Using a data-based individual model of instruction the responsive teacher learns to set goals for all students and assures that these goals are met by use of individualized instruction and the application of behavior analysis theory.

Candidates for the Responsive Teacher Program are chosen at the end of their sophomore year and must meet specified entrance requirements. The competency based program begins in the fall of the junior year with a consecutive two-year schedule, in addition to the regular elementary or secondary program. Responsive Teachers-in-Training attain competencies in specifying minimum objectives in the basic skill areas, measurement systems, individualized instruction and learning theory. A full-time commitment is expected of each Responsive Teacher-in-Training during the spring semester. Working with a partner, they spend each morning in a classroom where at least one child has been designated as eligible for special education services. Each afternoon students engage in course work and seminars designed to increase the rate of learning for Vermont's eligible children. During their senior year Responsive Teachers-in-Training will spend a full semester student teaching in a Vermont classroom that contains at least one child eligible for special educational services.

Students who successfully complete this program will be recommended for certification as regular elementary or secondary teachers, with an endorsement for Teacher of the Handicapped.

Questions concerning the Responsive Teacher Program should be directed to Coordinator of Responsive Teacher Program, Special Education Area.

The program must contain these courses:

	1st	2nd		1st	2nd
Junior Year	SEMESTER		Senior Year	SEMESTER	
Special Education Methods I (EDSP 151)	6	-	Student Teaching (EDSP 181)	12	-
Special Education Methods II (EDSP 152)	6	-	Seminar in Special Education (EDSP 165)	-	1
Responsive Teacher Practicum (EDSP 160)	-	6	Issues in Contemp. Ed. (EDSP 292)	3	-

A minimum of 127 approved semester hours is required for the degree. Students are responsible for completing all certification requirements at the elementary or secondary level.

SOCIAL WORK AREA

SOCIAL WORK Provides education for social work practice based on a liberal

education in the Social Sciences and Humanities. Career opportunities in the field of social work are explored. The student, in consultation with his advisor, selects elective courses which will give him the opportunity to develop his individual interests. A minimum of 122 credit hours of prescribed and elective courses is required for graduation.

Usual sequence of courses:

		1st	2nd			1st	2nd
Freshman Year		SEMESTER		Junior Year		SEMESTER	
Professional Courses				Professional Courses			
SOSE 2 Foundations of Social Work		3	or 3	SOSE 168 Social Work Intervention I		3	or 3
SOSE 15 Participation (optional)		-	3	SOSE 169 Social Work Intervention		3	or 3
Prerequisites for SOSE 166				SOSE 194 Basic Methods in Social Work Research		3	-
Economics 11		3	or 3	SOSE 195 Applied Basic Methods in Social Work Research (optional)		-	3
Political Science 21		3	or 3	Psychology 152			
Psychology 1		3	or 3				
Sociology 10		3	or 3				
		1st	2nd			1st	2nd
Sophomore Year		SEMESTER		Senior Year		SEMESTER	
Professional Courses				Professional Courses			
SOSE 166 Issues in Social Welfare I		3	-	SOSE 170 Field Experience		15	or 15
SOSE 166 Issues in Social Welfare II		-	3	SOSE 291 Senior Seminar		3	-
SOSE 167 Racism & Contemporary Issues		3	or 3	SOSE 292 Senior Seminar		-	3
Psych. 152 Abnormal Psychology (or in Junior year)		3	or 3	Recommended Electives			
EDSS 147 Learning & Human Development		3	-	Additional courses in:			
EDSS 148 Learning & Human Development		-	3	Psychology			
				Sociology			
				Education			
				Human Development			

The B.S. degree in Social Work requires a minimum of 122 approved credit hours (including 2 credits for P.E. activities) with grades of 2.5 or better in professional courses and prerequisites and a cumulative average of 2.0

A student must make formal application for admission to the professional Social Work Program and must meet specified entrance requirements.

PHYSICAL EDUCATION

Kindergarten through Twelve

The physical education curriculum, open to men and women, includes a selection of courses from within the broad areas of general education, general professional education, specific professional education, (including the physical education major and minor, if selected), and unstructured electives. Graduates are awarded a degree of Bachelor of Science in Education upon the completion of a 130 semester hour program.

The major program in physical education qualifies candidates to teach physical education in grades K-6, 7-12, K-12 depending upon the major option selected. Candidates may opt for a 30 credit specialty for teaching physical education in elementary schools, or a secondary school specialty. In either instance the candidate also selects

an 18 credit area of concentration (minor). A third option provides for a 40 credit broad field major which prepares students for teaching in grades K-12 and includes introductory courses in health and recreation. There is no minor requirement with the broad field major. Candidates in all three major options will earn a minimum of eight (8) credits in activity skill courses where they will demonstrate competency in a variety of sports from intermediate to advanced levels.

Individually designed major concentration in Health Education is available to selected students, working through a planned core of courses. The health program certifies the student to teach health in the public schools, K-12; additional options in public and community health are in the planning stages. Students interested in these programs should contact Dr. Robert Gobin in Physical Education for more information.

All physical education majors will be required to purchase a special instructors uniform.

A typical broad field program is as follows:

	1st	2nd		1st	2nd
Freshman Year	SEMESTER		Junior Year	SEMESTER	
EDSS 2 Found. of Ed.	3	or 3	EDPE 166 Kinesiology	3	or 3
Eng. 1	3	-	EDPE 167 Phys. Mus. Act.	3	or 3
Eng. Lit. (elect)	-	3	EDPE 208 Sch. He. Prog.	3	-
EDPE 21 Found. of PE	3	or 3	EDPE 182 Health Meth.	-	3
EDPE 116 Health Ed.	3	or 3	EDPE 155 PE in Sec. Sch.	3	or 3
Psych. I Gen. Psych.	3	or 3	EDPE 104 PETEX	5	-
Humanities ¹	-	3	EDPE 105 PETEX	-	5
Science Elect ²	3	3	EDPE Coach elect	3	or 3
Participation			EDPE elect	3	or 3
Activities PEAC	2	2	Activities PEAC	3	or 3
	17	17		17	17
Sophomore Year	1st	2nd		1st	2nd
	SEMESTER		Senior Year	SEMESTER	
Social Science ³	3	3	EDSS 190 Sr. Sem.	3	-
EDSS 145 & 146	3	3	EDPE 170 PE for Atyp.	3	-
Anat. & Physiol. ⁴	3	3	Teaching Reading	4	3
EDPE 157	-	2	Elect	3	-
EDPE 154 Intro. to Rec.	3	-	Elect	3	-
EDPE 195 Rec. Ldrshp.	-	3	Elect	3	-
EDPE 192 Intra. Prog.	3	or 3	EDSS 181 Stu. Teach.	-	12
Elect	3	or 3			
PEAC Activities	2	3			
	17	17		18	12

¹ Humanities (any Philosophy, Religion, or Foreign Language course)

² Science (Select from Biol., Bot., Zo., Chem., Physics, Psych., Soc. or Math.)

³ Social Science (6 credits from Hist. 7, 8, PSci 11, 21)

⁴ Anat. & Physiol. (Zo. 5 & 6, Anat. 9 & Physiol. 10, or Physiol. 100 & 101)

⁵ Fourth year fall and spring semesters interchangeable

Note: No more than 50 credits in major theory courses included in the 130 credit graduation requirement.

Physical Education majors will present a minimum of 130 approved semester hours for the degree.

Students are responsible for obtaining specific information regarding degree requirements and teacher certification from the appropriate College of Education and Social Service office.

FIFTH-YEAR CERTIFICATE IN EDUCATION

A special fifth-year program culminating in a certificate of advanced study is offered for students who wish to work beyond the bachelor's degree but who need or desire more flexibility than is possible in any of the standard programs for master's degrees.

The certificate program is especially designed to meet the needs of teachers who are developing new teaching fields, for advanced students who are meeting requirements for state certification, and for experienced teachers who desire flexibility in choice of courses at both graduate and undergraduate levels.

Each certificate program is individualized to fit the qualifications and the professional objectives of the candidate. Undergraduate courses may be approved for the program when such courses appropriately support the candidate's professional objectives.

The program for the *Fifth-Year Certificate* is governed by the following regulations:

- (1) Candidates must hold a bachelor's degree.
- (2) Candidates must make written application on forms obtained from the Office of the Dean of the College of Education and Social Services.
- (3) Candidates are admitted to the program by action of a faculty committee.
- (4) A maximum of twelve credits may be applied to the program at the time of admission.
- (5) A maximum of nine credits may be transferred from other institutions.
- (6) Credits for the program may be earned in the regular academic year, the Summer Session, and the Evening Division.
- (7) The program for each candidate must include a minimum of thirty credits approved by a faculty advisor.
- (8) A minimum mark of C must be made in any course which is to be included in the program.
- (9) No comprehensive examination or formal thesis is required for completion of the program, but the candidate will submit a culminating paper under the direction of his faculty advisor.
- (10) The program must be completed within seven years after the time of admission.

Requests for further information about fifth-year programs should be directed to the College of Education & Social Services Center for Student and Field Services, Waterman Building.

CERTIFICATE OF ADVANCED STUDY

A Certificate of Advanced Study (C.A.S. — sixth year certificate), a 30-36 graduate credit hour program beyond the Master's Degree, is offered by the College of Education and Social Services in the field of Administration and Planning, and Counseling and Integrated Studies. The C.A.S. has become a professional requirement in the hiring and advancement of administrative, supervisory, and other personnel in many school districts throughout the United States and since 1965 has been a prerequisite for membership in the American Association of School Administrators (A.A.S.A.). The American Association of School Administrators (A.A.S.A.). The program requires a nine credit on-campus residency unit which must include a three credit hour laboratory experience. Residency may be fulfilled during any academic semester or summer and is part of the total 30-36 program credits. Further information may be obtained from the College of Education and Social Services Center for Student and Field Services, Waterman Building.

INTERNATIONAL EDUCATION FIELD STUDY

The College of Education and Social Services now offers a comparative education

field experience in England and has plans to develop programs in other parts of the world.

The purpose of these programs is two-fold: 1) to provide an in-depth experience in the educational system of another country; and 2) to give students an opportunity to live in a society different from their own.

Traveling abroad has a number of advantages. First, it broadens the outlook of the person involved in the experience whether it be social, educational, or political. Second, it affords one an opportunity to observe people in their indigenous environment. Third, it allows for an exchange of ideas and philosophies. Finally, it adds a new dimension to one's life in being able to share one's thoughts and feelings with others of a different culture.

Specifically, the field experience in England is designed primarily to offer students something more than the usual "study abroad" program. In addition to the usual visits to places of local cultural interest, this program offers an opportunity for each student to relate his professional needs, interests, goals and aspirations to a specific educational area. Students will have the opportunity to visit many areas of cultural and personal interest but, in addition, will live with a family in the host country and work as a paraprofessional in one or more of the host nation's schools.

For further information contact Coordinator, International Education Program, University of Vermont, College of Education and Social Services, Burlington, Vermont 05401.

The College of Engineering, Mathematics and Business Administration

The College of Engineering, Mathematics and Business Administration offers professional undergraduate programs in the following areas:

- A. business administration and management science
- B. engineering, and engineering science
- C. mathematical sciences

Within each of these broad areas there are a variety of curricula, options, and concentrations designed to satisfy more specific interests. Each of the programs offered by the College provides a basis for professional practice and for further study in the same discipline or in other professional areas; business, law, or medicine, for example.

The specific programs and degrees offered are:

Business Administration (for specialty options see p. 89)	B.S. in Business Administration
Engineering and Engineering Science: General (for specialty options see p. 89)	B.S. in Engineering
Civil Engineering	B.S. in Civil Engineering
Electrical Engineering	B.S. in Civil Engineering
Manufacturing and Management Engineering	
	B.S. in Manufacturing and Management Engineering
Mechanical Engineering	B.S. in Mechanical Engineering
Engineering Science (for specialty options see p. 96)	
Mathematical Sciences (for specialty options see p. 97)	
Statistics	B.S. in Mathematics
Computer Science	B.S. in Computer Science

Professional Education

Graduates of professional schools are expected to fulfill unique and significant roles in planning and directing the work of the world and in effecting and managing change. The primary objective of professional education is, therefore, to develop skill in the "problem solving art." This includes not only intellectual knowledge of complex and high order, but also the intelligent and intuitive application of that knowledge to the situations of life.

Professional graduates must have the ability, the confidence, and the self-discipline to identify and define a problem, break it down into operable components, marshal the necessary resources from the natural and social sciences, mathematics and the humanities, and to employ these resources in a systematic, effective, and efficient fashion to derive a useful solution. To enhance and promote these qualities in students, the College's curricula all emphasize the balanced development of conceptual understanding and specific skills.

The professional graduate is also often required to act on the basis of incomplete knowledge and with limited time and resources. The College therefore requires that its students exhibit certain personal qualities in addition to the intellectual achievement expected of all university graduates. Foremost among these are integrity, acceptance of responsibility, and reliability in independent work.

The College is also committed to the idea that learning is a life-long endeavor. Our undergraduate programs therefore provide a base upon which students may build as the demands of their professional careers increase and their personal interests broaden.

General Requirements and Academic Regulations

DIVISIONS

The instructional programs of the College of Engineering, Mathematics, and Business Administration are made up of a lower division (the Pre-Professional Professional Program) and a variety of upper divisions curricula (majors). Each upper division curriculum is administered by one of the College's departments or programs, or through the office of the Dean.

Admission to the College as a freshman does not guarantee admission to an upper division program. In order to enter one of these programs the student must:

(a) be in good academic standing in the Pre-Professional Program of the College or in another College of the University. Where appropriate, applicants for transfer from colleges outside UVM will be considered for admission to an upper division program simultaneously with consideration of their application for admission to the University.

(b) meet specific requirements established by the department or program responsible for the upper division curriculum to which they seek admission. These requirements include (1) the completion of specific prerequisite courses, and (2) a minimum grade-point average in these prerequisite courses.

PRE-PROFESSIONAL PROGRAM

All newly admitted freshmen are assigned to the College's Pre-Professional Program. This College-wide activity is conducted by a staff of qualified advisor-counselors and faculty consultants representing the various upper division programs. The objectives of the Pre-Professional Program are not only to advise students with respect to curriculum requirements but also to help them in their adjustment to the college environment and to provide guidance in choosing an appropriate upper division program.

ADMISSION TO UPPER DIVISION PROGRAMS

Students admitted to the College as freshmen, and transfer students admitted with less than 30 credits that have been approved by the UVM Registrar for transfer, may apply for admission to an upper division program upon completion of the freshman year (or 30 credits). To be considered for admission, these students must have compiled a grade-point average of 2.5 or better in the prerequisite first-year courses specified for the program of their choice. A list of these prerequisite courses may be obtained from the Dean's Office or the Pre-Professional Program Office.

Students who are in good standing in the College, but have not satisfied the re-

quirements for admission to an upper division program after completing 30 credits, may continue in the Pre-Professional Program up to a maximum of 60 credits. These students should apply for admission to an upper division program during the spring semester of their sophomore year (or after completing 45 credits). In order to be considered for admission, they must meet the specific requirements for the program of their choice. Detailed statements of these requirements may be obtained from the Dean's Office, the Pre-Professional Program Office, or the appropriate department or program office. Students who have completed 60 or more credits (including transfer credits) in the Pre-Professional Program and have not been admitted to one of the upper division programs, *will not be permitted to enroll further in the College.*

Transfer students from other divisions of UVM, or from other institutions, who have 30 or more transferable credits, should apply for admission to an upper division program simultaneously with their application to admission to the College. The criteria for admission of these students are identical with those applying from the Pre-Professional Program.

In any year, places in the several upper division programs may be limited by available resources (faculty, laboratory facilities, etc.). In such cases only the most qualified students will be accepted, and some students who have satisfied the minimum requirements (above) may not be admitted.

CORE COURSES

A group of fundamental, or "core", courses is identified in each of the three primary program areas: business, engineering, and mathematics. These courses provide the foundations needed, both for advanced work and for specialization within the respective fields. Some core courses deal with essential concepts and skills and must be completed during the first and second years. Others treat material which, though more advanced, is common to all branches of the field. These courses are found primarily in the second and third years.

ELECTIVES

All curricula offered in the College provide elective choices, a part of which must be used to satisfy the College's requirement for a minimum of 18 credit hours in the humanities and social studies. Students are also encouraged to use elective courses to explore subject areas of latent or potential interest, to build a cross-disciplinary competence, or to undertake specialization within their major area of study.

HUMANITIES AND SOCIAL STUDIES

The objective of the requirements in humanities and social studies for all programs is to broaden the student's understanding of man and the relationships in human society.

Students are encouraged to plan, in consultation with an advisor, an integrated sequence of humanities and social studies courses which will constitute a continuing program extending through at least three undergraduate years.

No credit is given for a "dash course" unless the second semester is completed. Credit for elementary language courses is granted for degrees in the College only if the intermediate level course is also satisfactorily completed.

The College has a minimum requirement of 18 credit hours of humanities and social studies courses for the B.S. degree but specific programs may require more than this minimum.

PHYSICAL EDUCATION

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

ENVIRONMENTAL STUDIES

EMBA students who wish to concentrate in Environmental Studies may arrange for a coordinate major (see p. 124) in conjunction with one of the College's regular degree

programs. An Environmental option is also available under the general engineering degree program (see p. 96).

CREDIT FOR MILITARY STUDIES COURSES

Army ROTC at the University of Vermont

EMBA grants 8 credits for Military Studies 1, 2, 3, and 4 in the category of humanistic social studies for all programs in the College. Normally other Military Studies courses may be utilized as free electives only. See your advisor.

Air Force ROTC at St. Michael's College

No academic credit is granted for the first two years of AFROTC courses at St. Michael's College. At the junior and senior level the following St. Michael's courses are approved:

Military Studies 301-303 — A total of 6 credits (3 each semester) will be granted under the UVM elective category of "Political Science."

Military Studies 401-403 — 6 credits will be granted under the UVM elective category of "Business Administration." Credit will not be given for both the UVM course BSAD 170 and Military Studies 401 at St. Michael's.

Credits from these courses will be treated as transfer credits, and they may be used as electives only, not as substitutes for required UVM courses.

CREDIT FOR MILITARY SERVICE

The College of Engineering, Mathematics and Business Administration 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 Studies Committee.

TRANSFER CREDIT

Transfer credits from other institutions are not used in the calculations of the University of Vermont grade-point average (GPA). Students who wish transfer credit must obtain approval from their departments.

ACADEMIC STANDARDS

Students who receive a cumulative or semester GPA (grade-point average) of less than 2.0 will be placed on trial. Student who have failed half their course credits for any semester, or who have had two successive semesters with less than a 2.0 cumulative GPA, are eligible to be dismissed.

Business Administration

The Department of Business Administration offers a program leading to a Bachelor of Science degree in Business Administration. The curriculum is designed to provide the student with a broad background in the fields of knowledge useful for managerial decision making and additionally considerable exposure to the humanities and the social, physical and mathematical sciences. The core program required of all students provides:

- A. A background of the concepts, processes, and institutions in marketing and distribution, production, and financing functions of business enterprise.
- B. A background of the economic and legal environment of business enterprise along with consideration of the social and political influences on business.
- C. A basic understanding of the concepts and methods of accounting, quantitative methods, and information systems.
- D. A study of organization theory, interpersonal relationships, control and motivation systems, and communications.

- E. A study of administrative processes under conditions of uncertainty including integrating analysis and policy determination at the overall management level.

Beyond this core, study in a specialty option allows the student to pursue in more depth a functional area of interest. The areas available are Accounting, Finance and Banking, Marketing Management and Sales Promotion, and Management.

The Department of Business Administration cooperates with the Department of Mechanical Engineering in offering courses in the Management Engineering Curriculum. This curriculum is administered by the Department of Mechanical Engineering and is described in the section on engineering curricula.

The Accounting option is registered with the University of the State of New York, The State Education Department, Albany, N.Y. Students completing the requirements of the accounting option will be eligible for admission to the New York State licensing examination in Certified Public Accountancy.

A minimum of 122 approved semester hours is required for the Bachelor of Science in Business Administration degree, including required courses in physical education.

Distribution Requirements

1. Each student shall present nine semester courses (3 credits, or more, each) by choosing three courses from each of any three of the following four categories (labeled a, b, c and d below). No courses required in the Business Administration program may be used to fulfill distribution requirements.

a. Language and Literature

English

* French

* German

* Greek

* Hebrew

* Italian

* Latin

Literature in Translation

* Russian

* Spanish

* No distribution credit is allowed for courses taken in a foreign language unless at least one course in that language, at the intermediate level or above, is taken and passed.

b. Fine Arts and Philosophy

Art

Communications

Music

Philosophy

Religion

Theater

c. Social Sciences

Anthropology

Economics

Geography

History

Political Science

Psychology

Sociology

d. Sciences and Mathematics

Biology

Botany

Chemistry

Engineering and Technology

Geology

Physics

Zoology

Mathematics

Statistics

Computer Sciences

2. Majors in Business Administration are required to complete a minimum of 48 hours (including the 27 hours of distribution requirements) in nonbusiness courses. English 1 is normally required and may be included in the 27 hours of distribution requirements. Nonbusiness courses required in the business program may not be used to satisfy this requirement.

Freshman-Sophomore Core

Majors in Business Administration will normally take the following courses before enrolling in Junior-Senior core courses.

		Hours
Economics 11, 12	Principles of Economics	6
BSAD 40/Math 18	Quantitative Methods in Management	4
BSAD 42/CS 11	Computer Programming I	3
BSAD 60	Financial Accounting	4
BSAD 61	Managerial Accounting	4
BSAD 144/Stat 111	Elements of Statistics	3
	Total	24

Junior-Senior Core

The following courses must be completed by all majors in Business Administration.

		Hours
BSAD 154	Foundations of Marketing	3
BSAD 170	Organizational Behavior	3
BSAD 173	Operations Analysis I	3
BSAD 180	Managerial Finance I	3
BSAD 184	Financial Institutions and Markets	3
BSAD 191	Business Policy	3
	Total	18

Specialty Options

In addition to the courses listed above, a student must take a minimum of four courses (12 hours) in one of the areas of concentration listed below.

Finance and Banking

		Hours
BSAD 168	Cost Accounting	3
BSAD 181	Issues in Financial Management	3
BSAD 182	Security Valuation and Portfolio Selection	3
BSAD 185	Commercial Bank Management	3
BSAD 244/Stat 225	Applied Regression Analysis	3
BSAD 281	Municipal Finance	3
BSAD 283	Financial Management of International Operations	3

Management

Students with a specialty in Management have the option of concentrating in Human Resources Management or in Operations Management.

Human Resources Management**Hours****Required:**

BSAD 171	Personnel Management	3
BSAD 175	Designs for Organizational Systems	3

Electives; (6 credit minimum)

BSAD 176	Current Issues in Management and Organization Theory	(1-12)
ECON 242	Labor Management Relations	3

Any other 100 level or above course justified as relevant to the student's program and approved by the Undergraduate Studies Committee, or any course from the Operations Management Option electives.

Operations Management**Hours****Required:**

BSAD 175	Designs for Organizational Systems	3
BSAD 174	Operations Analysis II	3

Electives; (6 credit minimum)

BSAD 140	Decision Making Under Uncertainty	3
BSAD 242	Management Information System	3
BSAD 243	Quality Assurance	3
BSAD 244	Applied Regression Analysis	3
BSAD 245	Introduction to Operations Research	3
BSAD 272/CE 227	Discrete Simulation	3
ME 201	Safety Engineering	2
ME 275	Human Factors	3
ME 276	Plant Planning and Design	4

Marketing Management and Sales Promotion**Hours**

BSAD 153	Personal Selling and Sales Management	3
BSAD 156	The Marketing Operations of Small Retail and Service Establishments	3
BSAD 157	Marketing Research	3
BSAD 158	Fundamentals of Advertising	3
BSAD 257	Consumer Behavior	3
BSAD 258	Current Marketing Developments	3
BSAD 259	Marketing Management	3

Accounting

Accounting majors are required to take all of the following courses.

BSAD 17, 18	Business Law	6
BSAD 161-162	Intermediate Accounting	6
BSAD 164	Introduction to Federal Taxation	3
BSAD 168	Cost Accounting	3
BSAD 266	Advanced Accounting	3
BSAD 267	Auditing	3

ENGINEERING AND APPLIED SCIENCE

The College of Engineering, Mathematics and Business Administration offers accredited, professional programs in civil, electrical, and mechanical engineering. In addition, students may elect a program in manufacturing and management engineering or one of the several interdisciplinary options under the general Bachelor of Science in Engineering and the Bachelor of Science (Undesignated) degree programs (pp. 96 and 97).

ENGINEERING

Engineering education at UVM combines the study of mathematics and the physical and engineering sciences with courses illustrating their application to the analysis and design of equipment, processes, and complete systems. In addition, students are encouraged to avail themselves generously of the life science, social science, and humanities courses available throughout the University. 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 or science, and for further professional study in such fields as business, law, or medicine.

The required courses in each curriculum are normally arranged for a four-year program. These courses may be arranged in a five-year sequence if desired. Transfer from other curricula may be arranged also and co-op opportunities are available (see p. 101).

Departments may require students to visit Northeastern industrial centers during their junior year. The expense for the trip of several days is borne by the student.

Students enrolled in the civil, electrical, and mechanical engineering curricula may 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, as each organization has authorized a student chapter at the University of Vermont. 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. These student organizations' meetings present opportunities for students to conduct activities similar to those of the national societies.

The curricula in civil, electrical, mechanical, and manufacturing and management engineering are accredited by the Engineers' Council for Professional Development.

Core Curriculum for Engineering Students

	1st	2nd		1st	2nd
Freshman Year	SEMESTER		Sophomore Year	SEMESTER	
Chemistry 5*	4	-	Physics 25	4	-
Physics 24	-	4	Math 121	4	-
Math 21**, 22	4	4	Math elective	-	3
Engineering 1, 2	3	2	Other courses according		
Computer Science 11	-	3	to major selected	-	-
English 1	3	-			
Elective	-	3			
	14	16		both 16 to 18	

* Students planning to elect one of the options under the B.S. (Undesignated) or the Environmental option under the B.S. in Engineering should take Chem 1-2 in place of Chem 5.

** See footnote under course offerings of the Department of Mathematics.

CIVIL ENGINEERING

The curriculum in Civil Engineering, leading to the degree of Bachelor of Science in Civil Engineering offers instruction in community planning, 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 human and social sciences. Every candidate for this degree must earn a minimum of 122 semester hours of credit including the required courses in physical education.

Each student, with the approval of his advisor, must present a program of courses

and study that satisfies the distribution requirements in the Group I, Group II, and Group III categories that follow:

A. Group I. A student must elect nine courses from this group, by choosing at least three courses from each of two of the designated areas. The three remaining courses may be taken from any area or areas in this group. In fulfilling the requirements of this Group, the student must meet the Engineering Departments' requirement of 18 hours in Humanities and Social Studies.

Group I Areas

Business Administration
Education
Languages
Literature
Fine Arts
Philosophy
Anthropology
Economics
Geography
History
Political Science
Psychology
Sociology

B. Group II. A student must elect sixteen courses from this group by choosing at least three courses from each of three of the designated areas. The seven remaining courses may be taken from any area or areas in this group. Group II courses must include CE 1, CE 2, and either EE 100 or ES 110.

Group II Areas

1. Engineering Sciences
2. Mathematical Sciences
3. Natural Sciences —
Earth, Life, Physical

C. Group III. A student must elect fifteen courses from this group, by choosing at least three courses from each of two of the designated areas in Civil Engineering and by choosing at least two analysis courses and one design course from Structural Engineering. An additional three courses are to be selected in Civil Engineering, other engineering, or mathematics. The remaining three courses may be from any area or areas in this group, but they must contribute to the student's program objectives.

Group III Areas

1. Civil Engineering —
Community Engineering
Environmental Engineering
Hydraulics-Hydrology
Soil Mechanics
Structural Engineering
Transportation Engineering
2. Other Engineering
3. Agriculture
4. Medicine
5. Other Professions
6. Special Areas of Support —
such as mathematics, natural sciences, etc.

The following departmental requirements have been established for admission to the Upper Division in Civil Engineering:

1. A student must have completed the following ten courses: Engr 1, Engr 2, CE 1, CE 2, Chem 5, Phys 24, Phys 25, and Math 21, 22 and 121; and must have maintained a 2.0 average in these courses and have an overall cumulative average of 2.0. No Upper Division courses may be taken until a student is admitted to the Upper Division.
2. A Upper Division course is defined as an engineering course with a number of 100 or above.

ELECTRICAL ENGINEERING

The general accredited degree curriculum for Electrical Engineering students is outlined below. In addition, a Computer Engineering option is available (see p. 94). This option permits a concentration of courses in the computer design field.

The Department of Electrical Engineering is one of those which offers a cooperative work experience (see p. 101). This arrangement comprises a five-year program, with the fourth year devoted to full-time engineering work at a local industry.

The department offers one of the several pre-medical options available in the College (see p. 102). The curricular modifications associated with this option are detailed on page 102.

		1st	2nd
The Sophomore Year		SEMESTER	
Humanities & Social Studies		3	3
Mathematics 121		4	-
Intro. to Probability, Stat. 151		-	3
Physics 25, 128		4	4
Laboratory, EE 81, 82		2	2
Engineering Analysis I, EE 3		3	-
Engineering Analysis II, EE 4		-	3
Engineering Computation I, EE 31		2	-
Engineering Computation II, EE 32		-	2
		18	17
		1st	2nd
The Junior Year		SEMESTER	
Humanities & Social Studies	3	-	
Electromagnetic Field Theory, EE 143, 144	3	3	
Thermodynamics, M.E. 115	3	-	
Electronics I, EE 121	3	-	
Laboratory, 183, 184	2	2	
Signals and Systems, EE 171	3	-	
Discrete-Time Signal and Systems Analysis, EE 170	-	3	
Information Transmission Systems, EE 174	-	3	
Control Systems, EE 111	-	3	
Electronics II, EE 122	-	3	
		17	17
		1st	2nd
The Senior Year		SEMESTER	
Humanities & Social Studies	3	3	
Solid State Physical Electronics I, EE 263	3	-	
Laboratory, 185	1	-	
Electromechanical Energy Generation and Distribution, EE 113	3	-	
Electronics III, EE 123	3	-	
Solid State Physical Electronics II, EE 264	-	3	
Laboratory, EE 186	-	1	
Laboratory, EE 188	-	1	
Electric Energy Conversion Systems, EE 114	-	3	
Wave and Diffusion Analogies, EE 146	-	3	
Elective	3	3	
		16	17

The above comprises what is termed the general option curriculum, for which a minimum of 134 approved semester hours is required, including required courses in physical education. Two other options are offered as follows:

Computer Engineering Option

		1st	2nd
The Sophomore Year		SEMESTER	
Humanities and Social Studies		3	-
Linear Algebra, Math 124		-	3
Mathematics 121		4	-
Humanities and Social Studies or Statistics 151		-	3
Physics 25, 128		4	4
Laboratory, E.E. 81, 82		2	2
Engineering Analysis I, EE 3		3	-
Engineering Analysis II, EE 4		-	3
Engineering Computation I, EE 31		2	-
Engineering Computation II, EE 32		-	2
		18	17
		1st	2nd
The Junior Year		SEMESTER	
Introduction to Computer Science, C.S. 101	3	-	
Fundamentals of Digital Computer Design, EE 231, EE 232	3	3	
Electromagnetic Field Theory, EE 143, EE 144	3	3	
Electronics I, EE 121	3	-	
Laboratory, EE 183, EE 184	2	2	
Signals and Systems, EE 171	3	-	
Discrete-Time Signal and Systems Analysis, EE 170	-	3	
Electronics II, EE 122	-	3	
Software Fundamentals, CS 102	-	3	
		17	17
		1st	2nd
The Senior Year		SEMESTER	
Humanities & Social Studies		6	-
Statistics 151 or Humanistic Social Studies		-	3
Numerical Methods I, Math 237	3	-	
Solid State Physical Electronics I, EE 263		3	-
Solid State Physical Electronics II, EE 264		-	3
Laboratory, EE 185, EE 186		1	1
Laboratory, EE 187, EE 188		1	1
Electronics III, EE 123		3	-
Information Transmission Systems, EE 174		-	3
Control Systems, EE 111		-	3
Elective		-	3
		17	17

The above comprises the computer engineering option, for which a minimum of 135 approved semester hours is required, including required courses in physical education.

Pre-Medical Option

Requires a minimum of 140 approved semester hours, including required courses in Physical Education. The changes from the general option curriculum are:

Free electives in the senior year and three courses selected with departmental approval among EE 174, 162, 163, 113, 114 and M.E. 115 are replaced by Chemistry 131, 132, 140 and Biology 1, 2.

MECHANICAL ENGINEERING

The Curriculum in Mechanical Engineering, leading to a degree of Bachelor of Science in Mechanical Engineering, offers instruction in power systems, control systems, fluid mechanics, materials, machine design, and manufacturing processes, as

well as in the engineering sciences, natural sciences, humanities and the human and social sciences including the non-technical aspects of engineering such as law, safety, and economics.

Each student, with the approval of his advisor, must in the junior year elect to take either the energy option or the design and materials option.

The Sophomore Year			The Junior Year		
	1st	2nd		1st	2nd
	SEMESTER			SEMESTER	
Math 121	4	-	Systems Control, ES 141	3	-
Fund. of Physics, Phys 25	4	-	Systems Cont. Lab ES 143	1	-
Thermo. & Heat Transf., ES 110	4	-	Electr. Engr. Princ., EE 100	4	-
Mat'l. Proc. I, ME 131	3	-	Fluid Mechanics, ES 121	4	-
Math 271	-	3	Materials 1, ME 100	3	-
Intro. to Mod. Physics, Phys 128	-	4	Heat & Mass Transf. ES 122	-	4
Mechanics, ES 100	-	4	Humanities & Social Studies*	3	3
Engrg. Thermodynamics, ME 111	-	3	Materials, ES 131	-	4
Engrg. Experimentation, ME 119	-	2	Engrg. Vibr., ES 134	-	3
			Adv. Mech. Struct (D&M opt) ME 211	-	3
			Energy (Eng. opt.), ME 261	-	3
	15	16		18	17
The Senior Year			The Senior Year		
	1st	2nd		1st	2nd
	SEMESTER			SEMESTER	
Design and Materials Option			Energy Option		
Safety Engrg., ME 201	2	-	Safety Engrg., ME 201	2	-
Materials III, ME 102	3	-	Adv. Fluid Mech., ME 243	3	-
Engrg. Design I, ME 135	4	-	Engrg. Design I, ME 135	4	-
Mech. Engrg. Lab, ME 286	3	-	Mech. Engrg. Lab, ME 286	3	-
Humanities & Social Studies*	3	3	Humanities & Social Studies*	3	3
Free Elective	-	3	Free Elective	-	3
The Engrg. Profession, ME 200	-	2	The Engrg. Profession, ME 200	-	2
Conc. Electives	-	6	Conc. Electives	-	6
	15	14		15	14

Concentration Electives

Design and Materials Option			Energy Option		
Thesis, ME 192	-	3	Thesis, ME 192	-	3
Dynamics II, ME 202	-	3	Applic. of Computers in Engrg., ME 206	-	3
Applic. of Computers in Engrg., ME 206	-	3	Aerodynamics, ME 246	-	3
Adv. Mech. Structures, ME 222	-	3	Thermal Systems, ME 262	-	3
Mat'l Proc. II, ME 231	-	3	Thermal Environ. Engrg., ME 264	-	3
Micromanuf. Tech, ME 232	-	3	Special Topics, ME 295	-	3
Engrg. Design II, ME 252	-	3	Nuclear Engrg., ME 297	-	3
Mech. Behavior of Mat'l,			ME 272	-	3
Special Topics, ME 295	-	3			

A minimum of 127 approved semester hours is required for the degree in the Mechanical Engineering Curriculum, including required courses in physical education.

* See distribution of Humanities and Social Studies on page 86.

MANUFACTURING AND MANAGEMENT ENGINEERING

The Curriculum leading to the degree of Bachelor of Science in Manufacturing and Management Engineering is similar to Mechanical Engineering in humanities, math, physical sciences and basic engineering science requirements. Advanced engineering courses concentrate in the areas of materials and manufacturing systems. There is also a requirement for management courses, particularly those relevant to the management of industrial enterprises.

	1st	2nd		1st	2nd
The Sophomore Year	SEMESTER		The Junior Year	SEMESTER	
Math 121	4	-	Elect. Engr. Princ., EE 100	4	-
Fund. of Physics II, Phys 25	-	4	Fluid Mechanics, ES 121	4	-
Thermo. & Heat Transf., ES 110	4	-	Materials I, ME 100	3	-
Principles of Economics			Mat'l Processing I, ME 131	3	-
Econ 11, 12**	3	3	Humanities & Social Studies*	3	3
Math 271	-	3	Engrg. Econ., CE 225	-	3
Intro. to Mod. Physics, Phys 128	-	4	Engrg. Mat'l ES 131	-	4
Basic Statistical Meth., Stat 141	-	3	Tech. Elective***	-	6
Mechanics, ES 110	-	4			
	<hr/> 15	<hr/> 17		<hr/> 17	<hr/> 16

* See distribution of Humanities and Social Studies on page 86.

** Under special conditions other humanities and social studies may be substituted with approval of advisor.

*** To be selected from departments of engineering, mathematics, business administration or physical sciences.

	1st	2nd
The Senior Year	SEMESTER	
Materials III, ME 102	3	-
Human Factors, ME 275	3	-
Safety Engrg., ME 201	2	-
Engrg. Design I, ME 135	4	-
The Engrg. Profession, ME 200	-	2
Mat'l Proc. II, ME 231	-	3
Plant. Plan. & Design, ME 276	-	4
Tech. Elect.*	3	3
Free Elect.	-	3
	<hr/> 15	<hr/> 15

* Under special conditions other humanities and social studies may be substituted with approval of advisor.

A minimum of 127 approved semester hours is required for the degree in this curriculum including required courses in physical education.

BACHELOR OF SCIENCE IN ENGINEERING

In addition to the professional curricula outlined above, the College also offers a more flexible program leading to the degree of Bachelor of Science in Engineering. This curriculum is intended for students who desire a strong engineering science base

combined with specialization in an interdisciplinary engineering area. Specializations available under this program include bio-engineering, and management engineering.

All candidates for the Bachelor of Science in Engineering degree must complete the engineering core curriculum (page 91) and the following group of engineering science courses:

- Engineering Science 110 — Thermodynamics and heat transfer
- Engineering Science 121 — Fluid mechanics
- Engineering Science 122 — Heat and mass transfer
- Engineering Science 131 — Materials, I
- Engineering Science 141 — Systems control

Each student must select one of the options available when applying for admission to the upper division. Detailed statements of the requirements for each of these options may be obtained from the Dean's Office.

BACHELOR OF SCIENCE (Undesignated)

The College of Engineering, Mathematics, and Business Administration also offers a general Bachelor of Science degree. This degree is intended for students who wish to follow a curriculum with a strong applied science orientation but with greater flexibility than is permitted by the designated degree programs outlined above. The undesignated B.S. program also permits specialization in one of several interdisciplinary areas of applied science. Specializations available include engineering chemistry, engineering physics, environmental science, and materials science.

Candidates for the undesignated Bachelor of Science degree must complete the engineering core curriculum (page 91) except for Engineering 1 and 2 (which may be taken as electives) and the following group of engineering science courses:

- Engineering Science 100 — Mechanics
- Engineering Science 110 — Thermodynamics and heat transfer
- Engineering Science 121 — Fluid mechanics
- Engineering Science 122 — Heat and mass transfer
- Engineering Science 131 — Materials, I
- Engineering Science 141 — Systems control

Each student must select one of the options available when applying for the upper division. Detailed statements of the requirements for each of these options may be obtained from the Dean's Office.

Mathematical Sciences

The College of Engineering, Mathematics, and Business Administration offers programs in several areas of the mathematical sciences and their applications. Curricula leading to the Bachelor of Science degree are available in Mathematics, Computer Science, and Statistics.

CORE CURRICULUM FOR MATHEMATICAL SCIENCES

Mathematics 21, 22, 121, 124.
Computer Science 11.

MATHEMATICS

The curriculum in mathematics is designed to provide sound basic training in mathematics, to prepare the student for a position in an area in which persons with mathematical skills and insights are sought, and to qualify students for advanced study in graduate school. Students in the College of Arts and Sciences may concentrate in mathematics and receive the Bachelor of Arts degree. An advisor from the department will assist students in the determination of programs best suited to their individual needs and plans.

In addition to the core curriculum (above), candidates for the B.S. degree in mathematics must complete the following requirements:

1. Thirty additional hours in Mathematics, Statistics or Computer Science courses numbered 100 or above. Of these 30 hours, at least 21 hours must be numbered 200 or above and no more than 12 hours may be chosen from Computer Science.
2. At least 24 hours in the allied fields of
 - (a) Physical Sciences
 - (b) Biological Sciences
 - (c) Medical Sciences
 - (d) Engineering
 - (e) Agricultural Sciences
 - (f) Business Administration
 - (g) Psychology
 - (h) Economics
 Of these, at least 6 hours must be in courses numbered 100 or above and at least 6 hours must be taken in the fields (a) - (d).
3. Humanities and Social Studies — at least 24 hours chosen from categories A, B, C on page 100. These must be distributed over at least two categories, and at least 6 hours must be taken in each of the two categories chosen.

Note: Courses used to satisfy the requirements in 3 may not be used to satisfy requirements in 2, and vice versa.

4. A minimum of 122 semester hours, including required physical education courses.

Several concentrations are available within the mathematics curriculum. These are not separate degrees, but rather indicate an emphasis chosen by the student and are directed toward certain career objectives. A complete list of recommended courses for each concentration may be obtained from the Department of Mathematics, and advisors for each option assist students in the determination of their programs.

- (1) *General* — This option is intended for those students who choose to major in mathematics and whose career goals have not yet been determined. Those electing this option will be expected to attain proficiency in several branches of mathematics.
- (2) *Pre-Graduate Training* — This option is designed for students who elect mathematics not only as an undergraduate major, but also as a future profession. The program of study will prepare students for advanced courses at the graduate level.
Recommended Mathematical Sciences Courses include MATH 102, 207, 230, 240, 241, 242, 251, 252.
- (3) *Secondary Education* — This option provides mathematical training for students seeking careers as teachers in secondary schools.
Recommended Mathematical Sciences Courses include MATH 4, 104, 251, 252, 255, 257, 260, 261, 263, STAT 151, 211. The student should consult the College of Education concerning non-mathematical courses needed for certification.
- (4) *Pre-Medical* — The science requirements for the Bachelor of Science degree are particularly suited for a pre-medical student who has an interest in mathematics and who desires a more flexible curriculum than is possible elsewhere in the college.
Advanced Mathematical Sciences Courses should be chosen in consultation with departmental advisors.
- (5) *Pre-Law* — Mathematics can be an appropriate major for a student who intends to enter law school. Pre-law training should emphasize the development of

(a) language facility, (b) understanding of human values, (c) creative thinking. A broad course of study is needed for this development and the flexibility in the B.S. degree program in Mathematics provides the opportunity for such study. Recommended Mathematical Sciences Courses include MATH 102, 207, 219, 220, STAT 211.

APPLIED MATHEMATICS

The purpose of the curriculum in applied mathematics is to combine mathematical techniques with applications in order to equip the student to treat a variety of physical problems. Emphasis on the mathematics involved in the solutions of problems and on developing methods for addressing a large spectrum of "real world" problems.

Several options are also available under this curriculum:

- (1) *Mathematics of Computation* — This option emphasizes problem solving via computers. The program of study should expose the student to several areas in which the mathematics of computation has significant applications. Recommended Mathematical Sciences Courses include MATH 104, 207, 218, 230, 237, 238, 240, 274, STAT 211, 221, COMP SCI 12, 241.
- (2) *Industrial Mathematics* — This option stresses applied mathematics and its use in the scientific method of decision making. Included in this program are such areas as operations research and modeling and their applications to education, government and industry. Recommended Mathematical Sciences Courses include MATH 207, 221, 222, 230, 235, 236, 237, 238, 240, 241, 264, 274, 276.
- (3) *Military Mathematics* — Students who enter the ROTC program may wish to incorporate in their mathematics major certain courses especially valuable in the military. Recommended Mathematical Sciences Courses include MATH 221, 222, 230, 245, 261, 276, STAT 151.

STATISTICS

Students in mathematics may elect statistics as their area of specialization. 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 developing and investigating stochastic models, designing experimental plans, constructing and interpreting descriptive statistics, and developing and applying statistical inference procedures. 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 program is designed for students who plan to enter business, industry, or government as statisticians or plan to continue to graduate school in statistics or a related quantitative field (biostatistics, operations research, demography, biomathematics, etc). The courses and curricula are administered through the Statistics Program Steering Committee which includes faculty from Mathematics, Business Administration, Economics, Psychology, Forestry, Epidemiology and Environmental Health, the Agricultural Experiment Station, and the Academic Computer Center. This broad representation of disciplines affords students excellent opportunities for gaining direct experience in the application of statistics.

Students specializing in statistics are required to complete the requirements given above for the B.S. in Mathematics with the following specific requirements:

- a. Mathematical science courses must include 21 semester hours of statistics including 141 or 211, 151 or 251, 162 or 262, 221 or 227 or 229, and 281 or 291.
- b. Allied field courses must include a laboratory science course (8 credits). The stu-

dent in consultation with his Statistics Program advisor must plan a sequence of allied field courses consistent with his professional and career goals. Students interested in pursuing intensive studies in an area not specifically listed are encouraged to plan a program with their advisor and submit it to the Studies Committee for review and approval.

c. Humanities and Social Studies must include English 1 and Communication and Theater 11 or 14.

Further details on the statistics curriculum may be obtained at the Statistics Program Office.

Typical Freshman Program			
First Semester		Second Semester	
Math 21	4	Math 22	4
CS 11	3	Science	3 or 4
Humanities/Social Studies	3	Humanities/Social Studies	3
Science	3 or 4	Elective	3
Physical Education	1	Physical Education	1

COMPUTER SCIENCE

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

The program in Computer Science is a new administrative unit at the University. A student interested in majoring in computer science will have a faculty member from the Computer Science Program assigned as advisor. The program offers the B.S. and M.S. degrees in Computer Science.

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 the student develops an appreciation for the applicability of his knowledge of computer science.

Requirements for the degree of Bachelor of Science in Computer Science are, in addition to the mathematical sciences core (page 97):

Computer Science: CS 12, 101, 102, 103, 104, 201, 222, 241, 242

Other Mathematical Science: Math 104, 124; Stat 151

Electrical Engineering: EE 231

Other: English 1, Communications and Theatre 11, one full year of physics or electrical engineering. The courses selected in physics or EE can not be used as part of the minor requirement.

Minor Field: Six semester courses for a minimum of 18 credits in an allied area. Suggested areas are: Business Administration, Social Science, Physical Science, Biological Science or Engineering. Students who wish to minor in Mathematics or Statistics may do so and are required to take only 4 courses numbered 200 or above in the area of their choice.

In order to assure that the courses chosen to constitute the minor specialization form a cohesive unit, all minor programs must be approved by the Computer Science studies committee.

Distribution Requirements: A student must complete at least 2 semester courses for a minimum of 6 credits in each of the two areas:

A. Social Science to include:

Anthropology
Economics
Geography
History

Political Science
Psychology
Sociology

B. Humanities, Fine Arts and Philosophy to include:

Language
Literature

Music
Speech

Art

Drama

Philosophy

Religion

Courses used to fill the other requirements may not be used to fill the distribution requirement.

A typical program in Computer Science is as follows:

	1st	2nd		1st	2nd
Freshman Year	SEMESTER		Junior Year	SEMESTER	
CS 11, 12	3	3	CS 103, 104	3	3
Math 21, 22	4	4	EE 231	3	-
English 1	3	-	CS 222	-	3
C & T 11	-	3	Electives	9	9
Electives	6	6			
	<hr/>	<hr/>		<hr/>	<hr/>
	16	16		15	15
Sophomore Year	1st	2nd	Senior Year	1st	2nd
	SEMESTER			SEMESTER	
CS 101, 102	3	3	CS 201	3	-
Math 121, 124	4	3	CS 241, 242	3	3
Math 104	-	3	Electives	9	12
Physics or EE sequence	3	3			
Stat 151	3	-			
Electives	3	3			
	<hr/>	<hr/>		<hr/>	<hr/>
	16	15		15	15

Total Required Credits: 125 including required courses in physical education.

Cooperative Programs

The College of Engineering, Mathematics, and Business Administration offers cooperative work-study programs for majors in several departments within the College. These cooperative programs differ from those offered at many other institutions in that they do not begin until the junior year has been completed. Furthermore, all such arrangements are considered to be honors programs, with selection determined by the department concerned and enrollment limited to available opportunities in industries, companies and state and federal agencies.

Cooperative program arrangements are available for most of the curricula offered by the College. At least one year of practical work experience related to the student's major field is required. Academic credit is not ordinarily awarded for co-op work but may be possible to arrange for faculty-supervised independent study projects as part of the co-op experience.

Students interested in a cooperative program arrangement should consult the Dean's Office or the department in which they intend to enroll before the end of the sophomore year.

Although the College will attempt to place all qualified students in co-op positions, it cannot guarantee the availability of these positions in advance.

PRE-MEDICAL PROGRAMS

Students who wish to prepare for admission to medical or dental may do so through several curricular options available in engineering and applied science. These include the bioengineering option under the B.S. in Engineering program (p. 96), a special option under the Electrical Engineering curriculum (p. 93), and the Mathematics curriculum (p. 97).

The Division of Health Sciences

The Division of Health Sciences, authorized by the Board of Trustees, became effective July 1, 1968, bringing together several related programs in this important field. It includes the College of Medicine, the School of Allied Health Sciences, and the School of Nursing.

The Division reserves the right to require the withdrawal of any student from any curriculum whose health, academic record or performance and behavior in the professional careers is judged unsatisfactory.

The College of Medicine

REQUIREMENTS FOR ADMISSION

Applicants to The University of Vermont College of Medicine are expected to complete the required courses of study by July 1 preceding the September admission date — in a college or university accredited by the National Committee of Regional Accrediting Agencies of the United States.

Required are one year each of the following college level courses:

- Biology
- Physics (including laboratory)
- General or inorganic chemistry
- Organic chemistry

In addition, because a physician requires a broad and balanced cultural background as well as a technical education, the College recommends as appropriate to an adequate premedical program:

English — at least one and preferably two years of composition and or literature.

Mathematics — dependent upon secondary school preparation but should include at least an introduction to calculus.

Behavioral Sciences — one or two years in the areas of psychology, sociology or anthropology.

The Humanities — at least two years of course work in history, philosophy, religion or the arts.

The College of Medicine encourages its prospective students to concentrate while in college in a field of knowledge of their choice, whether in the sciences or humanities, and to pursue these interests in depth. It seeks students with diverse collegiate and extra-collegiate backgrounds, but insists that their pattern of performance has demonstrated intellectual drive, independent thinking, curiosity and discipline.

Since communication, written and verbal, is so essential in scientific and clinical medicine, the faculty of the College of Medicine fully expects applicants to have mastered basic skills in the use of the English language, i.e., proficiency in grammar, spelling, organization, etc.

Eligibility of an applicant for admission is determined by the Committee of Admissions of the College of Medicine on the basis of the following criteria:

- A. The prior scholastic record of the applicant.
- B. Aptitude for the study and practice of medicine as determined from the applicant's autobiographical statements, letters of evaluation and by

personal interview with members of the Committee.

C. Behavioral qualities deemed essential for a career in medicine. These include, but are not limited to, judgment, personal insight and perception, personal integrity, personal accountability, responsibility and sensitivity.

D. The applicant's scores on the Medical College Admissions Test.

The Committee strives to select as students those applicants who will benefit most from the College's specific educational program. Within the selection process, the needs of society are considered in addition to those of the individual applicant.

Preference for admission is according to the following priorities:

A. Residents of Vermont.

B. Residents of states having contractual arrangements with the College of Medicine.

C. Residents of all other states.

D. In order to further the interest of the State of Vermont in retaining physicians to practice medicine and deliver health care to its citizens, preference will be given in "A" above to those applicants having the greater duration of residency within the State.

E. Sons and daughters of alumni of the College of Medicine will be given special consideration within the framework of the above policy.

The final closure date for receiving applicants is November 1 preceding the September admission.

An application fee of \$20.00 (not refundable) is payable on request of the Office of Admissions.

THE CURRICULUM

The curriculum consists of three parts: the Basic Science Core, the Clinical Core, and the Senior Major Program.

Basic Science Core

The forty-eight weeks of instruction in the Basic Science Core spans the first year and fall semester of the second year. During this period students are instructed in the basic sciences that undergird clinical medicine. Emphasis is placed on that body of knowledge common to all types of medical practice, avoiding the minute details relevant only to individual specialties. In addition, seminars in Environmental Health, Medical Sociology, Human Sexuality and Human Behavior provide the medical student with an awareness of social, cultural and psychological factors affecting health and illness. The Basic Clerkship introduces the student to one of the most fundamental of all medical skills: clinical observation. This involves learning to interview a patient and perform a physical examination.

Clinical Science Core

The Clinical Core extends from January of the second year until December of the third year. During this twelve-month period each student receives twelve weeks of instruction in medicine, twelve weeks of instruction in surgery, eight weeks in pediatrics, eight weeks in obstetrics and gynecology, and eight weeks in psychiatry. There is a brief summer vacation. During this year the student works under the supervision of physicians in the Medical Center Hospital of Vermont, the Champlain Valley Physicians Hospital in Plattsburgh, New York, and the offices of physicians in the community in providing primary care to patients.

Senior Major Program

The final portion of the curriculum, the Senior Major Program, extends through the

final one and one-half years prior to graduation. This period is divided into sixteen rotations of one month duration. The major program enables each student to select that course of study best suited to his career objectives. Majors are offered in each of the preclinical sciences, plus medicine, family practice, surgery and its subspecialties, medicine, family practice, surgery and its subspecialties, obstetrics — gynecology, pediatrics, neurology, psychiatry, and rehabilitation medicine.

An integral part of each clinical major includes a number of required clinical and laboratory experiences as well as elective rotations. These elective rotations are not restricted to the disciplines in which the student is majoring and may include approved learning experiences away from Burlington. Many students see this as an opportunity to work and study in a large urban setting, at another medical school or a foreign medical center. Students should anticipate spending variable periods of time away from Burlington in the course of pursuing their required training. A system of faculty advisors has been developed to counsel each student on a one-to-one basis throughout the planning and course of this major program and in anticipation of later graduate education. Although the majority of students elect to pursue a clinical major, students so desiring may commit their entire major program to study in one of the preclinical sciences. While these programs are individualized, it is expected that graduate study and research will form the basis for each. Qualified students may simultaneously enroll in the Graduate College of the University as candidates for the Master of Science degree while fulfilling the requirements for the M.D. degree within the College of Medicine.

The School of Allied Health Sciences

Dental Hygiene
Medical Technology
Medical Laboratory Technology
Physical Therapy
Radiologic Technology
Nuclear Medicine Technology
Radiation Therapy
Radiographic Technology

Associate in Science
Bachelor of Science
Associate in Science
Bachelor of Science
Associate in Science

The School of Allied Health Sciences offers a variety of programs in response to the social and health care needs of our community. It encourages interaction among its students and faculty in meeting this need. All programs offer clinical education experiences in a variety of appropriately approved hospitals and health facilities in Vermont and the eastern part of the country. The academic programs are accredited by the responsible professional agencies.

THE PROGRAM IN 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 Council on Dental Education of the American Dental Association. Graduates are eligible to write the National Board Examination in Dental Hygiene and meet 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 they 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 identical with with general University requirements, with the additional recommendation that

applicants write the Dental Hygiene Aptitude Test. Information and application forms for this test are available from the American Dental Hygienist's Association, 211 East Chicago Ave., Chicago, Ill. 60611. Applicants are welcome to visit the department and to discuss dental hygiene with faculty and students.

As this program of study is scientifically orientated, high school courses in algebra, chemistry, and biology are important prerequisites. Personal attributes essential to success include good health, emotional stability, task orientation, high moral 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 and with varieties of problems receive service. Dental hygiene students also have an opportunity to increase their communication skills through oral health education presentations in schools in the area.

First Year			
1st Semester		2nd Semester	
Dental Hygiene Core I (DHYG 003)	6	Dental Hygiene Core II (DHYG 004)	5
Nutrition H 46	3	Radiology (DHYG 061)	2
Anatomy 009	4	Chemistry 003	4
English 001	3	Physiology 010	3
Physical Education	1	Psychology 001	3
<hr/>		<hr/>	
17		17	
Second Year			
1st Semester		2nd Semester	
Dental Hygiene Senior Major (DHYG 045)	5	Dental Hygiene Senior Major (DHYG 046)	3
Myofunctional Therapy (DHYG 071)	1	Dental Practice (DHYG 062)	2
Senior Clinic and Seminar (DHYG 081)	4	Senior Clinic & Seminar (DHYG 082)	4
Microbiology 055	4	Dental Materials (DHYG 091)	2
Speech 011	3	Anthropology 021	3
		Elective	3
<hr/>		<hr/>	
17		17	

A minimum of 68 approved semester hours and a grade point average of 2.0 is required for the Associate Degree in this curriculum. A grade of "C" or better is required for all professional courses.

PROGRAMS IN MEDICAL TECHNOLOGY

The Department of Medical Technology offers an integrated Associate degree and Baccalaureate degree curriculum. Both of these programs are accredited by the American Medical Association through the National Accrediting Agency for Clinical Laboratory Sciences.

Requirements for admission to study in these programs are identical with general University requirements, with the additional requirement that applicants have taken high school biology and chemistry; physics is highly recommended.

The Associate degree Program is designed to prepare individuals for technical practice and to promote personal development as responsible members of society, by providing a reasonable balance between general education content and specific medical laboratory knowledge and practice. Graduates of the Associate degree Program are

eligible for national certification as a Medical Laboratory Technician (MLT). The process of certification is a written examination covering the material included in professional courses. As there are many agencies that certify MLT's, students will be advised of options for certification during the second year.

The Baccalaureate degree Program is designed to extend the knowledge and judgment acquired at the Associate degree level preparing the individual to assume a leadership role in his/her professional practice. Students are admitted into the following curriculum options: Clinical Chemistry, Hematology, Clinical Microbiology and Generalist (Medical Technologist). On completion of the Baccalaureate degree, the student is eligible for certification at the Baccalaureate level. As with MLT certification, there are many agencies through which the student may be certified. Details of the certification process will be explained during the final year.

The Program offers clinical laboratory experience in the laboratories of the University and Medical Center Hospital of Vermont.

Due to space limitations imposed by physical facilities, the number of students admitted to the Baccalaureate degree Program is limited. Students desiring admission to this B.S. degree Program make application to the School of Allied Health Sciences in the Spring of the second year. The applicant must show evidence of technical proficiency, good academic achievement and adherence to high standards of professionalism.

Associate Degree Curriculum				
Freshman Year	1st	2nd	Sophomore Year	1st 2nd
	SEMESTER			SEMESTER
English	3	-	Organic Chemistry	4 -
Mathematics*	3-5	-	Clinical Chemistry**	- 6
General Chemistry	4	-	Clinical Immunology**	- 5
Anatomy	4	-	Hematology**	5 -
Medical Terminology	1	-	Clinical Microbiology**	5 -
Quantitative Analysis	-	4	Dynamics of Health Care	- 2
Physiology	-	3	Electives	3 3
Microbiology	-	4		
Physical Education Activity	1	1		
Electives	-	3-6		
	16-18 15-18			17 16

* Course according to placement test.

** Sequence of professional courses may be either Fall or Spring.

A minimum of 61 approved semester hours including University requirements for physical education activity (1 credit hour) and a grade point average of 2.0 are required for the Associate degree in this curriculum. A minimum grade point average of 2.0 in the professional courses (Medical Technology 20, 30, 40, 50) is necessary for recommendation to certifying agencies for examination.

Baccalaureate degree Curriculum

All students accepted for the Baccalaureate degree, regardless of their specialty area, will enroll in the following:

	Credit Hours
Biochemistry	8
Physics	8
Pathology	3
Principles of Education & Management	3
Principles of Immunology	3

The remainder of the curriculum is designed to provide advanced instruction in theory and practice within the specialty area.

A minimum of 128 semester hours including P.E. activity requirement of 2 credit hours and a grade point average of 2.0 are required for the Bachelor of Science degree.

THE PROGRAM IN PHYSICAL THERAPY

The Department of Physical Therapy offers a four-year curriculum leading to a Bachelor of Science degree. In the freshman and sophomore years, students will concentrate on the necessary prerequisite courses. These prerequisites are 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 with time to further explore the humanities and social sciences required for a liberal education. During the professional program, clinical education experiences will provide the student with concurrent opportunities to apply the acquired knowledge and skills. The program of study is:

Freshman Year	1st	2nd	Junior Year	1st	2nd
	SEMESTER			SEMESTER	
Psychology 1	3	-	Anatomy 102	3	-
Biology 1 & 2	4	4	Physiology 101	5	-
Chemistry 3 & 16	4	4	Pathology 101	3	-
* Mathematics	3	-	Physical Therapy 121-122	3	5
* English	-	3	Physical Therapy 131-132	1	2
Elective	-	6	Physical Therapy 144	-	3
Physical Education	1	1	Physical Therapy 128	-	3
			* Physical Therapy 142	-	2
			* Electives	3	6
	15	18		18	18

* Courses dependent upon
Freshman placement

* Optional/Advisor

Sophomore Year	1st	2nd	Senior Year	1st	2nd
	SEMESTER			SEMESTER	
+ Mechanical Engineering 93	4	-	Physical Therapy 151-152	5	3
+ Electrical Engineering 94	-	4	Psychology (P.T. 161)	3	-
Anatomy 101	5	-	Physical Therapy 133	2	-
Physiology 100	-	5	Pharmacology 190	-	2
* Electives	3	3	Physical Therapy 158 —		
Physical Therapy 21, 22	3	2	Clinical Ed. II	-	6
Physical Therapy 110			Physical Therapy 173-174	2	2
(Kinesiology)	-	3	Physical Therapy 176	-	2
+ Statistics	3	-	* Electives	6	-
	18	17		18	15

* Optional/Advisor
+ or other approved course

* Optional/Advisor

A minimum grade point average of 2.0 is required for the Baccalaureate Degree in this curriculum.

The full-time Clinical Education Program (PT 128, PT 158) 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 Northeastern United States. Students affiliating will be responsible for the cost of transportation and living expenses (including room and board) during the 6 week periods of the Junior summer and the 12 week period of the Senior Spring semester. 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.

THE PROGRAMS IN RADIOLOGIC TECHNOLOGY

The Department of Radiologic Technology offers three twenty-four month programs leading to the Associate in Science Degree.

- 1) The *Radiographic (X-ray) Technology Program* prepares persons for a career in operating x-ray equipment to obtain diagnostic information on patients.
- 2) The *Nuclear Medicine Technology Program* prepares persons for a career in working with radioactive drugs and complex equipment for diagnosing patient problems.
- 3) The *Radiation Therapy Technology Program* prepares persons for a career in operating high energy radiation machines for treating cancer patients.

During the semester, students obtain direct experience with patients at the Medical Center Hospital of Vermont (MCHV). Summertime clinical experiences are obtained at the MCHV and other hospitals throughout the region. The summer clinical experiences will require additional room, meal, and transportation expenses.

A limited number of eligible graduates of these programs may transfer to the College of Education 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.

All three programs are accredited by the American Medical Association and graduates are eligible to write the national registry examination. New England residents may enroll at reduced tuition rates because of the Regional Student Program of the New England Board of Higher Education.

Interested persons should write directly to the Department in the Rowell Building for additional information and interview.

RADIOGRAPHY

First Year	1st	2nd	Second Year	1st	2nd
	SEMESTER	SEMESTER		SEMESTER	SEMESTER
PE	1	-	RT 115	4	-
RT 1	2	-	COM 11	3	-
ANAT 9	4	-	RT 111, 112	3	3
PHYS 3	4	-	RT 113, 114	2	2
MATH 9	3	-	** DIST.	3	9
RT 11, 12	2	2			
RT 2	-	3			
RT 4	-	3			
RT 14		4	(xc*)		
PSL 10	-	3			
ENGLISH	-	3			

63 credits

13 week summer internship

2nd summer internship 13 weeks

* xc = the grade for RT 14 will be submitted at the end of the successful completion of the first summer internship.

		NUCLEAR MEDICINE			
		1st	2nd		
First Year	SEMESTER			Second Year	SEMESTER
ANAT 9	4	-		CHEM 3	4
MATH 9	3	-		RT 135	4
PHYSICS 3	4	-		** DIST.	3
PE	1	-		RT 131, 132	3
RT 1, 2	2	3		RT 133, 134	2
RT 31, 32	1	4		CT 11	-
RT 33, 34	1	4		CS 3	-
RT 4	-	3	(xc*)		3
ENGLISH	-	3			
PSL 10	-	3			
		16	18		
		64 credits		16 14	

13 week summer internship

13 week summer internship

* (xc) = the grade for RT 34 will be submitted at the end of the successful completion of the first summer internship.

		RADIATION THERAPY			
		1st	2nd		
First Year	SEMESTER			Second Year	SEMESTER
ANAT 9	4	-		CT 11	3
PHYSICS 3	4	-		DIST.	3
MATH 9	3	-		RT 125, 126	3
PE	1	-		RT 121, 122	3
RT 1, 2	2	3		RT 123, 124	2
RT 21, 22	1	2		** DIST.	-
RT 23, 24	1	4	(xc*)		3
RT 4	-	3			
PSL 10	-	3			
ENGLISH	-	3			
		16	18		
		62 credits		14 14	

13 week summer internship

13 week summer internship

* (xc) = the grade for RT 24 will be submitted at the end of the successful completion of the first summer internship.

(ALL PROGRAMS)

** DISTRIBUTION (at least one three-credit course from two of the three categories)

A. Anthropology, Home Economics (Human Development), Philosophy, Psychology, Religion, Sociology.

- B. Economics, Environmental Studies, Geology, Military Studies, Political Science, Geography, History, Natural Resources.
 C. Art, Music, Theatre, Languages.

Cooperating Personnel in Clinical Affiliations

NUCLEAR MEDICINE TECHNOLOGY

Bohannon, Jean, R.T.; Medical Center Hospital of Vermont, Burlington, VT
 Coppinger, Denise, R.T.; Maine Medical Center, Portland, ME
 Dapolito, John; Albany Medical Center, Albany, NY
 DesAutels, Frances, R.T.; Royal Victoria Hospital, Montreal, P.Q.
 Gross, Lorraine, R.T.; Rhode Island Hospital, Providence, RI
 Kieran, James, R.T.; Winchester Memorial Hospital, Winchester, MA
 Mazzola, Anthony, R.T.; Salem Hospital, Salem, MA
 Mikolowsky, Dan, R.T.; Manchester Memorial Hospital, Manchester, CT
 O'Brien, Patrick, R.T.; Mary Hitchcock Medical Center, Hanover, NH
 Rich, Dayton, R.T.; Hartford Hospital, Hartford, CT
 Rubel, Ted, R.T.; Memorial Hospital, New York, NY

RADIATION THERAPY TECHNOLOGY

Barany, Janet, R.T.; Medical Center Hospital of Vermont, Burlington, VT
 Clark, Dianna, R.T.; Massachusetts General Hospital, Boston, MA
 Eddington, Margery, R.T.; Con Secours Hospital, Methuen, MA
 Jones, Gisela, R.T.; Mary Hitchcock Medical Center, Hanover, NH
 Spence, Gerald, R.T.; Tufts University School of Medicine, Boston, MA
 Tremblay, Kathy, R.T.; Maine Medical Center, Portland, ME

RADIOGRAPHIC TECHNOLOGY

Canalas, Richard, R.T.; Central Vermont Medical, Berlin, VT
 Cunningham, Dan, R.T.; Medical Center Hospital of Vermont, Burlington, VT
 Gladden, Edward, R.T.; Northwestern Medical Center, St. Albans, VT
 Horton, James, R.T.; Osteopathic Hospital of Maine, Portland, ME
 Jones, Karl, R.T.; Putnam Memorial Hospital, Bennington, VT
 Kibbee, Gary, R.T.; North Country Hospital, Newport, VT
 Lacasse, Iris, R.T.; Medical Center Hospital of Vermont, Burlington, VT
 Parenchuck, Patti, R.T.; Brattleboro Memorial Hospital, Brattleboro, VT
 Quintana, Mary, R.T.; Mary Hitchcock Medical Center, Hanover, NH
 Surprenant, Dorothy, R.T.; Fairlawn Hospital, Worcester, MA

The School of Nursing

Technical Nursing — (2 years)
 Professional Nursing — (4 years)

Associate in Science
 Bachelor of Science

The School of Nursing offers two distinct educational programs to prepare qualified individuals for the practice of nursing. The Professional Nursing program is four years in length and leads to the Bachelor of Science degree. The Technical Nursing program Science degree. The Technical Nursing program is two years in length and leads to the Associate in Science degree. Both programs are approved by the Vermont State Board of Nursing and accredited by the National League for Nursing, Inc.

Transfer between the two programs is possible in accord with University policy and with consent of the departments concerned.

Applicant must satisfy the general admission requirements for the University. A high school course in chemistry is required and courses in biology and physics are highly recommended.

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. Refer to departmental sections for specific policies. 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 responsible for transportation to and from the agencies which are used for clinical experiences. These include the Medical Center Hospital of Vermont; the Burlington Visting Nurses' Association, Inc.; and other selected agencies in the Burlington, Middlebury and St. Albans areas.

Financial aid is available in the form of scholarships, loans, prizes, and employment (see section on Financial Aid). Of special interest to students in nursing is the Nursing Student Loan Program. Anyone interested should make application for financial aid by February 1.

PROFESSIONAL NURSING PROGRAM

The Department of Professional Nursing offers a curriculum leading to the Bachelor of Science degree. This curriculum is designed to provide the opportunity for qualified individuals to prepare for professional practice in beginning positions in various settings, to acquire a foundation for continued formal study in nursing, and to enhance growth toward maturity as individuals, professional persons, and citizens. The graduates of this program are eligible for licensure as registered nurses, and may advance without further formal education to positions which require beginning administrative skills.

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 professional nursing courses.

A minimum of 127 approved semester hours is required for the Bachelor of Science degree. A grade of "C" or better is required in Chem. 4, Zool 5-6, MCBI 55, Nursing 125-126, Nursing 145, 146 and 152.

A typical program of studies follows:

Freshman Year	1st	2nd	Junior Year	1st	2nd
	SEMESTER			SEMESTER	
English	3	3	Nursing I, PRNU 125	9	-
General Psychology, Psy. 1	-	3	Nursing II, PRNU 126	-	9
Outline of Chemistry, Chem. 3-4	4	4	Electives	6	6
Sociology	3	-			
Effective Speaking COM 11	3	-			
Electives	3	6			
Physical Education	1	1			
	17	17		15	15
Sophomore Year	1st	2nd	Senior Year	1st	2nd
	SEMESTER			SEMESTER	
Human Development, ECHD 80-81	4	4	Nursing III, PRNU 145	9	-
Introductory Microbiology, MCBI 55	4	-	Nursing IV, PRNU 146	-	9
Mammalian Anatomy and Physiology, Zool. 5-6	3	3	Nursing Research, PRNU 151	3	-
Concepts of Health, PRNU 102	-	3	Nursing Elective, PRNU 152	-	6
Introduction to Nursing Skills, PRNU 104	-	3	Elective	3	-
Nutrition & Health, HN & F 141	-	3			
Electives	6	-			
	17	16		15	15

In addition to the general educational courses found in the curriculum outline, specific courses in general education are required and additional courses are elected in accordance with individual need and interest and in consultation with the faculty advisor. These are:

Social Sciences — 15 credits

Including Psychology I and Sociology 10, 101, 165 or acceptable substitute.

Humanities and Languages — 15 credits

Including English — 6 credits

Philosophy or Religion — 3 credits

Communication 11 — 3 credits

General Electives — 15 credits

General electives may be chosen in an area of the student's choice. Students desiring to elect a sequence of courses in a given area such as foreign languages or mathematics should begin the sequence during the freshman year.

TECHNICAL NURSING PROGRAM

The Department of Technical Nursing offers a curriculum leading to the Associate in Science Degree. The curriculum is designed to prepare qualified individuals to give direct nursing care to patients of all age groups and to promote development of the individual as a responsible member of society. The graduates of this program are eligible for licensure as registered nurses and are prepared for nursing practice in hospitals, nursing homes and other health agencies.

The curriculum is two academic years in length. General education courses and courses related to nursing account for approximately one-half of the total required credits, and nursing courses for the remaining one-half. Nursing courses are taught concurrently with general education courses throughout the two years and include classroom instruction and guided clinical experiences in selected agencies.

A minimum of 63 approved semester hours is required for the Associate in Science degree. A grade of "C" or better is required in ANAT 9, PSLB 10, TENU 11-12 and TENU 27-28.

A typical program of studies follows:

First Year	1st 2nd SEMESTER		Second Year	1st 2nd SEMESTER	
Written Expression, ENGL 1, or			Sociology, SOC 10 ✓	3	-
English Elective	3	-	Approved Elective**	-	3
Human Development,			Free Elective	-	3
ECHD 80-81 ✓	3	3	Nursing Care of Children ✓		
Anatomy, ANAT 9 ✓	4	-	and Adults, TENU 27-28	10	10
Physiology, PSLB 10 ✓	-	3	Nursing Seminar, TENU 30 ✓	2	-
Man and Nutrition,					
HN & F 46	-	3			
Fundamentals of Nursing, ✓					
TENU 11-12	6	6			
Physical Education*	-	1			
	16	16		15	16

* Physical Education — 1 credit during the two years.

** Anthropology, English, History, Philosophy, Political Science, and/or Religion.

ADVANCED STANDING

The school of Nursing provides an opportunity for individuals who have had prior

experience in the health field to receive advanced standing in the program to which admission is sought. Admission to the program is essentially the same as for other applicants to the University. In accord with University policy, the student may apply for credit by examination in general education 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.

CONTINUING EDUCATION

The School of Nursing offers continuing education programs in cooperation with the Division of Continuing Education to meet the needs of registered nurses throughout the state. The School cooperates with health related agencies, institutions, and professional organizations in sponsoring additional programs. A tentative schedule for each year can be obtained from the School of Nursing or Division of Continuing Education.

The School of Home Economics

Clothing, Textiles, and Design Program

Clothing	Bachelor of Science
Textiles	Bachelor of Science
Textile Design	Bachelor of Science
Fashion Merchandising and Management	Bachelor of Science

Early Childhood and Human Development Program

Early Childhood Development	Bachelor of Science
Human Development	Bachelor of Science
Human Development Education	Bachelor of Science

Home Economics Education and Consumer Economics Program

Consumer Economics	Bachelor of Science
Consumer and Homemaking Education	Bachelor of Science
Extension Education	Bachelor of Science
Occupational Home Economics	Bachelor of Science
Human Development Education	Bachelor of Science
General Home Economics	Bachelor of Science

Human Nutrition and Foods Program

Dietetics	Bachelor of Science
Foods	Bachelor of Science
Hospitality Industry-Food Service Administration	Bachelor of Science
Human Nutrition	Bachelor of Science
Nutrition Education	Bachelor of Science

The School of Home Economics concerns itself with man's physical, social, and psychological relationship to his environment and offers four programs, each leading to a bachelor of science degree. Concentrations within programs offer a variety of backgrounds for professional careers. All programs require 120 semester hours of course work including:

General requirements

Behavioral and social sciences	6 credits
Communication skills	6 credits
Humanities	6 credits
Physical and biological sciences	6 credits

Home Economics

Integrated courses	9 credits
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Physical Education

Physical education activities	2 credits
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Professional concentration requirements and electives	82 credits
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PROGRAMS OF STUDY

Clothing, Textiles, and Design

CONCENTRATIONS: Clothing, Textiles, Textile Design, and Fashion Merchandising and Management.

Prepares students for careers in fashion and textile design and promotional work in industry, fashion merchandising and marketing, textile research and product testing, consumer services, the Extension Service and graduate study.

It is possible for students to take a semester or two away from the University to attend another school such as Fashion Institute of Technology and the Philadelphia College of Textiles, or participate in programs abroad.

Early Childhood and Human Development

CONCENTRATIONS: Early Childhood Development, Human Development, and Human Development Education (offered jointly with the Home Economics Education Program).

The Concentration in Early Childhood Development provides the student with academic and work experiences focusing on the developmental needs of young children. A state-approved teacher education program, it is closely aligned with the concentration in human development and cooperates with Elementary Education. Students prepare to work in public and private settings with young children and their families. Students are encouraged to participate in community programs. Graduates are recommended for Teacher Certification in Early Childhood (O-K).

In human development the approach is interdisciplinary and ontogenetic, close ties being maintained with other programs in the school and other departments in the University. A year of resident study at the Merrill-Palmer Institute in Detroit, Michigan, may be arranged. The student may prepare for work in agencies dealing with children and families, the public schools, and graduate studies.

The concentration in Human Development Education is designed to provide the student with a broad background, the necessary experience in professional education, and a full complement of preparation in the disciplines of Home Economics that focus on the developing individual. Students completing this concentration will be eligible for certification to teach home economics with particular competencies in the areas of human development, child care, and family living and sex education.

Home Economics Education and Consumer Economics

CONCENTRATIONS: Consumer and Homemaking Education or Middle School Living Arts, Extension Education, and Human Development Education (offered jointly with the Early Childhood and Human Development Program as described above), and Consumer Economics.

Prepares for a variety of teaching opportunities including high school Consumer and Homemaking programs, the newly developing areas of middle and elementary education in Living Arts, Adult Teaching, Occupational Home Economics, and positions in the Extension Service. All students who plan to specialize in any phase of education must make application to Teacher Education and must have a 2.5 average in their home economics subjects to be eligible for student teaching during their senior year. (See Teacher Education at UVM.)

Consumer Economics careers may be found in financial counseling, consumer relations for business and government, consumer protection agencies, educational divisions of business and financial institutions, extension service and utility companies. Students are required to participate in a field experience for a community agency or organization, and student internships are strongly encouraged.

Human Nutrition and Foods

CONCENTRATIONS: Dietetics, Foods, Hospitality Industry, Human Nutrition, and Nutrition Education.

Students may develop a strong background for professional careers, graduate study or college teaching by selecting a concentration in dietetics, foods, hospitality, human nutrition, or nutrition education. The concentration in dietetics is designed to meet academic requirements for membership in the American Dietetics Association.

The School of Natural Resources

Forestry
Recreation Management
Resource Economics
Wildlife Biology
Undecided — Natural Resources

Bachelor of Science
Bachelor of Science
Bachelor of Science
Bachelor of Science
No Degree

Academic programs of the School of Natural Resources provide the philosophical and scientific basis for addressing the critical issues facing society in the allocation, management, and utilization of renewable natural resources. These programs require a foundation in the humanities and social sciences, the physical and biological sciences, and the quantitative areas of mathematics and statistics. The technical and applied education of the natural resource programs builds from that knowledge base to prepare individuals for professional careers in forestry, wildlife biology, recreation management, resource economics, and environmental studies all leading to a Bachelor of Science Degree.

The School emphasizes scholastic excellence and the development of professional responsibility in its students. The faculty is conscientious in its role as academic advisors and encourages students to utilize them to meet their educational and professional goals.

FORESTRY

The program in Forestry provides a liberal education in the humanities and sciences and a professional education in forestry. The professional core emphasizes the science and technique of coordinating the management of forest and wild lands for forest products, water, wildlife, and recreation. The program is designed to prepare individuals for positions in forestry or for graduate study in the forest sciences. A non-professional minor option in forestry is available on a limited basis. For details consult the department.

A minimum of 138 credit hours of prescribed and elective courses, and a minimum cumulative grade point average of 2.0 is required for graduation in the professional curriculum.

	1st SEMESTER	2nd SEMESTER
Freshman Year		
Fundamentals of Calculus (Math 19)	3 ¹	-
General Zoology (Zool 9)	4	-
Introduction to Plant Biology (Bot 4)	-	4
Introduction to Forestry (For 1)	3	-
English	3 ⁵	-
Outline of General Chemistry (Chem 3)	-	4
Physical Education	1	1
Other Courses	3-4 ^{4,5}	6-7 ^{4,5}
Sophomore Year		
Basic Statistical Methods (Stat 141)	3	-
Plane Surveying (C.E. 12)	4	-
Dendrology (For 5)	4	-

Introductory Soil Science (P & SS 61)	4	-
Silvics (For 122)	-	3
Forest Biometry I (For 144)	-	3
Introductory Physics (Physics 3)	-	4
Other Courses	2-3 ^{4,5}	6-7 ^{4,5}
Summer Field Program		
Forest Biometry II (For 140)	4	
Forest Bioecology (For 100)	4	
Junior Year		
Silviculture (For 123)	3	-
Forest Tree Improvement (For 124)	-	2
Forest Economics (For 151)	3	-
Wood Technology (For 162)	-	3
Other Courses	10-11 ^{2,3,4,5}	10-12 ^{2,3,4,5}
Senior Year		
Timber Harvesting (For 163)	3	-
Forest Policy and Administration (For 153)	3	-
Forest Management (For 136)	-	3
Other Courses	10-11 ^{3,4,5}	13-14 ^{3,4,5}

¹ Students not qualified to enter Math 19 will take Math 10 during the first semester followed by Math 19 during the second semester.

² Two courses in forest protection (For 107, For 112, or For 132) must be taken during the junior year.

³ Two courses in multiple use forestry (RM 235, WLB 174, or an approved water related course) must be taken during the junior and senior years.

⁴ All students must complete the following requirements in the Arts, Social Sciences and Humanities.

a. One course in Economics prior to For 151

b. One course in Political Science

c. One course in either Psychology or Sociology

d. One course from either Art, Classics, History, Music, Philosophy or Religion.

⁵ All students must complete the following requirements in English and Communications.

a. One course in English

b. Effective Speaking (C & T 11)

c. Two communications elective courses from an approved list.

WILDLIFE BIOLOGY

This program prepares individuals for professional careers requiring expertise in wildlife biology and ecology. All majors must complete a core of courses which meets the minimum recommendations of the Wildlife Society for professional training, and which satisfies education requirements of the U.S. Civil Service Commission as well as most state agencies for entrance grades in wildlife positions. Program flexibility allows each student, in consultation with an advisor, to expand the core with coursework appropriate to personal education and career goals. A minimum cumulative grade point average of 2.0 is required for graduation.

Course sequences can be developed in preparation for traditional positions in wildlife management, graduate study in wildlife or fisheries science, or other positions in wildlife or fisheries resources. Completion of 133 semester hours of credit in core and elective courses is required for the Bachelor of Science degree.

Core Curriculum

	1st SEMESTER	2nd SEMESTER
The Freshman Year		
Introductory Biology (BIOL 1, 2 or BOT 4, Zool 9)	4	4
Introductory Chemistry (CHEM 1 or 3 and 4 or 16)	4	4

Calculus (MATH 19) ¹	3	-
Communications (ENGL 1 or 50) ²	-	3
Physical Education	1	1
Electives ³	3	3
	<hr/> 15	<hr/> 15
Sophomore Year	1st	2nd
	SEMESTER	
Plant Taxonomy (BOT 109 or FOR 5)	4	-
General Ecology (one course from BIOL 102, BOT 160, FOR 122)	-	3-4
Principles of Wildlife Management (WLB 174)	-	3
Introductory Soils (PSS 61)	4	-
Statistics (STAT 141)	3	-
Computer Programming (CS 11)	3	-
Communications ²	3	6
Electives ³	-	3-6
	<hr/> 17	<hr/> 15-18
Summer Program		
Ornithology (WLB 130)		4
Mammalogy (Zool 295)		4
		<hr/> 8
Junior Year	1st	2nd
	SEMESTER	
Structure/Function (ASCI 171 or BIOL 103 and BIOL 101 or Zool 104 or Zool 219)	4	4
Wildlife Biometry (WLB 151)	4	-
Fisheries Biology (WLB 161)	4	-
Natural Resources Law, Planning, Policy (2 courses)	0-3	3-6
Electives ³	0-3	6-9
	<hr/> 15-18	<hr/> 15-18
Senior Year	1st	2nd
	SEMESTER	
Wildlife Ecology/Management (two courses from WLB 271, 272, 264)	0-4	3-7
Aquatic Ecology/Management (one course from NR 278, Zool 204, 236)	0-4	0-4
Electives ³	6-18	9-12
	<hr/> 12-18	<hr/> 12-18
Total Program Requirements, Semester Hours		133

¹ Qualified students may substitute higher math; those not qualified for Calculus will take MATH 10 in the fall semester followed by MATH 19 in the spring semester.

² All students must complete the following courses: Composition (ENGL 1 or 50); Public Speaking (CT 11); Visual Methods (EDSS 142 or HEED 173 or VOTC 156); Technical Writing.

³ All students must complete the following requirements in Arts, Humanities, and Social Sciences:

one course in Economics (AREC 61 or ECON 11); two additional courses from Anthropology, Political Science, Psychology, Sociology; three courses from at least two of the areas: Art, Music, Foreign Language, History, Literature, Philosophy, Religion.

RECREATION MANAGEMENT

All majors in Recreation Management are required to successfully complete a series of core courses during the freshman and sophomore years. Upon completion of the sophomore year the student may elect to concentrate in one of two areas: Public Outdoor Recreation or Private Outdoor Recreation and Tourism.

These concentrations are designed to prepare students for professional careers in the management of outdoor recreation resources. The public recreation resources include parks, forests, and recreation areas at the local, regional, state, and federal governmental levels. Private resources include ski areas, campgrounds, hunting preserves, resorts, and other specialized recreation areas.

Freshman and Sophomore Year Core					
	1st	2nd		1st	2nd
Freshman Year	SEMESTER		Sophomore Year	SEMESTER	
English Electives	3	3	Speech Elective	-	3
Math/Computer Science			Soils/Geology Elective	3	-
Electives ¹	3	3	Political Science Elective	-	3
Intro. to Plant Biology,			Economic Electives	3	3
BOT 4	-	4	Plant Identification		
Freshman Recreation Seminar,			Elective ²	3	-
RM 8	-	2	Plane Surveying, CE 12	4	-
General Psychology, PSY 1	3	-	Cartography, GEOG 171	3	-
Sociology Elective	3	-	Technical Writing Elective	-	3
Physical Education Electives	1	1	Elective	-	3
Electives	3	3			
Summer Field Training					
Recreation Management, RM 150 ³				4	

¹ Based on student's ability and interest

² Dendrology, FOR 3, Dendrology, FOR 5, or Ornamental Horticulture, PSS 125

³ An intensive four week field-oriented course immediately following the Spring Semester

PUBLIC OUTDOOR RECREATION The Recreation Management Program's concentration 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 the various natural resource disciplines with social sciences, communications, and public administration and management.

	1st	2nd		1st	2nd
Junior Year	SEMESTER		Senior Year	SEMESTER	
Outdoor Recreation Planning,			Park Protection, RM 240	-	3
RM 235	3	-	Rec. Adm. & Operations,		
Economics of Outdoor Rec &			RM 153	3	-
Tourism, RM 225	-	3	Environmental Interpretation,		
Urban Forestry, FOR 126	-	3	RM 155	3	-
Resource Economics,			Recreation Policy Formulation,		
RSEC 121	3	-	RM 154	-	3
Elementary Statistics,			Participation in Rec.		
STAT 111	-	3	Mgt., RM 159	-	3
Park Design, RM 137 ¹	3	-	Water/Wildlife Management		
Electives	6	6	Elective	3	-

Senior Recreation Seminar, RM 182	-	2
Recreation Facilities Elective	3	-
Electives	3	3

Total Program Requirements, Semester Hours 126

¹ A second semester course in Park Design, RM 138, is available to students with a special interest in this area.

PRIVATE OUTDOOR RECREATION AND TOURISM This program is designed to prepare students for professional management careers in a variety of private outdoor recreation enterprises and tourist-oriented business firms. Special emphasis is given to the management problems of private ski areas (special courses, seminars, internship programs, etc.) but the program is sufficiently flexible to permit specialization in several types of private recreation management. Course work is concentrated in the areas of business and natural resource management.

Junior Year	1st SEMESTER	2nd SEMESTER	Senior Year	1st SEMESTER	2nd SEMESTER
Outdoor Recreation Planning, RM 235	3	-	Recreation Administration and Operations, RM 153	3	-
Economics of Outdoor Recreation and Tourism, RM 225	-	3	Ski Area Management, RM 157	3	-
Elementary Statistics, STAT 111	-	3	Participation in Recreation Management, RM 151	-	3
Park Design, RM 137 ¹	3	-	Senior Recreation Seminar, RM 182	-	2
Foundations of Marketing BSAD 154	3	-	Food and Lodging Business Management, RM 159	-	3
Organization Behavior, BSAD 170	-	3	Business Administration Electives ²	3	3
Business Law, BSAD 17	-	3	Hospitality Management Electives		
Electives	6	3	Basic Food Production, HE 37	3	-
			Quality Food Production, HE 138	-	5
			or		
			Natural Resource Management Electives		
			Urban Forestry, FOR 126	3	-
			Water Management Elective	-	3
			Electives	3	-

Total Program Requirements, Semester Hours 128 (129)³

¹ A second semester of Park Design, RM 138, is available to students with a special interest in this area.

² If the Hospitality Management Electives are taken, two of the following five Business Administration courses must be taken. If the Natural Resources Management Electives are taken, three of the following Business Administration courses must be taken: (a) Financial Accounting, BSAD 60; (b) Managerial Accounting, BSAD 61; (c) Personal Selling and Sales Management, BSAD

153; (d) The Marketing Operations of Small Retail and Service Establishments, BSAD 156; (e) Marketing Research, BSAD 157.

³ 128 semester hours are required if the Hospitality Management Electives are selected, and 129 semester hours are required if the Natural Resources Electives are selected.

RESOURCE ECONOMICS

This program deals with the application of economic theory to natural resource allocation problems. It prepares an individual to use the logic of economics and the perception of conservation to recommend the efficient and equitable use of natural resources. Graduates will be prepared for positions in natural resource management and administration.

Core Curriculum					
Freshman Year			Junior Year		
	1st SEMESTER	2nd SEMESTER		1st SEMESTER	2nd SEMESTER
Fine Arts or Humanities	3	3	Resource Economics (RSEC 121)	3	-
English, Speech, Drama or Writing	3	3	Natural Resource Evaluation (RSEC 222)	-	3
Intro to Economic Geography (GEOG 14)	3	-	Spatial Analysis (RSEC 243)	3	-
Social Sciences	-	3	Microeconomic Theory (ECON 186)	3	-
Fundamentals of Calculus I (MATH 19)	3	-	Macroeconomic Theory (ECON 190)	-	3
Fundamentals of Calculus II (MATH 20)	-	3	Electives	6	9
			Physical Education 1, 2	1	1
			Electives	3	3
Sophomore Year			Senior Year		
	1st SEMESTER	2nd SEMESTER		1st SEMESTER	2nd SEMESTER
Principles of Economics (ECON 11)	3	-	Economics of Outdoor Recreation (RSEC 225)	3	-
Principles of Economics (ECON 12)	-	3	Forest Economics (FOR 151)	3	-
Social Sciences	-	3	Legal Aspects of Planning (NR 235)	-	3
Statistics (or ECON 130)	3	-	Regional Economic Growth (ECON 217)	-	3
Natural Science Elective	3	3	Introduction to Econometrics (ECON 267)	-	3
Electives	6	6	Electives	9	6

Total Program Requirements, Semester Hours

122

ENVIRONMENTAL STUDIES Students interested in environmental studies may enroll in the School of Natural Resources (see p. 117). They may have a coordinate major or major in environmental studies, but must complete general School requirements for graduation. Students should contact the Director's Office and become familiar with the general requirements.

The Environmental Program

Environmental Studies — Agriculture	Bachelor of Science
Environmental Studies — Arts and Sciences	Bachelor of Arts
Environmental Studies — Education and Social Service	Bachelor of Science
Environmental Studies — Engineering, Mathematics & Business Administration	Bachelor of Science
Environmental Studies — Home Economics	Bachelor of Science
Environmental Studies — Natural Resources	Bachelor of Science

The Environmental Program is a University-wide program of undergraduate education, research, and community service dedicated to the study of the cultural and biophysical environments essential to the quality of life on earth. It seeks to serve the needs of students for sound education and career preparation and the needs of society — two goals that strengthen one another in practice.

The Environmental Program is an interdisciplinary venture involving students and faculty from throughout the University, as well as community professionals, recognizing that study of the environment involves all disciplines and professional fields. Thus, the Program is not a unit of any single college or school of the University, but works cooperatively with a wide range of academic programs and action organizations on campus and in the community.

While the Environmental Program attempts to serve a wide array of environmental interests, its primary focus is the individual student. A Director and interdisciplinary faculty assist students in planning an individualized program of studies which combines a broad, comprehensive understanding of the environment and depth in a specific discipline or profession leading to a future career. Program offices are located in The Bittersweet where students are invited to visit with the staff regarding their academic plans, to gain assistance with research or action projects, and to seek information about community internships and future employment.

The Environmental Studies Curriculum

The curriculum in Environmental Studies offers students several alternatives leading to an individualized program of studies: The *Coordinate Major in Environmental Studies* combines study of the environment with a traditional disciplinary major or professional field. The *Major in Environmental Studies* provides a unique opportunity for the student seeking an individually-designed interdisciplinary major.

Students entering the University may apply for admission to Environmental Studies through several of the undergraduate colleges and professional schools. Choice of the appropriate college or school will depend on the individual's interests and educational objectives or, in the case of the *Coordinate Major* program, on the major or professional field to be coordinated with Environmental Studies. It is recommended that incoming students consult with the Director of the Environmental Program before making application to the University.

DEGREE REQUIREMENTS

Students must complete the distribution requirements and minimum credit-hour re-

quirements of their college or school, and one of the following major programs. Incoming students will be assigned an advisor in the Environmental Program who will assist the student in selecting a major program, usually during the sophomore year.

COORDINATE MAJOR IN ENVIRONMENTAL STUDIES For the majority of students this program offers the best combination of career opportunities and environmental interests. In addition to the Environmental Studies Core Program, the student completes the departmental requirements of a related disciplinary or professional major in his or her college or school, and an individualized program of studies and independent work which strengthens the environmental aspects of the major.

Environmental Studies Core Program

Required Courses	Credit Hours
Introduction to Environmental Studies, ENV 1	4
Introduction to Environmental Studies, ENV 2	4
Environmental Theory & Analysis, ENV 100	3
Senior Seminar, ENV 204	3

Departmental Major Program

(Consult other sections of the catalogue for major requirements and actual credit hours)

Coordinate Option

At least three advanced environmentally-related courses selected by the student in consultation with an advisor in the Environmental program. These courses may be in the student's major field, a closely-allied discipline, or from several supporting fields. 9 +

(Education students seeking certification in Environmental Studies in elementary or secondary education: see p. 76 of catalogue.)

Electives — and College or School Distribution Requirements

Total Credits

120 + *

* (Consult appropriate College or School section of Catalogue for exact credit requirements)

MAJOR IN ENVIRONMENTAL STUDIES This interdisciplinary major offers qualified students the opportunity to combine studies in a variety of disciplines and professional fields. Each student's program is individually designed, rather than shaped around an existing departmental major, and provides the opportunity to direct study toward newly-developing environmental careers and graduate study programs. It is especially suited to the student seeking a broad liberal education with an environmental thrust.

The self-designed major is a highly selective major for honors students with well-conceived academic and career-oriented goals.

Admission to this major requires approval of the Environmental Program and successful completion of Environmental Studies 51. In addition to course requirements, the major includes a required senior research thesis, internship, or practicum.

Environmental Studies Core Program

Required Courses	Credit Hours
Introduction to Environmental Studies, ENV 1	4
Introduction to Environmental Studies, ENV 2	4
Environmental Theory & Analysis, ENV 100	3
Senior Seminar, ENV 204	3

Major Program

Major Seminar, ENV 51

3

Individually-designed Program

24 +

(Planning and selection of courses accomplished as a course project in Environmental Studies 51, including at least 24 hours of advanced environmentally-related courses)

Research Seminar, ENV 201

3

Senior Project & Thesis, ENV 202-203

6-15 +

Senior Thesis (a research or action project, or internship) planned and designed in Environmental Studies 201. Actual credit arranged in consultation with senior project and thesis advisor.

Electives — and College or School Distribution Requirements

Total Credits

120 + *

* (Consult appropriate College or School of Catalogue for exact credit requirements)

Reserve Officers' Training Corps

Army

GENERAL Army ROTC offers a program of 4 or 2 years for men and women leading to a Regular or Reserve Commission as an officer in the United States Army. The University's Department of Military Studies offers courses in world military affairs and other related areas. Additionally, special courses offer basic education and technical training in military subjects with emphasis on leadership and management.

PROGRAMS Military Studies at UVM consists of two programs — (1) a four-year program comprised of a Basic Course open to all freshmen and sophomores and an Advanced Course for qualifying juniors and seniors. Attendance at a summer camp of six weeks duration is required between the junior and senior year. (2) A two-year program for sophomores who have not taken any prior ROTC courses. The program consists of a six-week summer camp or attendance at a six-week on-campus military studies institute between the sophomore and junior year; one course per term during the junior and senior year, and attendance at a six-week summer camp between the junior and senior year. Students will receive pay and travel allowances for summer camps. It should be noted that attendance at summer camp or the on-campus military studies institute between the sophomore and junior year is without obligation.

SCHOLARSHIPS Scholarships, available for four, three, two years, and one year, provide tuition, books, and all associated fees plus \$100.00 a month for 10 months of each school year.

Application for the four-year scholarships is made during the senior year in high school. The three, two, and one-year scholarship applications are made through the Department of Military Studies.

SUBSISTENCE ALLOWANCE All junior and senior cadets receive \$100 a month for 10 months of each school year.

EXTRACURRICULAR ACTIVITIES "Pershing Rifles," "Green and Gold," and the "Ethan Allen Rifles" offer membership to participating students. The "Pershing Rifles" is a national military society fostering a spirit of friendship and cooperation among students in the ROTC program. "Ethan Allen Rifles" is an honorary society for the promotion of military excellence. The "Green and Gold" Drill Team, open to all students, participates in competitive activities throughout New England.

POSTGRADUATE Upon graduation, ROTC students are normally commissioned as officers in the U.S. Army Reserve and agree to serve on active duty for a period of three months or three years. However, active duty may be deferred for as many as four years for those who wish to pursue an advanced degree while studying as a full-time graduate student.

Air Force

The Department of Aerospace Studies provides preprofessional preparation for future Air Force Officers. The curriculum is designed to develop career-oriented men and women who can apply their university education and AFROTC experience to their initial active duty assignments as Air

Force Commissioned Officers. AFROTC is open to all college majors. In addition to the formal courses of study, pilot candidates participate in a 25-hour Flight Instruction Program during their senior year.

SCHOLARSHIPS Air Force ROTC College Scholarships provide payment of tuition, laboratory fees, textbooks, and a \$100 per month for each ten months of the school year on scholarship status.

SUBSISTENCE PAY All students in their last two years of AFROTC receive tax-free subsistence pay of \$100 per month.

UNIFORMS Uniforms are furnished at no cost.

AFROTC FIELD TRAINING Field training is offered during the summer between the sophomore and junior years at selected Air Force bases throughout the United States. Students in the four-year program participate in four weeks of field training during the summer between their sophomore and junior years. Students applying for entry into the two-year program must successfully complete six weeks of field training prior to enrollment in AFROTC.

For additional information contact the AFROTC, Saint Michael's College.

The Living/Learning Center

The Living/Learning Center consists of five residential facilities, interconnected through a central commons, each housing 120 students in suites of from five to seven. Scattered throughout the Living/Learning Center are fifteen apartments for resident faculty and their families and visiting scholars and artisans, and offices for non-resident faculty. There are classrooms, reading room and reference library, computer terminals, music rooms, a pottery and a craft shop, and a graphic design studio. Included also are recreation and laundry rooms, a pre-school, a dining room and snack bar, and the offices of both the Center for Research on Vermont, and Foreign and International Programs.

A University-wide residential educational facility, the Living/Learning Center exists to serve all UVM students and academic programs. Students live in the Living/Learning Center by participating in programs developed either by faculty members in their areas of academic expertise or by students whose program proposals have been accepted for Living/Learning Center support of space, facilities, and budget.

Living/Learning Center programs may supplement an existing course of study or define a totally new educational direction, and they must incorporate those educational objectives basic to the purpose of the University and the Living/Learning Center — acquisition of knowledge, development of skills, development of creative abilities and discipline, and personal and group development. All academic credit is administered by the University's regular departments. The Living/Learning Center does, however, maintain rigorous and ongoing evaluations of all of its programs to insure continuing benefit to the academic goals of the students and the University.

Above all, the Living/Learning Center is a community of people — students, faculty, and administrative staff — who share the goal, work, and excitement of together improving the scope and quality of their University experience. Recent programs have included Chinese, Film Making, Medieval/Renaissance Studies, History- English-Philosophy, Veterinary Interest, Women's Studies, Small Ensemble, Russian, German, and Early Childhood Development.

For information contact the Office of the Director, Living/Learning Center.

The Graduate College

The purpose of the Graduate College is to serve the needs of the college graduate who desires a broader and more thorough knowledge of scholarship and research in his chosen field. The College offers the following programs leading to the Master's degree and to the degree of Doctor of Philosophy. Each student is expected to be familiar with the general regulations and procedures of the Graduate College, and with the specific degree requirements in his chosen field of study. *For detailed information refer to the Graduate College Catalog available from the Graduate College Office, 332 Waterman Building.*

Master of Arts

Programs are offered in the following fields:

English	German	Political Science
French	Greek & Latin	Psychology
Geography	History	

Master of Science

Programs are offered in the following fields:

Agricultural Economics	Communication Disorders	Microbiology
Anatomy	Computer Science	Natural Resource
Animal Sciences	Electrical Engineering	Planning
Animal Pathology	Forestry	Pathology
Biochemistry	Geology	Pharmacology
Biomedical Engineering	Home Economics	Physics
Biostatistics	Mathematics	Physiology and Biophysics
Botany	Mechanical Engineering	Plant and Soil Science
Chemistry	Medical Microbiology	Statistics
Civil Engineering	Medical Technology	Zoology

Master of Arts in Teaching

This degree is appropriate for teachers who are interested primarily in increasing their knowledge of their subject matter fields and thereby the effectiveness of their classroom instruction. Programs are offered in the following fields:

Botany	Geology	Mathematics
Chemistry	German	Physics
English	Greek & Latin	Zoology
French	History	
Geography	Occupational Education	

Master of Science for Teachers

This degree is designed primarily for secondary school teachers who wish to strengthen their backgrounds in their subject matter field, and who desire flexibility in choosing courses at levels best suited to their needs. Programs are planned on an individual basis.

Biology (Botany & Zoology)	Mathematics
Geology	Physical Sciences (Chemistry & Physics)

Master of Education

The master of education degree is intended to give those who work in education the kind of background and professional preparation needed for leadership in teaching and functions related to it. Programs are planned on an individual basis with special attention to such fields as:

Administration
Foundations of Education
Occupational and
Practical Arts
Education

Reading and Language
(Elementary and
Secondary)
School Counseling
(Elementary and
Secondary)

Special Education
Student Personnel
Services in Higher
Education
Teacher Education

Master of Business Administration

Study leading to the degree of Master of Business Administration is designed to provide an opportunity for the individual to develop knowledge and understanding in a wide range of business activities that will provide foundation for growth and success in a business career. Programs are planned on an individual basis.

Master of Extension Education

This degree is designed to provide opportunity for those who work in non-school educational and counseling programs to develop knowledge and understanding in activities related to program management and educational methodology.

Programs are planned on an individual basis with special attention to fields such as:

Agriculture	Family Centered Services
Business and Industry	Youth Organization

Doctor of Philosophy

Programs are offered in the following fields:

Anatomy
Animal Sciences
Biochemistry
Botany
Chemistry

Electrical Engineering
Mechanical Engineering
Microbiology
Pharmacology
Physiology and Biophysics

Plant and Soil Science
Psychology
Zoology

Fifth Year Certificate in Education

A special fifth year program culminating in a certificate of advanced study is offered by the Department of Education for students who wish to work beyond the bachelor's degree. It is especially designed to meet the needs of teachers who are developing new teaching fields, for advanced students who are meeting requirements for state certification, and for experienced teachers who desire flexibility in choice of courses at both graduate and undergraduate levels. Information about the certificate program may be obtained by contacting the Dean of the College of Education and Social Services.

Concurrent Degrees

Post-sophomore fellows in medicine are permitted to use credit from appropriate medical courses toward an M.S. or a Ph.D. They are enrolled in the Graduate College for one or more years to pursue research and enroll in such courses as would normally not be included within a medical program. Such persons, therefore, are working toward an M.D. and M.S. or Ph.D., but completion of each degree may occur at a different time.

All courses for which graduate credit is received at UVM in a master's degree program, whether a master's degree is received or not, may be applied toward a Ph.D. at UVM provided they are appropriate for the Ph.D. program.

No provision is made for a person to employ the same credit to satisfy two master's degrees at the University of Vermont.

Continuing Education

Through Continuing Education the University provides opportunities for formal and informal study to persons who have not attended college, who require additional training in their work, or who wish to pursue previously unexplored areas of study.

The Summer Session

Summer session offers courses in many subjects at both the graduate and undergraduate level.

The offerings are diversified to meet the needs of students who desire courses leading to an undergraduate or graduate degree. Offerings are scheduled to enable students to accelerate their programs or explore new areas of interest. Special courses are developed for school personnel, both administrators and teachers, who desire fundamental or specialized courses or who wish to broaden their knowledge of special subjects. All courses are open to persons interested in study for self-improvement.

It is recommended that any regularly matriculated student at the University of Vermont obtain prior approval from his Academic Dean for any courses to be taken in the Summer Session. The purpose of this recommendation is to insure such courses are appropriate for the degree for which the student is working.

The master's degree in several (but not all) areas may be earned through work in the Summer Session. Enrollment in courses for graduate credit does not imply admission to the Graduate College. Details about available courses and programs will be sent on request by the Director of Continuing Education.

Evening Division

The University's Evening Division program provides educational opportunities for adults. Members of the faculty at the University, and others working under temporary appointment, offer evening or extension courses in many disciplines both at the Burlington campus and at locations throughout Vermont. Most courses may be taken for credit but some non-credit courses are offered in specialized areas of interest.

Courses are given in towns and cities throughout the state wherever a group of ten or more individuals register for a course.

Arrangements for Evening Division courses are made through the Evening Division, Grasse Mount. Length of courses varies from ten to fifteen weeks.

It is recommended that any regularly matriculated student at the University of Vermont obtain prior approval from his Academic Dean for any courses to be taken in the Evening Division. The purpose of this recommendation is to insure such courses are appropriate for the degree for which the student is working. All persons desiring graduate credit must secure the approval of the Dean of the Graduate College at the time of registration.

Non-Degree Student Enrollment

Non-degree students are persons who have presented minimum credentials and are permitted to undertake limited course work in the day program for purposes other than that of earning a degree. Credits earned by non-degree 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. Non-degree students may enroll for a maximum of 6 credits (or two courses) per semester in the day program; additional courses may be enrolled for only with permission from the appropriate Academic Dean. Undergraduate non-degree students may not exceed a total accumulation of 30 semester credit hours without permission of the Division of Continuing Education. Graduate students are limited to a total accumulation of 9 semester hours.

Undergraduate non-degree students, those seeking only undergraduate credit for course work taken, apply for approval to the Division of Continuing Education which will act as their college office.

Graduate non-degree students, those seeking graduate credit, must register through the Graduate College.

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

Students presently enrolled and in good standing at another institution may take courses at the University of Vermont to transfer to their institutions. Visiting students are considered non-degree students and should contact the Division of Continuing Education for information and registration material.

All non-degree students who would like assistance in planning educational programs and selecting courses should contact the Division of Continuing Education at Grasse Mount (telephone 802-656-2085).

Conferences and Institutes

Conference activity is a rapidly increasing part of University life. Throughout the regular college year and during the summer, many conference groups make use not only of University classroom and auditorium facilities but also of University dormitories and dining services. Groups interested in arranging for meetings or conferences at the University should contact the Conferences and Institutes Office, Grasse Mount. This office will also plan and coordinate conferences, seminars, short courses and meetings to be held at off-campus locations.

Church Street Center for Community Education

The Center, located in the restored Ethan Allen Firehouse on Burlington's Church Street, is a clearinghouse for information on University and community educational activities and operates a year-round program of lectures, films, readings, study groups, and non-credit mini-courses and workshops, in response to expressed and perceived community needs. It draws upon the combined talents and resources of the University and the larger community.

CONTINUING EDUCATION ACADEMIC SCHEDULE 1978-79

FALL SEMESTER 78

Registration

MAIL-IN registration for all Continuing Education students enrolling at the University of Vermont in on-campus day and/or evening courses

WALK-IN registration for all on-campus courses for all students

Tuesday, August 1-
Friday, August 18

Monday, August 21-
Wednesday, August 23
Tuesday, September 5

Classes Begin
 Day Division
 Evening Division

Wednesday, September 6
 Wed.-Tues., Sept. 6-12

SPRING SEMESTER 79

Registration

MAIL-IN registration for all Continuing Education
 students enrolling at the University of Vermont in
 on-campus day and/or evening courses

Tuesday, December 1
 Friday, January 5

Classes Begin

Day Division
 Evening Division

Tuesday, January 16
 Tues.-Mon., Jan. 16-22

SUMMER 79

6 week session

8 week session

Early Session

July 9 to August 17
 June 18 to August 10
 June 4 to June 15

1979-80

FALL SEMESTER 79-80

Academic year 1979-80 is still being
 approved by the Faculty Senate Calendar Committee.
 Therefore, no dates are available at the present time.

Study Abroad

The Office of Overseas Programs at B178 Living/Learning Center maintains information about overseas study programs and helps students make arrangements for foreign study. The Office also assists in the evaluation of credits for study abroad. Students intending to study overseas and receive credit from UVM must contact the Office of Overseas Programs and complete the Study Abroad Approval form prior to departure. This applies even to students intending to pursue independent study overseas under University of Vermont auspices.

In addition to providing information about hundreds of non-UVM overseas study programs, the University offers the following programs in which it has a direct involvement:

— *The Vermont Overseas Study Program (VOSP) at the University of Nice in France* provides a year of study abroad for a selected group of undergraduates from the University of Vermont and from other colleges and universities.

Intended primarily for students concentrating in French, the program is also open to qualified student from other fields, such as the fine arts or the social sciences. Student selection will be based on the following criteria:

1. Sophomore, junior or senior class standing with a minimum grade point average of 2.0 (C).
2. A working knowledge of French.
3. An interest in and potential for capitalizing on a year of study abroad.
4. A sound educational program.
5. Creditable personal qualifications.

Upon the successful completion of his/her work, the student receives appropriate credit (usually thirty hours) toward his/her degree. For further information about the Vermont Overseas Study Program, an interested student should speak to his/her academic dean or to the director of the program.

— *The University is a member of the Intercollegiate Center for Classical Studies in Rome.* Properly qualified students may attend one or two semesters at the Center and receive full credit. For further information consult with the chairperson of the Department of Classics.

— *The University of Vermont Summer Program in the Province of Quebec:* At a rural center near Nicolet where the program is located, teachers, and intermediate and advanced students of French participate in a wide variety of activities in an introduction to the heritage of French Canada and the culture and civilization of Quebec today. Through readings, lectures and discussions the major characteristics of French-Canadian thought, culture and civilization are introduced. With the total integration of the group into the Nicolet community each member becomes involved in the social life of the center's neighbors. Workshops include handweaving, folkdance, history, folksongs, literature, geography, recipes, holidays, language, traditional materials, furniture and tools, introduction to architecture, the oral tradition in literature. Each participant prepares a special project, alone or with others as part of the required evaluation.

Five weeks; six credits. For further information contact the Department of Romance Languages.

— *Issues in Contemporary Education: Seminar Abroad-Education in England*: This program is designed to offer students something more than the usual "study abroad" program. It offers an opportunity for each student to relate his or her professional needs, interests, goals, and aspirations to a specific educational program. There will be opportunities to visit many areas of cultural and personal interest. In addition, the student will live with a family in England and work as a paraprofessional in one or more of the host nation's schools. Time allowed for independent travel. Participants will be affiliated with a teacher training college in England. Contact David Shiman, College of Education and Social Services.

— *Medieval Studies in Italy*: The University of Vermont has developed a summer program of interdisciplinary Medieval/Renaissance studies. Centered in Rome and Assisi, the program offers three academic credits in history and features travel to many historical sites. All instruction is in English. For further information, contact Professor Alfred Andrea, Department of History.

— *Scandinavian Seminar*: A total cultural immersion program consisting of a year's study in folk schools in Norway, Denmark, Sweden, or Finland. No prior language competency required. Apply to this national program through the Overseas Programs Office.

Courses of Instruction

The University reserves the right to change these course offerings at any time.

The departments and areas of instruction are arranged alphabetically, and the college in which each is located is indicated.

A student who lacks the stated prerequisites for a course, but is otherwise qualified to take it, may be permitted to enroll by the department.

Unless otherwise specified, the numbers of prerequisites refer to a course number within that department.

Courses numbered from 1 through 99 are elementary and intermediate courses.

Those numbered from 100 through 199 are advanced undergraduate courses. They usually have at least one year of prior work in that discipline as a prerequisite. They may be taken as minor courses, but in some departments only a limited number may be taken as major courses. They are not ordinarily available for graduate credit.

Courses numbered from 200 through 299 are relatively more advanced courses for undergraduates which may also be taken for graduate credit by graduate students. They usually require at least two years of prior work in that and related disciplines. To obtain graduate credit the graduate student generally is expected to meet higher qualitative or quantitative expectations than the undergraduate student.

Two numbers with a comma between (17, 18) indicate that the separate semester courses may be taken independently for credit.

Two hyphenated numbers (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.

The number of credit hours per semester is stated in each course description.

Odd-numbered courses are generally offered the first semester; even-numbered courses are generally offered the second semester; variations from this arrangement may be indicated by the Roman numeral I for the first semester or II for the second semester.

The form (2-3) immediately following the course title indicates the number of class hours respectively of lecture and of laboratory.

Agricultural and Resource Economics

COLLEGE OF AGRICULTURE

Professors Sinclair (Chairman), Sargent, Tremblay, and Webster; Associate Professors Fife, Gilbert, Pelsue, and Schmidt; Extension Professors Bevins, Eddy, and Houghaboom; and Extension Associate Professor Bigalow.

Program in Agricultural Economics

2 World Food and Population Agricultural development with emphasis on natural and economic phenomena and the effect of food supplies on population trends and policies. Three hours. Tremblay.

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. Pelsue and Sinclair.

151 Food and Lodging Business Management Economic decision-making for food and lodging business management. Emphasis on analysis of business investment and profitability over the firm life. Credit cannot be granted for both Agricultural and Resource Economics 151 and 166. Three hours. Bevins.

161 Agricultural Finance Capital requirements of agriculture, financial problems of farmers, types and sources of credit, policies and practices of lending institutions. *Prerequisite:* Agricultural and Resource Economics 61 or Economics 12. Alternate years, 1979-80. Three hours. Sinclair.

162 Rural Land Use Issues in New England Analysis of the economic and social forces determining rural land use patterns in New England. Emphasis on Vermont issues, including factors affecting rural land use patterns and growth of noncommercial agriculture. *Prerequisite:* 61 or equivalent. Three hours. Sargent.

166 Small Business Management Theoretical and practical considerations in organizing and operating small businesses. Emphasis on financing, accounting, budgeting, investment analysis, and tax management. *Prerequisite:* Sophomore standing. Three hours. Fife.

191, 192 Practicum in Agricultural and Resource Economics Planned, supervised, off-campus education during academic year or summer. A student may earn up to 12 hours of credit. *Prerequisites:* Junior standing and departmental permission. Credit variable.

195, 196 Special Topics in Agricultural Economics Readings and discussion of selected topics in agricultural economics at an undergraduate level. *Prerequisite:* Departmental permission. Credit as arranged.

197, 198 Undergraduate Research Work on a research problem under the direction of a staff member. Findings submitted in written form as prescribed by the department. *Prerequisite:* Senior standing. Three hours. Staff.

201 Farm Business Management Organization and operation of successful farm businesses with emphasis on resource allocation, production efficiency, and marginal analysis. Field trips required. *Prerequisites:* Economics 12 or Agricultural and Resource Economics 61; Junior standing, College of Agriculture major. Three hours. Tremblay.

205 Rural Communities in Modern Society (See Sociology 205).

207 Markets, Food, and Consumers Market structure, prices, and economic forces involved in the movement of farm products from producers

to consumers. **Prerequisite:** Economics 12 or Agricultural and Resource Economics 61. Three hours. Webster.

208 Agricultural and Food Policy History and institutional development of agricultural policy. Price and income problems of American agriculture and alternative solutions. **Prerequisite:** Economics 12 or Agricultural and Resource Economics 61. Alternate years, 1979-80. Three hours. Sinclair.

210 Marketing Institutions Agricultural marketing institutions servicing northeastern U.S. Reading, lectures, and extended field trip. **Prerequisites:** Six hours in agricultural economics and permission of instructor. Three hours. Webster and Tremblay. **Note:** Not approved for graduate credit.

218 Community Organization and Development (See Sociology 207).

254 Advanced Agricultural Economics Theories of supply and demand analysis, price determination, market structure, and income distribution in competitive and imperfectly competitive markets. **Prerequisites:** Twelve hours in resource economics and/or economics, and permission of instructor. Three hours. Pelsue.

255, 256 Special Topics in Agricultural and Resource Economics Readings and discussion of selected topics in economics at an advanced level. **Prerequisite:** Departmental permission. Credit as arranged.

264 Agricultural 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:** Agricultural and Resource Economics 61 or Economics 12, Mathematics 18 or 19, or by permission of instructor (Statistics 111 helpful). Three hours. Pelsue.

266 Economics of Managerial Decisions Applying economic concepts to problems of capital budgeting, tax planning, pricing, demand analysis, and discounting cash flows. Cases. **Prerequisite:** Economics 12 or equivalent. Three hours. Fife.

271 Agriculture in Economic Development A study of the process of economic development in underdeveloped countries with special reference to the role of agriculture in providing food, clothing, and foreign exchange necessary to achieve the national development goals. **Prerequisite:** Economics 12 or Agricultural and Resource Economics 61. Three hours. Sargent.

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. **Prerequisite:** Agricultural and Resource Economics 271 or permission. Three hours. **Note:** Not approved for graduate credit.

Program in Resource Economics

(For descriptions of the following courses, refer to the School of Natural Resources, page 240.)

121 Resource Economics

157 Ski Area Management

222 Natural Resources Evaluation

225 Economics of Outdoor Recreation and Tourism

233 Regional Planning

234 Practicum in Regional Planning

235 Legal Aspects of Planning and Zoning

243 Spatial Analysis I (see geography 243)

Allied Health

DIVISION OF HEALTH SCIENCES

2 Dynamics of Health Care Introduction to the whole pattern of comprehensive health care; a core course for students in the health career programs. Two hours. Breen.

198 Management Project Analysis of current designs and methods used in existing physical therapy facilities. Group activity to design management models based on problem-solving. Two hours. Spring semester. Physical therapy students or permission of instructor. Staff.

Anatomy

COLLEGE OF MEDICINE

Professor Young (Chairman); Associate Professors Freedman, Krupp and Wells; Assistant Professors Boushey, Kriebel and Schwaber.

9 Introductory Human Anatomy (3-3) The laboratory emphasizes human topographic anatomy, presenting cadaver prosections, radiographs, microscope slides, etc. for study of regional relationships. Histophysiological correlations of body systems are discussed in lectures. *Prerequisite:* Departmental permission. Four hours. Young.

197, 198 Undergraduate Research Individual laboratory research under the guidance of a faculty member. *Prerequisite:* Departmental permission. Three or six hours. Staff.

201 Human Gross Anatomy (3-6) Lectures and detailed regional dissections emphasize functional anatomy of major systems (e.g. musculoskeletal, cardiovascular, nervous). Required for Physical Therapy students; others upon departmental permission. Five hours. Kriebel.

202 Human 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, microscopic slides. Required for Physical Therapy students; others upon departmental permission. Three hours. Schwaber.

Animal Pathology

COLLEGE OF AGRICULTURE

Professor Bolton (Chairman); Associate Professor Murray; Extension Professor Wadsworth; Associate Animal Pathologist Kunkel.

105 Animal Anatomy Gross and microscopic structure of the organ systems of the mammalian body with emphasis on farm animals. Three hours. Murray.

106 Animal Diseases Fundamentals of disease recognition and prevention in domestic animals. Special disease problems in cattle and

horses with emphasis on control measures. *Prerequisite*: 105 recommended. Three hours. Murray.

110 Wildlife Diseases Common diseases and parasitic problems of large game animals, small fur-bearing animals, waterfowl and game birds. Autopsy techniques and diagnostic laboratory procedures. *Prerequisites*: Two courses in biology or zoology. Three hours. Bolton. Alternate years, 1978-79.

195, 196 Special Topics Departmental permission required. 1-3 credit hours.

197, 198 Senior Research Work on a research problem under the direction of a qualified staff member. Findings submitted in written form as prescribed by the department. *Prerequisite*: Senior standing. Three hours.

Animal Sciences

COLLEGE OF AGRICULTURE

Professors Atherton, Balch, Carew, Duthie, Nilson, Smith (Chairman), and Welch; Associate Professors Foss and Simmons; Assistant Professor Gilmore; Extension Professors Mercia and Woelfel; Extension Associate Professors Gibson and Leamy.

1 Introductory Animal Science (3-3) Fundamental principles of anatomy, physiology, nutrition, breeding and management of animal species important in our agricultural economy. Four hours. Smith, Staff.

33 Introductory Dairy Technology (2-3) Basic information on milk and milk products and application of this information in laboratory exercises. Three hours. Duthie.

43 Fundamentals of Nutrition I, II A comprehensive study of specific nutrients in terms of their availability, function, utilization, and requirements in mammalian species. Three hours. Carew.

44 Dairy Cattle Selection (2-3) Fundamental principles of dairy cattle selection and breeding. Three hours. Gibson.

104 Dairy Testing and Quality Control (2-3) Composition and properties of milk products. Standard methods of bacteriological and chemical analysis and their significance in product quality. Three hours. Atherton.

109 Food Microbiology (2-3) Desirable and undesirable activities of microorganisms in foods. Laboratory methods in quality control. Microbial contamination, food spoilage, and food-borne disease. Three hours. Atherton.

114 Manufactured Dairy Products (2-3) Methods and technical problems in manufacturing milk products such as cheese, butter, evaporated and dry milks. *Prerequisites*: 33, Junior standing. Three hours. Nilson. Alternate years, 1979-80.

120 Sensory Evaluation of Foods (1-4) Taste and odor as basic components of flavor, sensory tests for consumer acceptance studies and practical training in flavor identification. Three hours. Duthie.

131 Qualitative Genetics of Domestic Animals and Cultivated Plants (3-2) An introductory course in qualitative genetics. Examples from

familiar species are used to demonstrate the principles of inheritance. Prerequisite: Botany 4 or Zoology 9 or equivalent. Four hours. Gilmore.

140 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.

153 Milk Processing (2-3) Technical aspects of processing fluid milk and fluid milk products. Prerequisite: Departmental permission. Three hours. Nilson. Alternate years, 1978-79.

158 Introduction Avian Biology (3-3) Designed for students with general interests in biology. Topics — Evolution, comparative structure and function, behavior, migration and orientation, flight, identification, population regulation. Four hours. Foss.

171 General Physiology An intermediate course, especially designed for the biology student to increase his knowledge of animal functions at the organ system level in mammals. Prerequisite: Animal Pathology 105 or equivalent. Three hours. Foss.

177 Livestock Production (2-3) Organization and operation of livestock enterprises. Theory and application of feeding, breeding and management programs and principles. Prerequisite: 140. Three hours. Welch.

187, 188 Light Horse Production and Management (2-3) The problem of light horse production. Application of the principles of selection, management and horsemanship. Prerequisites: 187 or 188; Junior standing. Three hours. Balch.

190 Poultry Production (2-3) Organization and operation of poultry enterprises. Theory and application of feeding, breeding and management programs and principles. Prerequisite: 140. Three hours. Mercia.

197, 198 Undergraduate Research Research activity under the direction of a qualified staff member. Findings submitted in written form as prescribed by the department. Prerequisites: Junior standing and department permission. Three hours. Staff.

211 Ice Cream and Frozen Dairy Products (2-3) Fundamentals of ice cream manufacturing, the physico-chemical and biological factors involved; calculation of formulas; sherbets and specialties; merchandising; sanitary control. Prerequisites: 104; credit or concurrent enrollment in 109; Junior standing. Three hours. Nilson. Alternate years, 1979-80.

232 Quantitative Genetics in Animal and Plant Improvement Principles of quantitative and statistical genetics including systems of mating and forces which change gene frequency are studied in relation to animal and plant breeding. Prerequisites: Introductory course in genetics, Stat. 111 or permission of instructor. Three hours. Gilmore.

245 Nutritional Biochemistry (See Home Economics 245). Three hours. Tyzbir.

246 Advanced Nutrition (See Home Economics 246). Three hours. Tyzbir.

249 Nutrition Seminar (See Home Economics 249). Three hours. Tyzbir and Carew.

250 Dairy Cattle Management (2-3) Organization and operation of dairy enterprises. Theories and methods of application of feeding, breeding, and management programs and principles. Prerequisite: 140. Three hours. Woelfel.

256 Dairy Plant Management (2-3) Organization and operation of milk

processing and manufactured milk products plants. *Prerequisites:* 153, Ag. Ec. 62; Junior standing. Three hours. Nilson.

270 Endocrinology (3-3) Anatomy, physiology, glandular interrelationships, and assay methods of the endocrine glands and their hormones. *Prerequisite:* Departmental permission. Four hours. Simmons.

275 Physiology of Reproduction and Lactation (2-3) Fundamental principles of the physiology of reproduction and lactation with the primary emphasis on farm animals. Three hours. Simmons.

281, 282 Animal and Dairy Science Seminar Reports and discussions of problems and special investigations in selected fields. One-three hours. Maximum credit two hours senior, three hours graduate. Smith.

291 Special Problems in Animal and Dairy Science Reading, discussion, and special laboratory investigation in the field of animal and dairy science. *Prerequisite:* Departmental permission. A student may enroll more than once for a maximum of six hours. Staff.

294 History of Nutrition (See Home Economics 294). One hour. Smith & Schlenker.

Anthropology

COLLEGE OF ARTS AND SCIENCES

Professor Mitchell (Chairman); Professor Haviland; Associate Professor Magnarella; Assistant Professors C. Pastner, S. Pastner, Woolfson, Power; Instructor McGough.

21 Human Cultures The culture concept; the lifeways of non-Western societies of varying social complexity. Three hours. McGough.

24 Introduction to Prehistoric Archaeology The origins and antiquity of culture; the nature of archaeological data and interpretation. Three hours. Power.

26 Physical Anthropology An introduction to the study of the evolution and racial differentiation of humanity. Three hours. Haviland.

50 Language in Culture This course is designed to provide background in linguistic anthropology. Three hours. Woolfson.

51 Field Methods in Linguistics Training in the Anthropological methods of obtaining linguistic data. Each student will work with an informant whose native language is other than English. At the end of the semester, each student will present a phonemic inventory of the pertinent sounds in the language he or she has explored. *Prerequisite:* 50 or Linguistics 101. Woolfson.

160 North American Indians An ethnographic survey of the major native American cultures of Mesoamerica and the United States against the background of aboriginal culture history, and problems arising from contact with European cultures. *Prerequisite:* 21. Three hours. Haviland.

161 Cultures of South America An ethnographic survey of the major native American cultures south of Mesoamerica against the background of aboriginal culture history, and their relation to the present day culture spheres of Euro-America, Indo-America and Plantation America. *Prerequisite:* 21. Three hours. Haviland.

162 Cultures of Africa An ethnographic survey of representative native societies of sub-Saharan Africa and of major colonial/immigrant minorities. Emphasis is placed on changes occurring as results of colonialism, independence and modernization. Prerequisite: 21. Three hours. C. Pastner, S. Pastner, Power.

163 Cultures of Oceania A survey of the ethnography and cultural history of the major cultural areas of Oceania, viz., Australia, Melanesia, Micronesia and Polynesia. Prerequisite: 21. Three hours. Mitchell.

165 Peoples of South Asia The culture and social organization of the peoples of Pakistan, India, Bangladesh and Sri-Lanka. Theoretical issues in the anthropological analysis of these societies will be discussed. Prerequisite: 21. Three hours. S. Pastner.

166 Peoples of the Middle East A cultural survey of the peoples living in the lands from Egypt to Afghanistan with emphasis on the Arabs, Turks and Persians. Prerequisite: 21. Three hours. Magnarella.

167 Native and Contemporary Peoples of Canada An exploration of the cultures of Canada's minorities — both native and immigrant; focuses on the background traditions of these minorities and the cultural conflicts engendered in the Canadian experience. Prerequisite: 21, or Geography 102, or History 214, or History 216. Three hours. Woolfson.

170 Pastoral Peoples An examination of the social and economic organization of peoples whose main livelihood is the migratory herding of animals, against a backdrop of environmental pressures and participation in larger social systems. Prerequisite: 21. Three hours. S. Pastner.

172 Women, Society and Culture A cross-cultural treatment of women which emphasizes the interrelationships between female status, social organization and ideological systems. Prerequisite: 21. Three hours. C. Pastner.

175 Ethnography of Art The analysis of the art of tribal and non-western peoples, with emphasis on the visual arts of Africa, Oceania and North American Indians. Particular attention is paid to the relation of art to social organization and ideological systems. Prerequisite: 21. Three hours. C. Pastner.

180 Cultural Ecology Interrelationships of social groups and their natural environments and resource bases, with primary emphasis on non-industrial cultures. Empirical and theoretical materials from hunting-gathering, pastoral and peasant peoples will be examined from the perspectives of anthropology and geography. Prerequisite: 21 or Geography 11. Three hours. Gade, S. Pastner (team taught).

185 College Culture The exploration and study of college student culture through the literature and the application of anthropological research techniques. Topics covered include: student living arrangements and the socio-cultural and personal use of space; ethnographies of college cultural scenes; student social networks and their determinants; and, the formation and character of student peer groups and communities. Prerequisite: 21 or Sociology 10. Three hours. Magnarella.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

212 Culture and Personality The cross-cultural comparison of personality development; the problem of delineating modal personality types. Prerequisites: Sociology 10, Anthropology 21 and one 100 level course in Sociology or Anthropology. Three hours. Mabry, Magnarella, Steffenhagen.

225 Current 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. Included are Evolutionism, Cultural Ecology, Functionalism, Relativism, Diffusionism, Structuralism and the Cognitive school. *Prerequisites:* 21 plus one 100 level course. Three hours. Magnarella, S. Pastner, C. Pastner.

228 Social Organization The study of social relationships of peoples living in various cultures and in different parts of the world; focuses on such topics as residence, descent and kinship in tribal organization and community life. *Prerequisites:* 21 and one 100 level course. Three hours. Magnarella, Mitchell.

229 Political and Economic Anthropology The analysis of traditional exchange and subsistence systems and the ways these relate to interest-based, or political behaviors. *Prerequisite:* 21 and one 100 level course. S. Pastner.

262 Cultural Geography (Same as Geography 262).

267 The Franco Americans A seminar designed to explore the cultural patterns of the French speaking peoples in New England, with particular reference to Vermont. Attention is paid to persistence and change in traditional French Canadian Society and Culture in New England. Individual research projects are required. *Prerequisite:* Permission of instructor. Three hours. Woolfson.

270 Revitalization Movements An examination of prophetic, millenarian and revolutionary sects and movements with an emphasis on non-western, non-industrial societies. Specific movements will be viewed in their cultural context. Analytical perspectives will be drawn from a variety of disciplines. *Prerequisites:* 21 and one advanced course in Anthropology, Sociology or Religion. Three hours. S. Pastner.

283 Culture Change The study of Socio-cultural transformations in non-western countries with emphasis on such topics as industrialization, urbanization and modernization and their impact on the lives of previously traditional peoples. *Prerequisites:* 21 and one 100 level course, or 21 and six hours in the social sciences. Three hours. Magnarella.

284 Urban Anthropology The study of urbanization and urban life in non-western countries including such topics as urban-rural ties, peasant migrations, and socio-cultural adjustment to urban living. *Prerequisites:* 21 and one 100 level course, or 21 and six hours in the social sciences. Three hours. Magnarella.

290 Methods of Ethnographic Field Work Examination of the theoretical and ethical premises of field work methodology with practical experience using selected techniques including participant observation, interviewing, the genealogical method and the recording of data. *Prerequisite:* Twelve hours of anthropology. Three hours. Mitchell.

295, 296 Advanced Special Topics *Prerequisites:* 21 and one 100 level course.

Area and International Studies

COLLEGE OF ARTS AND SCIENCES

Executive Committee: Professors Ambrose, Dellin, Gade, Kinnard (Director), Miles, Seybolt, Thompson, and Mr. Pilachowski.

Asian Studies: Professors Alnasrawi, Andrews, Davison, Engroff, Gussner, Little, Magnarella, McGough, Mitchell, C. Pastner, S. Pastner, Schmidt, Seybolt (Director), Sugarman, Vandermeer, and Yadav, Messrs. Dunlop and Pilachowski.

Canadal Studies: Professors Baskerville, Benoit, London, Metcalfe, Miles (Director), Shiman, Stanfield, Thompson, and Woolfson, Miss Crane.

European Studies (Western, Northern, Mediterrean): Professors J. Ambrose, P. Ambrose (Director), Andrea, Barnum, Bradley, Bryan, Chapman, Davison, Dellin, Dickerson, Finney, Fengler, Howe, Hutton, Kinnard, Lewis, Martin, Metcalfe, Moneta, Paden, Richel, Roland, Stephany, Ugalde, Wesseling, Whitebook, and Yarian, Mr. Buechler, Mrs. Pillsbury.

Latin American Studies: Professors Doolan, Dowe, Finney, Gade (Director), Haviland, Sargent, Simon, Spinner, Stone, True, Ugalde, Waitkin, Weiger, and Zarate.

Russian and East European Studies: Professors Daniels, Dellin (Director), Mabry, Meeks, Nalibow, Pacy, Pagunuzzi, Pomar and Staron.

General and Other Colleges: Professors Fritz, Hilberg, Julow, Schmokel, Stone, Tremblay, Vogelmann, and Webster.

91 Introduction to Area

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

297, 298 Seminar Conducted by a team of area specialists and covering selected topics through interdisciplinary and comparative approaches. **Prerequisite:** Permission by the executive committee of Area Studies. Other area courses are offered by the individual academic departments. For specific requirements for each area, consult the Director of the appropriate program.

Art

COLLEGE OF ARTS AND SCIENCES

Professor Janson; Associate Professors Davison, Hewitt (Acting Chairman), Lipke, Owre; Assistant Professors Blasdel, Fengler, Higgins, Okino, Rindler, Roland; Instructor Spivak; Lecturers Aschenbach and Parris.

Studio Art

1 Introductory Studio Introduction to visual thinking and awareness, projects focusing on basic concepts of two- and three-dimensional objects and images. Assignments and media vary with instructor. Three hours. Staff.

2 Basic Drawing The structure and reconstruction of visual experience through drawing, and the transformation of three-dimensional experiences on to a two-dimensional surface. Assignments and media vary with instructor. Three hours. Staff.

3 Two Dimensional Studies Primary concern with surfaces and imagery utilizing various aspects, depending on instructor, of painting, drawing, graphics and photography. Three hours. Staff.

4 Three Dimensional Studies Exploration of manipulative materials

and structural form, utilizing various aspects, depending on instructor, of sculpture and construction. Three hours. Staff.

Note: Art 1 will be closed to students with more than one of 2, 3, 4, while 3 or 4 may in certain cases be taken more than once if with a different instructor.

11 Introduction to Fine Metals Emphasizes design in the third dimension. The basic metal fabrication techniques, soldering, forming, forging, fusing, and casting will be covered. Drawing is required. Three hours. Spivak.

13 Introduction to Ceramics Basic design and practice in ceramics. Hand-built and thrown forms, firing and glazing. Three hours. Okino.

21 Drawing An intense investigation of drawing and elements that relate to the discipline. The figure will be used to introduce drawing exercise dealing with contour, gesture, color, and compositional geometry. Prerequisite: 2. Three hours. Owre.

22 Drawing An intense investigation of drawing and elements that relate to the discipline. The emphasis will be on conceptual method, contemporary techniques and both objective and non-objective source material. Prerequisite: 2. Three hours. Owre.

111, 112 Fine Metals A continuation of fine metals fabrication with work in chasing, casting, stone setting, and more complex methods with more emphasis on design. Prerequisites: 4. Three hours. Spivak.

113, 114 Ceramics Advanced techniques in throwing and hand-building. Clay and glaze technology, kiln theory and construction. Prerequisite: 4. Four hours. Okino.

121, 122 Painting Painting is examined as a traditional and contemporary act of exploring individual perception. Emphasis on organizing drawing, color and content. Prerequisites: 1 or 2, and 3. Three hours. Staff.

131 Printmaking: Etching A course in printmaking stressing control and manipulation by working a design into metal by the corrosive action of acid. Prerequisites: 1 or 2, and 3. Four hours. Davison.

132 Printmaking: Silkscreen A course in printmaking stressing control and manipulation of glue, tusche, stencil and photo as methods of resist. Prerequisites: 1 or 2, and 3. Four hours. Davison.

133, 134 Printmaking: Lithography Planographic printing, and lithography, stressing design and technical control. Prerequisites: 1 or 2, and 3. Four hours. Davison.

137, 138 Photography An introduction to photographic processes as methods of seeing, on visual discovery through informed manipulation of materials. Prerequisite: 3. Three hours. Higgins.

141, 142 Sculpture Advanced explorations of manipulative materials. Prerequisites: 4 and one of 2, 21, 22. Three hours. Aschenbach.

147 Visual Environment An exploration of public spaces, structures, architectural detail, landscaping, roadways, lighting, etc. Field trips; meetings with planners, and architects; projects. Prerequisites: 1 or 2 and 3 or 4. Three hours. Owre.

193 College Honors

195 Special Topics

197 Reading and Research Prerequisite: Departmental permission. Three hours. Staff.

281 Directed Studies Individual or group studies in a special area. Prerequisites: Six hours advanced in the chosen area and permission. Three hours. Staff.

Art History

5, 6 Art History Painting, sculpture, and architecture in the western world. First semester: Egyptian through Gothic; second semester: Renaissance to the present. *Prerequisite:* 5 or 6. Three hours. Fengler, Roland.

7 Architecture An introduction to architecture, its changing form, structure, and purpose from antiquity to the present. Three hours. Janson. Alternate years.

9 Visual Studies A non-historical examination of visual experience, artifacts, buildings and environment, and the distinction between aesthetic and ordinary visual data. Three hours.

51 Greek Art History of art in Greek lands in ancient times. Emphasis on sculpture, architecture, and vase painting. *Prerequisite:* Sophomore standing. Three hours. Schlunk.

52 Roman Art Development of Roman art styles out of Greek forms. *Prerequisite:* Sophomore standing. Three hours.

153 Medieval Art to the Year 1000 Painting, sculpture and architecture from the Early Christian through the Ottonian periods, with emphasis on Byzantine and Carolingian art. *Prerequisite:* 5. Three hours. Roland. Alternate years, 1978-1979.

154 Medieval Art from the Year 1000 Painting, sculpture and architecture of the Byzantine, Romanesque, and Gothic periods. *Prerequisite:* 5. Three hours. Roland. Alternate years, 1979-1980.

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, Durer, Bosch, and Bruegel. *Prerequisite:* 6. Three hours. Fengler.

161 Italian Renaissance Art Painting, sculpture and architecture in Italy, 1400-1600. *Prerequisite:* 6. Three hours. Fengler.

167 Baroque Art in Southern Europe The art of Italy, France, and Spain in the 17th Century, with emphasis on the sculpture of Bernini, the architecture of Versailles, and the paintings of Carracci, Caravaggio, LaTour, Poussin, Zurbaran, and Velazquez. *Prerequisite:* 6. Three hours. Roland. Alternate years, 1979-1980.

168 Baroque Art in Northern Europe The art of the Netherlands, Flanders, and England in the 17th Century, with emphasis on the paintings of Rembrandt, Vermeer, Rubens, and Van Dyck. *Prerequisite:* 6. Three hours. Roland. Alternate years, 1978-1979.

171 Rococo and Romantic Art European architecture, sculpture, and painting, circa 1700-1850, and the origins of the modern movement. *Prerequisite:* 6. Three hours. Roland.

172 Modern European Painting The major French, English, and German developments in painting from Realism to Surrealism, 1850-1940. *Prerequisite:* 6 or 9. Three hours. Lipke

175 19th-Century Architecture Building and design from the late 18th Century to the end of the 19th, as shaped by architects, engineers, and entrepreneurs. *Prerequisite:* 6 or 9. Three hours. Janson.

176 20th-Century Architecture Building and design since 1900. Visits with architects and to modern buildings in the area. *Prerequisites:* 6 or 9. Three hours. Janson.

179 Art Since 1945 Recent American painting and sculpture, and parallel developments in Europe. *Prerequisite:* 172, advanced studies in studio, or permission. Three hours.

181 American Painting Painting in America from Colonial Times to 1945. Use of the Fleming and Shelburne Museum collections. *Prerequisite:* 6. Three hours. Lipke.

184 American Architecture The Colonial Period to Frank Lloyd Wright. Research on buildings of historical interest in the area. *Prerequisite:* 6 or 9. Three hours. Janson.

194 College Honors

196 Special Topics

198 Readings and Research *Prerequisite:* Departmental permission. Three hours.

207 Studies in American Art Selected topics in American art and architecture, individual research and reports. *Prerequisite:* By permission to students of Art History, American History or Literature. Three hours. Janson.

210 Studies in Modern Art Topics in 19th and 20th century art, individual research and reports. *Prerequisites:* 105 or 6 and 54, and permission. Three hours. Roland.

224 Architecture and the Environment (See History 201) *Prerequisites:* Six hours advanced in art and architecture, and permission. Three hours. Liebs.

282 Seminar in Art History Group studies in a special area. *Prerequisites:* Six hours advanced, three in the chosen area and permission. Three hours.

285, 286 Museum Studies Museum methods as concerning the research, care and administering of a collection, aesthetic insight and the communication of ideas. *Prerequisites:* Junior standing and permission. Three hours. Parris.

Biochemistry

COLLEGE OF MEDICINE

Professors Bresnick (Chairman), Lamden, Melville, Thanassi, and Woodward; Associate Professors Cutraneo and Meyer; Assistant Professors Cidrowski and Hart.

102 Biochemical Analysis (2-4) Lectures, conferences, and laboratory exercises concerned with the theory and techniques of importance in the quantitative analysis of biological materials. Primarily for students of medical technology but open to others with permission of the department chairman. *Prerequisite:* Chemistry 1-2. Four hours. Lamden.

191, 192 Undergraduate Research Participation in a research program currently being pursued by a faculty member of the Department. A written report is due at the end of each semester. *Prerequisites:* Chemistry 1, 2 or 11, 12. Some programs may require additional courses in chemistry. Credit as arranged, up to 4 hours per semester. Staff.

211-212 Biochemistry for Health Sciences (2-4) Primarily for medical technology students. Lectures provide a comprehensive study of mammalian biochemistry particularly as it relates to man. Medically-oriented ex-

periments utilizing modern clinical chemistry techniques are performed in the laboratory. Case studies from the files of the MCHV are used to correlate lecture and laboratory material. *Prerequisites:* 102 or quantitative chemistry; organic chemistry. Physiology is strongly recommended. Four hours per semester. Hart.

Botany

COLLEGE OF AGRICULTURE

Professors Hyde, Klein and Vogelmann (Chairman); Associate Professors Cook, Ether-ton and Worley; Assistant Professors Barrington and Ullrich; Extension Associate Pro-fessor Laing; Extension Assistant Professor Gotlieb; Research Assistant Professor Lin-tilhac; Research Associate Morselli.

Biology

1, 2 Principles of Biology (3-3) Introduction to structure, functions, and evolution of animals and plants. Concepts important for advanced study in a Life Science and for understanding the biological world. *Prerequisite:* 1 or 2. Four hours. Barrington and Davison.

255 Structure and Function of Chromosomes Advanced analysis of recombination in eucaryotes. Arrangement of DNA and proteins in chromosomes. DNA duplication and mapping of certain DNA regions. Molecular nature of meiotic processes and control of gene expression with particular reference to the nucleolus. *Prerequisites:* Biology 101; Chemistry 16 or 131, 132. Three hours. Hyde.

Botany

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. Four hours. Klein.

6 The Green World An 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 the program distribution requirements. Three hours. Klein.

101 Genetics (see Zoology, 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:* 4 or Biology 1, 2; one semester of organic chemistry, one semester of physics, or permission of the instructor. Four hours. Ether-ton.

107 Algae, Fungi, and Bryophytes (3-3) Structure, reproduction, and evolutionary relationships of the non-vascular plants; ecological roles and economic significance; field identification and culture techniques. *Prere-quisites:* 4 or Biology 1, 2. Four hours. Cook.

108 Morphology and Evolution of Vascular Plants (3-3) An evolu-tionary survey of living and fossil vascular plants with emphasis on mor-phology and geography. Discussion of pertinent literature on phyto-

chemistry, genetics, and ecology. *Prerequisites*: 4 or Biology 1, 2. Four hours. Barrington.

109 Systematics and Phylogeny (2-4) 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. Vogelmann.

117 Plant Pathology (3-2) Diagnosis, life history and control of plant diseases caused by fungi, viruses, bacteria, nematodes, parasitic higher plants and environmental factors. Physiology, biochemistry and genetics of host-parasite interaction. *Prerequisite*: 4 or Biology 1, 2. Four hours. Ullrich.

149 Maple Science and Practice (1-2) Ecology, anatomy, physiology, pathology, and propagation of the maple tree; sap and syrup chemistry. Maple industry problems and potentials including sap gathering, syrup production, methodology and marketing. Field trips to UVM Maple Research Farm. *Prerequisites*: 4 or Biology 1, 2; Chemistry 3 or 1, 2; or permission of the instructor. Two hours. Morselli and Laing. Alternate years, 1978-79.

Credit will not be given for both Biology 1, 2 and Botany 4 or Zoology 9. Credit will not be given for both Biology 1, 2 and Biology 3. Botany and Zoology majors will not receive credit for Biology 3.

152 Plant Anatomy and Histology (2-2) Development of the organism and accompanying integration of cellular tissues. Ontogeny of vegetative tissues; modifications of the cell wall. *Prerequisite*: 4 or Biology 1, 2. Three hours.

160 General Ecology Analysis of the environment and its effects upon organisms; interrelationships among organisms; ecological adaptations. *Prerequisite*: 4 or Biology 1, 2. Three hours. Worley.

162 General Ecology Laboratory (0-3) Field work and experiments to illustrate concepts presented in Botany 160. *Prerequisite*: Previous or concurrent enrollment in 160. One hour. Worley.

197, 198 Undergraduate Research and Apprenticeships Individual projects under the direction of a faculty member. The project may involve original research, readings, or apprenticeships. *Prerequisite*: Junior standing. Three to six hours.

205 Mineral Nutrition of Plants Role of essential elements for plant growth including classical and modern approaches to the study of ion availability and transport. *Prerequisite*: 104. Three hours. Etherton and Bartlett. Alternate years, 1978-79.

207 Water Relations of Plants (see Forestry 207).

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. Vogelmann.

232 Botany Field Trip Trips to selected environments outside Vermont. Led by several faculty members representing different fields of Botany. Overall, integrated approach to ecology, structure, and function. One hour. Christmas or spring vacation or end of school year.

234 Ecology of Freshwater Algae (2-3) Environmental factors influencing the distribution and seasonal succession of freshwater algae of lakes, ponds, and streams; quantitative methods for estimating standing crop productivity; kinetics of algal growth; competitive and synergistic interactions. *Prerequisite*: 160 or Biology 102. Three hours. Cook. Alternate years, 1978-79.

250 Microtechnique (1-4) Theory and practice in the preparation of biological materials for anatomical and cytological study, including histochemistry and photomicrography. *Prerequisites:* Introductory Chemistry; some knowledge of organic chemistry, anatomy, or cytology is desirable. Three hours. Cook. Alternate years, 1979-80.

252 Experimental Biology of the Lower Eukaryotes Studies in selected attributes of fungi, algae and protozoans; physiology, metabolism, cell structure, growth, development and genetics; emphasis on critical thought and experimental design, the unity of life processes and important exceptions. *Prerequisite:* Permission of the instructor. Three hours. Ullrich. Alternate years, 1978-79.

254 Experimental Biology Laboratory (0-3) Independent projects designed to exploit the experimental utility of lower eukaryotes. *Prerequisites:* 252 or concurrent enrollment and permission of the instructor. One hour. Ullrich. Alternate years, 1978-79.

257 Physiology of the Plant Cell (3-2) Detailed study of photosynthesis, plant cell membrane function, and plant cell growth. *Prerequisites:* Botany 104, Chemistry 131, 132 or Chemistry 16, Physics 11, 12 or 15, 16. Four hours. Etherton. Alternate years, 1979-80.

259 Plant Growth and Development (3-3) Chemical and physical factors regulating growth and development of plant tissues and the plant body. Morphogenesis and differentiation. *Prerequisites:* 104, departmental permission. Four hours. Klein. Alternate years, 1979-80.

281, 282 Botany Seminar Presentations of personal research by faculty and graduate students from within and outside the University. May be jointly sponsored with related departments. Required attendance of botany graduate students and seniors in botanical research programs. Without credit.

295 Special Topics Courses for advanced students within areas of general expertise of faculty and staff. Various aspects of ecology, physiology, genetics, cytology, bryology, pteridology, paleobotany, photobiology, membrane physiology, and cell biology. *Prerequisite:* Permission of the department.

Business Administration

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION
Professors Greif, Laber, Nyquist and Severance (Chairman); Associate Professors Gatti, Kaplan, Michael, Schermerhorn, Shirland, Squire and Tashman; Assistant Professors Antil, Battelle and Parke; Adjunct Instructors Erdmann, and Kittell.

Business Environment and General Business

17, 18 Business Law First semester: concepts of law as related to business, including law of contracts, sales, bailments, and negotiable instruments. Second semester: business and laws of agency, partnerships and corporations. Three hours. Erdmann, and Kittell.

133 Government and Business The role of government in the private

sector. Emphasis is placed on the problem of industrial concentration, the history and enforcement of anti-trust legislation, and the conflicting goals of economic efficiency and political feasibility. Prerequisite: Economics 12. Three hours. Squire.

191 Business Policy A variety of important managerial decision questions are examined. The viewpoint is global rather than functional. Problems addressed include make or buy, plant location, product addition, and expansion. Prerequisite: Senior standing. Three hours. Staff.

195, 196 Special Topics

197, 198 Independent Study

293, 294 Special Projects

295, 296 Special Topics

297, 298 Independent Study

Accounting

60 Financial Accounting (3-2) An introduction to generally accepted accounting principles and techniques regarding corporations, partnerships and proprietorships, as they apply to income determination and financial position presentation. Four hours. Staff.

61 Managerial Accounting (3-2) An introduction to the use of accounting for planning, cost behavior and control, and decision making. Prerequisite: 60. Four hours. Staff.

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: 61 for 161; 161 for 162. Three hours. Battelle.

164 Introduction to Federal Taxation An examination of the Internal Revenue Code primarily regarding income tax law for individuals, and partnerships. Corporate, and trust tax law will be introduced. Prerequisite: 60. Three hours. Staff.

168 Cost Accounting Accounting for inventory valuation and income determination, non-routine decisions, policymaking and long range planning. Prerequisite: 61. Three hours. Staff.

265 Accounting Theory Study of underlying concepts, principles and structure of accounting theory. Topics covered include financial accounting standards, opinions of the APB, professional literature and current applications. Prerequisite: 162. Three hours. Battelle.

266 Advanced Accounting Accounting for partnerships, special sales contracts, parent-subsidary relationships, fiduciary relationships and governmental units. Prerequisite: 162. Three hours. Staff.

267 Auditing Study of the C.P.A. as an independent auditor. Topics covered include standards, ethics and legal responsibilities of the profession, financial statements, audit concepts and techniques, and the audit opinion. Prerequisite: 266. Three hours Battelle.

269 C.P.A. Problems Review of questions and problems from past C.P.A. examinations coupled with a study of the Opinions of the Accounting Principles Board. Prerequisite: 266. Three hours. Staff.

Financing and Banking

180 Managerial Finance I The financial function in the corporation is described. Techniques for evaluating current use of resources and proposed resource acquisition or dispositions are covered. Fund raising and disbursement practices are studied. Prerequisites: 61, 144, Economics 12; Junior standing. Three hours. Laber.

181 Issues in Financial Management This course examines several key areas of financial decision making. With the aid of cases and problems, issues such as risk and return, capital structure, and valuation of assets will be examined in the context of capital budgeting decisions, leasing questions, mergers and acquisitions, and public utility regulation. *Prerequisite:* 180. Three hours. Laber.

182 Security Valuation and Portfolio Selection An examination of the theories and evidence on the behavior of financial asset prices and rational portfolio selection. *Prerequisites:* 144, 180. (184 recommended.) Three hours. Gatti.

184 Financial Institutions and Markets Financial institutions and credit allocation, determinants of the level and term structure of interest rates, and characteristics of financial institutions and markets. *Prerequisites:* 60, 144, Economics 12; Junior standing. Three hours. Gatti.

185 Commercial Bank Management Problems facing bank managers are examined and solution techniques developed. Specific topics include asset selection, liability management, bank accounting systems, and the regulatory system. *Prerequisite:* 184. Three hours. Severance.

281 Municipal Finance An examination of the issues and policy options facing the financial administrators of municipal governments. Topics include property and non-property taxation, debt and cash management, budgeting, expenditure and revenue forecasting, and intergovernmental aid programs. *Prerequisite:* 180. Three hours. Tashman.

283 International Financial Management Theories and practices of international financial management are examined. Topics investigated include: systems of international exchange, spot and forward markets and expropriation and exchange risk as parameters in investment and financial decisions. Cases used. *Prerequisites:* 180, 184. Three hours. Staff.

Management

140 Introduction to Decision Making Under Uncertainty Probability models as applied to the optimal choice among alternative actions or strategies when outcomes are uncertain. Sample information is handled using Bayesian techniques to revise prior probability distribution. *Prerequisites:* 40 or equivalent. Three hours. Staff.

170 Organizational Behavior An introductory course in organizational behavior focusing on ways through which individuals and work groups within organizations can be better utilized as organizational resources. *Prerequisite:* Three hours of Psychology or Sociology; Junior Standing. Three hours. Parke, Schermerhorn.

171 Personnel Management A survey of the management issues pertinent to the personnel function in organizations. Topics covered will include personnel problems, union-management relations, employee selection and training, job analysis and evaluation, compensation systems and employee health and security. *Prerequisite:* 170. Three hours. Parke.

173 Operations Analysis I A study of the methods used in the planning, analysis and control of production and service processes. Topic areas include forecasting, assurance, inventory, and systems analysis. *Prerequisite:* 40, 144; Junior Standing. Three hours. Shirland.

174 Operations Analysis II A study of the operations function in industrial and service organizations. Practical applications of planning, analysis, design and control are stressed. *Prerequisite:* 173. Three hours. Shirland.

175 Designs for Organizational Systems An examination of organiza-

tion theories for their structural and task design implications. An open systems perspective will be used to address such topics as organization efficiency/effectiveness, contingencies in structural design, matrix organization, and job design alternatives. *Prerequisite:* 170. Three hours. Parke.

176 Current Issues in Management and Organization Theory A modular course designed to provide participants with further exposure to both theory and practice in those areas of management and organization theory of current relevance. The one credit modules offered in this course will include such topics as job design, organization intervention and change, performance assessment and appraisal techniques, employee training and career development, compensation system design, union-management relations under collective bargaining, behavioral skills in management, the history of management thought, and research designs for organizational analysis. *Prerequisite:* 170, certain modules may also require 171. One to six hours in any one semester. Parke, Schermerhorn, and Squire.

242 Management Information Systems The problems of designing business information processing systems. Manual and computer based systems are evaluated in terms of cost versus effectiveness. Systems design and programming projects are undertaken using the COBOL language. *Prerequisite:* 42, 173. Three hours. Staff.

243 Quality Assurance Analysis and design of systems for obtaining quality in operations. Topic areas include measurements, inspection, economic design, product design. *Prerequisite:* 40, 144. Three hours. Shirland. (Not approved for graduate credit).

244 Applied Regression Analysis The nature and applications of basic regression-correlation models in investigating relationships, testing hypotheses and making predictions. Emphasis on the art of developing appropriate models and evaluating existing research. *Prerequisite:* 144, or Stat. 141 or 211. Three hours. Tashman.

245 Introduction to Operations Research Analysis, with emphasis on applications of business decision problems using mathematical modeling. Topics include mathematical programming, network analysis, and simulation. *Prerequisite:* 173. Three hours. Staff.

272 Discrete Simulation Development of discrete traffic simulation using monte-carlo techniques and the GPSS simulation processor; techniques for modeling dynamic traffic entities, fixed facilities, buffers, storage areas, queues, and control devices; mathematical modeling of traffic movement as a probabilistic, time-dependent process; analyses of state-control and feed-back control systems; simulation processor. *Prerequisites:* Stat. 111 or 141 or 151, and Senior or Graduate standing. Three hours. Dawson. (Not approved for graduate credit.)

Marketing Management and Sales Promotion

153 Personal Selling and Sales Management Personal selling as a communication activity. Behavioral sciences are explored. Sales Organization, coordination of related department functions, methods of selecting, testing, training, compensating and controlling are considered. Individual projects. *Prerequisite:* 154. Three hours. Greif.

154 Foundations of Marketing The place of marketing in our economy. Analysis of the market structure by function, institutions and commodities. Selected cases used to develop the analytical content of marketing. *Prerequisites:* Economics 12, Junior Standing. Three hours. Greif.

156 The Marketing Operations of Small Retail and Service Establishments An understanding of the primary elements of marketing

management involved in the practical planning and operating decision problems facing the retailer. *Prerequisite:* 154. Three hours. Staff.

157 Marketing Research The role of research in a marketing information framework. Emphasis on data collection methodology. *Prerequisite:* 40, 144 or 154. Three hours. Staff.

158 Fundamentals of Advertising Principles and techniques of copy, layout, media selection and campaign development. Actual preparation of advertisements. *Prerequisite:* 154. Three hours. Staff.

257 Consumer Behavior An exploration and evaluation of the body of research evidence from marketing and the behavioral sciences relevant to a theory of consumer behavior. Emphasis is also given to research methodologies employed. *Prerequisite:* 157. Three hours. Greif.

258 Current Marketing Developments Discovery and analysis of both internal and environmental changes affecting marketing theory and practice. Topics include: social change, functional and institutional marketing system change, and legislative and regulatory trends. Individual research projects required. *Prerequisite:* 154. Three hours. Greif.

259 Marketing Management 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. *Prerequisite:* 154. Three hours. Staff.

Quantitative Methods and Computers

40 Introduction to Quantitative Methods in Management See course Mathematics 18.

42 Introduction to Computing I (2-2) See course Computer Science 11.

144 Elements of Statistics (3-1) See course Statistics 111.

Chemistry

COLLEGE OF ARTS AND SCIENCES

Professors Allen, Brown, Chairman Bushweller, Flanagan, Krapcho, Kuehne, Strauss and Wulff; Associate Professors Geiger and Weltin; Assistant Professors Elliott, Gress, and Sayer.

Note: Credit cannot be given for: 1, 2 and also 11, 12; 3, 4 and also 1, 2; 140 and also 141, 142.

1, 2 Introductory Chemistry (3-3) The important principles, ideas and concepts of general chemistry. Either this course, or Chemistry 11, 12 should be elected by all student planning subsequently to take any 100 level course in chemistry. *Prerequisite:* 1 or 11 for 2. Four hours. Gress, Wulff.

3 Outline of General Chemistry (3-3) A one-semester course in the principles, ideas and concepts of general chemistry, with particular emphasis on those aspects of the subject of importance to the biological and health sciences. Four hours.

4 Outline of Organic and Biochemistry (3-3) A brief introduction to

some of the important and interesting aspects of organic and biochemistry. Credit cannot be granted for both Chemistry 4 and 16. *Prerequisite:* 1, 3, 5 or 11. Four hours. Sayer.

5 Concepts of Chemistry (3-3) A one-semester course in the principles, ideas and concepts of general chemistry for students in engineering programs. Four hours. Weltin.

7 Earth, Air, Fire and Water (3-3) An introductory course intended for non-science majors. It deals with man's chemical understanding of his surroundings. Concepts of energy, structure, and change as related to the observable universe. Emphasis on understanding topics of current interest and on the chemical interpretation of biological systems. Four hours. Staff. (Not offered in 1978-79 academic year).

11, 12 General Chemistry (3-6) Includes general experiments in elementary qualitative and quantitative analysis. Recommended for those concentrating in chemistry or physics. *Prerequisites:* One year of high school chemistry and concurrent enrollment in Mathematics 21 or 23 for Chemistry 11; Chemistry 11 for 12. Five hours. Allen.

13, 14 The Chemical Bond Nature of interatomic and intermolecular forces. Stereochemistry, bond energies, and crystal structures are considered. *Prerequisites:* 1, 2 or 11, 12. One hour. (Not offered in 1978-79 academic year.)

16 Introductory Organic Chemistry (3-3) A one-semester introduction to the more important and interesting aspects of organic chemistry. (Does not satisfy medical school entrance requirements regarding undergraduate preparation in organic chemistry.) Credit cannot be granted for both Chemistry 16 and 4. *Prerequisite:* Either 1, 3, 5 or 11. Four hours. Krapcho, Strauss.

123 Quantitative Analysis (3-3) Theory and practice of gravimetric and volumetric methods of analysis. Theoretical discussion of indicators, buffers, pH, etc. *Prerequisites:* 1, 2. Not open to students with credit for 11, 12. Four hours. Elliott.

131, 132 Organic Chemistry (3-3) Organic chemistry for chemistry majors, premedical students, and those concentrating in the biological and physical sciences. *Prerequisites:* 1, 2 or 11, 12; 131 for 132. Four hours. May be taken without laboratory for three hours credit by chemistry majors (Section C) who intend to enroll in 134 and 135. Kuehne, White.

134 Organic Chemistry Laboratory (0-6) Laboratory practice in organic synthesis with an emphasis on separation and purification procedures. Introduction to spectral methods of structure identification. Ordinarily taken by students in Section C of 131, 132 (Chemistry majors). *Prerequisite:* 131. Two hours. Sayer.

135 Advanced Organic Chemistry Laboratory (0-6) Chemical and physical methods of identifying organic compounds. Advanced synthetic and separation procedures. *Prerequisites:* 131, 134. Two hours. Kuehne.

140 Physical Chemistry for Biological Science Students Aspects of physical chemistry most pertinent to work in the biological sciences: acid-base equilibrium theory of solutions, thermodynamics and kinetics. *Prerequisites:* 2, Physics 16. Three hours. Weltin.

141, 142 Physical Chemistry Elementary quantum chemistry, introduction to statistical mechanics, thermodynamics, properties of solutions and chemical kinetics. *Prerequisites:* 2 or 12; Physics 16; Mathematics 123 or 121 for 141. Three hours. Weltin, Wulff, Flannagan.

201, 202 Advanced Chemistry Laboratory (1-8) Modern analytical, physical and synthetic techniques. Syntheses requiring advanced methods

such as controlled atmosphere box, autoclave, photochemical reactor, etc. Selected basic physical chemistry experiments. Development of techniques used for measurement of a variety of phenomena, e.g. thermochemistry, kinetics, electro-chemistry, spectroscopy. Students wishing to take one semester only may concentrate in a particular area of interest, such as instrumental analysis. *Prerequisites:* 11, 12 or 123; credit for or concurrent enrollment in 141 and 142. Four hours. Geiger.

212 Advanced Inorganic Chemistry Structure, bonding, and reactions of inorganic compounds. Ionic compounds, the lanthanides; theories of acids and bases; electron-deficient bonding; covalent bond chemistry; simple models for structure prediction; introduction to crystal field theory; substitution reactions of transition metal complexes. *Prerequisite:* 142 or equivalent. Three hours. Allen, Brown.

213 Advanced Inorganic Chemistry Application of symmetry concepts to inorganic chemistry; ligand field theory and electronic spectra; multiply-bonded systems; metal carbonyls; introduction to organometallic chemistry; biologically important inorganic complexes. *Prerequisites:* 212. Three hours. Allen, Brown.

223 Chemical Instrumentation The design and usage of modern instrumentation to facilitate chemical research. Selected laboratory studies in instrumentation and analysis. *Prerequisites:* 201, 202, or consent of instructor. Credit as arranged with maximum of four hours. Geiger. Offered as occasion warrants.

231 Physical Organic Chemistry-Principles Structure-reactivity relationships, molecular properties and their interpretation. Methods and results of investigations of mechanisms of common organic reactions. *Prerequisites:* 132, 142 or 247 or permission of instructor. Three hours.

235 Molecular Orbital Theory An introduction to the Huckel molecular orbital method. Energy levels and orbitals, molecular properties and their interpretation. Effects of substituents on electronic structure. Extensions of the Huckel method. *Prerequisite:* 132, 142, or equivalent. Three hours. Weltin.

242 Chemical Kinetics and Mechanisms Theoretical and experimental aspects of chemical kinetics. Use of kinetics to deduce mechanisms of organic and inorganic reactions. Gaseous reaction, catalysis, isotope and solvent effects, chain reactions and very fast reactions. *Prerequisites:* 141, 142. Three hours. Flanagan, Sayer.

246 Fundamentals of Spectroscopy A general discussion of molecular spectroscopy, rotational and vibrational states of molecules, symmetry of vibrations; introduction to electronic spectra. *Prerequisite:* 141, 142, Mathematics 124 or permission of the instructor. Three hours. Weltin. Alternate years.

247 Introduction to Quantum Mechanics General considerations of quantum mechanics. Development of techniques pertinent to the application of quantum mechanics to chemical problems. *Prerequisite:* 141, 142 or equivalent. Three hours. Weltin.

248 Chemical Thermodynamics Systematic study of the application of thermodynamics to chemical problems. Concepts of statistical thermodynamics to be introduced. *Prerequisite:* 141, 142 or equivalent. Three hours. Wulff.

249 Statistical Mechanics Development of statistical mechanics and its application to problems of chemical interest. *Prerequisite:* 141, 142 or equivalent; 247 recommended. Three hours. Flanagan. Alternate years.

251, 252 Advanced Organic Chemistry Detailed discussion of fun-

damental principles and reactions in organic chemistry. Stereochemistry, conformational analysis, ring strain, reactivity criteria in the main reaction classes, reaction mechanisms, and important synthetic methods are discussed. *Prerequisites:* 131, 132, credit for or concurrent enrollment in 141, 142, 251 for 252. Three hours. Kuehne, Krapcho.

271 Advanced Analytical Chemistry A systematic survey of modern methods of chemical analysis. Principles and applications of analytical and molecular spectroscopy, electrochemistry, and separation techniques. *Prerequisites:* 141, 142. Three credits. Geiger.

282 Organometallic Chemistry A systematic survey of the syntheses, properties, structures, bonding and reactions of organometallic compounds. Variation of the structure and stability of the metal-carbon bond throughout the periodic system. *Prerequisite:* 212. Three hours. Allen, Brown. Alternate years.

284 Physical Inorganic Chemistry Ligand field theory, magnetic properties, magnetic resonance techniques (NMR, ESR, and NQR), Mossbauer spectroscopy, and optical activity. *Prerequisites:* 213 or equivalent, 246 or permission of the instructor. Three hours. Alternate years. Allen, Brown.

Seminars are required of graduate students and seniors concentrating in chemistry.

184 Senior Seminar Oral and written presentation of a subject of current chemical interest. *Prerequisite:* Audit of 381. One hour. Staff.

197, 198, 199 Undergraduate Research Special study in inorganic, physical, or organic chemistry and with an assigned staff member. Findings submitted in written form. *Prerequisites:* 1, 2 or 11, 12 and departmental permission. Credit as arranged with a maximum of four hours per semester and twelve hours for the undergraduate program. 197 is offered in the fall, 198 in the spring, and 199 in the summer.

Classics

COLLEGE OF ARTS AND SCIENCES

Professors Ambrose (Chairman), Bliss, Davison, Gilleland, and Schlunk.

Greek

(There are no prerequisites to any Greek course. Students who have previously studied Greek should consult the department.)

1-2 Elementary Greek Four hours. Schlunk.

11, 12 Intermediate Greek Review of syntax. Readings from Plato, Herodotus, Euripides and Homer. Three hours. Gilleland, Davison.

111, 112 Prose Composition Required of students who concentrate in Greek. Greek 111: one hour. Greek 112: two hours.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

- 201 Greek Orators** Three hours. Gilleland. Alternate years, on demand.
- 202 Greek Comedy** Three hours. Ambrose. Alternate years, 1978-79.
- 203 Greek Historians** Three hours. Bliss. Alternate years on demand.
- 204 Greek Tragedy** Three hours. Ambrose. Alternate years, on demand.
- 205 Greek Philosophers** Three hours. Schlunk. Alternate years, on demand.
- 206 Greek Epic** Three hours. Bliss. Alternate years, 1978-79.

Latin

(There are no prerequisites to any Latin course. Students who have had two years of high school Latin normally enroll in Latin 9 or Latin 12. 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.)

1, 2 Elementary Latin For students who present less than two years of high school Latin. Four hours. Ambrose.

9 Basic Latin Grammar Review Extensive review of Latin syntax. Selections from prose writers. Three hours. Davison.

12 Intermediate Latin Selections from Vergil and Ovid. Three hours. Bliss.

101, 102 Survey of Latin Literature Selections from principal Roman authors. Three hours. Gilleland.

111, 112 Latin Prose Composition Required of students who major in Latin and of those who wish to be recommended to teach Latin. Latin 111: one hour. Latin 112: two hours. Schlunk.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

203 Republican Prose Three hours. Ambrose.

204 Epic Poets Three hours. Schlunk.

227 Roman Lyric Poets Three hours. Bliss. Alternate years, 1978-79.

251 Roman Letters Three hours. Bliss. Alternate years, on demand. (Not approved for graduate credit.)

252 Comedy Three hours. Bliss. Alternate years, on demand.

253 Roman Oratory Three hours. Gilleland. Alternate years, on demand.

255 Historians of the Empire Three hours. Davison. Alternate years, on demand.

256 Satire Three hours. Gilleland. Alternate years, 1978-79.

271 Silver Latin Three hours. Gilleland. Alternate years, on demand.

Courses entitled "Classics" are not foreign language courses.

All readings are in English and no prior knowledge of Greek and/or Latin is required.

Classics 22 Etymology* Derivation of English words from Greek and Latin bases. Training in analysis of unfamiliar words, special attention to scientific vocabulary. Three hours.

Classics 42 Mythology** Greek myth in literature, art, and music from antiquity to modern times. No prerequisites. Three hours. Spring semester. Ambrose.

Classics 153 Greek Drama Three hours. Gilleland. Alternate year, 1978-79.

Classics 154 Greek Historians Three hours. Alternate years, on demand.

Classics 155 Ancient Epic Three hours. Alternate years, on demand.

Classics 156 Greek and Roman Satiric Spirit Three hours. Alternate years, on demand.

* This course may be used towards the distribution requirement of the College of Arts and Sciences in category A as part of the non-foreign language courses.

**This course may be used toward the distribution requirements of the College of Arts and Sciences in either category A or B.

See also: Art 51 (Greek Art) and Art 52 (Roman Art); European Studies; General Literature 151 (Development of Prose Fiction); History 9 (Ancient Mediterranean Civilization), 105 (Ancient Near East), 106 (Greek History), and 107 (Roman History).

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.

Communication

COLLEGE OF ARTS AND SCIENCES

Professors Lewis, London, and Manchel; Associate Professor Worden; Assistant Professors Catt, Schultz, and Yadav (Acting Chairperson); Lecturer Orth.

Communication Studies

1 Introduction to Human Communication Three hours. I, II.

11 Effective Speaking Three hours. I, II.

14 Small Group Communication Theory and performance in small group communication, including preparation, language, leadership, analysis, reasoning, organization and interpersonal relations. Three hours. I, II.

111 Advanced Public Speaking: Emotive Means of Persuasion Human motivation, attitudes, emotion, stereotypes, attention, and audience psychology as applied in the speaking situation. Prerequisite: 11. Three hours.

112 Argument and Decision Inductive, deductive, casual, and analogical reasoning as applied in the speaking situation. Prerequisite: 11. Three hours.

113 Methods of Rhetorical Criticism Introduction to the major prin-

ciples and theories of speech criticism. *Prerequisite:* Six hours including 11. Three hours.

121 General Semantics An analysis of the relationships between language and human behavior. *Prerequisite:* 1. Three hours. Lewis.

193, 194 College Honors (Available in both majors of the department).

195, 196 Special Topics (Available in both majors of the department).

197, 198 Readings and Research (Available in both majors of the department).

201 Theories of Human Communication A behavioral approach to the role of language, meaning, perception, thinking and social context in human communication process. *Prerequisite:* Nine hours of related courses, including 1. Three hours. Yadav.

210 Classical Origins of Communication Theory Major trends in rhetorical thought. An examination of outstanding works of criticism, speaking, and writing. Selected works from classical and contemporary sources. *Prerequisite:* Nine hours of related courses. Three hours.

211 Persuasive Communication Analysis of contemporary approaches to persuasion. Study of recent research contributions including credibility, controversy, and political influence. *Prerequisite:* Nine hours. Three hours.

213 Theories of Speech Analysis An in-depth study of major theories of criticism of public address and an application of those theories to speakers, speeches, and religious, social and political movements. *Prerequisite:* Nine hours of related courses. Three hours. *

214 Issues in Public Address Each semester this course will emphasize analysis of specific speakers, movements, theses and strategies encompassed by a selected topic of public address. *Prerequisite:* Nine hours of related courses. (May be repeated up to nine credit hours.) Three hours.

215 Group Communication *Prerequisite:* Nine hours of related courses, including 14. Three hours. May be repeated up to nine credit hours.

223 Interpersonal Communication *Prerequisite:* Nine hours of related courses, including 121. Three hours. Lewis, Yadav.

225 Cross-Cultural Communication A study of cultural factors and cognitive process in cross-cultural communication. *Prerequisite:* Nine hours of related courses. Three hours. Yadav.

283, 284 Seminar *Prerequisite:* Departmental permission. Three hours. Staff.

294 Seminar for Prospective Teachers of Communication *Prerequisite:* Twelve hours. Three hours. London.

Mass Communication

63 Survey of Mass Communication The historical development, socio-economic and political impacts of the press, radio, television and film in American society. Three hours. I, II. London, Yadav, Lewis.

161 Audio Production A practicum in the use of audio recording techniques and technology as employed in broadcasting, film and multimedia presentations. *Prerequisite:* 63. Three hours.

164 Basic Television Production *Prerequisite:* 161. Three hours.

165, 166 Development of the Motion Picture *Prerequisite:* Three hours. Manchel.

167 Basic Filmmaking Theories of film expression. Students produce films. Three hours. Worden.

260, 261 Seminar in Mass Media An intensive examination of selected areas of study related to mass media. *Prerequisite:* Nine hours of related courses, including 63. Three hours.

262 Writing for Mass Communication *Prerequisite:* 63. Three hours. Lewis, Worden.

263 International Mass Communication Mass media systems of other countries, i.e., Britain, Canada. *Prerequisite:* Nine hours of related courses. Three hours. May be repeated up to nine credit hours. London.

264 Advanced Television Production Emphasis on the following types of programs: educational, news, documentary, dramatic and variety. Laboratory use of the ETV studio. *Prerequisite:* 164. Three hours.

265 Cinematography Advanced study of film expression and production of student films. *Prerequisite:* 167 or permission of the instructor. Three hours. Worden.

266 Seminar in Film *Prerequisite:* Six hours of related courses, including 165 or 166. Three hours. May be repeated up to nine credit hours.

267 The Contemporary Cinema Lectures, screenings, and reports on modern filmmakers, recent trends and new techniques. *Prerequisite:* Six hours of related courses, including 165 or 166. Three hours. Manchel.

268 The Black Man in Film A study of black artists in movies from 1895 to the present, with an emphasis on American films. *Prerequisite:* Six hours of related courses, including 165 or 166. Three hours. Manchel.

269 Broadcast News A study of radio and TV news in the United States in terms of its historical, political, social, and economic roles. *Prerequisite:* Six hours of related courses, including 63. Three hours.*

* Note: Not approved for graduate credit.

Communication Science and Disorders

COLLEGE OF ARTS AND SCIENCES

Professor Wilson (Acting Chairman); Assistant Professor Guitart; Visiting Assistant Professor Hoffman; Visiting Instructor Kilburg; Lecturer Houghton; Clinical Supervisors Daruvala and Wener.

74 Communication (Speech and Hearing) Science A beginning course for intending majors; physics and biology of human communication. Three hours. Guitart. (Is required of majors).

76 Introduction to Communication Problems (Speech Pathology) A general survey course of the problems of communication behavior (speech pathology-audiology). Three hours. Wilson.

81 Voice and Articulation Elements of speech and phonetics for the improvement of voice and articulation in communication. *Prerequisite:* Sophomore standing. Three hours.

101 Phonetics Acoustic and physiologic phonetics. Analysis of English speech sounds used in the International Phonetic Alphabet. *Prerequisite:* Sophomore standing. Three hours. Hoffman.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

270 Learning and Development of Speech and Language Speech and language acquisition in relation to current learning theory and methods of linguistic analysis. *Prerequisites:* Nine hours of speech and psychology, including 74. Three hours. Wilson.

271 Communication Disorders I The etiology, symptomology and principles of habilitation for articulation deviancies, language and fluency disorders. *Prerequisites:* 74, 101, and 270. Three hours. Guitar.

272 Communication Disorders II Problems of voice, cleft palate, cerebral palsy and aphasia. *Prerequisite:* 281. Three hours. Kilburg.

273 Principles of Audiology An introduction to clinical audiology including a consideration of hearing disorders, tests of the hearing function and hearing conservation programs. *Prerequisites:* Twelve hours of speech and psychology, including 74. Three hours. Houghton.

275, 276 Clinical Study Supervised practicum experiences with children and adults presenting disorders of speech, hearing and language. *Prerequisites:* Twelve hours in speech and hearing science courses, including 271 or 272; department permission. Credit as arranged.

278 Neurological Bases of Communication Study of the neurological bases of communication and various behavioral correlates; structure and junction of sensory-motor systems and higher center. *Prerequisites:* Nine hours of speech and psychology, including 74. Three hours. Hoffman. (Note: not approved for graduate credit.)

281 Anatomy-Physiology of Speech *Prerequisites:* Nine hours of speech and psychology, including 74. Three hours. Hoffman.

282 Anatomy-Physiology of Audition *Prerequisites:* Nine hours of speech and psychology, including 74. Three hours.

283, 284 Seminar Discussion and research in the selected areas of communication science and disorders. *Prerequisite:* Departmental permission. Three hours.

287 Current Research in Language Acquisition Recent advances in the study of child language. *Prerequisite:* 270. Three hours. Wilson.

Computer Science

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION
Professors Absher, Dawson, Hill (Director); *Assistant Professors* Aggarwal, Gabrovsky, Schultz; *Lecturers* Charbonneau, Cobb, Fischl, Halsted, Thomas, Whalen.

3 Computers and Their Application (3-0) Survey for nonspecialists. Basic concepts and vocabulary. Applications and future trends. Some elementary programming, but not intended for majors in quantitative areas. No credit for C.S. majors. *Prequisite:* Two years high school algebra. Three hours.

11 Computer Programming I (2-2) Structure of a digital computer. Development of algorithms for problem solution. Expression of algorithms using flowcharting techniques. Implementation of algorithms utilizing a higher level language (e.g. Fortran). *Prerequisite:* Credit in Math 18 or 19, or concurrent enrollment or credit in Math 21. Three hours.

12 Computer Programming II (3-0) Concepts of programming style. Continuation of programming concepts to include the development of program specifications, efficient organization and coding techniques, documentation, debugging and testing. *Prerequisites:* 11, Math 18, 19, 21, or 23. Three hours.

101 Introduction to Computer Science (3-0) Assembly language and machine structure for current host computer (Xerox Sigma 6). Debugging techniques. System services to include I/O services and trap handling. *Prerequisites:* 12. Three hours.

102 Software Fundamentals (3-0) An overview of design, concepts associated with assemblers, loaders, compilers and operating systems. *Prerequisite:* 101. Three hours.

103 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:* 12, Math 104. Three hours.

104 Programming Languages (3-0) Formal definition of programming languages including specification of syntax and semantics. Global properties of algorithmic languages including scope of declarations, storage allocations, binding time of constituents and recursive procedures. List processing and string manipulation languages. Precision of arithmetic operations and run time representation of data structures. *Prerequisite:* 102. Three hours.

200 Discrete Simulation (3-0) See Civil Engineering 227. (Note: Not approved for graduate credit.)

201 Operating Systems (3-0) An introduction to the principle components and algorithms involved in operating systems design and implementation. Memory, processor, device and file management techniques are presented and compared. Protection and security schemes are examined for both memory and file organizations. Synchronization primitives are discussed. *Prerequisite:* 222. Three hours.

202 Compiler Construction (3-0) Practice in the 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:* 102, 103, 104, or 301.

204 Advanced Systems Programming Advanced study and research in a selected area of systems programming. *Prerequisite:* 201. Three hours.

222 Computer Architecture (3-3) The architecture of computing systems. Levels of computer description. Taxonomy of computing machines. Addressing structures, memory concurrency, processor concurrency. Hardware features desirable for various software systems. Hardware, software, firmware tradeoffs. *Prerequisites:* 102, Math 104, EE 231. Three hours.

241 Introduction to the Theory of Computing (3-0) Computability, effective procedures, algorithms, and recursive functions. Post's symbol manipulation systems and formal languages. Undecidable problems. Abstract and concrete complexity. *Prerequisite:* Math 104.

242 Sequential Machines and Automata Theory (3-0) Capabilities and limitations of finite state automata. Minimization, control and identification

of machines. Structure and loop-free decomposition of machines. State-identification and fault-detection experiments. Finite state recognizers and regular expressions. Prerequisites: 241 or Math 104 or EE 231. Three hours.

283 Special Topics (3-0) Prerequisite: Consent of instructor. Three hours. Staff.

Dental Hygiene

SCHOOL OF ALLIED HEALTH SCIENCES

Assistant Professor Hill (Chairperson); Associate Professors Faigel, Farnham; Assistant Professors Brown, Ingalls, Levi, Wootton; Instructors Belfiglio, Bellhouse, Bowen, Fersing, Grundler, Josselyn, Lamoray, Lawrence, Mercier, Preston, Reed, Saboski and Welsh.

3 Dental Hygiene Core I Introduction to the morphology and physiology of the oral tissues and to the practice of dental hygiene with emphasis on patient education and preventive procedures. Six hours. Wootton, Saboski.

4 Dental Hygiene Core II Continuation of Dental Hygiene 3 including in-depth study of head and neck anatomy and the development of clinical skills. Five hours. Saboski, Wootton.

45 Dental Hygiene Senior Major Introduction to general pathology, oral pathology, and periodontics. Five hours. Levi, Hill.

46 Dental Hygiene Senior Major Continuation of Dental Hygiene 45 including pharmacology and anesthesiology in dental practice. Three hours. Farnham, Hill.

61 Radiology Study, demonstration, and practice of fundamentals of intraoral radiographic technic including electrophysics; angulation of the machine; placement and complete processing of films. Two hours. Brown.

62 Dental Practice Discussion and project participation in the planning, development, and implementation of dental health education, public health dentistry, and the private practice of dentistry. Two hours. Bellhouse.

81-82 Senior Clinic and Seminar Clinical practice with patients from simple to more difficult cases both children and adults. Field practice at local dental clinics, hospitals, and private institutions. Four hours. Prerequisites: 3 and 4.

91 Dental Materials Study of the materials used routinely in dental practice. One hour. Fersing, Lamoray.

Economics

COLLEGE OF ARTS AND SCIENCES

Professors Alnasrawi, Campagna, Chase, Dellin (Chairman) and Nadworny; Associate

Professor Bates; Assistant Professors Fritz, Stoler and Sullivan.

11 Principles of Economics I An introduction to economic ideas, basic concepts and institutions adequate to address selected current problems. Suitable for nonmajors. Sophomore standing preferable. Three hours. Staff.

12 Principles of Economics II Study of individual economic units and the national economy with the tools of modern economic analysis. For majors and others interested in a more thorough understanding of economic phenomena. *Prerequisite:* 11. Three hours. Staff.

101 Money and Banking Commercial and central banking with special attention given to the Federal Reserve System, monetary theory and policy *Prerequisite:* 12. Three hours. Bates, Fritz.

103 Public Finance 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:* 12. Three hours. Stoler.

105 International Trade and Finance Theories of international values, adjustment of international balances, foreign exchange, international aspects of money and banking, and tariffs. *Prerequisite:* 12. Three hours. Alnasrawi.

130, 131 Quantitative Methods for Economists Topics to include maximum and minimum criteria with application to optimization problems in economics; static, comparative static, and dynamic models; matrix methods in economics; research design, data organization and presentation; analysis of central tendencies and probability; secular trend and seasonal variation of time series analysis; construction and weighting of index numbers; and measurement of linear and non-linear correlation. *Prerequisite:* 12. Some knowledge of calculus recommended. Three hours. Fritz.

138 Evolution of Capitalism Origins and development of capitalism; their social-economic institutions and their transference from Western Europe to North America. *Prerequisite:* 12. Three hours. Chase.

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:* 12. Three hours. Nadworny.

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. *Prerequisites:* 11, 12 and six hours in another social science. Three hours. Dellin

186 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. Sullivan.

187 Industrial Organization The structure, conduct, and performance of U.S. industry and appraisal of its economic efficiency and social impact, including governmental policies. *Prerequisite:* 12. Three hours. Stoler.

190 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. Campagna.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

200, 201 Economic History of the United States Economic development and the evolution of capitalism in the United States. First Semester (200): Origins and growth of the economy to 1900. Second Semester (201):

The American Economy in the Twentieth Century. Prerequisite: 186 or 190 or permission of the instructor. Three hours. Nadworny.

210 Income, Wealth and Welfare Analysis of the distribution of income and wealth and policies which affect them. Prerequisite: Nine hours in Economics. Three hours. Bates, Stoler.

216 Economic Development Theories of economic growth applied to underdeveloped areas of the contemporary world including the political and social determinants of economic progress. Prerequisite: 12; 190 recommended. Three hours. Alnasrawi.

217 Urban and Regional Economics Economic analysis applied to the problems of cities, states and regions. Prerequisite: Nine hours in Economics. Three hours. Bates, Fritz.

234 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. Prerequisites: 101 and 190. Three hours. Campagna.

241 Human Resources The theory and policy, the labor sector, and human capital in an advanced economy. Prerequisite: 141. Three hours. Nadworny, Sullivan.

242 Labor-Management Relations Economic influences of unionization. The grievance process, arbitration and labor relations laws. Prerequisite: 141. Three hours. Nadworny.

258 Problems of Communism (same as Political Science 258) A comparative study of economic and political problems of applied communism with particular emphasis on current developments in selected Communist countries. Prerequisite: Twelve hours in history and or social sciences. Three hours. Dellin.

267 Econometrics A combination of economic theory, mathematics, and statistics for the testing of economic hypotheses and developing economic models. Prerequisite: 131, 186, 190, 130 recommended. Three hours. Fritz.

290 The Soviet and Eastern European Economies Analysis of the economic development, structure, performance and direction of the Soviet and related economies. Prerequisites: Nine hours in economics or permission of the instructor. Three hours. Dellin.

295 Development of Economic Thought Development of economic ideas. The Pre-Classical, Classical, Socialist, Neo-Classical, Keynesian Schools and individual theoreticians. Prerequisites: 186 and 190 or concurrent enrollment. Three hours. Chase, Dellin.

296 Seminar and Special Topics

297 Readings and Research

299 Departmental Honors

Education

COLLEGE OF EDUCATION AND SOCIAL SERVICES

Any information concerning course instructor may be obtained from department chairman at the beginning of each semester.

Professors Abruscato, Agne, Boller, Carlson, Ducharme, Fishell, Fox, W., Gobin, Hanley, Hunt, Leggett, McKenzie, Nash, Peterson, Petrusich, Phillips, Rippa, Saurman, Tesconi; Associate Professors Burrell, Christensen, Clements, Conrad, Erb, Hillman, Lang, Larson, Meyers, Nichols, Rathbone, Sandoval, Shiman, Thompson, Whittlesey; Assistant Professors Bright, Chase, Cheney, Deutsch, Dunkley, Greig, Griffin, Guzzetta, Holmes, Lekan, Letteri, McKay, Nedde, Nevin, O'Donnell, Ponzo, Robie, Ryan, Simberg, Strassburg, York; Lecturers, Burdett, Christie, Cody, Condon, Farrell, Fox, T., Guerette, Hasazi, Hayes, Knight, Kusiak, LaCasse, Lange, McEntee, Paolucci, Perelman, Pierce, Pierson, Reinhardt, Roberts, Royce, Schiller, Slack, Smith, Wade, Walker, Watson; Wood.

EDSS — Education — General

1 Schooling, Learning and Society An introduction to issues and problems in American education: schools and learning, professional careers, individuals in systems, characteristics of learners. Required readings and papers. Non-CESS students only. Three credits.

2 Foundations of Education Social foundations of education: development of American education; education as a profession. Three hours. I or II.

55 Special Topics Designed so that its content and structure may accommodate special issues in education not especially appropriate within the boundaries of an existing course. Two to six hours.

60 An Introduction to Helping Skills for the Educator: To examine the phenomenon of "helping" in American society within its sociological, cultural, economic, political, and educational contexts. The emphasis will be on how helping professionals function both to help and to hinder clients in this society. Three hours.

62 Life Planning An introduction to self, career, and academic resource awareness geared to students who want to assess their own values systems, decision making processes and life goals. Three hours.

143, 144 Learning Theory Studies in behavior with emphasis in cognitive, emotional, and psychological development. Examination of views of learning styles and developmental processes. Non-CESS only. Three hours.

145, 146 Learning and Human Development The developing individual; psychology of learning with particular application to human development; measurement and evaluation of learning and development; opportunities for related field experiences. Three hours.

147, 148 Learning, Personality, and Change Understanding of major psychological models of man and theories of learning. Integration of the theory and practice of particular systems of human development and human learning. Analysis of selected social problems and institutional settings. Problems related to educational/social service institutions, with the focus on the role of the helping professions in the learning and change process. (Nine credits: Six in Fall Semester; Three in Spring Semester.)

190 Approaches to Education Senior Interdisciplinary Seminar. A study of ideas and values, historic and contemporary, with emphasis upon the ideological bases of American education. Drawing from theory and research in the humanities and social sciences, this course helps the student to develop new perspectives as a guide toward resolving some of the crucial issues of our time. *Prerequisite:* Senior standing. Three hours.

193 Environmental Education Philosophy, concepts, and teaching-learning strategies of environmental education. Three hours.

197 Readings and Research Individual research problem or directed reading in an area of special interest to the student. *Prerequisite:* Permis-

sion of the instructor. Variable credit, one to four hours per semester. Course may be repeated for a maximum of eight hours credit.

198 Personal Component The personal component offers students an opportunity to pursue an activity under self-direction. Each student is required to state the objectives for his study and make a contractual arrangement with his personal component advisor to fulfill the terms of the contract. Each contract holds one credit. Options such as education colloquia, community action experience, seminars and discussion groups, individual counseling, group counseling, and others will be provided during the four years. The course may be repeated for a maximum of seven hours credit. Only open to UVM students enrolled in Teacher Education and Social Welfare Programs.

202 Philosophy of Education Educational theory and philosophy past and present; contributions of leading educational philosophers; the interrelations of education, society, and philosophy. *Prerequisite:* Twelve hours in education and related areas. Three hours.

203 The Ethics of Helping Relationships The general objectives of the course will be to clarify the ethical dimensions of professional rights and obligations for educators, counselors, administrators, and other helping professionals. This course will examine selected ethical controversies currently facing the helping professions. Three hours.*

204 Seminar in Educational History Struggles for Freedom and Equality. A study of selected topics in the history of education from the "Golden Age" of Greece to the present. Special attention to the nature of education in democratic and authoritarian social orders. Discussions and research will revolve around such topics as the education of women, the black heritage in education, and American higher education in transition and crisis. *Prerequisite:* Twelve hours in Education and related areas or permission of the instructor. Three hours.

205 History of American Education Educational principles and practices in the United States as they relate to the main currents of social history. Discussions will focus on key ideas of historic and contemporary significance. *Prerequisite:* Twelve hours in Education and related areas or permission of the instructor. Three hours.

206 Comparative Education An examination of educational policies and practices in selected countries throughout the world. Special attention will be paid to those topics that relate to important issues in American education. *Prerequisite:* Twelve hours in education and related areas. Three hours.

211 Educational Measurements The essential principles of measurement in education. Topics include measures of achievement, analysis of standard tests, construction of objective tests and inventories. *Prerequisite:* Twelve hours in education and related areas. Three hours.

212 Child and Adolescent Psychology An examination of children and adults as emerging individuals and the impact of socio-cultural ethics, values and institutions on that individual. A variety of themes will be explored including human needs, values, self concept, personal freedom, bureaucratic society, cross cultural issues; as relative to children and youth. *Prerequisite:* Twelve hours in education and/or related areas. Three hours.

237 The Middle School Child: Education and Social Implications This course will involve an intensive analysis of the unique problems faced by the middle school child. Middle school organization, curriculum, teaching procedures and family life adjustments will be examined in depth. *Prere-*

quisites: Twelve hours of Education or Psychology or permission of instructor. Three hours.*

238 Teaching for Global Awareness The course will focus on three important value issues — peace and the prevention of war, social and economic justice, and environmental quality — and their relationship to global problems. New curriculum materials will be developed and shared. Ways of teaching about global issues through the discipline areas will be stressed and links between local and global concerns will be made. Three 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.

252 Seminar in Aesthetic Education A critical examination of aesthetic values transmitted in contemporary schools. Consideration of ways to expand aesthetic awareness among children, youth and adults. The aesthetic quality of natural and man-made environments with implications for present and future educational practice will be given special attention. *Prerequisite:* Twelve hours in education and related areas. Three hours.

254 Anthropology of Education Introductory examination of theories and research of cultural anthropology and education. An anthropological perspective on education grounded in the cultural realities of life in the American school. Study of the interrelationship of culture and man — his educational values, beliefs, and practices. *Prerequisite:* Twelve hours in education and related areas. Three hours.

277 Seminar in Educational Psychology Examination of personal values, attitudes, and beliefs related to learning, psychological research of the teaching-learning process, use of such research in analyzing the process of education, and the creation of applications for educational settings of all kinds. *Prerequisite:* Twelve hours in education and related areas. Three hours.

281 Thought Processes and Learning An intensive analysis of theory and research related to various thought processes and their application in teaching, learning and performance situations. Topics will include concept attainment, concept formation, memory, problem solving, verbal learning, cognitive styles and profiles. *Prerequisites:* Twelve hours Education or Psychology or permission of instructor. Three hours.*

292 Issues in Contemporary Education Designed so that its content and structure may accommodate special issues in education not especially appropriate within the boundaries of an existing course. *Prerequisite:* Twelve hours in Education and related areas. Two to six hours.

295, 296, 297, 298 Laboratory Experience in Education Supervised field work designed to give students experience in specialized areas for their professional development. *Prerequisite:* Permission of the Coordinator of Professional Laboratory Experiences. Credit as arranged.

* Note: Not approved for graduate credit.

EDEL — Education — Elementary

3, 4 Child and Community Supervised experiences with children's groups in the community. Students should plan a schedule which will enable them to have blocks of time, such as a morning or afternoon, free of regular classes. *Prerequisite:* Sophomore standing. One hour.

115 Experience Analysis of American Primary Schools This course is designed for students enrolled in the American Primary Program. The course will include readings on the American school, observation in several

schools, instruction work with children, and seminars about interns' experiences in the schools. Three to six semester hours.

121 Reading and Language Arts Principles underlying teaching reading; materials of instruction; reading readiness; vocabulary development; development of correct study skills; reading in the Language Arts program; observation in elementary school. Three hours.

122 Developmental Reading Consideration of current practices and controversial issues relative to teaching reading. Study of recent innovations, methods, materials, as well as the organization and evaluation of various reading programs. *Prerequisite:* For Elementary Education Majors, 121; all others consent of Director of Reading Center. Three hours.

134 Children's Literature and Language Arts Traditional and modern children's literature in prose and poetry; appreciation and evaluation of literature for children of all age levels; techniques of story telling; literature in the Language Arts program. Three hours.

136 Children's Theatre A workshop in dramatic activities for elementary school children. Creative expression based on selections from children's literature as well as plays and vignettes written by the class participants. *Prerequisite:* EDEL 134 Children's Lit & Language Arts.

138 Analysis of Problems in Reading & Related Language Instruction An introductory course for elementary education in the analysis and evaluation of reading and writing difficulties; critiquing of testing instruments; interpretation of testing data; strategies for improvement. Three hours. *Prerequisite:* ELEL 121 Reading & Language Arts.

139 Laboratory Experience in Reading & Related Language Instruction An introductory course in the prevention and correction of reading and writing difficulties. Involvement with students is required. Three hours. *Prerequisite:* ELEL 138 Analysis of Reading & Related Language Instruction.

144 Teaching Science and Social Studies Teaching methods, curriculum planning in social studies and science for the primary through middle school. A variety of nationally developed curriculum projects will be examined and micro-taught; AAAS Science: A Process Approach, Elementary Science Study, Science Curriculum Improvement Study, Conceptually Oriented Program in Elementary Science, Environmental Studies, Taba Social Studies, Man: A Course of Study. A wide variety of instructional activities and strategies will be considered. Three hours.

160 Teaching Mathematics and Critical Thinking in the Elementary School An investigation of the modern approach to mathematics with emphasis on instructional strategies, curriculum resources, and problem solving. Students will construct learning aids, develop individualized learning units, and have opportunity to use various manipulative devices. Three hours.

181 Student Teaching See course description under Secondary Education.

186 Seminar for Primary School Teachers This course is designed to provide on-site psychological and instructional support to American Primary Experience Program interns during their student teaching experience. Weekly meetings and personal conferences centering around the difficulties and successes of student teaching will be held in the various field sites. *Prerequisites:* Acceptance in APEX, concurrent enrollment in Student Teaching. Three semester hours.

222 Improvement of Reading Instruction in the Elementary School Analysis of philosophies, programs and instructional practices for teaching reading in the elementary school. Examination and evaluation of

basal textbook, individual and specialized reading programs. *Prerequisite:* Twelve hours in education and/or related areas including an introductory course in reading, or consent of instructor. Three hours.

234 Literature and Language for Children and Youth Characteristics, interests, and reading habits of children and young people; criteria for selection and evaluation of literature; organizing book units for teaching literature and for content areas; books for children and youth. *Prerequisite:* Twelve hours in education and related areas or consent of instructor. Three hours.

241 Science for the Elementary School This course will examine a number of elementary school science programs. Emphasis will be on the methods and materials relating to the construction and use of science units for children in grades K-6. *Prerequisite:* Twelve hours in education and related areas and permission of instructor. Three hours.

242 Modern Trends in Elementary Education Study of modern educational principles and practices in today's elementary schools. Emphasis will be on communication in the classroom, interaction between students and teachers, materials and emerging trends as they affect the elementary school. The course will deal with different teaching modes that may assist in the development of more critical analysis of the teaching act. *Prerequisite:* Twelve hours in education and related areas. 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.

256 Methods and Materials in Elementary School Mathematics Topics include the evolution of mathematical concepts and notations, the meaning of numbers and number systems, the theory underlying fundamental operations, and an analysis of the modern approach to mathematics in the elementary school. *Prerequisite:* Twelve hours in education and related areas. Three hours.

270 Kindergarten Methods and Organization Objectives, organization, curriculum, methods and materials, and relationships of kindergarten to Head Start and other pre-school experiences. *Prerequisite:* Twelve hours in education and related areas. Three hours.

271 Kindergarten Education With Laboratory Experiences A course designed to acquaint the prospective kindergarten teacher with educational research conducted by Piaget, Bruner, Montessori, and others with experiences provided for working with Children of kindergarten age. *Prerequisite:* Twelve hours in education and related areas. Three hours.

275 Introduction to Analysis of Reading and Related Difficulties Analysis and evaluation of learning difficulties with emphasis on reading and writing; nature of difficulties; procedures and materials for assessing reading performance. Involvement with children is required. *Prerequisite:* Six hours in reading and three hours in Education or permission of instructor. Three hours.

276 Introduction to Laboratory Experiences in Reading and Related Language Instruction Approaches to be used for the prevention and correction of reading and written language difficulties. Supervised teaching of individuals and/or small groups experiencing reading and language problems. Apprenticeships in reading instructional programs. *Prerequisite:* Introduction to Analysis of Reading and Related Language Difficulties. Three to six hours.

292 Issues in Contemporary Education Designed so that its content and structure may accommodate special issues in education not especially

appropriate within the boundaries of an existing course. *Prerequisite:* Twelve hours in Education and related areas. Two to six hours.

EDSC — Education — Secondary

15 Participation A minimum of thirty clock hours of observation and participation in classroom work in a formal learning environment. Weekly seminars on campus. Students should plan a schedule which will enable them to have blocks of time, such as morning or afternoon, free of regular classes. *Prerequisites:* Sophomore standing and acceptance by the Coordinator of Professional Laboratory Experiences. Two hours.

137 Reading in the Secondary School Principles underlying the teaching of reading at the middle and high school levels. Materials of instruction; development of word recognition, vocabulary, comprehension, and study skills in the content areas. Three hours.

138 Analysis of Problems in Reading & Related Language Instruction An introductory course for secondary education in the analysis and evaluation of reading and writing difficulties; critiquing of testing instruments; interpretation of testing data; strategies for improvement. Three hours. *Prerequisite:* EDSC 137 Reading in the Secondary School.

178 Secondary Methods and Procedures This course is designed to prepare students for teaching in the secondary school. Experiences such as micro-teaching, role playing, classroom simulation, analysis of classroom behavior, and preparation of individualized materials are integral portions of the course. *Prerequisites:* Satisfactory completion of Ed. 145 & 146, Senior standing, and acceptance in a teacher education program. Three hours.

179 Secondary Methods and Procedures in Special Subject Areas (Latin, mathematics, romance languages, and social studies.) *Prerequisites:* Prior or simultaneous enrollment in Ed. 178 and acceptance in a teacher education program. Variable credit, two or three hours, i.e. Latin three hours, mathematics three hours, romance language three hours and social studies three hours. (English majors enroll in Ed. Eng. 182 and Speech majors in Ed. Speech 294. Speech minors are encouraged to enroll in 294.)

181 Student Teaching Teaching in the elementary or secondary schools under the guidance of cooperating teachers, principals, and college supervisors. For most undergraduates this is a full-time, 16 weeks, 12 credit experience during a semester. *Prerequisites:* Acceptance in a teacher education program, and acceptance by the Coordinator of Professional Laboratory Experiences. Variable credit, three to twelve hours.

182 Seminar for Prospective Teachers of English (see page English 182).

217 Secondary School Curriculum Principles and problems in curriculum development. An analysis of recent curricular innovations in American secondary schools. *Prerequisite:* Twelve hours of education and related areas. Three hours.

223 Reading Programs in Secondary Schools and Colleges Relationship of reading to learning; study of organization, instructional procedures, and materials for developing reading improvement programs for secondary and college students; reading in content areas. *Prerequisite:* Twelve hours in education and/or related areas or consent of instructor. Three hours. (Also offered for undergraduates under EDSC 137.)

225 Teaching Social Studies in Secondary Schools Includes multiple teaching modes, questioning techniques, micro-teaching laboratory, analysis of historical content to determine students' prerequisite cognitive

skills and processes for construction of historical scenarios. *Prerequisite:* Twelve hours of education and related areas. Three hours.

227 Teaching Science in Secondary Schools Consideration of science curricula for grades 7-12. The following is a representative listing of topics to be examined: Teaching science as problem-solving, research in science teaching, evaluation strategies, instructional techniques, and affective education through science. *Prerequisites:* Twelve hours in education and related areas, and permission of instructor. Three hours.

294 Seminar for Prospective Teachers of Communications (see Communication 294.)

295, 296, 297, 298 Laboratory Experience in Education Supervised field work designed to give students experience in specialized areas for their professional development. *Prerequisite:* Permission of the Coordinator of Professional Laboratory Experiences. Credit as arranged.

EDAR — Art Education

140 Foundation Studio for Elementary Education Majors Students enrolled in this course are to 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 in College of Arts and Sciences. Three hours.

141 Practicum in Field Experience Student will work as a teaching assistant to a faculty member in foundation, studio, advanced studio, art history, or museology depending on his/her interest and capabilities. *Prerequisites:* Senior standing and permission. Four hours.

177 Curriculum and Practice in Elementary Art The study and implementation of curriculum in the elementary school. Student will work directly in an elementary classroom. Lectures and discussions. *Prerequisites:* Eighteen hours studio art, junior standing. Four hours.

183 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 plus twelve hours in art and/or related areas. Three hours.

184 Special Problems in Art Education Independent study in related field works, research, or combination. *Prerequisites:* Junior standing and permission of instructor. One to six hours.

292 Issues in Contemporary Education Designed so that its content and structure may accommodate special issues in education not especially appropriate within the boundaries of an existing course. *Prerequisite:* Twelve hours in Education and related areas. Two to six hours.

EDMU — Music Education

The Music Department offers a number of pedagogy courses in specific musical areas. All are open to non-majors by permission of the instructor. See Music listings under the College of Arts and Science.

111 Music for Elementary Teachers The development of musical skills, understandings, and attitudes pertinent to the teaching of music in the elementary classroom. *Prerequisite:* Sophomore standing. Three hours.

112 Elementary Music Methods A course to aid the elementary classroom teacher in developing the potential musicality of students to the highest level through the practical application of musical skills and understandings already acquired by the teacher. *Prerequisite:* 111 or music major, or instructor's permission. Three hours.

131 Music Methods Methods and materials in the teaching of vocal

and instrumental music in elementary and secondary schools. *Prerequisites:* 145, 146 and Senior standing in music education. Five hours.

295, 296, 297, 298 Laboratory Experience in Education Supervised field work designed to give students experience in specialized areas for their professional development. *Prerequisite:* Permission of the Coordinator of Professional Laboratory Experiences. Credit arranged.

EDSP — Special Education

1 The Behavioral Model of Education An introduction to the behavioral model of education. Includes an introduction to behavioral principles, observation and measurement and the implementation of a teaching/learning procedure. Students carry out a daily practica with an eligible learner. *Prerequisite:* None. Three hours.

53 Introduction to Exceptional Individuals Overview of the causes, behaviors and educational programs of those who have psychological and educational needs that are different from those of the general population. *Prerequisite:* Permission of Responsive Teacher Program Coordinator. Three hours. Trinity College.

100 Specifying Minimum Objectives for Basic Skills An introduction to the concept of minimum instructional objectives and their use for developing language, arithmetic and social interaction curricula. Observation of selected public school classrooms using basic skills minimum objectives is required of each student. Three hours.

150 Classroom Management Procedures A survey of researched procedures for managing children eligible for special education services within regular and special classrooms, and home and institutional environments. Students will develop, apply and evaluate specific procedures in simulated and classroom environments. Three hours.

151 Special Education Methods I A series of modules designed to introduce students to historical issues and current trends in special education, the concept of minimum instructional objectives and their use for developing language, arithmetic and social interaction curricula and the analysis of specific teachers' and childrens' behavior in the classroom setting. *Prerequisite:* Acceptance into the Responsive Teacher Program. Six hours.

152 Special Education Methods II A series of modules to facilitate the Responsive Teacher Practicum. Modules include procedures for dealing with special education children; measurement systems to assess pupil progress; peer tutoring techniques; program development for children with learning deficits; norm and criterion reference testing; and evaluation of learning environments. *Prerequisites:* Acceptance into the Responsive Teacher Program, concurrent enrollment in EDSP 160. Six hours.

155 Measurement and Implementation of Minimum Objectives for Basic Skills The specification and implementation of a measurement system to assess pupil progress in language, arithmetic and social interaction curricula. Practicum applications of the measurement system will be required for at least one child eligible for special education services in a regular or special classroom. *Prerequisites:* Acceptance into the Response Teacher Program and concurrent registration in Special Education 160: Responsive Teacher Practicum. Three hours.

160 Responsive Teacher Practicum A practicum to be conducted within a public school, or public or private institution designed to provide opportunities for Responsive Teacher Program students to apply the behavioral model of education to serve children eligible for special education services. The practicum will require a minimum of four hours daily

within a selected learning environment in addition to travel time to and from the off-campus facility. *Prerequisites:* Acceptance into the Responsive Teacher Program and concurrent registration in Special Education 152. Six hours.

165 Seminar in Special Education Students will develop personal vitae and materials describing their experiences and achievements during their college career. Interviews with school administrators, classroom teachers and peers will provide opportunities for students to survey positions and careers in special education. *Prerequisites:* Acceptance into Responsive Teacher Program and permission of the instructor. Seniors. One hour.

181 Responsive Teacher Internship Teaching in the elementary or secondary schools under the guidance of cooperating teachers, principals, and college supervisors. For most undergraduates this is a full-time, 16 week, 12 credit experience during the fall semester. *Prerequisites:* Acceptance into Responsive Teacher Program and permission of instructor. Twelve hours.

197 Readings and Research in Special Education Individual research problem or direct reading in an area of special interest to the student. *Prerequisite:* Permission of the instructor. Variable Credit: One to four hours per semester. Course may be repeated for a maximum of eight hours credit.

201 Foundations of Special Education An examination of historical and current trends in the treatment of handicapped individuals, including the effects of litigation, legislation and economic considerations on educational and residential service delivery systems. *Prerequisite:* Twelve hours in Education and related areas, or permission of instructor. Three hours. (Not approved for graduate credit.)

224 Introduction to Behavioral Principles of Education This course will involve an analysis of specific teachers and childrens' behavior in the classroom setting that function to either facilitate or impede the attainment of educational goals. Emphasis will be on the application of basic behavioral principles in the regular class setting that will improve student's academic and social behaviors. *Prerequisites:* Twelve hours in education and related areas and permission of the instructor. Juniors and Seniors. Three hours.

292 Issues in Contemporary Education Designed so that its content and structure may accommodate special issues in education not especially appropriate within the boundaries of an existing course. *Prerequisite:* Twelve hours in education and related areas. Two to six hours.

295, 296, 297, 298, Laboratory Experience in Education Supervised field work designed to give students experience in specialized areas for their professional development. *Prerequisite:* Permission of the Coordinator of Professional Laboratory Experiences. Credit arranged.

EDOH — Education — Organizational and Human Development

185 Future Cognition A survivable future will require the development of expanded cognitive and affective abilities, consensus on values, and new behaviors and skills. Alternative futures will be examined to determine the implications for these abilities and implications for current educational processes. Students will develop scenarios of alternative future. Three hours.

220 Personality Development Approaches to understanding human behavior in applied settings. With emphasis on behavior development as an inter-personal process. *Prerequisites:* Twelve hours in education and psychology. Three hours.

266 Educational Finance Consideration will be given to the National and State statutes and practices in Educational Finance and Taxation; taxation; other revenue sources; school budgeting; and financial expenditures. *Prerequisites:* 12 semester hours in Education or permission of instructor. Three semester hours.

268 Educational Law This course is a survey of the legal basis for Education. Included are investigations of the State and Federal statutes; court cases; Attorney General opinions; and State Board and State Education Department policies and regulations. *Prerequisites:* 12 semester hours in Education or permission of instructor. Three semester hours.

292 Issues in Contemporary Education Designed so that its content and structure may accommodate special issues in education not especially appropriate within the boundaries of an existing course. *Prerequisite:* Twelve hours in Education and related areas. Two to six hours.

295, 296, 297, 298 Laboratory Experience in Education Supervised field work designed to give students experience in specialized areas for their professional development. *Prerequisite:* Permission of the Coordinator of Professional Laboratory Experiences. Credit as arranged.

SOSE — Social Work and Social Services

2 Foundations of Social Work An introductory course in Social Work to develop an understanding of existing social service delivery systems and their history. Three hours.

4 Analysis of Foundations of Social Work A course for non-majors to study the history of social work and conditions which influenced American society's response to the needy. Junior, Senior standing. Three credits.

15 Participation (optional) Designed so that its content and structure may accommodate special issues in social work not especially appropriate within the boundaries of an existing course. Three hours.

51 Human Needs & Social Services (optional) Experience for students to be of service in a social agency, to relate observation to learnings about agency structure, programs and their operation and to assessing student's commitment to working with people.

165, 166 Issues in Social Welfare Philosophy, purpose, history of social welfare; review of fields and processes of social work. *Prerequisites:* Sociology 10, Psychology 1, Economics 3, Political Science 21. Three hours.

167 Racism and Contemporary Issues Study of perception, conceptualization and comprehension of racism. Strategies, techniques and procedures to deal and combat many facets of racism. Three hours.

168, 169 Social Work Intervention Means of intervention or methods employed by social workers in providing services on individual, group and community levels. *Prerequisites:* 166, 167. Three hours.

170 Field Experience Field experience under supervision will be given in social agencies four and one-half days each week. Weekly seminar. *Prerequisites:* 168, 169; majors, Senior standing. Fifteen hours.

194 Basic Methods in Social Work Research Introduction to social research skills for social workers. Three credits.

195 Applied Basic Methods in Social Work Research (optional) Application of research skills and social work practice. Three credits.

291, 292 Senior Seminar Weekly seminar for social work majors to examine issues in social work practice. Three credits.

EDPE — Physical Education Professional

21 Foundations of Physical Education Review of Historical,

Philosophical and Scientific Foundations as a basis for physical education and to the opportunities and obligations associated with physical education as a profession. Three hours.

22 First Aid and Safety Course is designed to prepare the general public with the first aid knowledge and skills necessary to care for most injuries and to meet most emergencies. Content includes treatment for wounds, burns, shock, broken bones, drugs, poisoning, sudden illness, as well as techniques for bandaging, artificial respiration, and transportation. The course also provides accident prevention information. Red Cross certification for successful performance in Standard First Aid and Personal Safety, Basic First Aid, and Multimedia First Aid. One hour, half semester.

23 Advanced First Aid and Emergency Care Advanced first aid and emergency care is primarily designed to meet the needs of individuals who are in a position to provide first aid and emergency care frequently. Course content includes Standard First Aid and Personal Safety skills in addition to cardiopulmonary resuscitation, emergency childbirth, extrication, and water accidents. Red Cross certification for successful performance in Advanced First Aid and Emergency Care. Prerequisite: Permission of instructor. Two hours.

26 Water Safety Advance performance skills in swimming, diving, survival and rescue techniques. Theory and practice in the 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

30 Career Planning in H.P.E.R. Study of alternatives, issues and skills related to career options for students majoring in health, physical education and recreation. Special emphasis on factors pertaining to the preparation, locating, and application for employment. Topics include alternatives for student teaching, post-graduate study, locating vacancies, application for the job, getting started on the job, and common issues requiring decisions. One and one-half hours, half semester.

100 Teaching Physical Education in the Elementary School Planning, organization and practice in skills appropriate for teaching movement patterns to children aged 4-12. Two hours. Elementary Education majors only.

104, 105 Physical Education Teaching Experience (Petex) An experience based course sequence emphasizing the relationship of motor development to learning. Includes age level needs and appropriate physical education activity sequences. Screening and response to perceptual mechanisms and implications for teaching motor skills. The first semester focuses on grades K-3. The second semester (105) studies the needs and programs appropriate for youngsters in grades 4-6. Junior standing. Five hours.

116 Health Education Concepts of personal health related to problems of daily living. Areas of concern include mental health, sex education, nutrition and weight control, fatigue and relaxation, chronic and communicable disease, stimulants and depressants. Three hours.

122 Coaching Women's Basketball and Softball Classroom and laboratory experiences designed for coaching women's basketball and softball. Includes theory and technique in coaching in each sport, as well as care and purchase of equipment, conditioning, team selection, scheduling, planning for practices, defensive and offensive strategies, etc. Prerequisite: Skill competency in basketball and softball or permission of instructor. Three hours.

123 Coaching Baseball and Football Theory and technique of coaching interscholastic baseball and football. Includes practice, game and

schedule organizations. *Prerequisites:* Skill competency in baseball and football, and Junior standing. Three hours.

124 Coaching Track and Wrestling Analysis and practice of the skills, technique and knowledge involved in coaching interscholastic track and wrestling. *Prerequisites:* Skill competency in track and wrestling and Junior standing. Three hours.

125 Coaching Soccer and Basketball Theory and technique of coaching interscholastic soccer and basketball. Includes practice game and schedule organization. *Prerequisites:* Skill competency in soccer and basketball, and Junior standing. Three hours.

126 Coaching Gymnastics and Aquatics Analysis and practice of skills, techniques and knowledge involved in teaching and coaching gymnastics and aquatics. *Prerequisites:* Skill competency in gymnastics and aquatics, and Junior standing. Three hours.

140 Seminar in Physical Education Strategy, analysis, techniques and contemporary issues in selected areas of physical education. Variable credit based upon the nature of the semester topic selection. One-three credits.

145 Seminar in Athletics Contemporary issues, strategy, analysis and problem areas related to selected comparative sports. Variable credit. One-three credits.

150 Seminar in Health Education In-depth content, methods, materials and units of instruction for selected areas of health education. Special emphasis upon current health problems. Variable credit, one-three.

154 History, Philosophy and Trends in Recreation An in-depth review of the chronological history of the evolution of recreation and leisure and the development of the park and recreation movement; an examination of past and emerging theories and philosophies of recreation and leisure; and exploration of trends in recreation and leisure and its probable impact on our life styles. Three 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 including the use of a problem solving approach to learning. Laboratory experience in teaching activity skills to youth from age of 12-18 years. *Prerequisite:* Junior standing. Three credits.

156 Curriculum Design in Health and Physical Education The role of health education and physical education in the comprehensive school curriculum. Philosophy and techniques of curriculum innovation. Emphasis upon inter-relationships that exist between student needs and interests, teaching methodology, evaluative procedures, community involvement and administrative organizational patterns. *Prerequisite:* 104, 105, or 155. 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.

158 Organization and Administration of Physical Education Organization and administration of instructional programs, intramurals, interscholastic athletics, school recreational programs, schedules, personnel, budgets, equipment, records, tests, and public relations. Three hours.

166 Kinesiology Study of joint articulation, muscular action, and basic principles of body mechanics as a foundation for the analysis of motor performance in physical education activities, athletics, and physical therapy. *Prerequisite:* One year Biol. Sci. Three hours.

167 Physiology of Muscular Activity Study of physical exercise upon the circulatory, respiratory, digestive, and nervous system. Relationship of endurance, fatigue, training and nutrition to the efficiency of physical performance. *Prerequisite:* One year Biol. Sci. Three hours.

168 Tests and Measurements in Physical Education and Health Principles and techniques in evaluation of instruction in health and physical education. Emphasis is given to test selection, administration, construction, application of statistical procedures, and development and interpretation of research data. Three hours. Accelerated.

170 Adapted Physical Education Recognition, prevention, and correction of functional and structure deviations from normal body mechanics. Special emphasis given to the organization of programs adapted to the needs of physically, emotionally, and mentally handicapped children. *Prerequisite:* 104, 105, or 155. Three hours.

172 Psychology of Coaching Analysis and application of psychological sub-disciplines to coaching and athletics. Learning, motivation, transfer, retention and emotion are discussed with special implications for the coach. Personality qualities of the player and coach will be examined as they relate to success in sport. An analysis of the outside influences on the athlete as they affect the player-coach relationship. 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 will approximate those commonly associated with student teaching. *Prerequisite:* 104, 105, or 155. Variable credit (2-4 hours).

182 Health Methods and Materials Fundamental methods of health teaching as applied to school and public health education. Consideration of materials applicable to health education, evaluation techniques, preparation of teaching units and bibliographies, a survey of the literature in the field of health education. Three 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. *Prerequisite:* 157 and permission. Three hours.

192 Intramural Programs Organization and administration of intramural sports programs for Junior High through college levels. Philosophy, program planning, units of competition, and financing of intramural programs. Laboratory experience organization, supervision and officiating the UVM Intramural Program. *Prerequisites:* 22 or 157. Three hours.

195 Recreation Leadership and Programming A practical approach to the significance, theories and characteristics of leadership content and methods of program planning. Field work practice in planning and leadership techniques. Three hours.

197 Reading and Research For course description see the College of Education and Social Services listing.

201 Administration of Athletic Programs Designed to provide the athletic director, school administrator, and teacher-coach with a background for effective administration of the athletic program of schools. Areas considered include scheduling, budgeting, management, equipment, policy, public relations, and educational justification. *Prerequisites:* Twelve hours of 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:* Junior standing. Three hours.

208 School Health Programs Organization of the total school health program. Problems and administration in the area of school environment, health services, health education, and school-community relationship. Special emphasis on health appraisal of children in grades 1 through 12. *Prerequisite:* 116 (Health Education) or equivalent. Three hours.

Physical Education

Physical Education. Two to three hours weekly. One credit.

One year of physical education is required of undergraduate students. (See page 42.) 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 co-educational unless indicated for men or women only.

ACTIVITIES

Archery	Golf	Social Dance
Badminton	Gymnastics	Softball
Basketball	Handball	Square Dance
Conditioning	Ice Hockey	Squash
Cross Country Skiing	Judging Women's Gym	Swimming
Diving	Lacrosse	Tennis
Fencing	Modern Dance	Track and Field
Field Hockey	Officiating Basketball	Trampoline
Field Hockey	Ski Instructors	Umpiring Softball
Officiating	Skin and Scuba Diving	Volleyball
Flag Football	Soccer-Speedball	Wrestling
Folk 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	Horseback Riding	Paddle Tennis
Bowling	Ice Skating	Sailing
Downhill Skiing	Karate	

The following activities, co-offered by the Physical Education and ROTC Departments, may be counted toward the physical education requirement:

Back Packing	Orienteering	Survival
Marksmanship	Rappelling	Physical Training (by special permission of ROTC)

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 7 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.

OTHER COURSES IN EDUCATION

In addition to the courses previously described, the following courses are also offered, usually in the Summer Session and Evening Division.

Number	Title	Credit Hrs.
7	Educational Psychology	3
75	Driver Education Workshop, Basic	3
172	The Creative Process Through Art	3
175	Driver Education, Advanced	3
209	Education of Teachers of the Mentally Retarded I — Early Years	3-6
210	Education of Teachers of the Mentally Retarded II — Later Years	3-6
214	The Slow Learner (Education of the Exceptional Child)	3-6
215	The Gifted Child	3
216	Introduction to Individualizing Instruction for Elementary Classroom Teachers	3
218	Workshop in Curriculum	1-4
219	Workshop in Economic Education	4
219	Introduction to Individualizing Instruction for Secondary Classroom	3
221	Counselor-Teacher-Parent Consultation	3
226	Introduction to Behavioral Principles of Education with Secondary Classroom Application	3
228	Literature in the Junior-Senior High School Curriculum	3
229	Communicative Arts in Secondary Schools (Teaching English in Secondary Schools)	3
240	Musical Creativity in the Junior	3
243	Recent Trends in Music Education	3
253	Practicum in Music Education	1-4
257	Teaching Mathematics in Secondary Schools	3
259	Teaching Foreign Language in the Elementary (Secondary) School	3
260	Improvement in Teaching Bookkeeping and Business Subjects	3
261	Seminar in Business Education	3
262	Principles, Problems, and Trends in Business Education	3
263	Improvement in Teaching Secretarial Subjects	3
264	Business Education Curriculum	3
272	Public and School Library Services	3
273	Cataloging and Classification	3
274	Reference Materials and Teaching the Use of Libraries	3
275	Selection of Books and Materials for Young Adults	3
276	Reference Sources and Services	3
277	Library Materials and Services for Media Personnel	3
277	Seminar in Educational Psychology	3
278	Cataloging and Organization of Media Materials	3
279	Selection of Library Materials for Children	3
290	Development of School Year Minimum Objectives	3
290	Basic Concepts in Music Education	3
291	Psychology of Music	3
291	Special Topics in Organizational and Human Resource Development	Variable

Engineering

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION
(Department of Mechanical Engineering)

1 Introduction to Engineering (3-0) Formulation, analysis and solution of typical engineering problems are used to introduce students to the profession of engineering. Class work includes lectures, case studies, and problem work, and all students are required to participate in individual and group projects. Open to all students. Three hours.

2 Graphical Communication (3-0) An intensive six-week course covering the elements of technical sketching and mechanical drawing. Students who have already mastered these skills may be exempted by successfully completing an examination given in the fall semester. Two hours.

Engineering Science

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION
Prof. Hundal, Martinek, Outwater, Tuthill, von Turkovich (Chairman).

100 Mechanics (3-2). First course in mechanics after the general physics course. Statics, motion of particles, rigid bodies, kinematics and kinetics. Energy methods. *Prerequisites:* Physics 25; Math 121; Concurrent registration in Math 271. Four hours. Hundal.

110 Thermodynamics and Heat Transfer (4-0). Principles of engineering thermodynamics; applications of these principles to thermodynamic cycles; introduction to heat transfer. *Prerequisites:* Physics 24; Math 22. Four hours. Tuthill.

121 Fluid Mechanics (3-3). Dynamics of an ideal fluid; energy and momentum relationships; similitude; flow in conduits; boundary layer mechanics; compressibility phenomena; wing theory; hydrodynamic lubrication; fluid machines and controls. *Prerequisites:* ES 100 and 110. Four hours. Martinek.

122 Heat and Mass Transfer (4-0). Principles of heat transfer; conduction, convection, radiation; steady and unsteady state; the electric analogy; diffusion and mass transfer; applications to heat and mass transfer problems. *Prerequisites:* ES 110 and 121, Math 271. Four hours. Martinek.

131 Engineering Materials (3-3). Atomic, electronic, molecular, crystalline structures; imperfections; phases in solids; equilibrium diagrams; non-equilibrium transformations; diffusion; corrosion phenomena. *Prerequisite:* ES 100. Four hours. Outwater.

134 Engineering Vibrations (3-0). Vibrations of single and multi-degree freedom systems; response to periodic and transient excitation; passive and active isolation of shock and vibration; non-linear phenomena. *Prerequisite:* ES 141. Three hours. Hundal.

141 Systems Control (3-0). Dynamic analysis of lumped parameter systems. Modeling of systems with mechanical, fluid, thermal, electrical,

and biological elements; linearization; theory of feedback control; transient and frequency response; graphic and computer methods of systems analysis and design. *Prerequisites:* Either Math 271 and ES 100, or EE 4 and 171. Three hours. Hundal.

143 Systems Control Laboratory (0-3). Experiments with systems consisting of mechanical, electrical, fluid and thermal elements; dynamic response; implications of systems response in measurement techniques. *Prerequisites:* Credit or concurrent enrollment in ES 141. One hour. Hundal.

Engineering, Civil

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION
Professors Cassell, Dawson, and Oppenlander (Chairman); Associate Professors Downer, Fay, and Olson; Assistant Professors Hemenway and Laible; Lecturer Dunham; Adjunct Professor Knight; Professor Emeritus Milbank.

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. Staff.

2 Dynamic (3-0) Fundamentals of kinematics covering rectilinear and curvilinear motion, relative motion. Coriolis acceleration, translation, rotation, and plane motion; fundamentals of kinetics covering translation, rotation, and plane motion of particles and rigid bodies; work, energy, power; impulse and momentum; and simple harmonic motion. *Prerequisite:* 1. Three hours. Staff.

10 Surveying (3-4) Fundamental surveying methods; propagation of errors as applied to surveying measurements; triangulation; control surveys; and traverse adjustments. *Prerequisites:* Math 21 and CS 11. Four hours. Staff.

11 Geomtronics (2-4) Selected items in analytical photogrammetry; celestial observations, elements of photo-interpretation; theory of curves; and digital terrain analysis. *Prerequisites:* 10 or 12 and Math 22. Three hours. Staff.

12 Plane Surveying (3-4) Fundamental surveying methods; elements of topographic surveying; and special problems according to student interest. For those not enrolled in civil engineering. *Prerequisites:* Math 2 and/or equivalent. Four hours. Staff.

100 Mechanics of Materials I (3-0) The elastic and plastic behavior of materials; normal and shearing stresses from axial, torsional, and flexural loading combinations; deflections due to torsion and bending; applications to statically indeterminate members; analysis of plane stress and strain; failure theories and design criteria. *Prerequisite:* 1. Three hours. Staff.

101 Mechanics of Materials Laboratory (0-3) Experimental stress analysis methods; fundamental properties of metals, plastics, and wood; and the effects of size, shape, method and speed of loading, and strain history on these properties. *Prerequisite:* 100. One hour. Staff.

140 Transportation Planning (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. Three hours. Dawson.

141 Traffic Operations and Design (3-0) Basic characteristics of vehicular and pedestrian traffic; highway and intersection capacity; techniques for measurement and analysis of traffic characteristics; design and application of traffic controls; analyses of rural and urban facilities. *Prerequisite:* 140. Three hours. Dawson, Oppenlander.

142 Structural Roadway Design (3-0) Properties of construction materials for roadways; design of aggregate, asphalt and concrete mixes; analyses of pavement performance; structural design of flexible and rigid pavements; highway earthwork; highway drainage; and construction techniques. *Prerequisites:* 141 and 180. Three hours. Olson, Oppenlander.

150 Environmental Engineering (3-0) Basic environmental engineering concepts: water supply, water and air pollution control, solid wastes. Emphasis on basic phenomena. *Prerequisites:* Chem 5 and Math 21. 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. *Prerequisite:* 150. Three hours. Downer.

155 Quantitative Analysis for Environmental Engineers (2-3) 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:* Chem 4 and Math 22. Three hours. Hemenway.

160 Hydraulics (3-3) Mechanics of fluids with emphasis on incompressible fluids; flow meters; flow in closed conduits and open channels; elements of hydraulic machinery; laboratory studies of flow in closed conduits and open channels; and experiments with hydraulic machinery. *Prerequisite:* 2. Four hours. Downer.

161 Fundamentals of Fluid Mechanics (3-0) An introduction to the statics and dynamics of fluids. One-third to one-half of the semester will be spent on acquiring the necessary level of competence in mathematics, statics, and dynamics. *Prerequisites:* One year of college calculus and one year of related science. Three hours. Staff.

162 Applied Fluid Mechanics (3-3) The application of basic principles of fluid mechanics to practical problems; flow in closed conduits and open channels; and hydraulic structures and machinery. *Prerequisite:* 161. Four hours. Staff.

163 Principles of Hydrology (3-0) A systematic analysis of the distribution and movement of water in the environment; detailed discussion in nonmathematical terms of the occurrence, distribution, and movement of water through the main phases of the hydrologic cycle; precipitation, interception, evaporation, soil moisture, groundwater, and runoff; and methods of measurement of a wide range of the hydrologic parameters. *Prerequisites:* Junior standing and one year of college science. Three hours. Downer.

170 Structural Analysis I (3-3) Analysis and design of statically determinate structures; consideration of function, expected loads, reactions, material choice, and layout of members; influence lines; criteria for positioning moving loads; classical analysis of trusses, frames and beams; geometric methods for displacement calculations; introduction to matrix

analysis for trusses and computer-aided analysis and design. *Prerequisites:* 100 and CS 11. Four hours. Laible.

171 Structural Analysis II (3-0) Analysis of statically indeterminate structures by consistent deformation, least work, slope deflection, and moment distribution; determinations of deflections by energy methods; matrix analysis for frame structures and computer-aided analysis and design. *Prerequisites:* 170 and CS 11. Three hours. Laible.

172 Advanced Structural Design (3-0) Theory and design of steel structures including flexural members, axially loaded members and combined stress members; design of composite members; introduction to plastic analysis and design. *Co-requisite:* 171. Three hours. Dunham.

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. Dunham.

180 Soil Mechanics (3-3) Identification, description, and physical properties of soils and other particulate systems; subsurface exploration; and engineering characteristics of natural deposits; consideration of stress distribution, permeability, consolidation, shear strength, and stability of soils; and laboratory practice in testing for index properties, permeability, consolidation, shear, and the effects of additives and cementing agents on particular systems. *Prerequisite:* 100. Four hours. Olson.

181 Substructure Analysis and Design (3-3) Evaluation of subsoil conditions and earth pressures; and design of retaining walls, substructures for buildings and bridges, and cofferdams. *Prerequisite:* 180. Four hours. Olson.

190 Special Projects (3-0) Independent investigation of a special topic under the guidance of a faculty member. The course work may consist of library investigations, unique design problems, and laboratory and field studies. Preparation of a formal report on the problem is required. *Prerequisites:* Senior standing and departmental permission. Three hours.

191, 192, 193 Intern in Civil Engineering (3-0) Assignments which are individual or group investigations under the guidance of one or more faculty members. Three hours.

194 Extern in Civil Engineering (3-0) Assignments consisting of practical engineering experiences in selected public and private organizations. Each student will work under the guidance of an experienced engineer or other professional person. *Prerequisite:* 191. Three hours.

195 CE Inspection Trip (0-0) As a college requirement, all students must participate in a scheduled inspection trip. Various civil engineering projects and related activities are visited under the guidance of professional personnel. Students normally take this trip in the Spring semester of their junior year. *Prerequisite:* Junior standing.

210 Airphoto Interpretation (2-3) Techniques in aerial photographic interpretation; principles of stereoscopic viewing and identification of the airphoto features related to land form, vegetation, drainage, soil color and tone, topography, and cultural features; special techniques in remote sensing; and the use of airphoto interpretation in soil identification, agricultural and forest surveys, water and air resource studies, regional and urban planning, and site and route locations. *Prerequisite:* Senior or Graduate standing. Three hours. Olson.

220 Construction Engineering (3-0) Discussion of construction processes; relationship of techniques to design details and specification requirements; sequence studies by means of CPM and PERT; measurements of construction efficiency, cost estimating, and specifications; and case

studies of local projects. **Prerequisite:** Senior or Graduate standing. **Three hours.** (Not approved for graduate credit.)

225 Engineering Economy (3-0) Mathematical comparison of alternatives to maximize the financial return on engineering decisions and processes; project feasibility studies and design decision making; effect of taxes on engineering decisions; and analysis of risk and uncertainty. **Prerequisite:** Senior or Graduate standing. **Three hours.** Oppenlander.

226 Civil Engineering Systems Analysis (3-0) Development of operations research techniques including graph theory, dynamic programming, linear programming, and scheduling, resource allocation and simulation, specific applications to public works problems; emphasis on comparison of solution models and selection of appropriate models for solving complex problems. **Prerequisite:** Senior or Graduate standing. **Three hours.** Dawson.

227 Discrete Simulation (3-0) Development of discrete simulation using monte-carlo techniques and the GPSS simulation processor; techniques for modeling dynamic entities, fixed facilities, buffers, storage areas, queues, and control devices; mathematical modeling of movement as a probabilistic, time-dependent process; analyses of state-control and feedback control systems; validation and sensitivity analyses, comprehensive development of the GPSS simulation processor. **Prerequisites:** Statistics 111, 141 or 151, and senior or graduate standing. **Three hours.** Dawson. (Not approved for graduate credit.)

230 Community Planning Techniques (3-0) Theories on the size, spacing, and functions of cities; economic, social, and physical determinants of various land-use elements; basic studies for urban planning; and the process of land-use planning including location and space requirements and the development of the land-use plan. **Prerequisite:** Senior or Graduate standing. **Three hours.** Oppenlander.

231 Community Planning Analysis (3-0) History and development of urban planning; approaches to planning with attention to city design and appearance, quantitative methods in planning, and social welfare planning; plan implementation; organization and administration of planning agencies, and financial planning. **Prerequisite:** Senior or Graduate standing. **Three hours.** Dawson, Oppenlander.

232 Community Design (2-1) Basic principles and methods of planning and designing the community; site selection; and elements such as subdivisions, industrial parks, new towns, etc. **Prerequisites:** 230 or 231, **Three hours.** Dawson, Oppenlander.

233 Regional Planning (see Resource Economics 223).

240 Traffic Engineering Characteristics (3-0) Basic components of highway travel including driver, vehicle, roadway, environmental, and pedestrian characteristics; traffic flow and intersection characteristics; highway and intersection capacities; performance of traffic systems; and techniques for measuring traffic characteristics. **Prerequisites:** Stat 141 and Senior or Graduate standing. **Three hours.** Dawson, Oppenlander.

241 Transportation Systems Engineering (3-0) Interdisciplinary aspects of transportation systems and their technological characteristics; mathematical analysis and synthesis of system problems; economic consideration of transportation; fiscal studies and financial planning; and administration of transportation systems. **Prerequisites:** Stat 141 and Senior or Graduate standing. **Three hours.** Dawson, Oppenlander.

244 Urban Transportation Systems (3-0) Transportation planning process for urban areas; inventory, use, and desire studies for urban transportation; techniques of travel forecasting and trip generation, distribution,

and assignment; planning, design and operation of mass transit systems; and location and design of terminal facilities. Prerequisite: Senior or Graduate standing. Three hours. Oppenlander.

250 Environmental Facilities Design-Water (2-3) Design of water supply systems including source evaluation, transmission, distribution, water treatment plant design; equipment selection; and wells. Prerequisite: 151. Three hours. Cassell.

251 Environmental Facilities Design-Wastewater (2-3) Design of wastewater conveyance and treatment facilities; sewage treatment plant design; and equipment selection. Prerequisite: 151. Three hours. Cassell.

252 Industrial Hygiene (3-2) Industrial hygiene problems; effects of pollutants on health; threshold limit values; and emphasis on the engineering evaluation of the hazard and control techniques. Prerequisites: Chem 5 and Phys 25. Three hours. Hemenway.

253 Air Pollution (3-0) Sources of air pollution, methods of measurement, standards, legal aspects and control techniques available. Emphasis placed on source testing and source control. Prerequisites: Chem 5 and Math 21. Three hours. Hemenway.

254 Solid Wastes (3-0) Significance of solid wastes from municipal, industrial, agricultural, mining; optimization and design of collection, disposal, recycle systems; and sanitary landfills, incineration, composting, material recovery. Prerequisites: Chem 5 and Phys 25. Three hours. Cassell.

255 Water Renovation Processes-Chemical/Physical (2-3) Design theory of chemical/physical processes for treating waters and wastewaters; mass transfer, coagulation/precipitation, sedimentation, filtration, mixing, absorption, ion exchange, and membrane processes; and pilot plant experimentation. Prerequisites: 160, Chem 5, Math 22 and Senior or Graduate standing. Three hours. Staff.

256 Water Renovation Processes-Biological (2-3) Design theory of biological processes for treating waters and wastewaters; aerobic, anaerobic, photosynthetic processes; disinfection; and pilot plant experimentation. Prerequisites: Math 22 and Senior or Graduate standing. Three hours. Staff.

257 Analysis of Aquatic Systems (3-0) Quantitative study of biological, chemical and physical phenomena in lakes, streams and estuaries; and mathematical modeling applied to management of water quality. Prerequisites: 150 and 160. Three hours. Staff.

258 Environmental Facilities Design-Air (2-3) Advanced design principles for air pollution control equipment including scrubbers, precipitators, cyclones, and filters. Prerequisites: 150 and 252 or 253. Three hours. Hemenway.

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 contaminants. Prerequisite: 252 or 253. Three hours. Hemenway.

260 Hydrology (3-0) The basic 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 and Stat 141. Three hours. Downer.

261 Open Channel Flow (3-0) Application of the basic laws of fluid mechanics to flow in open channels; design of channels and transition structures including riprap and culverts; and gradually-varied flow problems in-

cluding flood plain and floodway studies. *Prerequisite:* 160. Three hours. Downer.

263 Measurements in Applied Hydrology (2-3) Design of hydrologic experiments; observational methods, equipment and problems in describing precipitation, runoff, air temperature, relative humidity, wind movement, solar radiation, evaporation, soil temperature; infiltration, soil moisture, soil density, soil water pressure, sediment load, and snow density; data reduction and handling techniques; and application to the instrumentation and study of the hydrology of a small watershed. *Prerequisite:* 163 or 260. Three hours. Downer.

270 Advanced Indeterminate Structures (3-0) Matrix analysis of framed structures; finite element theory and application in structural mechanics and hydrodynamics; emphasis on computer applications and numerical analysis techniques. *Prerequisites:* 171 and a basic knowledge of matrix algebra and computer programming. Three hours. Laible.

271 Prestressed Concrete Structures (3-0) Ultimate strength theory for concrete structures with emphasis on prestress effects; prestressed beam analysis, load balancing methods, columns, and piles, bent analysis, yieldline theory, and circular prestressing in domes and tanks; and discussion of current design specifications. *Prerequisite:* 173. Three hours. Laible.

280 Applied Soil Mechanics (3-0) Use of soil mechanics in the evaluation of building foundations, braced excavations, earth structures; lateral earth pressures, pile foundations, pier and caisson foundations, slope stability, and construction problems. *Prerequisite:* 180. Three hours. Olson.

282 Engineering Properties of Soils (2-3) Study of soil properties that influence the engineering behavior of soils; subject areas include soil mineralogy, physio-chemical concepts, plasticity properties, permeability and compaction; and laboratory study of soil index properties, permeability, and compaction tests. *Prerequisite:* 180. Three hours. Olson.

290 Engineering Investigation (3-0) Independent investigation of a special topic under the guidance of a staff member. The course work may consist of literature investigations, unique design problems, and/or laboratory and field studies. Preparation of an engineering report is required. *Prerequisite:* Senior standing or departmental permission. Three hours. Staff.

Engineering, Electrical

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION
Professors Absher, Evering, Handelsman, Lai, Roth and Rush (Chairman). Associate Professors Mirchandani and Williams; Lecturer Hogel, Adjunct Professors Hohl, Koss; Adjunct Instructor Dickstein; Adjunct Lecturer Bullis.

Undergraduate Courses

3 Engineering Analysis I (3-0) Input-output relations of systems. Ordinary linear differential equations with specific application to linear systems. Response of systems to exponential excitation and concepts of complex frequencies. Impulse response. Steady-state response of linear systems. System functions. Resonance. Network theorems. Energy and power. *Prerequisite:* Math. 21. Three hours. Staff.

4 Engineering Analysis II (3-0) Coupled circuits and transformers. Non-linear elements. Fourier series and integrals. Laplace transformation. Two port networks. *Prerequisite:* 3. Three hours. Staff.

31 Engineering Computation I (2-0) Analog and hybrid computing devices. Simulation of linear algebraic and dynamic systems. Various mathematical operations. Non-linear problems. Conversion between analog and digital domains. Scaling. *Prerequisite:* Concurrent enrollment in Math. 121. Two hours. Staff.

32 Engineering Computation II (2-0) Introduction to digital computers. Hardware and software structure. Solution of electrical engineering problems using digital computer techniques. *Prerequisite:* 31. Two hours. Staff.

94 Bioengineering Applications of Physical Principles II (3-3) Application of the 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. Staff.

100 Electrical Engineering Concepts (3-3) Designed for students not majoring in Electrical Engineering; introduction to electrical measurements and circuit theory; energy conversion, instrumentation, and digital systems for science and industry. *Prerequisites:* Math. 121 and Physics 25. Four hours. Staff.

101 Electronic Circuits and Instruments (3-3) Active circuit analysis and design, application of Laplace Transforms, s-plane impedance concepts, design applications to analog and digital circuits and instruments. *Prerequisite:* 100 or related undergraduate preparation. Four hours. Staff.

111 Control Systems (3-0) Theoretical background for analysis and synthesis of feedback control systems. Concepts of stability, transfer functions, signal flow, performance criteria, compensation and the classical root-locus and frequency response methods. State variable approaches. Analog simulation as a design tool. *Prerequisite:* 4. Three hours. Staff.

113 Electromechanical Energy Generation and Distribution (3-0) Principles basic to electromechanical energy conversion devices and systems. Concepts associated with the interchange of energy among electrical magnetic and mechanical circuit elements. Continuous energy conversion in the ideal and practical rotating machine. Machine dynamics. *Prerequisites:* 3 or 100. Three hours. Staff.

114 Electric Energy Conversion Systems (3-0) Analysis of present and future systems for energy conversion to electricity, primarily; other energy end-forms are included for overall perspective. Emphasis is on systems (e.g., fossil fuel, hydro, geothermal, fission, fusion, solar, wind, etc.) their technical operation characteristics, economics, and environmental impact. Designed for electrical and other engineers and scientists. *Prerequisite:* Physics 25. Three hours. Staff.

121 Electronics I (3-0) Properties of semiconductors. PN junctions. Application of diodes. Circuit models for transistors, vacuum tubes, and other active devices. Biasing techniques and regions of operation. *Prerequisite:* 4. Three hours. Staff.

122 Electronics II (3-0) Properties of amplifiers. Amplifier design. Feedback and oscillation in electronic circuits. High-frequency circuit models and limitations. *Prerequisite:* 121. Three hours. Staff.

123 Electronics III (3-0) Analysis of pulse and digital circuits. Design of transistor logic gates, multivibrators, and blocking oscillators. *Prerequisite:* 122. Three hours. Staff.

143, 144 Electromagnetic Field Theory (3-0) Basic laws and elementary applications of electromagnetic fields; electrostatics, magnetostatics,

Faraday's law, Maxwell's equations, plane waves, transmission lines, waveguides, and antennas. *Prerequisites:* 4 or Physics 25 for 143; 143 or Physics 213 for 144. Three hours. Staff.

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:* 144. Three hours. Staff.

263 Solid State Physical Electronics I (3-0) Introduction to the physics of atoms and crystals through quantum and statistical mechanics. Application of these principles to semiconductor devices. *Prerequisite:* Physics 128. Three hours. Staff.

264 Solid State Physical Electronics II (3-0) Theories of conductivity, dielectric constant, magnetic permeability, optical properties, piezoelectricity, ferroelectricity, pyroelectricity, magnetostriction. *Prerequisite:* 263. Three hours. Staff.

170 Discrete-Time Signal and Systems Analysis (3-0) Discrete-time Signals & Systems. Properties of Discrete Signals and Linear Discrete Systems. The z-Transform. The Inverse z-Transform. System Transfer Function and System Response. Digital Filters & Their Design. State Space Representation of Systems. Applications. *Prerequisites:* CS 11 and Math. 22. Three hours. Staff.

171 Signals and Systems (3-0) Fourier series and Fourier integral. Pulse, periodic, and random signals and their spectra. Correlation functions and power spectra of signals. Transmission of signals through linear systems. *Prerequisites:* 4. Three hours. Staff.

174 Information-Transmission Systems (3-0) Introduction to information transmission. Modulation and demodulation. Noise and noise figures. Comparison of information transmission systems. Transmission lines and propagation. *Prerequisite:* 171. Three hours. Staff.

176 Theory of Communications (1-0) For students of Speech Pathology, Special Education, Psychology, Life and Social Sciences. Includes definitions of information and coding, effects of bandwidth, noise and channel capacity. Applications includes communications aids for the physically handicapped, remote communications, animal-human communication experiments, sensory resolution, ESP, the genetic code, the nervous system. One hour. Staff.

Laboratories

Each student will keep a laboratory notebook which will be collected and checked periodically by the instructor. He will prepare one experiment in a form suitable for publication and will present his paper to the class and other interested persons. The student will be graded on the notebook as well as the final written and oral presentation.

81 Sophomore Laboratory (1-3) Direct current measurements, nonlinear resistive elements, electron ballistics, the cathode ray oscilloscope, transients in RC circuits, alternating current measurements, sinusoidal behavior of RL and RC circuits, transients and sinusoidal behavior of RLC circuits. Two hours. Staff.

82 Sophomore Laboratory (1-3) Alternating current bridges, resonant harmonic analyzer, acoustic resonance, measurement of charge, current, voltage, power, resistance, capacitance, inductance, and time. *Prerequisite:* 81. Two hours. Staff.

183 Junior Laboratory (1-3) Two dimensional field mapping; electrostatic field plots, duals, and analogs; magnetic fields and circuits;

magnetic forces and the magnetic field as an energy source. Input-output characterizations of linear time invariant systems. Introduction to active circuits; amplification and oscillation. *Prerequisite:* 82. Two hours. Staff.

184 Junior Laboratory (1-3) Active device characteristics, Power supplies a.m. and f.m. modulation and detection. Transformer, magnetic amplifiers, a-c and d-c machines. *Prerequisite:* 183. Two hours. Staff.

185 Senior Laboratory (0-3) Electrical conductivity in solids, the Hall effect, properties of gaseous conductors and dielectric materials. Control systems. Electromechanical transducers. *Prerequisite:* 184. One hour. Staff.

186 Senior Laboratory (0-3) Design and construction of pulse and digital circuits including logic gates, astable multivibrators, bistable multivibrators, monostable multivibrators, and blocking oscillators. *Prerequisite:* 185. One hour. Staff.

187, 188 Senior Project (0-3), (0-3) Experimental or theoretical project selected by the student and conducted under staff supervision. One hour. Staff.

Advanced Undergraduate and Graduate Courses

201 Linear System Theory (3-0) Introduction to linear system theory and application to the processing and control of information. Mathematical models and classification of systems. Lagrangian and Hamiltonian formulation. Time-invariant and time-varying differential systems. Characterization by impulse response and integral transforms. Methods of analysis. Adjoint system and implications. Characterization and analysis of linear discrete-time systems. *Prerequisite:* Math. 124 or equivalent background. Three hours. Mirchandani.

202 Network Analysis (3-0) Introduction to modern network analysis through a topological study of networks with emphasis on electrical networks. Graph theory. Fundamental principles and theorems. State variable characterization of linear, nonlinear and time-varying networks. Other methods of characterization. Analysis using linear algebra concepts. Computational problems. *Prerequisites:* 171 and Math. 124 or equivalent background. Three hours. Mirchandani.

205, 206 Network Synthesis (3-0) Design of linear and nonlinear networks using the digital computer. Review of classical realizability theory of passive networks. Computer oriented topics including linear algebraic computational and numerical integration problems. Concepts of modeling. Optimization methods. Worst case design. Use of analysis programs. Discussion of recent methods and developments. *Prerequisite:* 202. Knowledge of programming helpful but not necessary. Three hours. Mirchandani.

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. Rush.

220 Electronic Instrumentation for Scientists (3-3) Introduction to electrical components and circuit theory, electrical measurements, oscilloscopes, power supplies, amplification by vacuum tubes and transistors, oscillators, comparison measurements, servo systems, operational amplifiers for measurement and control, electronic switching circuits, timing and digital counting systems. This course may not be taken for credit by students in Electrical Engineering. *Prerequisites:* College physics and calculus or permission of the instructor. Four hours. Staff.

231, 232 Fundamentals of Digital Computer Design (3-0), (3-0) Fundamentals of logical design. Design of combinational and sequential logic circuits. Implementation of arithmetic operations. Memory systems. In-

struction codes. Dynamic storage allocation. Graduate credit not given for both 230 and 236. *Prerequisites:* CS 101 or E.E. 32 or equivalent. 230, or 236 for 237. Three hours. Staff.

233 Minicomputer Systems and Microprocessors (3-0) Introduction to mini and micro computers; hardware and peripherals; software and programming aspects; operating characteristics and configurations; mini/micro computer systems applications; discussion of system reliability, installation, and maintenance; future trends of minis and micros. *Prerequisite:* Senior standing in Electrical Engineering or Computer Science or departmental permission. Three hours. Staff.

234 Computer Peripherals-Interfacing (2-3) Selected topics in the area of digital computer controls; basic principles of mini/microcomputer operations; description of major types of peripheral components; analog-to-digital, digital-to-analog channels; magnetic devices, display devices, mechanical devices; programming peripheral devices; interface designs of analog systems to mini/microcomputers. *Prerequisite:* 32 or permission of instructor. Three hours. Williams.

237 Digital Computer Logic, Circuits and Systems (3-0) The logical design digital computers. Boolean algebra as an aid to circuit design. Circuits and components for the transmission, storage and modification of information and their combination into arithmetic units, memory devices, program controls and micro-processors. *Prerequisite:* Graduate standing or departmental permission. Three hours. Staff.

238 Computer Applications for Design and Manufacturing (3-0) Computer hardware and software concepts. Basic and advanced APL Program Language, practical computer applications. *Prerequisite:* Department permission. Three hours. Staff.

240 Boundary Value Problems in Electromagnetism (3-0) Solution of classical problems of electromagnetism using images, conformal mapping and separation of variables methods. *Prerequisite:* 144. Three hours. Rush.

242 Theory and Applications of Time-Varying Fields (3-0) Maxwell's Equations and boundary conditions for time varying systems. Propagation and reflection of electromagnetic waves, guided electromagnetic waves, resonant cavities, and microwave networks. *Prerequisite:* 240 or departmental permission. Three hours. Handelsman.

244 Radar Systems Engineering (3-0) Radar theory including antennas, propagation, signal detection and parameter estimation. Applications including search and track radars, aircraft control and landing, radio/radar astronomy, and modern phased array radars. *Prerequisite:* 174 or departmental permission. Three hours. Handelsman.

251 Applications of Linear Algebra (3-0) Introduction of basic definitions and concepts of linear algebra; formulation and solution of engineering problems. Definitions of linear vector and function spaces, linear operators, change of basis, spectral representation of operators, the eigen-value problem, functions of matrices. Application to problems of state variable analysis, field theory, mechanics, quantum mechanics and signal theory. *Prerequisites:* Graduate standing in EE or Physics or departmental permission. Three hours. Rush.

261 Transistor Engineering (3-0) Introduction to energy band theory and the effective mass concept. Analysis of the transport properties of holes and electrons. Characteristics of PN junctions. Theory of transistors as developed from drift and diffusion properties of carriers. Charge control model of transistor switch. *Prerequisite:* Math. 121. Three hours. Lambert.

262 Transistors (3-0) The fundamental principles of semi-conductor operation. P and N type conductivity; the PN junction; construction of the

junction transistor. Circuit analysis of transistor operation in terms of hybrid parameters. Analysis of MOSFET device characteristics and equivalent circuits. *Prerequisite:* 261. Three hours. Staff.

270, 271 Signal Processing (3-0) Signal-space concepts. Processing of analog and digital signals. Representation and analysis of nonrandom and random signals. Signal measurement techniques. Analysis and design of digital filters. Applications to real-world signals such as biosignals and signals in communication and radar systems. *Prerequisites:* Graduate standing in Electrical Engineering or 171, 270 for 271. Three hours. Lai.

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. Staff.

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. Staff.

285 Creative Engineering (3-0) Creative techniques applied to problems in process control, biomedical engineering, communications, circuit design. *Prerequisites:* Graduate standing in EE or departmental permission. Three hours. Roth.

287, 288 Special Topics (3-0) Formulation and solution of theoretical and practical problems dealing with electrical circuits, apparatus, machines or systems. *Prerequisite:* 4. Three hours. Staff.

Engineering, Mechanical

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION
Professors Gaden, Hundal, Marshall, Martinek, McLay, Outwater, Tuthill, von Turkovich (Chairman); Associate Professor Carpenter; Research Professor Pope; Adjunct Professors Gardiner and Liu.

1 Technical Graphics I (0-6) Familiarization with and use of drawing materials and equipment; geometric constructions; free hand sketching and lettering; pictorials; charts and graphs; orthographic projection and multi-view drawings; topographic drawings; introduction to descriptive geometry. The student is expected to furnish his (her) own drafting equipment. Three hours. Tuthill.

93 Bioengineering Applications of Physical Principles I (3-3) Applications of the principles of mechanics, thermodynamics and mechanical engineering to an understanding of the structure and function of the human body and to diagnostic and therapeutic instrumentation. Four hours. Hundal.

100 Materials I (3-0) Mechanics concepts; force transmission; stress, strain, temperature relationships; torsion; bending stresses; deflections in torsion and bending; stability redundant structures. *Prerequisite:* ES 100. Three hours. Outwater.

102 Materials III (3-0) Mechanical testing; fracture and failure mechanisms; strengthening mechanisms; ceramics; polymers; plastic deformation. *Prerequisite:* ES 131. Three hours. Outwater.

111 Engineering Thermodynamics III (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:* ES 110 or ME 115. Three hours. Tuthill.

115 Thermodynamics (3-0) The first and second law of the classical thermodynamics; introduction to statistical mechanics, Boltzmann, Bose-Einstein and Fermi-Dirac statistics, partition function; microcanonical, canonical and grand canonical ensembles; kinetic theory of gases; introduction to statistical thermodynamics; derivation of thermodynamic properties of perfect gases and solids; Maxwell relations; chemical equilibrium; the behavior of real gases and liquid; phase equilibrium and multicomponent systems. *Prerequisites:* Physics 128, Math. 22. Three hours. Martinek.

119 Engineering Experimentation (1-3) Engineering Measurements; experimental error; test sequences; data analysis. Experiments using the project method to investigate engineering principle, instrument capability and the theory of experimentation. *Prerequisite:* Sophomore standing in ME. Two hours. Staff.

131 Materials Processing I (2-3) Properties of materials pertinent to processing; principles of casting; forming; metal removal and welding processes. Emphasis on material behavior and economics. *Prerequisites:* Physics 24. Three hours. Marshall.

135 Engineering Design I (3-3) Application of fundamental principles to the design of machine elements including consideration of function, production, and economic factors with emphasis on engineering mechanics. Projects including experimental and analytical work. *Prerequisites:* ME 100, ES 100. Four hours. Carpenter.

191, 192 Thesis (0-9) Investigation of a research or design project under the supervision of an assigned staff member culminating in an acceptable thesis. *Prerequisites:* Senior standing and departmental permission. Three hours. Staff.

200 The Engineering Profession (2-0) The professional practice of engineering; laws and professional attitudes regarding design, standards of patient safety, liability, insurance, industrial hygiene and contracts. *Prerequisite:* Senior standing. Two hours. Outwater. (Not approved for graduate credit.)

201 Safety Engineering (2-0) Safety management and standards, recognition and control of environmental, mechanical, electrical and chemical hazards, fire prevention, personal protective equipment. *Prerequisite:* Senior standing in Engineering or Business Administration or permission of instructor. Two hours. Marshall. (Not approved for graduate credit.)

202 Dynamics II (3-0) Advanced topics in dynamics of particles and systems of particles. Space motion in fixed and moving frames of reference. Impulse and momentum. Central force motion. Kinematics and kinetics of rigid bodies. Euler's equations of motion. Gyroscopic effects in mechanical systems. *Prerequisite:* ES 100. Three hours. Hundal.

206 Application of Computers in Engineering (3-0) Utilization of digital and analog/hybrid computers as engineering tools for the solution of complex engineering problems. *Prerequisite:* Senior standing. Three hours. Hundal.

211 Advanced Mechanical Structure I (3-0) Statically indeterminate problems in bending; general expression of strain energy; theorem of Castigliano and the unit load method; theory of curved beams; beams on

elastic foundations; unsymmetrical bending; torsion of thin sections. *Prerequisites:* ES 100, ME 100. Three hours. McLay.

222 Advanced Mechanical Structures II (3-0) Theory and applications of the force, and displacement matrix methods of analysis; basic theory of elasticity including analysis of stress, the equilibrium equations; analysis of strain, the compatibility equations, and generalized Hooke's law; introduction to plasticity; problems of plane stress and plane strain; finite differences and variational methods. *Prerequisite:* ME 211. Three hours. McLay.

231 Materials Processing II (2-3) Fundamentals of forming from liquid state, plastics forming, metal joining, powder metallurgy. *Prerequisites:* ME 102, ES 110. Three hours. von Turkovich.

232 Micromanufacturing Technologies (3-0) Crystal growth, defects, diffusion mechanisms, theory and practice. Thin film processes, vacuum, chemical vapor deposition; selection of integrated circuit materials and processes; photolithography; interconnection technologies and packaging. Manufacturing engineering for semi-conductors, plant and equipment aspects. *Prerequisite:* Senior standing or departmental permission. Three hours. Gardiner.

243 Advanced Fluid Mechanics (3-0) Foundations of compressible flow; isentropic flow; normal and oblique shock waves; Prandtl-Myer flow; flow with friction and with heating and cooling; flow in electric and magnetic fields; potential flow; linearized flows; method of characteristics. *Prerequisite:* ES 121. Three hours. Martinek.

246 Aerodynamics (3-0) Application of the principles of fluid mechanics to the design and performance of aircraft; fluid dynamics; experimental facilities; airfoil characteristics; aspect ratio and plan-form influences; viscosity phenomena as applied to boundary layer; transition and separation on various shapes; compressibility phenomena; the optimum airfoil; performance. *Prerequisite:* ES 121. Three hours.

252 Engineering Design II (2-3) Application of engineering principle to the design of mechanical systems and their components. Group projects on current industrial problems. *Prerequisite:* ME 135. Three hours. Carpenter.

261 Energy (3-0) The study of energy, including sources, methods of conversion, utilization, and the effects on the environment. Recognition of the second Law is emphasized. *Prerequisites:* ME 111 and concurrent enrollment in ES 122. Three hours. Tuthill.

262 Thermal Systems (2-3) Application of engineering thermodynamic machines and processes; problems of gas turbine, jet propulsion, nuclear power plants, energy conversion devices and other areas of current interest. *Prerequisite:* ME 261. Three hours. Tuthill.

264 Thermal Environmental Engineering (3-0) The principles of psychrometrics, heat transfer and fluid mechanics applied to thermal environments and their control for man, animal or process. *Prerequisites:* ME 111, ES 121 and 122. Three hours. Tuthill. (Not approved for graduate credit.)

272 Mechanical Behavior of Materials (3-0) Elastic and plastic behavior of single crystals and; dislocations; approximate plastic analysis; anisotropic materials; hardness; residual stress, brittle, transitional and ductile fractures; fatigue; damping; creep and surface phenomena. *Prerequisite:* ME 102. Three hours. Outwater.

275 Human factors (2-3) Human sensory capabilities and limitations, design of information input, human motor activities and space relationships, intro. to work measurement. Three hours. *Prerequisite:* junior standing. Marshall. (Not approved for graduate credit.)

276 Plant Planning and Design (3-3) Analysis of facilities and services requirements, material handling, office and clean room layout, mathematical and computer techniques, safety and plant conservation. Four hours. *Prerequisite:* ME 131 or permission of instructor. Marshall. (Not approved for graduate credit.)

281, 282 Seminar (1-0) Presentation and discussion of advanced mechanical engineering problems and current developments. *Prerequisite:* Senior or Graduate Engineering enrollment. One hour.

286 Mechanical Engineering Laboratory (0-9) A laboratory experience designed to the particular interest of the student, utilizing and synthesizing his total mechanical engineering educational experience. *Prerequisite:* Senior standing in Mechanical Engineering. Three hours. (Not approved for graduate study.)

295, 296 Special Topics (3-0) Advanced study and discussion in areas dependent on the interest of the students. *Prerequisites:* Senior or Graduate standing and departmental permission. Three hours. (Not approved for graduate credit.)

297 Nuclear Engineering (3-0) Neutron chain reactions and the criticality condition; the slowing down of neutrons in an infinite medium; one-speed diffusion of neutrons in a multiplying and non-multiplying system combined slowing down and diffusion; bare and reflected homogeneous reactors; time-dependent behavior of reactors; reactor control theory; reactor accident and transient analysis. *Prerequisite:* Senior standing. Three hours. von Turkovich, Martinek.

English

COLLEGE OF ARTS AND SCIENCES

Professors Bogorad, Broughton, Clark, Cochran, Jones, Long, Orth, Poger, Rothwell and Shepherd; *Associate professors* Bradley, A. I. Dickerson, Edwards, Eschholz, Gutman, Hall, Howe (Chairman), Huddle, Stanton and Rosa; *Lecturers* M. J. Dickerson, Kohler; *Emeritus Professors* Bandel, Dean, Hughes, Pope and Trevithick.

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. Staff.

2 Types of Literature An introduction to fiction, poetry, and drama — past and present, British and American. Staff.

3 Genre: Drama An approach to the play as a work of literature and as a dramatic experience. The course will include a variety of Continental, British, and American drama and will range from the classical to contemporary periods. Staff.

4 Genre: Fiction Exploration of a variety of fictional forms which will include the short story, the novella, and the novel. Staff.

5 Genre: Poetry An examination of the forms of poetry, past and present, British and American. The course will provide a wide variety of perspectives on the poem. Staff.

6 Theme Course Exploration of a single literary theme by examining a variety of genres. Subject matter will change from semester to semester. Some representative topics have been: war and violence, myth and literature, and ecology. Staff.

7, 8 British Literature A survey of major figures in British literature such as Chaucer, Milton, Swift, Wordsworth and Shaw. The course is of special value to students planning for a major in English, though it has interest for anyone wishing a sound introduction to literary history. Staff.

9, 10 American Literature A survey of major American writers, from the beginning of the nineteenth century down to the present, such as Poe, Thoreau, Hawthorne, and Melville (9); Twain, Eliot, Hemingway, and Faulkner (10). Staff.

11, 12 World Literature A survey in comparative literature dealing with the great writers of the world to include Vergil, Dante, Goethe, and similar major figures. For students planning a major in English, this background is valuable in providing a context for English and American literature. Staff.

13 Introduction to the English Language Topics will include consideration of language as a part of human behavior, history of the language, dialects of American English, lexicography, and the new analyses of English. Clark, A. I. Dickerson, Eschholz, Jones, Rosa.

20 Science Fiction and Fantasy Literature Representative modern works of fantasy and science fiction, including works by Asimov, Tolkien and Clarke. I, II. Stanton.

50 Expository Writing Writing and analysis of expository essays (sophomore standing a prerequisite). Howe, Sweterlitsch.

53 Writing: Poetry and Fiction An introductory course in the techniques of writing poetry and short prose fiction. Classes are organized around the discussion of student work and the problems arising from weekly writing assignments (preference in enrollment given to sophomores). Broughton, Edwards, Huddle.

61 Utopian and Anti-Utopian Fiction Themes and literary characteristics of selected English and American utopias and dystopias from the Renaissance to the present. Bogorad.

62 Women In Literature Consideration of the changing roles of women through examination of the images, archetypes, and stereotypes of women characters in selected literary works, primarily British and American. Clark.

Unless otherwise stated, the prerequisite for any course in the Department of English numbered 100-199 is 6 hours of English (or exemption), or Junior standing and permission of instructor.

107, 108 Shakespeare Howe, Rothwell, Simone.

135, 136 Canadian Literature The development of a national literature. Required of students in the Canadian Area Studies Program. Thompson.

138 Modern British Novel Bradley, Stanton.

140 Modern Short Fiction Cochran, Gutman, Jones, Shepherd.

141 Modern American Novel American novelists from 1915 to 1945. Biddle, Cochran, Eschholz, Gutman, Poger, Shepherd.

142 Contemporary American Novel Significant American novelists since 1945. Cochran, Gutman, Shepherd.

143 Literature of Black America Poetry, fiction, and drama by black writers since the turn of the century. M. J. Dickerson.

150 Techniques for Teaching Composition in Middle and Secondary Schools Problems and methods of teaching composition in the middle school and high school. Topics include defining the relationships among grammar, rhetoric, literature and composition; evaluating student writing; individualizing instruction; and designing a composition curriculum. *Prerequisite:* 50. Sweterlitsch.

159 Contemporary American Poetry American Poetry since 1950. Edwards.

165 Introduction to Folklore Basic concepts of folklore — folklife study; development of the discipline; survey of major genres: material culture, oral literature, custom, and kinetic lore; role of folklore in modern society. Sweterlitsch.

173 Technique and Criticism of Poetry Intensive analysis of various kinds of poetry to develop appropriate critical methods and standards. Bogorad.

176 Introduction to Critical Approaches A survey of major critical approaches, with emphasis on both critical problems and specific critical attitudes toward literary works. Readings will include major critical statements and several exemplary literary texts. Gutman, Stanton.

177, 178 Advanced Writing Students follow their own interests in the writing of poetry, fiction and non-fiction. Permission of instructor required. *Prerequisite:* 53 for poetry and fiction, 50 for non-fiction. Broughton, Huddle.

182 Seminar for Prospective Teachers of English Grammar and language; literary interpretation and criticism; allied problems useful to teachers of English. *Prerequisite:* 50, 173, 261. Biddle, Stanton.

192 Major Topics in English and American Literature Studies in literary figures, periods, movements, ideas and genres. Primarily for English Majors. *Prerequisites:* Junior standing and English Major. Seminars limited to 15 students. Staff. Departmental permission required.

193, 194 College Honors Departmental Permission required. Not to exceed three hours per semester.

195, 196 Special Topics Not to exceed three hours per semester.

197, 198 Reading and Research Departmental Permission required. Not to exceed three hours per semester.

Unless otherwise indicated, the prerequisites for any course numbered 199 to 299 are six hours of English and Junior standing.

200 Old English The sounds, words, and structure of Old English; simple prose texts and selections from *Beowulf*. A. I. Dickerson. Alternate years, 1979-80.

201 Chaucer Study of the principal works of Chaucer, with emphasis on Chaucer's literary scope, talents, and position in medieval literature. A. I. Dickerson, Stephany.

202 Medieval Literature The forms (in translation) of medieval literature, with emphasis on Arthurian materials. Stephany.

204 Middle English Literary, historical, and linguistic considerations of Middle English texts, excluding Chaucer. Dickerson. Alternate years, 1978-79.

205, 206 History of English Drama First semester: Drama from the

Middle Ages to the early 17th century. Second semester: Drama of the 17th and 18th centuries. Alternate years, 1978-79. Bogorad, Howe, Rothwell.

209, 210 Elizabethan Prose and Poetry First semester: from More and Wyatt to Spenser and contemporaries; second semester: Donne, Jonson and followers; development of prose from ornateness to simplicity. Three hours. Alternate years, 1979-80. Long.

212 Milton *Paradise Lost*, *Paradise Regained*, *Samson Agonistes*, some minor poems, and selected prose works. Bogorad.

218 Restoration and Eighteenth-Century Prose and Poetry Significant writers from Dryden to Johnson. Bogorad. Alternate years, 1979-80.

221, 222 The Romantic Period First semester: development of the Romantic Movement through Wordsworth and Coleridge; second semester: Byron, Shelley, Keats and other Romantic poets and prose writers. Three hours. Jones, Stanton.

227, 228 English Novel English fiction from its origin through the nineteenth century. Hall, Stanton.

231, 232 Victorian Literature Significant writers, exclusive of novelists, from 1832 to 1900. Alternate years, 1978-79. Long.

235 Modern British Drama British and continental plays of the 19th and 20th centuries, including plays by Ibsen, Pinter and Beckett. Simone.

236 Modern American Drama Recent and contemporary, including plays by O'Neill, Miller and Williams. Orth.

239 Modern British Poetry A study of selected British poets since World War I, including Eliot, Yeats and Auden. Poger.

242 Literature of the Southern Renaissance Selected short stories, novels, and poetry by Glasgow, Faulkner, Warren, Tate, Styron, and others. Shepherd. (Offered irregularly.)

244 Modern Irish Literature Irish literature from 1890 to the present, with emphasis on Joyce and Yeats. Bradley.

250 The Literature of Vermont An exploration of Vermont writing from the narratives of the Allen brothers to the poetry and fiction of today. Normally offered in summers only. Biddle, Eschholz.

251, 252 American Novel of the Nineteenth Century First semester: Hawthorne, Melville, and others; second semester: Twain, Howells, James and others. Biddle, Eschholz, Shepherd.

253 American Colonial Literature Intellectual and literary origins in the seventeenth and eighteenth centuries of American culture. Mather, Taylor, Edwards, Franklin, Tyler, Freneau and Brown. Rosa. Alternate years, 1978-79.

254 Emerson, Thoreau and Their Circle Orth. Alternate years, 1979-80.

256 Regional Writing in America Selected works by Cooper, Harte, Garland, Twain, Faulkner, and others, including units on local color and Southwest humor. Cochran. (Offered irregularly.)

257 American Poetry to World War I Major American poets to 1917, including Poe, Whitman, Dickinson, and others. Cochran, Gutman.

258 Modern American Poetry Major American Poets from World War I to 1950, including Frost, Stevens and Williams. Edwards, Poger.

261 Structure of the English Language Descriptive study of Modern American English. I, II. Clark.

262 History of the English Language The principles of historical linguistics and their application to English. Clark. Alternate years, 1978-79.

264 English Stylistics Introduction to English stylistics through consideration of changing conceptions of style, evaluation of selected methods of stylistic analysis, and comparison of various literary styles. Clark. (Offered irregularly)

266 American English Dialects The emergency of American English with special attention to dialectology. *Prerequisites:* 13, Linguistics 101 or permission of the instructor. Eschholz. (Offered irregularly.)

275 History of Criticism Principles and theories of criticism from Aristotle to the twentieth century. Hall, Stanton. Alternate years, 1979-80.

Environmental Studies

COLLEGE OF AGRICULTURE

COLLEGE OF ARTS AND SCIENCES

COLLEGE OF EDUCATION AND SOCIAL SERVICES

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION

SCHOOL OF NATURAL RESOURCES

SCHOOL OF HOME ECONOMICS

Professor Reidel (Director); Associate Professors Lapping (Acting Director), Worley; Lecturers Hudspeth; Bradley, Brande, Eddy.

1 Introduction to Environmental Studies I A study of environmental problems and issues from an interdisciplinary perspective. A broad survey of historic and contemporary environmental studies examining the ecological, socio-economic, aesthetic and technological influences determining the quality of life on earth. *Prerequisite:* Freshman or Sophomore standing or permission of instructor. Four hours. Reidel, Lapping.

2 Introduction to Environmental Studies II A follow-up to Environmental Studies I with an emphasis on the political-legal-social aspects of environmental policy and problem-solving. *Prerequisite:* 1. Lapping, Reidel. Four hours.

51 Major Seminar An analysis of environmental problems and issues from the perspective of various academic disciplines and professional fields, with emphasis on interdisciplinary scholarship and research. *Prerequisites:* 1; Major in Environmental Studies; permission of instructor. Three hours. Hudspeth.

100 Environmental Theory A comparative analysis of emerging concepts of man/environmental relationships; the history, philosophy, and theoretical framework of environmental studies. *Prerequisites:* 2, standing as a major or coordinate major. Three hours. Worley.

191 Environmental Practicum Individual readings and research, internship, practicum, or field-based learning experience under the direction of a faculty member or environmental practitioner. Credit arranged. *Prerequisite:* Permission of course coordinator. Hudspeth.

195, 196 Special Topics Special topics courses taught by Environmental Program faculty and community environmental practitioners. These vary from semester to semester. Topics in the past have included environmental law, environmental policy, environmental economics, environmental design, environmental health, impact assessment, etc.

201 Research Seminar Planning, design, and methods of research for the study of environmental problems. Open to Junior Majors in Environmental Studies. *Prerequisites:* 51, 100. Three hours. (Not approved for graduate credit). Worley.

202, 203 Senior Project and Thesis Individual research under staff direction. *Prerequisites:* 201, permission of Environmental Program, Major in Environmental Studies. Credit arranged. (Not approved for graduate credit). Reidel, Worley.

204 Seminar in Environmental Studies Review and discussion of current environmental research and literature. *Prerequisites:* 100, Senior standing, Major or Coordinate-Major in Environmental Studies. Three hours. (Not approved for graduate credit). Brande, Reidel.

295, 296 Special Topics (Graduate)

Extra-Departmental Courses

COLLEGE OF AGRICULTURE

Agriculture

195, 196 Special Topics Appropriate for interdepartmental and interdisciplinary topics in Agriculture. Permission of Dean's Office. Credit as arranged. Staff.

COLLEGE OF ARTS AND SCIENCES

Chemistry

7 Earth, Air, Fire and Water (3-3) See course description under Chemistry.

General Literature

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. Sandler and staff.

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. Staff.

153 Greek Drama Three hours. Gilleland. Alternate years, 1978-79.

154 Greek Historians Three hours. Alternate years, on demand.

155 Ancient Epic Three hours. Alternate years, on demand.

156 Greek and Roman Satiric Spirit Three hours. Alternate years, on demand.

161, 162 German Literature in Translation Lectures on the development of German literature; readings and discussion of representative works in English translations. No knowledge of German required. *Prerequisites:* Sophomore standing and one year course in any literature. Three hours. Richel, Scrase.

181, 182 Russian Literature in Translation First semester: Russian masters of the nineteenth century. Second semester: twentieth century writers from the symbolists to the present. *Prerequisites:* Sophomore standing and one year course in any literature. Three hours. Nalibow.

251, 252 Study of Movement, Genre or Topic Precise content of the course to be announced before the 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. Staff.

Linguistics

101, 102 An introductory course designed to acquaint the student with the methods and theory of systematic observation and explanation of language phenomena (linguistics). *Prerequisite:* 101 for 102. Three hours. Clark, Wilson, Woolfson.

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION

Engineering — see page 183.

Technology — see page 279.

Forestry

SCHOOL OF NATURAL RESOURCES

Professors, Hannah, John, Reidel and Whitmore (Program Leader); Associate Professors Armstrong, Donnelly, Forcier and Newton; Assistant Professors Bergdahl and DeHayes; Lecturers Bousquet and Turner; Adjunct Professor Foulds.

1 Introduction to Forestry Introduction to forestry and conservation sciences. Three hours. Whitmore.

3 North American Trees (2-3) Survey of the principle forest trees of North America; their identification, silvics and major uses. Primary emphasis is directed toward trees of the eastern United States. (Not open to Forestry majors). Three hours. Forcier.

5 Dendrology (3-4) Classification, silvical characteristics and identification features of native and introduced trees and shrubs. *Prerequisite:* Biology 1 or Botany 4. Four hours. DeHayes.

62 Wood: Its Properties and Uses A study of the identification and technology of wood within the framework of the manufacture of wood products and their use by society. *Prerequisite:* General knowledge of chemistry and physics. (Not open to forestry majors). Three hours. Bousquet. Alternate years 1979-80.

100 Forest Bioecology Structure, dynamics, and manipulation of selected forest communities. *Prerequisite:* 122. Twenty days in summer camp. Four hours. Donnelly, Fuller, Hannah.

103 Small Woodland Management (2-4) Concepts of forest ecology, resource inventory, cultural practices, and multiple use management for small woodland areas. *Prerequisite:* Junior standing. (Not open to forestry majors). Three hours. Turner.

107 Forest Entomology (See P & SS 107). Three hours. MacCollom.

112 Forest Pathology (2-4) A survey of principal diseases of forest trees and deterioration of their products, with emphasis on identification,

prevention, and suppression. *Prerequisites:* Botany 4 and Zoology 9, or Biology 1, 2. Three hours. Bergdahl.

122 Silvics (2-4) Environmental factors and their influence upon the development, distribution and succession of forest trees. *Prerequisites:* 5 and P & SS 61, or permission. Three hours. Forcier.

123 Silviculture (2-4) Natural regeneration, production and tending of commercial forest stands. *Prerequisite:* 140 or WLB 151. Three hours. Hannah.

124 Forest Tree Improvement Practical application of forest genetics, planting stock production and establishment in the artificial regeneration of forests. *Prerequisites:* Botany 4 and Junior standing. Two hours. DeHayes.

126 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. *Prerequisites:* A course in tree identification and permission. Three hours. Donnelly.

132 Forest Fire Control Forest fire ecology and behavior; causes and effects; danger measurements; prevention and control of fires; use of fire in forest management. *Prerequisites:* Sophomore standing and one forestry course. Two hours. Bergdahl.

136 Forest Management (2-2) The planning and organization of forests for multiple-use sustained yield production; environmental impact statements. *Prerequisites:* 123 and 144. Three hours. Armstrong.

140 Forest Biometry II Boundary and topographic survey methods in forest management. Principles of forest biometry in forest-data collection. *Prerequisites:* 5 and 144 and C. E. 12. Twenty days in summer camp. Four hours. Newton, Turner.

142 Forest Photogrammetry (2-3) Identification, interpretation, measurement, and mapping of forest resources from aerial photographs. *Prerequisite:* 144. Three hours. Newton.

144 Forest Biometry I (2-4) Introductory concepts in forest biometry, measurement of trees and forest products, forest sampling and inventory with application in multiple-use management. *Prerequisite:* Mathematics 19 and Statistics 141. Three hours. Newton.

151 Forest Economics The economic principles and problems in the management and utilization of forest resources; taxation of forest lands. *Prerequisites:* A course each in economics, statistics and calculus. Three hours. Armstrong.

153 Forest Policy and Administration The evolution and analysis of public and private forest policies and their administration in relation to other natural resources and to the people. *Prerequisite:* Junior standing in forestry. Three hours.

162 Wood Technology (2-4) Properties, uses and identification of commercial woods of the United States. *Prerequisite:* Botany 4. Three hours. Whitmore.

163 Timber Harvesting (2-4) Methods of harvesting timber under different forest conditions and silvicultural treatments; organization and costs of logging operations. *Prerequisite:* Senior standing in forestry. Three hours. Turner.

165 Forest Products (2-4) Wood products manufacture and distribution including lumber, veneer and plywood, pulp and paper. Wood preservation. *Prerequisite:* 162. Three hours. Whitmore.

185 Special Topics Readings, investigations, lectures or work-study projects in selected forest resource areas. *Prerequisites:* Junior standing and permission. One to three hours.

197, 198 Senior Research Work on research problem under the direction of a staff member. Findings submitted in written form as prescribed by the department. *Prerequisites:* Senior standing and permission. Three hours.

205 Mineral Nutrition of Plants (See Plant & Soil Science 205.) Three hours.

207 Water Relations of Plants Terminology and measurement of soil moisture. Absorption, transport, and transpiration by plants. Effects of water excesses and deficits. *Prerequisite:* Permission. Three hours. Donnelly and botany and plant and soil science staff. Alternate years, 1979-80.

221 Site Relations and Production Dynamics in Forests (2-4) Theory of site relations, methods of study, discussion of current research and its application; total site concepts; dynamics of dry matter production. *Prerequisite:* Permission. Three hours. Hannah. Alternate years, 1979-80.

222 Advanced Silviculture Scientific bases for selected silvicultural practices. *Prerequisite:* Permission. Three hours. Hannah.

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:* 144 or permission. Three hours. Newton. Alternate years, 1978-79.

252 Forest Valuation Principles of valuation of forests, growing stock, and other forest resources. Real estate appraisal principles as applied to forests. *Prerequisite:* 151. Two hours. Armstrong.

253 Forest Management Decision Theory Operations research procedures in forest management as they apply to wildlife, fire control, insect control, construction projects, and management of youth conservation programs. *Prerequisite:* Calculus. Three hours. Armstrong.

285 Advanced Special Topics Advanced special topics courses or seminars in forestry beyond the scope of existing formal courses. *Prerequisite:* Graduate or advanced undergraduate standing and permission of instructor. Credit arranged.

Geography

COLLEGE OF ARTS AND SCIENCES

Professors Miles, VanderMeer (Chairman); Associate Professors Barnum, Gade, Lind, Meeks; Assistant Professor Biel; Visiting Assistant Professor Ryerson.

Note: The normal introductory sequence is 11, 12 although 14, 12 is a recommended alternative especially for students in economics and business administration.

11 Introduction to Geography Basic geographic concepts. The cultural diversity among people as it affects the organization and use of the environment. Three hours. I, II.

12 World Natural Environments The patterns of man's natural environment with particular attention to land-forms, climate, soil, vegetation and water resources. Three hours. I, II.

14 Introduction to Economic Geography Elementary spatial models of economic patterns, processes and relationships. Three hours. Biel.

101 to 109 The regional courses numbered 101 to 109 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. *Prerequisites:* Six hours in the social sciences and sophomore standing. Three hours each.

101 Africa Miles.

102 Canada Miles.

103 The Soviet Union Meeks.

105 Europe Barnum.

106 Latin America Gade.

107 The United States Meeks.

108 China, Korea, and Japan VanderMeer.

109 Southeast Asia and India

137 Vermont in New England The physical, economic and cultural patterns of Vermont in the context of New England and the Northeast. Evolution of the Vermont landscape; problems of land use planning and development. *Prerequisite:* Sophomore standing. Three hours. Meeks.

151 Climatology Elements of weather and climate and their interaction to produce world climate patterns. Daily weather analysis to facilitate understanding of various climatic systems. *Prerequisite:* Sophomore standing. Three hours. Lind, Ryerson.

161 Remote Sensing of Environment Geographic analysis and evaluation of aerial imagery produced by remote sensors and its relationship to environmental problems in the social and physical sciences. *Prerequisite:* Sophomore standing or permission of the instructor. Three hours. Lind.

171 Cartography Introduction to maps and map preparation, principles of map construction, kinds of information suitable for map presentation, techniques of map drawing, methods of map reproduction, graphs and frequency distributions. *Prerequisite:* Sophomore standing and permission of the instructor. Three hours. I, II. Barnum, Ryerson.

180 Cultural Ecology (Same as Anthropology 180) Interrelationships of social groups and their natural environments and resource bases, with primary emphasis on non-industrial cultures. Empirical and theoretical materials from hunting-gathering, pastoral and peasant peoples will be examined from the perspectives of anthropology and geography. *Prerequisite:* Anthropology 21 or Geography 11. Three hours. S. Pastner (Anthropology) and Gade.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

201 Historical Geography of the United States (Same as History 201) The physical setting of the American historical development, emphasizing the sequence of peoples and cultures which have occupied the land and their varied appreciation of its resource base. *Prerequisites:* A course in U.S. history plus three additional hours in geography, history, or other social science. Three hours. Miles.

202, 203 Historical Geography of Europe (Geography 202 same as History 202) European geography within a framework of past times, the historical development and distribution of settlement, economic and political patterns. *Prerequisite:* Six hours in geography or history. Three hours. Barnum.

211 Field Geography Field studies using the local area as an outdoor laboratory to indicate lines of geographic inquiry and demonstrate methods and techniques of investigation into the human use of the earth. Prerequisite: Six hours in geography. Three hours.

216 Biogeography Processes and patterns of distribution, domestication and human utility of plant and animal species and communities in varying environmental and historical contexts. Prerequisite: Nine hours in geography or biology. Three hours. Gade.

220 Seminar in Environmental Geology (See Geology 220)

221 Special Topics in Regional Geography Specialized study of a particular region or parts thereof. Prerequisites: Twelve hours in the social sciences including 3 in geography and departmental permission. Three hours.

231 Resource Geography of the United States Identification and analysis of the natural regions of the U.S. as they reflect the elements of the physical environment. Emphasis on distributional patterns and resource significance. Prerequisite: Six hours in geography including Geography 12. Three hours. Meeks.

233 Regional Planning (See Resource Economics 233)

241 Advanced Physical Geography Patterns and processes in the interactions between the earth, atmosphere, hydrosphere and biosphere; effects of human intervention in environmental systems. Prerequisites: 12 or 151, and advanced courses in geography, geology, or biological sciences; or permission of the instructor. Three hours. Lind.

243 Spatial Analysis I (Same as Resource Economics 243) Analysis of spatial pattern and interaction through quantitative models; introduction to measurement, sampling and covariation in a spatial framework. Prerequisites: Six hours in geography or other social sciences. Three hours. Biel.

244 Spatial Analysis II Probabilistic, normative and multivariate models in analyzing problems of spatial structure and process; emphasis upon spatial diffusion, regional classification and spatial forecasting. Prerequisite: 243. Three hours.

246 Urban Geography An analysis of the morphology and function of cities. Consideration of urban growth and development, methods of classification, distribution, and theories of location. Prerequisites: 11 and three additional hours in the social sciences. Three hours. Barnum, Biel.

247 Transportation Flows and Networks Growth, location, and structure of transportation networks; study of spatial flows and linkage patterns, development, and connectivity through analytical, descriptive, and theoretical models. Prerequisite: Six hours in geography or other social sciences. Three hours. Biel.

248 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: Six hours in geography or other social sciences. Three hours. Biel.

249 Agricultural Geography Analysis of 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: Six hours in geography or other social sciences. Three hours. Meeks, VanderMeer.

251 Advanced Climatology Analysis of regional and local climatic data with special reference to climatic controls; special laboratory projects. Prerequisites: 151. Three hours. Lind, Ryerson.

257 Political Geography (Same as Political Science 257) The political unit as a geographic area. Location, resources, and the distributional relationships of the variety of human factors as they bear on the structure and functioning of the modern political unit. Relationship between geopolitics and political geography. *Prerequisites:* Six hours in geography and political science. Three hours. Miles.

261 Remote Sensing and Environmental Problems (Same as Geology 219) Research projects in remote sensing; application of multi-spectral data for environmental studies. *Prerequisite:* 161 or permission of the instructor. Three hours. Lind.

262 Cultural Geography (Same as Anthropology 262) Concepts and theories of cultural ecology, culture area, culture history and the cultural landscape. *Prerequisites:* 11 and six additional hours in geography, anthropology or other social sciences. Three hours. Gade.

263 Man in Nature An inquiry into the changing conceptions of the earth as the home of man, and the conservative and destructive uses of the physical environment that have resulted from these attitudes. *Prerequisite:* Three hours of geography. Three hours. II. Gade.

264 Man, Space and Community Social geography; an interpretation of the social nature of place and the spatial character of social phenomena and groups; origins and dispersals, distributions, boundaries, and territoriality at community, regional and national scales. *Prerequisite:* Six hours in geography or other social sciences. Three hours.

271 Advanced Cartography Special laboratory projects. *Prerequisites:* 171 and permission of the instructor. Three hours. Barnum, Ryerson.

281 The Nature of Geography The history, philosophy and structure of modern geography. *Prerequisite:* Twelve hours in geography. Three hours. I.

295, 296 Seminar Selected topics in geography. *Prerequisite:* Six hours in geography. Three hours.

297, 298 Special Topics

Geology

COLLEGE OF ARTS AND SCIENCES

Professors Hunt and Stanley; Associate Professors Drake (Acting Chairman) and Wagner; Assistant Professors Bucke, Doolan; and Visiting Assistant Professor Stewart; Adjunct Professor Ratte, Adjunct Instructor Detenbeck.

1 Introductory Geology (3-3) Processes, agents, and their effects on materials, structure, and morphology of Earth's crust. Laboratory includes field trips, study and interpretation of rocks, minerals, and maps. Four hours. Bucke.

42 Geological Oceanography (3-0) Characteristics and development of oceans, their basins and shorelines, Plate tectonics and related investigations. *Prerequisite:* 1 or introductory science course. Three hours. Hunt, Doolan.

51 Environmental Geology (3-0) Survey of geologic perspective on

resources, waste disposal, environmental health hazards, environmental impact, and natural systems; with emphasis on geologic applications and contemporary issues. *Prerequisite:* 1 or introductory courses in science, engineering, or permission of instructor. Three hours. Wagner.

105 Elementary 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 science. *Prerequisites:* 1; 42 or 51. Three hours. Stanley, Bucke.

110 Extraterrestrial Geology (3-0) The geology of extraterrestrial bodies, with emphasis on lunar materials and meteorites. *Prerequisite:* 1. Three hours. Drake.

111 Earth Materials (2-6) Study of the chemical and physical properties of minerals and rocks with special regard to their mode of origin. Laboratory stresses identification of minerals and rocks in hand specimen. *Prerequisite:* 1, 42, or introductory courses in physics, or chemistry. Four hours. Drake.

115 Geomorphology (3-0) Examination and interpretation of landforms resulting from the action of rivers, glaciers, waves, and the wind. Emphasis on processes. *Prerequisite:* 1 or 51. Three hours. Staff.

121 Geologic History of Life (3-0) Survey of the origin, preservation, and diversification of ancient life. The interaction of organisms with their environment and the effect that organisms have had on the evolution of the earth. *Prerequisite:* 1, 42, or Biology 1, or equivalent. Senior Biology majors by permission only. Three hours. Hunt.

132 Intermediate Environmental Geology (3-0) Applications of rock mechanics and structural geology to such environmental problems as earthquakes, slope stability, underground excavation, highway and dam construction and land development. *Prerequisite:* 1 or 51, 105 or 111 or introductory courses in Physics, Chemistry, Engineering. Three hours. Staff.

145a, b, c Optical Mineralogy (1-6) A sequence of three units of mini-courses studying the optical properties of minerals: 145a the petrographic microscope and the immersion method, 145b behavior of light in isotropic and anisotropic media, 145c special techniques; spindle stage, universal stage and double variation methods. Students may enroll in from one to three units for one credit each. *Prerequisites:* 111 (may be taken concurrently) for 145a, 145a for 145b, and 145b for 145c. One to three credits. Doolan.

155 Sedimentary Petrology (2-3) Origin, identification, and basis for classification of sedimentary rocks, with emphasis on interpretation of depositional and post-depositional environments. *Prerequisite:* 111. Three hours. Bucke.

156 Igneous and Metamorphic Petrology (2-3) The origin and analysis of igneous and metamorphic rocks. Laboratory stresses modern approaches to petrologic problems. *Prerequisite:* 105, 111, 145. Four hours. Doolan.

160 Geology of Mineral Resources (2-3) The origins, forms, and classifications of mineral deposits. The world location, occurrence and production of major mineral products. Three hours. Drake.

166 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. *Prerequisite:* 105, 111, or Physics 16, 25, or C.E. 100, 180. Four hours. Stanley.

180 Soil Mechanics (See Civil Engineering 180) Four hours. Olson.

193, 194 College Honors

195, 196 Special Topics

197, 198 Research in Geology (0-2) Supervised research and readings in a selected field of geology. Students from the allied sciences, mathematics, and engineering may elect a research problem that combines their major field of study and geology. *Prerequisite:* Consultation with the staff. Three hours.

211, 212 Seminar in Sedimentary Processes (3-0) Selected readings on the origin and interpretation of sedimentary deposits. Topics will include mechanics of transportation and deposition, interpretation of surface textures, methods of statistical analysis, geomorphology of sedimentary environments. *Prerequisites:* 115, 155. Three hours. Bucke, Hunt.

216 Glacial Geology (2-3) The Quaternary history of North America with emphasis on the origin, mechanics, and effects of past and present glaciation. *Prerequisite:* 105, Junior standing or above. Three hours. Wagner.

218 Hydrogeology (3-0) The origin, occurrence, movement, and character of ground water, with particular emphasis on pump test methods. *Prerequisite:* Junior standing or above. Three hours. Staff. Alternate years.

219 Remote Sensing of the Environment (See Geography 261) Three hours. Lind.

220 Seminar in Environmental Geology (2-3) Consideration of environmental problems in Vermont, New England, and elsewhere with emphasis on the geological role in the solution of these problems. *Prerequisite:* 51, 132, or permission of instructor. Three hours. Staff.

221 Soil Classification and Land Use (See Plant and Soil Science 261) Three hours. Bartlett.

223 Environmental Geology Actions Studies Study of environmental problems. Emphasis is given to project selection, investigation methods, actual investigation, and constructive implementation of findings for maximum social benefit. *Prerequisite:* Permission of instructor. Three hours. Wagner.

235 Advanced Structural Geology (3-0) Selected topics in analytical structure. *Prerequisite:* 166. Three hours. Stanley.

237 Structural Petrology (3-0) Elastic and ductile behavior of rocks. Fracture phenomena and analysis. Stress and strain interpretation of deformational features in rocks and minerals. *Prerequisites:* 66 and 145. Three hours. Stanley.

238 Field Geology (1-6) Field mapping in western Vermont. Methods of analysis of field data. Geological reports. Held in late summer. *Prerequisite:* 166 or departmental permission of instructor. Three hours. Stanley.

240 Plate Tectonics (3-0) Development and current status of plate tectonic concepts with applications to selected parts of the globe. *Prerequisites:* 156 or 166, permission of instructor. Three hours. Stanley.

242 Regional Geology (4-0) Geology of selected parts of the North American continent; course includes a four week summer field trip that illustrates the salient features of the region in question. *Prerequisite:* Junior standing in geology. Four hours. Staff.

245 Geology of the Northern Appalachians (3-0) Stratigraphic, structural and petrologic problems of the New England and Canadian Appalachians as viewed within the context of Plate tectonics. *Prerequisites:* 166, or 155, 156, or 277. Three hours. Stanley, Doolan.

250 Advanced Mineralogy (2-3) Crystallographic, chemical, and physical properties of the common rock forming minerals. Laboratory stresses techniques of mineral identification and analysis of mineral assemblages. *Prerequisite:* 111. Three hours. Drake.

252 Clay Mineralogy (2-3) The structure, composition, properties, occurrence, origin, distribution, and environmental significance of the various clay minerals. Laboratory techniques in identification of clay minerals and measurement of their physical and chemical parameters. *Prerequisite:* Permission of instructor. Three hours. Bucke.

253 Phase Equilibrium in Mineral Assemblages (2-3) The application of thermodynamics and graphical methods to analysis of multicomponent, polyphase systems of mineralogical interest. *Prerequisite:* 250, or 156, or permission of instructor. Three hours. Drake.

254 Geochemistry (3-0) The application of basic concepts in chemistry to geological problems, including solution geochemistry, weathering, mineral paragenesis, and the effects of pressure and temperature. *Prerequisite:* 250, or 155, or 156, or permission of instructor. Three hours. Drake.

262, 263 Seminar in Petrology (3-0) Modern concepts of the evolution of igneous and metamorphic rocks. Emphasis directed toward application of petrologic concepts to interpretation of earth history and tectonophysics. *Prerequisite:* 156 or equivalent. Three hours. Doolan.

270 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.

272 Recent Sedimentation (1-6) Investigation of recent sedimentary environments using geolimnological and oceanographic techniques. Group and individual projects. Field oriented with use of the University research boats. *Prerequisites:* 155 or 42 and permission of instructor. Three hours. Hunt.

277 Stratigraphy (2-2) Study and interpretation of development and distribution of sedimentary rocks. *Prerequisite:* 155. Three hours. Bucke.

291 Seminar in Geology Selected topics of current interest. *Prerequisite:* Senior or graduate standing. One to three hours. Staff.

German

COLLEGE OF ARTS AND SCIENCES

Associate Professor Mieder (Chairman), Richel and Scrase; Assistant Professors Allen and Doane.

1-2 Elementary German Four hours.

11, 12 Intermediate German Literature and Discussion of selected prose with review of grammar. *Prerequisites:* 1-2 or equivalent for 11; 11 for 12. Three hours.

13, 14 Intermediate German Composition and Conversation. Guided conversation, discussion and written work leading to free composition and oral presentations. Grammar review. *Prerequisites:* 1-2 or equivalent for 13; 13 or 11 for 14. Three hours.

21-22 German for Reading Knowledge To develop reading proficiency in German for research or graduate study. Does not fulfill distribution requirements. Credit not granted for both German 1-2 and 21-22. Freshmen and sophomores by permission only. Four hours.

101, 102 Introduction to German Literature Survey of German literature from the beginnings to the twentieth century. *Prerequisite:* 12 or 14 or equivalent. Three hours. Allen, Richel.

121, 122 Composition and Conversation Emphasis on increasing oral and written command of the language. Class discussions focus on German history and culture. *Prerequisite:* 12 or 14 or equivalent. Three hours. Allen, Doane.

193, 194 College Honors

195, 196 Special Topics Advanced study in accordance with students' needs and interests. *Prerequisites:* 101, 102 or the equivalent and departmental permission. Three hours.

197, 198 Readings and Research

201 Proseminar: Methods of Research and Bibliography An introduction to tools and methods of research. *Prerequisite:* 101 or equivalent. One hour. Mieder.

203 Development of German Intellectual Movements A comprehensive survey of the history of ideas as a framework for the study of German literature. *Prerequisite:* 101, 102 or equivalent. Three hours. Allen. Alternate years, 1978-79.

204 Courtly Epic and Minnesang Cultural background and major works of medieval classicism. *Prerequisite:* 101, 102 or equivalent. Three hours. Mieder. Alternate years, 1978-79.

205, 206 Goethe and Schiller and Their Time Origin, development, characteristics and criticism of German Classicism. *Prerequisite:* 101, 102 or equivalent. Three hours. Richel, Scrase. Alternate years, 1979-80.

207 Nineteenth-Century Prose Narrative prose of representative authors such as Kleist, Droste-Hulshoff, Stifter, Storm and Keller. *Prerequisite:* 101, 102 or equivalent. Three hours. Mieder. Alternate years, 1978-79.

208 Nineteenth-Century Drama Works by Kleist, Buchner, Grillparzer, Hebbel, Wagner and the early Hauptmann. *Prerequisite:* 101, 102 or equivalent. Three hours. Richel. Alternate years, 1978-79.

209, 210 The Twentieth Century Selected works in poetry, prose and drama by Brecht, George, Hauptmann, Hofmannsthal, Kafka, Thomas Mann, Rilke and others. *Prerequisite:* 101, 102 or equivalent. Three hours. Allen, Scrase. Alternate years, 1979-80.

221, 222 Advanced Composition and Conversation Oral and written practice in German of advanced difficulty with emphasis on stylistics. *Prerequisite:* 121, 122 or equivalent. Three hours. Mieder.

232 History of the German Language Historical linguistic development of the German language from earliest times to the present. No knowledge of the older stages of the language is presupposed or required. *Prerequisite:* 121, 122 or equivalent. Three hours. Mieder. Alternate years, 1979-80.

281, 282 Senior Seminar Readings and research. Required of all senior concentrators. Three hours.

Hebrew

COLLEGE OF ARTS AND SCIENCES

1-2 Elementary Hebrew The spoken language of everyday use with

oral, aural and written practice in speaking, reading, and comprehension. Four hours.

11, 12 Intermediate Hebrew Reading, translation, and discussion in Hebrew of texts selected to show the development of Hebrew culture from Biblical times to the present. Three hours.

General Literature

161, 162 German Literature in Translation See course description under Extra-Departmental Courses, page 202.

History

COLLEGE OF ARTS AND SCIENCES

Professors Bliss, Daniels, Davison, Evans (Emeritus), Felt, J., Hand, Metcalfe, Schmokel (Chairperson), Schultz, Spinner (Director of Graduate Studies), Steffens, and Stout; Associate Professors Andrea, Hutton, Overfield, Seybolt, Stoler, and Assistant Professors Jackson, and Liebs; Lecturer Engroff; Adjunct Professor Morrissey.

The Department of History has recently renumbered all of its courses, in order to help guide students to courses appropriate for them. Numbers are designed to indicate method of instruction and expected preparation level of students, as follows:

1-9 Introductory Courses — Open to freshmen and sophomores, but primarily designed for freshmen. Generally emphasize the textbook-lecture-exam approach.

10-99 Intermediate Courses — Designed for sophomores and juniors, open to all except graduate students. Generally the format emphasizes lectures and discussion. Short papers, book reviews, etc. will be required in addition to exams. No prerequisites.

100-199 Advanced Courses — Intended primarily for juniors and seniors with specific prerequisites. Discussion-lecture, with some seminar type work. Evaluation methods tend to emphasize written work other than exams.

200-299 Seminar/Graduate level — 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.

1, 2 Major Civilizations An introductory survey of major world civilizations. First semester: Ancient, medieval, and non-European civilizations; second semester: the emergence of modern world civilization from European roots. Three hours.

5 European Civilization to 1815 An introduction to the political, social, and intellectual movements which have shaped the foundations of western civilization: from the Renaissance to the French Revolution. Three hours.

6 European Civilization, 1815 to 1945 A survey emphasizing the ideas and institutions which have helped shape western society and culture from the Napoleonic Era to the end of the Second World War. Three hours.

7, 8 History of the United States Survey from the pre-Revolutionary period to the present. Three hours.

9 Ancient Mediterranean Civilization A detailed study of Athens in the 5th century B.C. continuing to the rise of Rome through the 1st century A.D. (Students who have already taken History 106 may not take History 9.) Three hours. Bliss.

15 The Birth of Europe Survey of the history of Western Europe from the late Roman Empire to the stabilization of Medieval Civilization. Three hours. Andrea.

16 The High and Later Middle Ages Western Europe from the Age of the Crusades to the Renaissance. Three hours. Andrea.

20 The Study of History An introduction to the methods of studying the past. Use of the works of major historians as a means of investigating the ways in which historians think and write history. Three hours.

21, 22 History of Science A survey of the history of the physical and biological sciences from antiquity to the present. The course will stress science as an intellectual activity, within the contemporary context of philosophy, religion and social organization. Three hours. Steffens.

25 Biography Readings in the history and criticism of biography, the role of the individual in history, and biographies of individuals. Three hours. Schultz.

31 Traditional Chinese Civilization An historical examination of the thought, social structure, politics, economics, science, literature, art and music of traditional China. Three hours. Seybolt.

32 History of Japan A survey of Japanese political, social, economic and aesthetic thought and institutions from 600 A.D. to the present. Three hours. Seybolt.

33 Introduction to the Modern History of Latin America A lecture survey of Latin American history which concentrates on the post-independence period. Selected national histories will be studied. Three hours. True.

35 Rise of Islam Arab/Islamic civilization during its formative period, from the 6th through the 13th centuries A.D. Three hours.

36 The Modern Middle East Major historical developments in the Middle East from the late 18th century to the present. Three hours.

37 Introduction to African History Lecture survey: traditional Africa, the European impact, colonial rule, African nationalism and independence. Three hours. Schmokel.

40, 41 World History Since 1945 First semester, the Soviet Union, Eastern Europe, Western Europe, and the United States; second semester, Asia, Africa, and Latin America. Three hours. Spinner.

50, 51 English History Political and social history of England. First semester: Middle Ages and Tudor-Stuart; second semester: 1715 to the present. Three hours. Metcalfe, Spinner.

52 Modern Germany and Its Historical Background Lecture survey of German history from 1871, including consideration of major events and forces which shaped German society and politics from the reformation to the 19th century. Three hours. Schmokel.

53 French History Survey of the major historical forces which have shaped modern French civilization (1700-1971). Principal themes: Absolutism, Enlightenment, French Revolution, 19th Century Society and Culture. Lectures and discussions. Three hours. Hutton.

54 History of Russia and Eastern Europe A broad survey from the Middle Ages to the present time, with emphasis on political history since 1815. Three hours. Daniels.

56 Introduction to Scandinavia An introduction to the history, culture, and contemporary life of Scandinavia (including Finland). The course will emphasize an area rather than a country-by-country approach and will consider basic historical turning points, examples of literary and artistic expression, and the regions's efforts to solve the problems of modern society. Some attention will be given to a comparison between the social reform efforts of the U.S. and Scandinavia. Regular use will be made of faculty and other resource persons on and off campus. (Normally given in the spring semester.) Three hours. Felt.

65 Rural America A survey of the rural agrarian side of American history from colonial times to the present. Topics include the history of farming methods from medieval Europe to the age of agribusiness, the Frontier Thesis, agrarian protest movements, and the culture of rural America. Three hours. Stout.

70 Black History Economic, social, political, and intellectual developments in U.S. history as they have affected and been affected by the Black American; emphasis on the period since 1865. Three hours.

71 Vermont History A survey of Vermont history from early times to the present. Three hours. Hand.

72 History of Women in the United States Special emphasis on the women's movements of the 19th and 20th centuries and on the relationships among them. Three hours.

75, 76 Canadian History Canadian development from the French exploration and settlement to the present; evolution of self-government and relations with the United States; historical foundations of the problems of biculturalism. Three hours. Metcalfe.

80 U.S. Military History The development of the American Military Establishment within the framework of American history from the Colonial era to the present. Three hours. Stoler.

95, 96 Special Topics

105 Archaeology and History of the Ancient Near East Survey of the primary civilizations of Egypt and Mesopotamia and the secondary cultures of Anatolia, Syria-Palestine, Assyria, and Iran, with major emphasis on the archaeological evidence. *Prerequisites:* History 1 or 9 or appropriate work in Classics. Three hours. Davison.

106 History of Greece Survey of the history of ancient Greece from prehistoric times (with special emphasis on the Minoan and Mycenaean cultures) to the Hellenistic Age. *Prerequisites:* History 1 or 9 or appropriate work in Classics. Three hours. Davison.

107 History of Rome Survey of the history of ancient Italy from prehistoric times (with special emphasis on the Italic peoples, the Etruscans, and Greek colonization) to the age of Justinian. *Prerequisites:* History 1 or 9 or appropriate work in Classics. Three hours. Davison.

111 The Renaissance European society from the fourteenth to early sixteenth century, emphasizing the transition from medieval to "modern" society and the roots of Renaissance Italy's cultural and artistic brilliance. *Prerequisites:* History 5 or 16. Three hours. Overfield.

112 The Reformation European society from the Renaissance to mid-seventeenth century. Emphasis on the religious struggles growing out of the Protestant Reformation and their impact on the social, political, economic and cultural movements of the era. *Prerequisites:* History 5 or 16. Three hours. Overfield.

116 Topics in Medieval Culture Course will examine selected issues relating to the social and/or religious history of medieval Europe. Topics in-

clude: medieval town life, popular piety in the Middle Ages, the Crusades, monasticism, and heresy. *Prerequisites:* History 5 or 16. Three hours. Andrea.

120 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 Science College major requirements.) *Prerequisites:* Acceptance in teacher certification program. Three hours. True.

121 Quantitative Methods in Historical Research Applications of quantitative methods to the selection and analysis of historical source materials; emphasis on political and social data. Use of the University's Computation Center facilities and other data-processing equipment. *Prerequisites:* Statistics 111 or permission of the instructor. Three hours. Jackson.

122 Philosophy of History (Same as Philosophy 230) An investigation of the theories of history from the perspectives of both historians and philosophers. *Prerequisites:* 6 hours of History or Philosophy. Three hours. Steffens.

123 American Biography Investigation and portrayal of personalities; the uses of biography in the study of American history. Subjects selected to represent a variety of vocations and aspects of history. *Prerequisites:* History 7 or 8. Three hours. Schultz.

124, 125 Intellectual History of Modern Europe Emphasis upon ideas in their relation to major political and social movements. First semester: Humanism, the Scientific Revolution, and the Enlightenment (1500-1800); second semester: the Modern Era. *Prerequisites:* for 124, History 5; for 125, History 6. Three hours. Hutton, Overfield.

126, 127 Intellectual History of the U.S. *Prerequisites:* for 126, History 7; for 127, History 8. Three hours. Felt.

128 Science and Culture A study of science as an integral part of the culture of our age with emphasis on the published works of leading scientists, mathematicians and "humanists" of the 20th century. *Prerequisites:* History 22 or 6 hours of European History or Philosophy 112 or science major. Three hours. Steffens.

129 The Scientific Revolution The interrelationship between scientific activity and social change during the sixteenth and seventeenth centuries in Europe. The course concentrates upon the early stages of the "Scientific Revolution," emphasizing the lives and works of Copernicus, Kepler, Galileo and Newton. Special emphasis will be placed upon the broad philosophical, religious, artistic and social context of their times. *Prerequisites:* History 21 or 6 hours of European History or Philosophy 112 or junior/senior majors in science. Three hours. Steffens.

131 Modern China An examination of Chinese history from 1800 to 1949 including a discussion of Western imperialism, the breakdown of the Confucian order, and the 20th century struggle to find a viable alternative, culminating in the Communist victory of 1949. *Prerequisites:* 6 hours of history; History 31 recommended. Three hours. Seybolt.

132 People's Republic of China An examination of the domestic and foreign affairs of China from 1949 to the present. *Prerequisites:* 6 hours of history; History 31 recommended. Three hours. Seybolt.

133 Topics in the History of Modern Latin America Topics will include the plantation economy, slavery, race relations, immigration, militarism, economic development, *indigenismo*, and the influence of the U.S. Students will be encouraged to do independent research and study

Latin American topics of their choice. Classroom emphasis will be on dialogue and question-asking rather than lecture and recitation. *Prerequisites:* History 33. Three hours. True.

134 History of Mexico Reading knowledge of Spanish strongly recommended. *Prerequisites:* History 33. Three hours. True.

137 Problems in the History of Modern Africa Topics explored through extensive reading assignments and discussion include the African response to European penetration (collaboration vs. resistance), the theories and practices of colonial rule, ideologies and organizational forms of African nationalism, and the problem of development in present-day Africa. *Prerequisites:* History 37. Three hours. Schmokel.

150 Tudor-Stuart England England from 1485 to 1660, with particular emphasis on the central period from the 1530's to the 1640's (the Henrician Reformation to the Revolution). *Prerequisites:* History 5 or 50. Three hours. Metcalfe.

151 Victorian England Selected topics in the 19th century English history with emphasis on "industry and empire," changing class relationships, and the growth and development of political parties. *Prerequisite:* History 6 or 51. Three hours. Spinner.

152 Political and Social History of Modern Germany The political development and changing social and economic structure of Germany during the Bismarckian Empire, the Weimar Republic, the Nazi dictatorship, and the period 1945-69 will be explored through discussion of extensive reading assignments. *Prerequisites:* History 52. Three hours. Schmokel.

153 France in the Contemporary World Topics in French history since 1870: the Commune and the decline of the revolutionary movement; emergence of mass politics; art and society of the "Belle Epoque"; French Fascism; Vichy; French Communism; Religious Renewal; Existentialism; demise of the French colonial empire; de Gaulle; student protest of 1960's; the "American challenge." Small class, discussion. *Prerequisites:* History 53. Three hours. Hutton.

154 The Russian Revolution and the Soviet Regime A detailed study of the revolutionary movement, the revolutions of 1917, Marxism, Leninism, and the evolution of the Soviet Regime to 1939. *Prerequisites:* History 54. Three hours. Daniels.

158 Modern Spain (Same as Spanish 158) See Spanish 158.

171, 172 Social History of the U.S. Selected topics in the history of American society, including social movements, rural history, or urban history. *Prerequisites:* for 171, History 7; for 172, History 8. Three hours. Jackson.

173, 174 History of U.S. Foreign Relations First semester: 1763-1900; second semester: 1900-present. *Prerequisites:* for 173, History 7; for 174, History 8. Three hours. Stoler.

181 Colonial America, 1607-1791 A survey of the colonial period of U.S. history from the earliest settlements through the establishment of the Constitution. This course is a prerequisite for any seminar course in the Colonial period and American Revolution. *Prerequisites:* 6 hours of history or other social science, of which History 5 is highly recommended. Three hours. Stout.

182 The Early National Period A chronological survey of U.S. history from 1790 to 1847. *Prerequisites:* History 7. Three hours.

183 U.S. History 1847-1876 A history of the United States, 1847-1876, with emphasis on the sectional conflict of the 1850's, the Civil War, the life

of Lincoln, and Reconstruction. *Prerequisites:* History 7. Three hours. Schultz.

184 The U.S. in the Age of Industrialization A chronological survey of U.S. History from 1876 to 1914. *Prerequisites:* History 8. Three hours.

185 The United States as a World Power A history of the U.S. from 1914 to 1945. *Prerequisites:* History 8. Three hours.

186 American History Since 1945 A topical review of United States history since 1945 with special emphasis upon the problems of interpreting and reconstructing the recent past. *Prerequisites:* History 8. Three hours. Hand.

191 Internship in History Supervised cooperative internship work in history in archives, museums, libraries, etc. To be individually arranged for each student. *Prerequisites:* Junior or Senior standing; permission of the department. Three-six hours.

193, 194 College Honors *Prerequisites:* Junior or Senior standing; permission of the department. Three hours.

195, 196 Special Topics *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.

201 Historical Geography of the United States (Same as Geography 201) See Geography 201. Three hours.

202 Historical Geography of Europe (Same as Geography 202) See Geography 202. Three hours.

Prerequisites for Seminar Courses (all following courses). Enrollment limited to juniors, seniors, and graduate students who have taken at least 12 hours of previous 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.

210, 211 Seminar in History of Traditional Societies Three hours.

220, 221 Seminar in Historical Methods, Historiography, History of Ideas Three hours.

222 Seminar in Comparative History Three hours.

230, 231 Seminar in Third World History Three hours.

250, 251 Seminar in Modern Europe Three hours.

261 Seminar in Vermont History A topical approach to the Vermont experience through original research utilizing primary sources available at the University of Vermont, the Vermont Historical Society and the Vermont State Library. *Prerequisites:* History 71 and permission of instructor. Three hours.

270, 271 Seminar in American Statesmen Thought and practical politics of American statesmen. First semester: 1783-1865; second semester: since 1865. Three hours. Schultz.

278 Seminar in Foreign Policy of the USSR (Same as Political Science 278) An historical topical study of Soviet foreign relations since 1917, including the international Communist movement and ideological, economic, and strategic aspects. Three hours. Daniels.

280, 281 Seminar in Early American History Three hours.

282, 283 Seminar in Modern American History Three hours.

284 Seminar in Canadian History Three hours.

285 Seminar in French Canada Three hours.

Historic Preservation Courses

History seminar prerequisites do not apply to the following course(s).

201 Architecture and the Environment (Formerly History 223/Art 283) An introduction to the basic skills necessary to preserve, document, and re-use America's visible past, its architectural heritage. Students will do projects in actual preservation problems in Vermont. *Prerequisites:* Junior or Senior standing. Three hours. Liebs.

202 Historical Preservation. Special topics. Three hours.

Home Economics

SCHOOL OF HOME ECONOMICS

Professors Carew, Grams (Acting Director), and Webster; Associate Professors Atwood, Caldwell, J. Emanuel, Livak, Powell, and Shelton*; Assistant Professors Barbour, Edwards, Goldhaber, Jameson, Schlenker, Soule, and Tyzbir; Instructor F. Emmanuel**; Lecturers Brower, Gora, Lapping**, Lawton, Medina, Miller, Mohler**, Osborn*. Affiliated Faculty: Adjunct Associate Professor Rathbone, and Adjunct Assistant Professor Stowell.

* On sabbatical leave 1978-79.

** Part-time.

Clothing, Textiles, and Design

15 Design (1-4) Color and design in theory and practice. Work with various media for creative expression and understanding of art principles. Three hours. Caldwell.

16 Sketching and Illustration (1-4) Visual elements of design related to various areas of interest. Two and three dimensional categories. Emphasis on sketching. *Prerequisite:* 15. Three hours.

20 Textiles and Clothing for the Consumer (2-2) Clothing: its impact on wearer and observer. Today's fibers, fabrics and finishes. Consumer problems and responsibilities in selection, use, care. Three hours. J. Emanuel.

22 Clothing Concepts and Techniques I (1-4) Basic concepts and skills related to clothing construction. Fabric selection, pattern alteration, garment construction and ready-to-wear evaluation. Three hours.

23 Clothing Concepts and Techniques II (1-4) Advanced construction with emphasis on pattern alteration. Techniques used with fabrics which require special handling. Includes current fashion, fabric and related product developments. *Prerequisites:* 22 or instructor approval based on a pretest. Three hours.

25 Clothing, Textiles, and Design Seminar An integrated look at the professional aspects of Clothing, Textiles, and Design. To be offered alternate years. Minimum of 2 credits. Required for majors. One hour.

107 Fashion Design (1-4) Application of design fundamentals and prin-

ciples to fashion planning. Techniques of fashion illustration. *Prerequisite:* 16. Three hours.

114 Weaving: Spinning and Hand Techniques (1-4) An introduction to spinning and weaving with emphasis on hand methods as practiced in past and present cultures. *Prerequisite:* A course in design. Three hours. Atwood.

115 Textile Design (1-4) Application of design to fabric printing techniques. Emphasis on the use of natural and historical motifs for repeat patterns. *Prerequisites:* 16 and 20, or departmental permission. Three hours. Atwood.

116 Weaving (1-4) An introductory course in four harness loom weaving. Application of design fundamentals to woven textiles. *Prerequisites:* 15 and 20, or departmental permission; Junior standing. Three hours. Atwood.

117 History of Costume (3-0) History of costume stressing the background philosophy and events of each period as reflected in dress. *Prerequisite:* Art 6. Three hours. Caldwell.

118 History of Textiles (3-0) Textiles throughout history. Design, production and uses in various periods and societies. Geographic, economic and cultural implications. *Prerequisite:* 20 or permission of instructor. Alternate years. Three hours. Caldwell.

120, 121 Intermediate Textiles (2-2) First Semester: Economic and historic aspects of textile industry. Physical and chemical properties of fibers in relation to fabric characteristics, testing techniques and evaluation. Second Semester: Current technological developments in fabric formation, dyes and finishes. *Prerequisites:* Chemistry 16; 20, 120 for 121. Three hours. J. Emanuel.

122 Pattern Design (2-4) Techniques of designing and altering flat patterns. Advanced construction techniques, altering flat pattern and emphasis on original design. *Prerequisite:* 22 or permission of instructor. Four hours. Webster.

125, 126 Fashion Merchandising I and II (2-1) First Semester: The fashion merchandising world, dynamics and marketers of fashion and retail institutions. Second Semester: Functions of personnel management, merchandising, sales promotion, and customer services; incorporates work experience. *Prerequisites:* Economics 11, and 125 for 126. Three hours.

153 Interior Design I (1-4) Application of design fundamentals to the problems involved in furnishing the home. *Prerequisite:* 15 (and 16 for design majors). Three hours. Caldwell.

159 Home Furnishing Techniques (1-4) Principles and skills in design, construction and restoration of home furnishings. Emphasis may vary with semester. Students may enroll three semesters. Three to nine hours. *Prerequisite:* 153 or permission of instructor.

217 American Textiles and Fashion: Two Centuries — 18th Century to 1910 Study of home production of textiles, needle art and clothing in collections at Shelburne Museum. Lectures, demonstrations and laboratory experience. *Prerequisites:* Six hours in design and/or textiles, or permission of instructors. Three hours. Atwood, Caldwell.

221 Costume Design and Draping (1-4) Draping techniques in creative fashion design. Handling of fabrics in relation to line in dress. Original projects. *Prerequisites:* 15, 122. Three hours. Webster.

223 Tailoring (1-4) Construction techniques with emphasis on tailoring problems. *Prerequisite:* 122. Three hours. Webster. (Not approved for graduate credit.)

229 Contemporary Issues in Clothing, Textiles and Design Theory and

research into Clothing, Textiles, and Design, analysis of current problems; review and discussion of recent publications; individual studies. *Prerequisite:* CT & D Senior standing or departmental permission. Three hours.

231 Advanced Clothing, Textiles or Weaving Workshops Independent laboratory work. Emphasis on management, research, planning, techniques, production and evaluation. Individual projects planned and progress discussed with instructor and shared with class. *Prerequisite:* Completion of highest level course in CT & D Program area. Three hours, but may be taken once in each area. (Not approved for graduate credit.)

253 Interior Design II (1-4) Interior design; period furnishing, its present use and influence upon modern furnishing. *Prerequisite:* 153. Three hours. Caldwell.

Early Childhood and Human Development

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. Edwards.

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 the child and his relationships with his family, peers and institutions. *Prerequisites:* Sophomore standing, Psychology 1. Three hours. Jameson, Shelton, Goldhaber.

64 Maturing and Aging Physical change, physiological, psychological, social development during the maturing years and older age. Interrelationships between these processes will be stressed. *Prerequisites:* Sophomore standing, Psychology 1. Three hours. Grams.

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.

69 Freshman Program Seminar First half of the two year program in which the advisor and his students meet to discuss contemporary issues in human development and early childhood. Students may enroll twice in this course. Two hours.

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. Six to eight hours. Goldhaber, Shelton.

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:* Permission of instructor. Three hours. Jameson.

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. *Prerequisites:* 82 in preceding semester or permission of instructor. Three hours. Jameson.

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. Jameson.

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 consent of instructor. Three hours. Grams.

169 Sophomore Program Seminar An ongoing seminar for Human Development majors. Readings, study and discussion of current issues, research, publications and professional affairs. Prerequisites: Sophomore standing, Early Childhood and Human Development Major. A student may enroll twice in this course. Two hours.

184 Early Childhood Programs An active examination of present day early childhood programs in relationship to their historical development from early history. Three hours. Goldhaber.

187 Field Practicum Supervised teaching in accredited early childhood facilities licensed or approved by responsible boards. Prerequisite: Permission of instructor. Eight hours. Jameson.

188 Prepracticum Internship Administration and planning for an early childhood development center. Prerequisites: Early Childhood Major, permission of instructor. Two hours. Lawton.

189 Early Childhood Practices Supervised planning and conducting the early childhood laboratory center integrated with readings and research, advanced child development seminar and curriculum workshop. Prerequisite: Permission of instructor. Fifteen hours. Brower, Lawton, Jameson.

260 Family Ecosystem The family will be viewed in and as an environment for human development. The family ecological approach will be applied to practical family concerns. Prerequisite: Senior standing or permission of instructor. Three hours. Edwards. (Not approved for graduate credit.)

263 Advanced Child Development A survey of the professional literature in child development with special emphasis on the influence of early life experiences throughout the life cycle. Prerequisite: 80-81 or equivalent. Three hours. Goldhaber. (Not approved for graduate credit.)

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 permission of instructor. Three hours. Goldhaber, Jameson.

265 Teaching Human Development Designed for individuals who teach or plan to teach human development. Emphasis on group-building skills and interpersonal relationships. Prerequisites: 65, permission of instructor. 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 credits. Prerequisites: Junior standing, nine hours of Human Development or equivalent. Three hours.

281 Infancy Development and rearing from conception to eighteen months and the relationship to subsequent development. Prerequisites: Nine hours in human development, nutrition, and physiology or biology or permission of instructor. Three hours. Shelton. (Not approved for graduate credit.)

Consumer Economics

56 Personal Resource Management Application of the management process to decision-making procedures for individuals and/or families in the use of resources to achieve desired goals. Three hours.

158 Consumer Problems The consumer interest in relation to other segments of our economy, society and polity including buyer-seller relation-

ships and sources of consumer information and protection. *Prerequisite:* Sophomore standing. Three hours.

258 Personal and Family Finance The role of money and its management in planning, controlling and evaluating income, expenditures, investments and debts. Alternatives in relation to goals. *Prerequisites:* 56, Economics 11. Three hours.

259 Field Experience in Consumer Economics Application of skills developed in the Consumer Economics Program to a community situation for the purpose of encouraging individual growth and clarifying career goals. *Prerequisites:* 56, 158, 258 or permission of instructor. Three hours.

Home Economics Education

71 Introduction to Home Economics Education Careers in home economics education, contemporary programs, professional and youth organizations, and resources. Independent study, field trips, experiences in teaching. *Prerequisite:* Sophomore standing. Three hours. Miller.

171 Methods of Teaching Three week concentrated course emphasizing teacher competencies in home economics. Planning, executing and evaluating instruction; management; guidance; school-community relations; professional development. *Prerequisites:* 71, Psychology 1. Three hours. Miller, Osborn.

172 Student Teaching Supervised observation and teaching in approved home economics programs in Vermont schools. *Prerequisite:* 171. Seven hours. Barbour, Miller, Osborn.

173 Communication Methods Presentation of information through the media of press, radio and television, and lecture-demonstration. *Prerequisite:* Junior standing. Three hours. I. Osborn, Wales.

174 Extension Experience Seven weeks off campus supervised jointly by extension and resident faculty. *Prerequisites:* 173 and Votec 112. Seven hours. Miller, Osborn.

175 Special Problems in Home Economics Education Individual investigation of a problem selected to meet special needs of students. Students may accumulate up to six hours. *Prerequisites:* 71 and permission of instructors. Two or three hours. Miller, Osborn.

177 Teaching Special Groups Independent study and teaching experience in home economics programs designed for adult, occupational and/or elementary classes. *Prerequisite:* 171. Students can enroll more than once for a maximum of three hours in each area or nine hours total. Miller, Osborn.

272 Teaching Adults Organization and teaching of classes in home economics to meet the needs of adults; supervised experience in teaching adults. *Prerequisite:* 171, or permission of instructor. Two hours.

273 Occupational Education (2-3) Role of the home economics teacher in organizing and implementing wage earning educational units at the secondary school level. *Prerequisite:* 171, or experience in secondary home economics education. Three hours.

274 Home Economics in Elementary and Middle Schools Home Economics, an integral part of curriculum, grades one through eight. Observations of children in these grades. Participation in schools. *Prerequisites:* 63, 71. Three hours.

Human Nutrition and Foods

37 Basic Concepts of Foods (3-0) Basic principles of food purchasing

and preparation presented through demonstration and lecture. Three hours. Soule.

38 Food Preparation Techniques Laboratory application of basic principles of food preparation. Prerequisite: 37 (concurrent). Enrollment limited to Home Economics majors. Three hours. Soule.

40 Basic Concepts of Contemporary Nutrition (3-0) An interdisciplinary study of nutrition with special emphasis upon choosing foods for good health, developing nutritional awareness and personal decision-making. Three hours. Livak.

43 Fundamentals of Nutrition (See Animal Sciences 43) Credit will not be given for both 43 and 141. Three hours. Carew.

44 Survey of the Field: Human Nutrition and Foods (2-0) Introduction to the professional field and career opportunities in Human Nutrition and Foods. Required of all freshmen and transfers. Two hours. Schlenker.

46 Man and Nutrition (3-0) Nutritional implications in growth, development and performance throughout the life cycle emphasizing interrelationships with social, cultural and economic factors. Designed for students in dental hygiene, education, human development, and technical nursing. Three hours. Tyzbir.

130 Food and the Consumer (2-3) An investigation of factors which influence food intake. Decisions in food selection as they are affected by skill, time, energy, and money. Prerequisites: 37 and a college course in nutrition. Three hours. Soule.

131 Food Preservation History of, and current techniques in, extending the availability of the food supply. Prerequisite: 130. Two hours. Soule.

132 Historical Dimensions of Food (2-0) Food is surveyed (analyzed) from primitive survival needs to social and creative expression. Prerequisites: 37, 38, and three hours in nutrition. Two hours. Medina.

135 Applied Food Science (3-3) Study of the scientific principles involving the chemical and physical properties of food and the changes that occur in food preparation and processing. Prerequisites: 37, 38, three hours in nutrition and organic chemistry. Four hours. Medina.

136 Nutritional Evaluation of Food (3-0) Stability and biological availability of the nutrient and non-nutrient components of food. Prerequisites: 37, 38, three hours in nutrition and organic chemistry. Three hours. Medina.

138 Quantity Food Production and Service (3-4) Application of principles and techniques of food production and service in different establishments including equipment, sanitation, and time-motion studies. Prerequisites: 130 and permission. Five hours. F. Emanuel.

139 Institutional Purchasing and Food Cost Control (3-0) Principles of institutional purchasing, accounting, food cost control, and menu planning. Prerequisite: Concurrent enrollment with 138. Three hours. F. Emanuel.

141 Nutrition and Health (3-0) Basic principles of nutrition. Nutrient content of foods. Practice in recording and evaluating dietary intake of individuals. Credit will not be given for both 43 and 141. Prerequisites: Chemistry 4 or 16, and Zoology 5. Three hours. Powell.

142 a, b, c Nutrition in the Life Cycle a. Pregnancy, Lactation and infancy; b. Children and teenagers; c. Adulthood and aging. A series of mini-courses designed to concentrate on man's nutritional needs in particular segments of the life cycle. Credit will not be granted for both 142 and 144. Prerequisite: One hour per segment. Livak.

144 Applied Normal Nutrition (3-0) Nutritional needs of individuals

during the life cycle. Physiological and environmental factors which affect nutritional status. Designed for nutrition majors. *Prerequisites:* 43 or 141, Chemistry 4 or 16, and Physiology. Three hours. Powell.

145 Clinical Nutrition I (1-4) Students are assigned to a variety of approved clinical centers for supervised observation and participation. *Prerequisites:* Junior standing; dietetics majors. Three hours.

146 Clinical Nutrition II (1-4) Students are assigned to a variety of approved clinical centers for supervised observation and participation. *Prerequisites:* 145, 247, Senior standing; dietetics majors. Three hours.

148 Community Involvement-Nutrition and Food Focus on effectively relating community experiences with academic theory in the field of multi-disciplinary nutrition. *Prerequisites:* College course in nutrition and departmental permission. Three hours. Livak.

230 Feeding Problems of the Handicapped (4 week mini-course) Problems in nutrition presented by the physically disabled and techniques for approaching a solution. *Prerequisites:* Senior standing (majors only); graduates of allied health professions or permission. One hour. (Not approved for graduate credit.)

235 Recent Advances in Foods and Nutrition Interpretation, application and communication of trends in foods and nutrition as evidenced through literature and research. May be taken more than once for a maximum of six hours. *Prerequisites:* Junior standing, twelve hours in foods and nutrition, and permission of instructor. Three hours.

236 Introduction to Food Research (1-6) Independent Laboratory study of problems in food analysis, preparation, processing or product development. *Prerequisites:* 135, and a course in biochemistry with laboratory. Three hours. Medina.

237 Readings In Foods Critical survey of the literature on the recent developments in food research. *Prerequisites:* Junior standing; 135. Two or three hours.

239 Institutional Organization and Management (3-0) Institutional organization and management; personnel policies; laws and regulations; promotion and advertising. *Prerequisites:* 138, 139, or equivalent. Three hours. F. Emanuel.

240 Methods in Nutrition Education (3-0) Problems common to nutrition education in schools, hospitals and community. Individual investigations selected to meet special needs. *Prerequisite:* 43 or 141. Three hours. Soule.

241 Nutrition and Aging Study of the physiologic, psychologic, sociologic and economic factors which influence the nutrient requirements, nutritional status and food habits of older people. *Prerequisite:* 144. Three hours. Schlenker.

242 Advanced Nutrition (3-0) A study of nutrients and their specific functions in metabolic process integrating cellular physiology, biochemistry and nutrition. *Prerequisites:* 43 or equivalent, and a course in biochemistry and physiology. Three hours. Tyzbir.

245 Nutritional Biochemistry I (3-0) Comprehensive study of metabolism of carbohydrates, lipids, and protein with emphasis on hormonal control, nutritional and metabolic interrelationships and dietary abnormalities (e.g. starvation and obesity). *Prerequisites:* 242 and permission of instructor. Three hours. Tyzbir.

246 Nutritional Biochemistry II (3-0) Comprehensive study of chemistry and biochemical function of vitamins, vitamin-like compounds,

minerals, and trace elements with emphasis on metabolic function. *Prerequisites:* 242 and permission of instructor. Three hours.

247 Diet Therapy (4-0) Adaptations of the normal diet in conditions affected by or affecting the utilization of food. *Prerequisites:* 242 and permission of instructor. Four hours. Powell.

249 Nutrition Seminar A review of recent developments in nutrition research. Students may enroll twice for a total of four hours. *Prerequisites:* Advanced nutrition courses and permission of instructor. Two hours. Tyzbir.

294 History of Nutrition Foremost investigators and methods involved in the development of present day nutritional knowledge. *Prerequisite:* Three hours of nutrition. One hour. Smith.

Human Shelter

51 Family Housing Selection A study of the problems involved in selecting living environments for families including site location, financing, structure and space design. Three hours.

151 House Planning (1-4) An advanced study of housing design to meet family requirements, application of home management principles. *Prerequisite:* 51. Three hours.

154 Household Equipment (2-2) Application of scientific principles to the selection, operation and care of household equipment. Three hours. Staff.

251 Advanced Housing Investigation of housing data and current problems including studies of environmental factors, technological developments and governmental programs. *Prerequisites:* 51, Economics 12 and Sociology 21. Three hours. Staff.

Seminars, Field Experience, Special Topics and Research

90 Integrated Seminar in Home Economics Selected topics dealing with contemporary human concerns. Emphasis on understanding the interrelationships between the various basic disciplines and major program areas in the school. Three hours.

97, 197, 297 Mini-Course Short courses dealing with limited topics offered in various disciplines in home economics. Enrollment may be more than once. *Prerequisite:* Varies with course. One hour.

195 Special Topics Lectures, laboratories, readings or projects relating to contemporary areas of study. Enrollment may be more than once, accumulation up to twelve hours. *Prerequisite:* Varies with course.

290 Introduction to Research Research procedures with lectures and discussions of problem selection, objectives, bibliographical techniques, and analysis of data. Two hours. Tyzbir.

291 Special Problems Reading, discussion, and special field and/or laboratory investigations. *Prerequisite:* Departmental permission. Students may enroll more than once for a maximum of twelve hours. One-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 twelve hours. *Prerequisite:* Departmental permission.

296 Field Experience Professionally oriented field experience under joint supervision by faculty and business or community representative, credit arranged up to fifteen hours. *Prerequisite:* Departmental permission.

Mathematics

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION

Professors Chamberlain, Cooke, Hill, Izzo, Meserve, Moser (Chairman), Riggs, Schoonmaker, Sylwester and Wright; Associate Professors Burgmeier and Dwork; Assistant Professors Aggarwal, Ashikaga and Haugh; Lecturers Aleong, Cole, Johansson, Kost, Lawlor, Moraczewski, Morency and Puterbaugh.

The Mathematics Department provides basic courses for all students throughout the University. The following lists of courses, grouped according to their prerequisites, are provided for the information of students seeking a first elective in mathematics.

Minimal background one year of high school algebra:

Math. 1 Elementary College Algebra (evenings and summers only)

One year each of high school algebra and geometry:

Math. 7 Fundamentals of Mathematics I

Two years of high school algebra and one year of geometry:

Math. 2 Plane Trigonometry

Math. 4 Mathematics of Finance

Math. 9 College Algebra

Math. 10 Precalculus Mathematics

Math. 18 Mathematics for Business

Math. 33 Finite Mathematics

Four years or more of college preparatory mathematics in high school:

Math. 19 Fundamentals of Calculus I

Math. 21 Analytic Geometry and Calculus I

Students entering with Advanced Placement in Calculus may take Math. 22 or 121 as their first mathematics course at UVM.

Basic Courses

1 Elementary College Algebra Review of fundamental operations and a more extensive study of fractions, exponents, radicals, linear and quadratic equations. Additional topics to be discussed include ratio proportion, variation, progressions and the binomial theorem. This course covers the topics normally included in intermediate algebra in high school. Students who have satisfactorily completed two years of high school algebra, or the equivalent, will receive no credit for this course. Offered only in Evening Division and Summer Session. *Prerequisite:* One year of high school algebra. Three hours. Staff.

2 Plane Trigonometry A study of trigonometric functions, their graphs and other properties, logarithms, 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 19 or above. Credit will not be given for both 2 and 10 nor 9 and 10. *Prerequisite:* 1 or 9. Three hours. Staff.

4 Mathematics of Finance Precalculus mathematics applied to interest, annuities, life insurance and other business areas. *Prerequisite:* 1 or 9. Three hours. Staff.

7, 8 Fundamentals of Mathematics I, II A liberal arts elective designed to illustrate both the enjoyment and the utility of a variety of mathematical concepts. Students with four years of college prep. high school mathematics will not receive credit for this course. *Prerequisites:* One year each of secondary school algebra and geometry; 7 for 8. Three hours. Staff.

9 College Algebra A study of 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 will not be given for both 2 and 10 nor 9 and 10. *Prerequisites:* Two years of secondary school algebra and one year of secondary school geometry. Three hours. Staff.

10 Pre-Calculus Mathematics Skills in working with numerical, algebraic and trigonometric expressions are developed in preparation for Mathematics 21. *Prerequisites:* Two years of secondary school algebra and a good background in geometry and trigonometry. May not be taken for credit concurrently with, or following receipt of credit for any mathematics course numbered 19 or above. Credit will not be given for both 2 and 10 nor 9 and 10. Three hours. Staff.

18 Mathematics for Business Elements of matrix operations, logarithms, exponential equations, differential and integral calculus and probability with applications to business. The Department recommends that credit not be given for any two of the courses 18, 19, 21. *Prerequisite:* Two years of secondary school algebra. Four hours. Staff.

19 Fundamentals of Calculus I An introduction to limits and differential calculus with a wide variety of applications. Students interested in intensive use of mathematics should take Mathematics 21. Credit will not be given for more than one of the courses 19, 21. *Prerequisites:* 9 and 2 or sufficiently strong background in secondary school algebra and trigonometry. Three hours. Staff.

20 Fundamentals of Calculus II An introduction to integral calculus and linear algebra with a wide variety of applications. Credit will not be given for more than one of the courses 20, 21. A student who completes Mathematics 20 may be admitted to Mathematics 22 upon the recommendation of his Mathematics 20 instructor. *Prerequisite:* 19. Three hours. Staff.

21* Analytic Geometry and Calculus I Plane analytic geometry and an introduction to the calculus of one variable including limits, continuity and the techniques and applications of differentiation. *Prerequisites:* 10; or 9 and 2; or strong background in secondary school algebra and trigonometry. Four hours. Staff.

* 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.

22 Analytic Geometry and Calculus II Techniques and applications of integration of functions of one variable, the calculus of vector functions, and polar coordinates. *Prerequisite:* 21. Four hours. Staff.

33 Finite Mathematics An elementary treatment of logic, sets, probability, vectors, matrices with a variety of applications to Markov chains, linear programming, game theory, and graph theory. *Prerequisites:* Two years of secondary school algebra and one year of secondary school geometry. Three hours. staff.

102 Fundamental Concepts of Mathematics Analysis Sets, relations, functions, the Schroeder-Bernstein theorem, cardinal numbers, ordinal numbers, well-ordering, the Axiom of Choice, Zorn's lemma, rational numbers, fundamental sequences, real numbers, complex numbers, elementary topology of the reals and complexes. *Prerequisite:* Credit or concurrent enrollment in Mathematics 121. Three hours. Staff.

104 Fundamentals of Mathematics of Computation An introduction to the mathematical theory and techniques underlying computer science.

Topics include set theory, graph theory, Markov chains, game theory, semi-groups, free monoids, finite groups and wreath products. *Prerequisites:* 22, Statistics 151 desirable. Three hours. Staff.

121 Analytic Geometry and Calculus III Solid analytic geometry, the calculus of functions of two and three variables, infinite series and elementary differential equations. *Prerequisite:* 22. Four hours. Staff.

124 Linear Algebra A study of matrices, linear dependence, vector spaces, linear transformations, characteristic equations and applications. *Prerequisite:* 22 or 20. Three hours. Staff.

125, 126 Fundamental Concepts of Elementary School Mathematics Discussion of natural numbers, integers, fractions, decimals, and real numbers together with the fundamental operations and fundamental principles involving them. Number bases, sets, measurement and approximation, ratio, proportion, percentage, and selected topics from algebra which are a natural extension of arithmetic. Open only to students in elementary education. *Prerequisites:* Sophomore standing; 125 for 126. Three hours. Staff.

151 Applied Probability For description see Statistics 151.

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 the 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. *Prerequisite:* Ed. 178, acceptance to teacher education, or permission of instructor. Three hours. Staff.

Other Basic Courses

In addition to the courses offered during the academic year, the following courses may be offered in summer sessions and in the evening division program.

Number	Title	Credit Hours
A 15	Plane Analytic Geometry	3
A 16	Differential Calculus	3
A 17	Integral Calculus	3
A 18	Intermediate Calculus	3
S 45	Coordinate Geometry and Vectors	3
S 46	Elementary Functions	3
S 47	Calculus I	3
S 48	Calculus II	3
S 142	Fundamental Concepts of Algebra	3
S 144	Statistics and Probability	3

206 Introduction to Statistical Inference For description see Statistics 162. (Not approved for graduate credit).

207a, b Probability Theory For description see Statistics 251, a, b.

208 Statistical Theory For description see Statistics 262.

217 Introduction to the Theory of Computing Computability, effective procedures, algorithms, and recursive functions. Post's symbol manipulation systems and formal languages. Undecidable problems. Abstract and concrete complexity. *Prerequisite:* Math 104. Staff.

218 Automata Theory Capabilities and limitations of finite state automata. Minimization, control and identification of machines. Structure and loop-free decomposition of machines. State-identification and fault-detection experiments. Finite state recognizers and regular expressions. *Prerequisite:* 104. Three hours. Aggarwal.

219, 220 Mathematical Logic Truth tables, axiomatic propositional calculus, independence, first order quantification theory, completeness theorems, prenex normal forms, decidability. Formal number theory, recursive functions, Gödel numbers, recursive undecidability, axiomatic set theory, ordinal numbers, the axiom of choice, effective computability, undecidable problems. *Prerequisites:* 102 or 104; 219 for 220. Three hours. Staff.

221 Deterministic Models in Operations Research Techniques of linear and dynamic programming and game theory. Graphs and tree models. Classical problems are discussed, and problem formulation stressed. *Prerequisites:* 124; 121 desirable. Three hours. Staff.

222 Stochastic Models in Operations Research Stochastic processes and their use in analysis of industrial problems. Markov chains, queueing theory, linear and dynamic programming under uncertainty. *Prerequisites:* 151, or 207; 221. Three hours. Staff.

224 Analysis of Algorithms Models of computation, design of efficient algorithms, integer and polynomial arithmetic, sorting, binary-search trees and adaptive merging. NP complete problems. Parallel processing. *Prerequisites:* 104, 121 and CS 103. Three hours. Staff.

230 Ordinary Differential Equations Solutions of linear ordinary differential equations, the Laplace transformation, and series solutions of differential equations. *Prerequisites:* 121, 124. Three hours. Staff.

231 Functions of a Complex Variable Differentiation and integration of a function of a complex variable, mapping of elementary functions, infinite series, properties of analytic functions, analytical continuation, calculus of residues, contour integration, integral functions, meromorphic functions, Riemann surfaces, and conformal representation. *Prerequisite:* 242. Three hours. Staff.

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. Staff.

237 Numerical Methods I Concept of error, polynomial approximation, summation techniques, solution of equations, linear systems, eigenvalues. *Prerequisites:* 121, 124 and knowledge of computer programming. Three hours. Staff.

238 Numerical Methods II Finite differences, differentiation and integration, ordinary and partial differential equations, linear programming. *Prerequisite:* 237. Three hours. Staff.

240 Operational Mathematics Orthogonal functions, transforms and boundary value problems. *Prerequisite:* 230 or 271. Three hours. Staff.

241 Advanced Calculus I Calculus of several variables, Euclidean spaces, open and closed sets, limits, continuity, differentiation (emphasizing the linearity), maxima and minima, Lagrange multipliers and integration of functions of several variables. *Prerequisites:* 121 and 124. Three hours. Staff.

242 Advanced Calculus II Jacobians, change of variables in a multiple integral, line and surface integrals, Green's, Gauss', and Stokes' Theorems, Fourier Series, Fourier and Laplace transforms. *Prerequisite:* 241. Three hours. Staff.

245 Introduction to Operations Analysis Problem definition, criteria, decision making; emphasis on modeling and simulation. Computerized simulations are accentuated. *Prerequisites:* CS 11 and either 19 or 21; 151. Three hours. Staff. (Not approved for graduate credit.)

251 Modern Algebra Fundamental concepts of Abstract Algebra. Sets, mappings, groups, rings, integral domains, fields, homomorphisms and isomorphisms. *Prerequisites:* 22; 102 or 104 highly desirable. Three hours. Staff.

252 Advanced Linear Algebra Linear transformations and vector spaces, including Jordan forms. Symmetric, Hermitian, orthogonal and unitary matrices, and quadratic forms. *Prerequisites:* 124; 251 desirable. Three hours. Staff. Alternate years, 1979-80.

253, 254 Topology The elements of point set topology; closed sets and open sets in metric spaces, continuous mappings, connection, Peano curves, separation theorems and homotopy. *Prerequisites:* 102, 253 for 254. Three hours. Staff. Alternate years, 1979-80.

255 Elementary Number Theory Divisibility, prime numbers, Diophantine equations, congruence of numbers, and methods of solving congruences. *Prerequisite:* One year of calculus. Three hours. Staff.

257 Theory of Groups The study of the various kinds and structures of groups. *Prerequisite:* 251. Three hours. Staff. Alternate years, 1978-79.

258 Galois Theory The study of Galois theory leading to the insolubility of general quintic equations by radicals and theorems on construction with straightedge and compass. *Prerequisite:* 257. Three hours. Staff. Alternate years, 1978-79.

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:* One year of calculus. Three hours. Izzo, Meserve, Riggs.

261 The Development of Mathematics The historical development of the mathematical sciences is considered with an emphasis upon the interrelations among these sciences. Individual students are expected to emphasize the specific aspects of mathematics that are of interest to them at the level of abstraction that is compatible with their previous experience. *Prerequisite:* Nine hours of college mathematics. Three hours. Staff.

262 Geometry for Elementary School Teachers An informal approach to geometry is considered with an emphasis upon the use of intuitive geometric concepts in the introduction or clarification of most topics of elementary school mathematics. Not open to mathematics majors. *Prerequisite:* 125 or a teaching certificate. Three hours. Staff.

263 Projective and Affine Geometries The principle of duality, perspectivity, projectivity, harmonic sets, cross ratio, the theorems of Pascal and Brianchon, poles and polars. *Prerequisite:* 124. Three hours. Meserve.

264 Vector Analysis Introduction to general vector methods, including the elements of vector algebra and vector calculus with applications to physics and mechanics. *Prerequisite:* 121. Three hours. Staff.

266 Mathematics of Digital Computation for Teachers Mathematical theory underlying digital computing machines including assigned problems on a University computer, including programming in computer system language. A portion of the course is devoted to elementary numerical analysis. *Prerequisites:* 121, 124 highly desirable. Three hours. Staff.

271 Applied Mathematics for Engineers and Scientists I Matrix Theory, Vector Analysis, Linear Ordinary Differential Equations. Emphasis

on methods of solution, including numerical methods. No credit for mathematics majors. For a mathematics concentration, a sequence beginning with 230 is advised. *Prerequisite:* 121. Three hours. Staff.

272 Applied Mathematics for Engineers and Scientists II Partial Differential Equations of Mathematical Physics, Calculus of Variations, Functions of a Complex Variable, Cauchy's Theorem, integral formula. Conformal mapping. *Prerequisite:* 271. Three hours. Staff.

273 Introduction to Combinatorics Combinatorial relations, elementary problems of existence, enumerative combinatorics; generating functions and graphs. Applications to problems in probability, mathematics of computers, graph theory and number theory. No graduate credit for mathematics majors. *Prerequisite:* 104. Three hours. Staff.

274 Computational Linear Algebra Implementation on digital computers is stressed. Topics include examples of "real" problems leading to formulation of linear computational problems; efficient algorithms for Gauss elimination, Householder upper triangular and tridiagonal reduction, stable least-squares computations, eigenvalue computations, determination of conditioning and stability, solution of under and over-determined systems. *Prerequisites:* 124 or 271, modest experience with digital computer programming. Three hours. Staff.

276 Mathematics of Space Flight Topics include orbit determination and prediction of natural and artificial satellites and projectiles. Astrodynamic coordinate systems and their transformations. Integration schemes and perturbation theory. Attitude determination. *Prerequisites:* 237 and modest experience with digital computer programming. Three hours. Riggs.

279, 280 Special Project An approved project under the guidance of a staff member and culminating in a written report. Involvement with off-campus groups is permitted. *Prerequisites:* Junior or Senior standing and approval of the Chairperson of the Department. One to three hours as arranged.

281, 283, 287, 289, 291, 293 Special Topics For advanced students in the indicated fields. Lectures, reports and directed readings on advanced topics. *Prerequisite:* Consent of instructor. Credit as arranged. Offered as occasion warrants. Staff.

281 Special Topics in Applied Mathematics

283 Special Topics in Computer Science

287 Special Topics in Algebra

289 Special Topics in Topology

291 Special Topics in Geometry

293 Special Topics in Analysis

Medical Microbiology

COLLEGE OF MEDICINE

Professors Johnstone, Phillips, Schaeffer (Acting Chairman), and Stinebring; Associate Professors Albertini, Boraker, Fives-Taylor, Gump, T. Moehring, and Novotny; Assistant Professor J. Moehring.

120 Clinical Microbiology (3-6) A comprehensive study of human pathogenic microorganisms and their disease states in man. Emphasis is on the bacteria but some mycology and virology is included. Laboratory sessions provide the practical experience in handling and identifying these pathogens. Fall semester. *Prerequisite:* Microbiology 55. Four hours. Fives-Taylor.

197, 198 Undergraduate Research A small number of undergraduate honors students can be accommodated in individual research projects sponsored by a department member. Arrangement with the individual department member and approval of the Department Chairman. Credits negotiable. Staff.

203 The Mammalian Cell as a Microorganism Discussion of such current ideas in cell biology as cell immortality, transformation, dedifferentiation, synchronization, cell-macromolecule interaction; laboratory will illustrate current cell culture techniques as a foundation for the lectures. Designed for biology students of varied training. *Prerequisite:* Permission of instructors. Four hours. Moehring, Schaeffer.

205 Pathogenic Bacteriology Studies of major species of pathogenic bacteria with emphasis on mechanisms of disease production, epidemiology, control measures, and diagnosis. Designed for advanced undergraduate or graduate students interested in phenomenon of parasitism. *Prerequisite:* Permission of the instructor. Three hours. Stinebring.

211 Genetics of Microorganisms Studies of organization and replication of genetic material, the expression of genetic information, and gene transfer in bacteria and bacterial viruses. *Prerequisite:* Permission of the instructor. Three hours. Novotny.

223 Immunology Analysis of the immune response with respect to structure and function of immunoglobulins, cytokinetics and immunocompetence, tolerance, ontogeny and phylogeny of adaptive immunity, immunogenetics of transplantation, hypersensitivity states, and theories of antibody formation. *Prerequisite:* Permission of the instructor. Four hours. Boraker.

Medical Technology

SCHOOL OF ALLIED HEALTH SCIENCES

Associate Professors Breen, Lachapelle (Chairman), Sullivan; Assistant Professors Fike, Page, Reed; Instructors Czerniawski, Russell; Lecturers Rapsinski, Sowek; Clinical Instructors Albarelli, Coble, Cote, Cummings, Dopp, Gillespie, Isham, Knight, Letourneau, Powden, Standage, Thibault, Thomas, Wilbur, Wyllie.

3 Medical Terminology Terminology related to medical science and hospital services. Required of all students in Department of Medical Technology. Open to Health Science students by permission of instructor. Fall. One hour. Breen.

20 Clinical Chemistry Lecture and laboratory experiences in basic clinical chemistry. Practicum in Rowell student lab and MCHV Laboratory. Required of all second-year students. Fall and Spring. Six hours. Sullivan, Sowek.

30 Hematology Theory and laboratory techniques of basic hematology, coagulation and urinalysis. Clinical laboratory experience provided by MCHV. Required of all second-year students. Fall and Spring. Five hours. Reed, Sowek.

40 Clinical Immunology Introduction to immunology and its application to serology and blood banking. Includes lectures, lab exercises and clinical practicum in MCHV Blood Bank. Required of all second-year students. Fall and Spring. Five hours. Fike, Rapsinski.

50 Clinical Microbiology Introduction to isolation and identification of clinically significant bacteria, fungi and intestinal parasites. Includes lecture, laboratory exercises and a clinical practicum in MCHV Laboratory. Required of all second-year students. Prerequisite: MCBI 55. Fall and Spring. Five hours. Page, Rapsinski.

102 Medical Technology Principles, procedures and special techniques. Includes parasitology and urinalysis. Spring. One-two hours. Page, Rapsinski.

121 Clinical Chemistry: Generalists Lecture series and laboratory practicum in advanced clinical chemistry. Practicum in MCHV Laboratory. Required of all Medical Technology students. Fall. Four hours. Sullivan.

126 Clinical Chemistry: Specialists Advanced work in clinical chemistry, providing for experience on multiple-channel auto-analyzers, the application of isotopes to the clinical laboratory, advanced laboratory instrumentation and "trouble shooting". Managerial and educational skills are also emphasized. MCHV Laboratory. Spring. Thirteen hours. Sullivan.

132 Advanced Hematology Advanced theory and practice of hematology and coagulation. Includes in-depth study of physiology and pathophysiology of blood cells with emphasis placed on disease processes and study of peripheral and bone marrow smears. Spring. Four hours. Reed.

135, 136 Hematology for Specialists A two-semester course required of senior hematology specialists. Includes a weekly seminar, 6-10 week clinical rotation, independent research project and didactic instruction of second-year students. Fall and Spring. An extended course (XC). Reed.

141 Principles of Immunology Basic concepts of the immune mechanism including structure and function of immunoglobulins, antigen-antibody reactions and the lymphoid system. Application of these concepts in health and disease of humans will be covered. Fall. Three hours. Lachapelle, Fike.

151 Advanced Practicum in Clinical Microbiology Includes rotation in MCHV and State Health Laboratories. Prerequisites: MCBI 55, MDMC 120. Fall. Five hours. Page.

152 Selected Topics in Clinical Microbiology In-depth study of anaerobic bacteria, fungi and mycobacteria. Includes lectures, laboratory exercises and a clinical practicum. Prerequisites: MCBI 55, MDMC 120. Spring. Four or five hours. Page, Lachapelle.

159 Microbiology Seminar Case histories of microorganisms of clinical significance. Prerequisite: Senior MT standing. Fall. One hour. Page.

161 Blood Bank: Generalists Advanced study of human blood groups and transfusion practice. Emphasis on problem solving, advanced theory and special lab exercises. Laboratory experiences at UVM, MCHV and Red Cross Blood Center. Fall. Four hours. Fike.

197 Principles of Education and Management Designed to introduce procedures and methods of instruction in various teaching situations with the opportunity to design and participate in teaching activity. Concurrent

offering is an introduction to the basic principles of management, supervision, and administration. Project emphasis on investigation of concepts for projecting new patterns to meet the needs of future health care systems. Fall. Three hours. Breen, Russell.

198 MT Seminar Assigned readings and special topics. Spring. One hour. Breen.

201 Medical Technology Advanced Individual research in the field of medical technology. Departmental permission. Fall and Spring. Variable. Faculty. (Not approved for graduate credit.)

260 Blood Bank Seminar Discussion on recent advances and practices used in transfusion of patients. *Prerequisite:* MEDT 40 or permission of instructor. Spring. One hour. Fike. (Not approved for graduate credit.)

Microbiology and Biochemistry

COLLEGE OF AGRICULTURE

Professors Little, Racusen (Chairman), and Weller; Associate Professors Foote and Sjogren; Assistant Professor Carrier; Teaching Associate Husted.

55 Introductory Microbiology (2-4) The study of microorganisms, especially bacteria, their structure, development and activities. *Prerequisite:* Four hours of chemistry. Four hours. Sjogren. Also offered each spring. The fall term is reserved for Allied Health Science students except by permission of instructor.

195 Special Topics *Prerequisite:* Permission of instructor.

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 16 or 131. Four hours. Foote. Also offered each spring.

202 Advanced Biochemistry (3-3) A study of metabolic cycles with emphasis on research methods involving radioisotopes and chromatography. *Prerequisite:* 201 or 203 or permission of the instructor. Four hours. Racusen.

203 Molecular Biology (3-3) The structure and biological function of nucleic acids, proteins, and enzymes. Emphasis is on optical, electrophoretic, and ultracentrifugal methods. *Prerequisite:* Chemistry 140 or 142 or permission of instructor. Four hours. Carrier.

220 Environmental Microbiology (2-3) The activities of microorganisms, primarily bacteria, in air, soil, and water. *Prerequisite:* A previous course in microbiology. Four hours. Sjogren. Alternate years, 1979-80.

254 Microbial Biochemistry (2-4) The chemical composition and metabolism of microbial cells. *Prerequisite:* 55, 201, or permission of instructor. Four hours. Sjogren. Alternate years, 1978-79.

295 Special Topics *Prerequisite:* Permission of instructor.

Military Studies

Lieutenant Colonel Coseo (Chairman); Major Kushnir; Captain Botelho; Sergeants First Class Wierenga and Wilson.

Note: Total allowable credit for Military Studies varies by College; check with Department of Military Studies. Refer to page 126 for program details.

1 Introduction to Military Studies (2) American military heritage; customs and traditions of the service; historical development of the Army and its role in support of national objectives; the diversity of missions performed during both peace and war; civil-military relations; the role of ROTC, the National Guard and Reserve; the military as a profession. Fall and spring. Two hours. *Prerequisite:* Freshman or Sophomore standing.

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. Fall. Two hours. Gaden. *Prerequisite:* Sophomore standing; MSTD 1, or departmental permission.

3 The Non-Military Role of the Military (2) Examines the political, social, economic, and educational implications generated by the existence of armies. The non-military role is examined in its traditional role of nation building and in its developing role as an agent of social and economic rehabilitation. Spring. Two hours. Coseo. *Prerequisite:* Sophomore standing or departmental permission.

4 Contemporary World Military Scene (2) Seminar on current international uses of military forces, viewed against a background of long range national concerns, especially of the U.S., U.S.S.R., China. Spring. Two hours. Botelho. *Prerequisite:* Sophomore standing, MSTD 1, or departmental permission.

***12 Rapelling** (½ Physical Education credit) Basic instruction in rope management, rope installation and rappelling, consisting of both classroom instruction and outdoor practical exercises. Fall and Spring. One hour. Wierenga.

***14 Physical Training** (½ Physical Education credit) Physical conditioning which provides the student an opportunity to assess his/her physical condition against the standards required for successful completion of the ROTC Advanced Course. Also provides a means of getting into proper physical condition. Fall, twice; Spring, twice. One hour. Wierenga.

***16 Survival** (½ Physical Education credit) Instruction in wilderness survival techniques, to include land navigation, procurement of food, water and shelter. Fall and Spring. One hour. Botelho, Wierenga.

***17 Marksmanship** (½ Physical Education credit) Instruction in basic rifle marksmanship, to include hand and eye coordination, posture and breath and trigger control. Fall and Spring. One hour. Botelho.

***18 Backpacking** (½ Physical Education credit) Instruction in the basics of backpacking, to include an overnight hike in the Green Mountains of Vermont. Fall and Spring. One hour. Wierenga, Wilson.

***19 Orienteering** (½ Physical Education credit) Instruction and field work in land navigation using the map and compass. Fall and Spring. One hour. Kushnir.

****101 Leadership and Management I (2)** Military cartography. The psychological and sociological factors which affect human behavior; individual and group solution of leadership problems in an organization. Analysis of the leader's role in directing and coordinating the efforts of in-

dividuals and small groups in obtaining organizational goals. Fall. Two hours. Kushnir.

****102 Leadership and Management II (2)** Fundamentals of educational psychology applicable to instruction; techniques used in planning, presenting, and evaluating instruction. An orientation military occupational specialties.

****111 Leadership and Management III (2)** Analysis of techniques and procedures used in managing organizations. The role of interdisciplinary teams and the development of courses of action to solve typical stressful leadership problems. Fall. Two hours.

****112 Leadership and Management IV (2)** Investigation of selected leadership and management problems associated with unit administration, military law, and the Army Readiness Program. Obligations and responsibilities of an officer. Spring. Two hours.

****211 Special Studies** (academic credit as arranged) In-depth analysis of topics broached in MSTD 1, 2, 3, or 4. Guided research. Student proposes topic. Fall and spring. Two hours. (Not approved for graduate credit).

****212 Special Studies** (continuation of MSTD 211) Fall and spring. Two hours. (Not approved for graduate credit).

*Prerequisites for MSTD 12, 14, 16, 17, 18, and 19 are freshman or sophomore standing or departmental permission.

**Prerequisites for MSTD 101, 102, 111, 112, 211, and 212 are acceptance into Army ROTC Advanced Course or departmental permission.

Music

COLLEGE OF ARTS AND SCIENCES

Professors Chapman (Acting Chairman), Lidral, T. Read; Associate Professors Kinsey, Schultz and Wigness; Assistant Professors J. Ambrose, Brown and Weinrich; Instructors Boyer, Dahl, Dorsam, Fleming, Guigui, Karstens, E. Metcalfe, E. Read, Scoones, Storandt, Vogelmann, M., Lecturer Bemis.

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.

Theory and Composition

1 Introductory Music Theory Rudiments of notation, rhythm, melody, harmony, scales, form and terminology. Three hours.

15, 16 Theory I Melodic and rhythmic dictation, sight singing, and elementary harmony. Four hours.*

115, 116 Theory II Contrapuntal and harmonic dictation, advanced harmony, and elementary counterpoint. Prerequisite 16; 115 for 116. Four hours.

203, 204 Orchestration First semester: characteristics of instruments, arranging for orchestra; second semester: advanced exercises in orchestral scoring. Prerequisites: 116; 203 for 204. Three hours.

205, 206 Counterpoint First semester: tonal counterpoint; second semester: canon and fugue. *Prerequisites:* 116; 205 for 206. Three hours. 206 in alternate years, 1979-80.

207 Pedagogy of Theory Objectives, viewpoints, content and specific approach to the organization and teaching of theory courses. *Prerequisite:* Eighteen hours in theory. Three hours. Lidlal. (Not approved for graduate credit.)

208, 209 Form and Analysis Creative approach to aural and sight analysis of musical construction. *Prerequisites:* 116, 205 recommended. Three hours.

215, 216 Composition Creative work in free composition with instruction according to the needs and capabilities of the individual student. *Prerequisite:* 205 and 208, or consent of instructor. Three hours. May be repeated for credit. Read.

* Enrollment in 15 will cancel credit for 1.

History and Literature

2 Introductory Music Listening A concise view of western music from plain-song to the present, with emphasis on baroque, classical, romantic, impressionistic and modern music. Course involves both in-class and outside listening. Three hours.

11, 12 Survey of Western Music A historical study of the development of Western music. First semester: earliest times through the baroque; second semester: classical period to contemporary. Course involves both in-class and outside listening. Three hours.**

21, 22 History of Music I A chronological, analytical study of musical literature; first semester, medieval and early Renaissance; second semester: late Renaissance to baroque. Required of all music majors, open to others with departmental permission. Three hours. Ambrose, Chapman.

113 Contemporary Music Development and stylistic characteristics of twentieth century music from the late Romanticists to the experimentalists. Both European and American composers will be presented. *Prerequisite:* 1, 2 or 10. Three hours. Read.

114 Jazz Literature The history of jazz music: African and American backgrounds; transition to jazz, growth, early jazz, further developments in the decades from the teens to the present. *Prerequisite:* any one of 2, 11, 12, 21, 22.

121, 122 History of Music II A chronological, analytical study of musical literature: first semester: late baroque through romantic; second semester: post-romantic to contemporary. Required of all music majors, open to others presenting normal prerequisites. *Prerequisites:* 21, 22 or departmental permission. Three hours. Ambrose, Chapman.

123 through 128 Music Literature Studies in the literature of music. *Prerequisites:* Three hours of music history/literature and the ability to read music. Several different topics offered each semester. Consult the pre-enrollment printed course schedules. Three hours.

193, 194 College Honors

195, 196 Special Topics

197, 198 Reading and Research

221, 222 History of Music Changes in musical structure and styles in relation to contemporaneous artistic, literary, religious, and social movements. First semester: Gregorian chant to the baroque era. Second semester: baroque to modern. *Prerequisites:* 21, 22 and 16. Three hours. Chapman.

245, 246 Chamber Music Literature Study through analysis and performance of masterworks for small groups leading to public performance. *Prerequisites:* Twelve hours or the equivalent in performance field and departmental permission. One hour.

281 through 284 Independent Study Studies in theory, composition, history, or literature under the direction of an assigned staff member for advanced students and candidates for honors. Credits as arranged.

For Music Education, see page 174.

** Enrollment in 12 will cancel credit for 2.

Performance

For the fees for instruction, see page 32.

A senior recital in the performance major field is required of all music majors. Regular appearances in informal recitals are required of all performance students. Appearance in one formal departmental recital a semester is required of all music majors. At the end of each semester jury examinations are given in applied music.

All music majors in any curriculum are required to pass a FUNCTIONAL PIANO FACILITY examination before certification for graduation. Music Education Majors should pass this exam prior to student teaching (i.e., by the end of their third year). This will include:

a. Ability to sight-read songs of the type found in a community song book.

b. Ability to harmonize at sight; to improvise a single piano accompaniment for songs requiring the use I, IV, and V chords and some simple modulations; to transpose the songs and harmonizations to other keys.

c. Ability to sight-read fairly fluently simple accompaniments, vocal or instrumental, and simple piano compositions of the type used for school rhythmic activities.

41, 42 Major Ensembles (0-3) University Band, Choir, Choral Union, and Orchestra. Attendance at all rehearsals and public performances required. *Prerequisite:* Departmental permission. One hour. Staff. May be repeated for credit.

45, 46 Chamber Music (0-2) Study and performance of masterworks for small groups. Attendance at all rehearsals and public performances required. Outside practice required. *Prerequisite:* Departmental permission. One hour. Staff. May be repeated for credit.

51, 52 Performance Study* Individual instruction in piano, organ, classical guitar, harpsichord, voice, strings, woodwinds, brass, percussion, and harp. One to four hours.** For specific instruments see course schedules each semester.

71, 72 Class Study (0-2) Required of music education students, elective to others to limit of facilities and equipment. Class study in performance fields of voice, strings, woodwinds, brass, percussion. One hour. May be repeated for credit.

74 Instrument Repair Class (0-2) A 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 and departmental permission. One hour. Schultz.

74A Piano Repair — Tuning A course to acquaint students with the basic knowledge of piano construction, tuning and repairing. Departmental permission. One hour. Weinrich.

111 Music for Elementary Teachers The development of musical skills, understandings, and attitudes pertinent to the teaching of music in the elementary classroom. *Prerequisite:* Sophomore standing. Three hours. Ambrose, Wigness, Schultz.

112 Elementary Music Methods A course to aid the elementary classroom teacher in developing the potential musicality of students to the highest level through the practical application of musical skills and understandings already acquired by the teacher. *Prerequisite:* 111. Three hours. Wigness.

211, 212 Conducting (2-2) First semester: technique of the baton, score reading, laboratory practice; second semester: preparation and performance of selected scores, including rehearsal procedures. Selected students may conduct University major ensembles. *Prerequisites:* 16, 211 for 212. Three hours.

271, 272 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 the major field. *Prerequisites:* Senior standing in performance and consent of instructor. Three hours.

* Indicated courses in performance may be repeated for credit.

**Each hour of credit in performance study requires one hour's practice per day, and credit will be given only on condition that the instruction be accompanied or preceded by a three-credit course in music and participation in ensemble, unless excused from the latter by the chairman.

Natural Resources

SCHOOL OF NATURAL RESOURCES

Professors Cassell, John, Reidel; Associate Professors Forcier, Lapping.

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. (Not approved for graduate credit.)

272 Environmental Impact Assessment Comprehensive perspective on methods and problems of assessing environmental and social impacts arising from natural resource management. *Prerequisite:* Senior standing. Three hours. Lapping.

278 Water Resources: Analysis, Planning and Management Study of the physical, chemical and biological phenomena in rivers, streams and lakes. Concepts of water resources modeling, planning and management. *Prerequisite:* Senior standing and permission. Three hours. Cassell.

Nursing

SCHOOL OF NURSING

Professor Milligan (Director).

Professional Nursing: Professors Beeker (Chairperson), Sawyer; Associate Professors Barrett, Cronin, Deck, Demers, Emerson, Forgione, Palmer, Murray, Schwalb, Scranton; Assistant Professors Adams, DeHaven, Jacoby, Luce, Magee, Stiles; Lecturer Potter.

Technical Nursing: Associate Professor Gray (Acting Chairperson); Assistant Professors Cicione, Clarke, Turner; Lecturers Kranich, Roy; Instructors Ball, Tanner; Teaching Associate Hall.

Note: All courses limited to students majoring in nursing except by permission of Departmental Chairpersons.

PRNU — Professional Nursing

102 Concepts of Health Study and discussion of health care systems, issues, culture, stress, roles of providers and consumers of health care. Lectures, multimedia sessions and seminars. Opportunity for observational experiences and self-directed study. Three hours. Deck, Emerson.

104 Introduction to Nursing Skills Identification and application of basic nursing skills necessary to provide care for a person in his environment. Various learning resources provided to enable the student to meet the course objectives through self-directed study. Creativity and application of knowledge emphasized. Limited supervised experience in clinical setting. *Prerequisites:* Satisfactory completion (C or better) of at least two of the following sciences — CHEM 4, ZOOL 5, MCBI 55. Three hours. Murray, Potter.

125 to 126 Nursing I and II Development of knowledge and skills needed to assess and maintain the 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 are explored. The dynamics of groups (family and peer) are introduced. Laboratory experiences take place in different hospital settings and with families in the community. *Prerequisites:* Chem 3-4, Zool 5-6, MCBI 55, ECHD 80-81, PSYC I, HN & F 141, an introductory Sociology course, PRNU 102 and PRNU 104. Nine hours. Staff.

145 Nursing III Development of knowledge and skills needed for nursing individuals and families with complex problems. Development of knowledge and skills necessary in giving nursing care to families and groups with emphasis on the interrelatedness of the family and group to the environment. Laboratory experience is provided in distributive and episodic settings. *Prerequisite:* PRNU 126. Nine hours. Staff.

146 Nursing IV Study and practicum focusing on the development of knowledge and skills needed to assume the role of a professional nurse. Core content explores the nurse as a change agent, leader and accountable professional. The student will have a laboratory experience in leadership which occurs in the same setting as PRNU 152. *Prerequisite:* PRNU 145. Nine hours. Staff.

151 Nursing Research An introduction to research in nursing. Each student will participate in designing a study of a nursing problem. *Prerequisite:* Nurs. 126. Three hours. Beeker and Sawyer.

152 Nursing Elective Practicum in a setting selected to meet student identified learning objectives. *Prerequisite:* PRNU 145. Six hours. Staff.

TENU — Technical Nursing

11-12 Fundamentals of Nursing A basic course in the principles of nursing care. The entire sequence focuses on nursing interventions to meet the psychological, safety, and individual needs of all persons. Within each course, specific needs of man are presented in depth with learning opportunities to develop related skills and to adapt these skills to specific age levels. Microbiology content taught in collaboration with the Department of Microbiology in the College of Medicine is included. Concurrent experiences are planned in direct care settings. *Prerequisite:* For TENU 12: ANAT 9. Six hours. Cicione, Hall.

27-28 Nursing Care of Children and Adults These courses focus on nursing interventions necessary to meet changing needs of children and adults in various stages of the wellness — illness continuum. Within each course, content is presented within a framework of broad psychosocial and pathophysiological concepts in which principles of nursing care are emphasized. Clinical learning experiences focus on the adaptation and application of nursing principles to individual patient situations, including maternal and infant care and care of children and adults with varying alterations in physiological and/or psychological functioning. *Prerequisites:* TENU 11-12, ANAT 9 and PSLB 10. Ten hours. Clarke, Kranich, Roy, Ball, Tanner.

30 Nursing Seminar This course is designed to increase the student's understanding of the role of the technical nurse within the profession of nursing. Past and current trends in nursing are reviewed in relation to future goals. *Prerequisite:* TENU 12. Two hours. Gray.

195 Independent Study Independent study in nursing as indicated by student's interest. *Prerequisite:* Departmental permission. One to two hours.

Pathology

COLLEGE OF MEDICINE

Professors Clemmons, Craighead (Chairman), Korson, Stark, Trainer; Associate Professors Howard, Perl, Tindle, Winn; Assistant Professors Brody, Glavin, Hardin, Little, MacPherson, McQuillen, Mossman, Whitcomb.

101 Introduction to Human Disease (2-3) This is an elementary course in human pathology designed for Allied Health students. The first portion will deal with general mechanisms of disease, to be followed by disorders of specific organs. *Prerequisites:* One year college level general biology or equivalent and permission of departmental chairman. Three hours. Staff.

Pharmacology

COLLEGE OF MEDICINE

Professors Gans, Jaffe, Krakoff, McCormack and Soyka (Chairman); Associate Professors Doremus, Reit; Assistant Professors Newman, Redmond, (Clinical) Scollins; Visiting Professor Maxwell.

190 Pharmacology for Physical Therapy Basic pharmacology and classes of drugs which may alter the responsiveness of patients to physical therapy. Last six weeks of second semester. Two hours. Staff.

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 and background in biology. Open to undergraduates. Three hours. Gans.

290 Introduction to Pharmacology Consideration of the factors which determine the efficacy and safety of drugs with emphasis on representative agents used in medicine. *Prerequisites:* Introductory course in organic chemistry (CHEM 4, 16 or 131-132) and background in biology or health sciences. Three hours. Staff. (Not approved for graduate credit.)

Philosophy

COLLEGE OF ARTS AND SCIENCES

Professors Cahn, Dykhuizen (emeritus) and Hall; Associate Professors Hansen, Mann (Acting Chairman), Moneta, and Sher; Assistant Professors P.S. Kitcher, P.W. Kitcher, and Miller.

1 Introduction to the Problems of Philosophy An introduction to philosophy through a study of such fundamental problems as knowledge and belief, mind and body, freedom and determinism, the existence of God, moral and aesthetic values, and liberty and the authority of government. Readings in historical and contemporary sources. Three hours. Staff.

2 Historical Introduction to Philosophy Works of major philosophers in the Western tradition considered in their historical and philosophical contexts. Three hours. Cahn, Hall, P.S. Kitcher, Moneta.

3 Introduction to Logic A study of the basic principles of deductive inference. Three hours. P.S. Kitcher, Mann, Sher.

4 Introduction to Ethics An analysis of the principal problems and theories of ethics. Three hours. Hall, Sher.

101 History of Ancient Philosophy A study of the works of the Pre-Socratics, Plato, Aristotle, and their successors. Three hours. *Prerequisite:* 1 or 2. Cahn, Hall, Mann.

102 History of Modern Philosophy A study of the works of the major philosophers of the seventeenth and eighteenth centuries: Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, Kant, and others. *Prerequisite:* 1 or 2. Three hours. Cahn, P.S. Kitcher, P.W. Kitcher.

105 History of Medieval Philosophy A study of the works of such major philosophical figures as Augustine, Anselm, Abelard, Duns Scotus, and William of Ockham. *Prerequisite:* 101 is recommended. Three hours. Mann.

107 Nineteenth Century Philosophy A study of the works of such philosophers as Hegel, Fichte, Schopenhauer, J. S. Mill, Kierkegaard, Nietzsche, and Marx. *Prerequisite:* 102 is recommended. Three hours. Hall.

110 Nature of Mind An examination of philosophical issues raised by influential psychological views of the nature of the human mind. *Prerequisite:* 1 or 2 or one course in psychology. Three hours. P.W. Kitcher.

112 Introduction to the Philosophy of Science An introduction to the major philosophical problems raised by science. Such topics as the nature

of scientific inference, the structure of scientific theories, causation, explanation, and scientific change will be studied. *Prerequisite:* 1 or 2 or History 61 or six hours in some science. Three hours. P.S. Kitcher.

113 Intermediate Logic A study of the basic results about logical systems, including axiomatic treatments of sentential calculus and first-order logic, independence, consistency, soundness, completeness, and the Lowenheim-Skolem theorem. The course may also include studies of other logical systems; e.g., modal logic, the logic of vague concepts, etc. *Prerequisite:* 3. Three hours. P.S. Kitcher, Mann.

121 Oriental Philosophy An examination of the main schools of Chinese and Indian philosophy including Confucianism, Taoism, Buddhism, Neo-Confucianism, and Maoism. *Prerequisite:* One course in philosophy. Three hours. Hansen.

130 Philosophical Foundations of Education A critical examination of the aims of education and the most appropriate means of achieving those aims. Readings from historical and contemporary sources. *Prerequisite:* 1 or 2. Three hours. Cahn.

132 Philosophy of History An investigation of theories of history from the perspectives of both historians and philosophers. *Prerequisites:* Either two advanced courses in philosophy or six hours in history. Three hours. P.W. Kitcher, Mann, Moneta.

135 Philosophy of Religion A critical analysis of such issues as the nature of religion, the concept of God, the grounds for belief in God, the immortality of the soul, truth and revelation, and problems of religious language. Readings from historical and contemporary sources. *Prerequisite:* 1 or 2. Three hours. Cahn, Hall, Mann.

140 Social and Political Philosophy An analysis of such fundamental theories and problems in social and political thought as political obligation, rights, and justice. *Prerequisite:* 1, 2, or 4. Three hours. Sher.

142 Philosophy of Law An analysis of the nature of law including some of the leading theories, such as natural law theory, legal positivism, and legal realism. *Prerequisite:* 1, 2, or 4. Three hours. Hall, Hansen, P.W. Kitcher.

144 Philosophical Problems in Medicine A 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, 2, or 4. Three hours. Mann, Sher.

151 Philosophy and Literature Selected philosophical works and the literary works they have influenced. *Prerequisite:* One course in philosophy. Three hours. Hall, P.S. Kitcher, Moneta.

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:* One course in philosophy. Three hours. Cahn, Hall, P.W. Kitcher.

160 Phenomenology I A systematic study of fundamental principles of the phenomenological method such as: intentionality of consciousness, phenomenological reflection, phenomenological reduction, concept of constitution, and inner time consciousness. *Prerequisite:* One course in philosophy. Three hours. Moneta.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

201 Theory of Knowledge A critical examination of the nature and

sources of knowledge; belief, truth, evidence, perception, memory, and induction. *Prerequisite:* 102. Three hours. P.W. Kitcher, Sher.

202 Metaphysics A 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 or 102. Three hours. Cahn, Mann, Moneta, Sher.

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. P.W. Kitcher, Sher.

212 Philosophy of Science A thorough investigation of one or two problems in the philosophy of science. There will be emphasis on modern attempts to solve them. *Prerequisite:* 112 or extensive study in the sciences. Three hours. P.S. Kitcher.

213 Mathematical Logic A study of important advanced results in mathematical logic, including Godel's Incompleteness Theorems and an introduction to proof theory and recursive function theory. *Prerequisite:* 113. Three hours. P.S. Kitcher.

215 Philosophy of Mathematics A study of the philosophical problems connected with mathematics. The course will attempt to answer the following questions. What (if anything) is mathematics about? How do we acquire our mathematical knowledge? Is there an important difference between mathematics and natural science? Could all our mathematical beliefs be false? *Prerequisite:* 3 or 214 or extensive background in mathematics. Three hours. P.S. Kitcher.

217 Philosophy of Language A philosophical study of the nature of language. *Prerequisite:* 3 or 214 or background in linguistics. Three hours. Hansen, P.S. Kitcher, Sher.

221 Tao Te Ching A systematic study of one of the most important texts of Taoism and of the English translation of the text. *Prerequisites:* 101, 102, and 121. Three hours. Staff.

222 I Ching or Book of Changes A systematic study of one of the most difficult and most important texts in the Oriental tradition. *Prerequisites:* 101, 102, and 121. Three hours. Staff.

240 Contemporary Ethical Theory An analysis of the ideas of contemporary moral philosophers in normative ethics and metaethics. *Prerequisites:* 4, 140, or 142. Three hours. Sher.

260 Phenomenology II A critical and intensive investigation of the thought of a major twentieth century phenomenologist, e.g. Husserl, Heidegger, or Merleau-Ponty. *Prerequisite:* 160. Three hours. Moneta.

262 Existentialism A study of existentialism as a philosophy, and an examination of its background, as displayed in the literary and philosophical writing of Pascal, Kierkegaard, Camus, Heidegger, and Sartre. *Prerequisites:* Any two of 101, 102, and 107. Three hours. Hall, P.W. Kitcher.

265 American Philosophy The thought of such leading American philosophers as Peirce, James, Royce, Santayana, Dewey and Whitehead. *Prerequisites:* 101 and 102. Three hours. Cahn, Miller.

271, 272 Seminar: Major Philosophical Author A study of the major philosophical texts by a single author. May be repeated for credit when different authors are studied. *Prerequisite:* An appropriate 100-level course in philosophy. Three hours. Staff.

273, 274 Seminar: Major Philosophical Period or School A study of the philosophical texts of a specific period or school of philosophy. May be

repeated for credit when different periods or schools are studied. Prerequisite: An appropriate 100-level course in philosophy. Three hours. Staff.

281, 282 Seminar Selected topics in philosophy. Prerequisite: An appropriate 200-level course in philosophy. Three hours. Staff.

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. Staff.

Physical Therapy

SCHOOL OF ALLIED HEALTH SCIENCES

Professor Feitelberg (Chairperson); Associate Professor Page, Anderson, and Moffroid; Instructor: Evans; Lecturers: Delehanty, Jette, Kristensen, Nelson; Clinical Assistant Professors Corbin, DeAngelis, Parry, Smith; Clinical Instructors Cummings, Kane, Kleczak, Marn, Montague, D. Nalette, E. Nalette, Sorrell, Sowles, Sulima, Tandy, Tighe.

21 Physical Therapy I History and current trends of the profession with emphasis on the medical-ethical-legal aspects of practice. The role of the therapist in treatment, the health care environment and as a team member. Supervised observation in approved clinical centers. Three hours. Feitelberg, Faculty.

22-121-122-151-152 Physical Therapy Procedures II-VI This sequence of courses develops increasing levels of sophistication in evaluation and treatment procedures to prepare the student for professional qualification. Included are procedures such as a massage, physical agents, therapeutic exercise and physical rehabilitation, culminating with the investigation of more complex medical problems and their management. Lecture, laboratory, clinical demonstrations and clinical correlation. II: three hours; III: three hours; IV: five hours; V: five hours; VI: three hours. Anderson, Page, Jette.

110 Kinesiology The study of normal posture and movement. Principles of anatomy, biomechanics and neurophysiology are studied in relation to static and dynamic components of motion. Prerequisite: Sophomore Physical Therapy standing or permission of the instructor. Three hours. Moffroid.

120 Scientific Inquiry I Introduction to clinical inquiry. Basic statistics of central tendency, dispersion, correlation and analysis of variance. Current literature provides a framework for discussion of these statistical applications. Two hours. Moffroid.

128 Clinical Education I Students are assigned to a variety of approved clinical centers for supervised observation and participation. Learning experiences are designed in cooperation with the clinical faculty in keeping with the level of competency acquired. Three hours. (Full time, 6 week period, May-June) Evans, Kristensen, Clinical Faculty.

131-132-133 Clinical Medicine I-III Management of disease processes in the major medical specialties such as General Medicine, Orthopaedics, Neurology, Pediatrics and Rehabilitation Medicine. Utilization of the problem oriented medical record as a basis for understanding the concept of comprehensive care. Lecture and clinical presentations. A continuum of four semesters. 131: one hour; 132: two hours; 133: two hours. Faculty, College of Medicine.

142 Independent Study The selection and development of a topic for investigation using an assigned faculty member as a preceptor. Seminar sessions for guidance and problem solving on related issues. Two hours. Moffroid.

144 Health Care Systems An overview of the present health care system, with emphasis on issues and aspects that are specifically related to physical therapists. Lecture, discussion, written projects. Three hours. Feitelberg.

158 Clinical Education II A continuation of Clinical Education I. At this level students fully participate in the evaluation and treatment of patients according to the objectives of the facility. A wide variety of opportunities are planned within the facility and community. Students are assigned full time to two facilities during this period. Six hours. (Full time 12 week period, January-March.) Evans, Kristensen, Clinical Faculty.

161 Psychological Aspects of Physical Disability Consideration of the reactions to illness and disability and associated emotional and personality changes. Emphasis on developing methods to modify behavior for effective treatment and teaching of the disabled and the family. Three hours. TBA

173-174 Principles of Organization and Administration-Principles of Education Analysis of current designs and methods used in existing physical therapy facilities. Opportunity to investigate concepts for projecting new patterns to meet the needs of future health care systems. Study of communication theories fundamental to the process of change. Group activity to design alternate models based on problem solving. Introduction to learning theory as applicable to Physical Therapy. Opportunity to become familiar with instructional media, design and participate in educational units. Five hours. Feitelberg, Faculty, E. Nalette.

176 Scientific Inquiry II Clinical inquiry is presented as a methodology. Two way analysis of variance is learned. The student plans an experimental design and completes it with mock data. The administrative planning of clinical inquiry is explored and methods are discussed for disseminating information. *Prerequisite:* 173 or a statistics course. Two hours. Moffroid.

Physics

COLLEGE OF ARTS AND SCIENCES

Professors Arns, Brown, Crowell, Detenbeck, Juenker, Krizan, Lambert, Nyborg (Acting Chairman) and Scarfone; Associate Professor Sachs.

1 Celestial Physics Description of various historical models of the observable universe. Nature of light and description of optical instruments, especially the telescope. Concept of space and time, Einstein's Relativity. Three hours. Brown.

2a, b, c Topics in Physical Science A sequence of three four-week mini-courses offered for one credit each on topics to be announced in advance. Students may enroll in from one to three credits. Limited use of algebra. No prerequisites.

3 Introductory Physics (3-2) or (3-0) A one-semester course in basic physics designed to meet the needs of students in programs in agricultural and health sciences. Four or three hours. Krizan.

11, 12 Elementary Physics (3-2) or (3-0) A survey of the principles of classical and modern physics without calculus, appropriate for students concentrating in life and health sciences. With laboratory, satisfies minimum requirement for premedical students. *Prerequisites:* 11 or 15 for 12; secondary school algebra and trigonometry. Four or three hours. Crowell.

15, 16 General Physics (3-2) Introduction to principles of physics, in which students use calculus as course develops. Appropriate for students in the natural sciences and recommended for students in premedical programs. *Prerequisites:* 15 or 24 for 16; Mathematics 20 or concurrent enrollment or credit in Mathematics 21 for 15. Four hours.

24, 25 Fundamentals of Physics (3-2, 3-2) For students concentrating in engineering or a physical science. *Prerequisites:* For 24, Mathematics 21 and credit or concurrent enrollment in Mathematics 22; for 25, 24 and credit or concurrent enrollment in Mathematics 121. Four hours. Juenker and Detenbeck.

128 Introductory Modern Physics (3-2) An introduction to the theory of relativity and to modern descriptions of radiation, the electron, the atom, the atomic nucleus, and elementary particles. *Prerequisites:* 16 or 25 and credit or concurrent enrollment in Mathematics 121. Four hours. Detenbeck.

155 Acoustics and Optics Introduction to two important areas of classical wave phenomena. Use of rays and waves in describing the propagation and superposition of sound and light; geometric and physical optics, physical acoustics. *Prerequisite:* 16 or 25. Three hours. Alternate years, 1979-80. Brown.

170 Geophysics (3-0) The structure of the solid earth, using seismic, magnetic, and gravitational methods. *Prerequisites:* 6 hours of either geology or physics and Mathematics 20 or 21. Three hours. Alternate years, Spring 1979. Doolan or Bucke and Detenbeck.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

201, 202 Experimental Physics (1-3) Experiments in classical and modern physics. Each student selects laboratory experiments appropriate to his background and interests. The course may be entered at the beginning of either semester and repeated for credit up to a maximum of four semesters. *Prerequisites:* 16 or 128 and Mathematics 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:* 16 or 25, Mathematics 121. Three hours. Krizan.

213 Electricity and Magnetism Fundamental principles of electricity and magnetism; electrostatic fields, and magnetic fields of steady currents. Electrical and magnetic properties of matter and electromagnetic energy relationships. *Prerequisites:* 16 or 25, Mathematics 121. Three hours. Juenker.

214 Electromagnetism An introduction to time dependent electromagnetic fields. Maxwell's equations in vacuum and in matter. Electromagnetic waves and radiation. *Prerequisite:* 213. Three hours. Brown. Alternate years: 1979-80.

220 Biological Physics (3-2) Physical laws, concepts and methods discussed with respect to their reference to biology. *Prerequisites:* 12 or 16, Chemistry 2, Mathematics 22. Four hours. Nyborg.

222 Advanced Biological Physics (3-2) Sound and electromagnetic waves; ionizing particles and radiation. Interaction of these physical agents with biological systems. Physical properties of macromolecules and their aggregates. *Prerequisites:* Chemistry 2; Mathematics 121; and experience in applying differential equations. Departmental permission required. Four hours. Nyborg. Alternate years, 1978-79.

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 semi conductors. Elementary band theory. *Prerequisite:* 128. Three hours. Scarfone. Alternate years, 1978-79.

254 Atomic and Nuclear Physics Phenomenological study of electronic structure of atoms. Development of quantum theory. Structure of the nucleus and properties of elementary particles. *Prerequisite:* 128. Three hours. Crowell. Alternate years, 1979-80.

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. Krizan. Alternate years, 1979-80.

265a, b, c Thermal Physics A sequence of three units or mini-courses: 265a, Thermodynamics; 265b, Kinetic Theory; 265c, Statistical Mechanics. Students may enroll in from one to three units for one credit each. *Prerequisites:* 128 or 16 and Mathematics 121 for 265a; 265a or other thermodynamics course for 265b; 265b for 265c. One to three credits. Brown. Alternate years, 1978-79.

273 Introductory Quantum Mechanics Introduction to nonrelativistic quantum mechanics. Schroedinger equation and applications to simple systems. *Prerequisites:* 128 and 211. Three hours. Scarfone.

Physiology and Biophysics

COLLEGE OF MEDICINE

Professors Alpert (Chairman), Chambers, McCrorey, Parsons; Assistant Professor Hamrell; Associate Professors Gibbons, Hendley, Low, Webb, Whitehorn; Lecturer Halpern.

10 Introduction to Human Physiology A Systems Approach to Biology. This course will provide a physical-chemical basis for an understanding of modern human physiology. Specific emphasis will be placed on the functioning of the various organ systems and the interrelationships among these systems. Time will be spent in discussing how the intact organism uses the systems for maintaining its own integrity and for withstanding the stresses of the environment. There will be a focus on the skeletal-neuro-muscular system; cardiovascular system; respiratory system; gastrointestinal system; endocrine system; nervous system, and the renal system and body fluids. Three hours. Staff.

101-102 Physiology and Biophysics (5-5) The scientific basis of mammalian (especially human) physiology and biophysics is presented for physical therapy students as well as other undergraduate and graduate students requiring an in-depth working knowledge of structure and function. Emphasis is placed on the broad physical, chemical and biological prin-

ciples underlying the performance of the subcellular components, cells, tissues, organs and multi-organ systems. Time will be spent in discussing how the intact organism maintains its own integrity despite the environmental stresses to which it is subjected. The laboratory will supplement all of these areas including experiments using human volunteer subjects for studying the detailed interaction of the pulmonary, renal, and cardiovascular systems during a variety of stresses. *Prerequisites or concurrent courses:* Chemistry 3 and 16, two semesters of general physics or equivalent, and one semester of mathematics or permission of instructor. Two semesters, 5 hours per semester. Staff.

Plant and Soil Science

COLLEGE OF AGRICULTURE

Professors Bartlett, Boyce, MacCollom, Wiggins (Chairman) and Wood; Associate Professors Evert and Parker; Assistant Professor Magdoff; Extension Professor Way; Extension Associate Professors Flanagan and Pellett, Extension Assistant Professor Costante; Lecturers Bruckel, Calahan, Flinn, Watson and Whipkey.

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. This course does not meet distribution requirements for P & SS majors. Three hours. Wiggins.

11 Principles of Plant Science Principles and practices involved in the culture, management, and utilization of economically important horticultural and agronomic crops. Three hours. Boyce.

14 Laboratory and Field Photography Introduction to still and super-8 photography for the student and researcher in the biological sciences. *Prerequisite:* Math 9. Three hours. Wood. Alternate years, 1979-80.

38 Plant Propagation (2-4) Principles and practices involved in propagating herbaceous and woody plants by seeds, division, layering, cuttings, budding, grafting, and tissue culture. *Prerequisite:* 11. Three hours. Evert.

61 Introductory Soil Science (3-3) Introductory study of the nature and properties of soils and how they serve as media for plant growth. *Prerequisite:* One semester of chemistry. Four hours. Magdoff.

82 Plant and Soil Science Career Orientation Discussions of various careers in Plant and Soil Sciences by professionals in the field. *Prerequisites:* Sophomore standing, 11, and 61. One hour. Wiggins.

106 Insect Pest Management (3-2) Survey of the major insect orders, and methods for controlling injurious species. *Prerequisite:* 11. Four hours. MacCollom.

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. Three hours. Parker.

110 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

arrangement. *Prerequisites:* 61 and Math 2 or 9. Three hours. Whipkey. Alternate years: 1978-79.

112 World Crops Effect of environment, nutrition, and management on crop growth, distribution and production of world food supplies. *Prerequisite:* 11 or Botany 4. Three hours. Wood. Alternate years, 1978-79.

122 Small Fruit Crops (2-2) Principles of small fruit production, including propagation, culture, management, and harvesting. *Prerequisite:* 11. Three hours. Boyce.

124 Vegetable Crops (2-2) Principles and practices of home and commercial vegetable production, including seed production, tillage, cultural practices, nutrition value, storage, and processing. *Prerequisite:* 11. Three hours. Calahan.

126 Ornamental Horticulture (3-3) Identification, climatic requirements, cultural management, and use of ornamental plant materials in landscape planting. *Prerequisite:* 11. Four hours. Bruckel.

127 Greenhouse Management (2-3) An introduction to the principles and practices of commercial greenhouse flower and bedding plant production. *Prerequisite:* 38. Three hours. Bruckel.

141 Forage Crops (2-3) Identification, establishment, and management of crops grown for hay, pasture, and silage. *Prerequisite:* 11. Three hours. Wood.

144 Field Crops Principles and practices essential to the establishment of field crops grown for food, feed, and fiber. *Prerequisite:* 11. Three hours. Wood. Alternate years 1979-80.

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. Three hours. Wood. Alternate years: 1978-79.

151 Landscape Design I (2-3) An introduction to the theory of landscape design and its relationship to man, man-made structures, and the natural environment. *Prerequisite:* 11, 126. Three hours. Flinn and Bruckel.

152 Landscape Design II (2-6) Application of landscape design theory to residential and small buildings. *Prerequisite:* 151. Four hours. Flinn and Bruckel.

162 Soil Fertility and Management Principles of soil management including soil testing methods and interpretations, fertilizer manufacture, usage, and management practices. *Prerequisite:* 61. Three hours. Magdoff.

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 fifteen hours may be arranged through the Department Chairman for approved off-campus project.

202 Micrometeorology (2-3) Theoretical and practical considerations of the micrometeorological factors that affect plant growth and agricultural practices. *Prerequisite:* 11. Three hours. Whipkey. Alternate years: 1979-80.

204 Plant Research Techniques (2-3) Methods of conducting research with plants including the organizing and planning of experiments. *Prerequisite:* 11 and Botany 104. Three hours. Wiggans. Alternate years: 1978-79.

205 Mineral Nutrition of Plants (See Botany 205) Alternate years, 1978-79.

207 Water Relations of Plants (See Forestry 207) Three hours. Don-

nally and botany and plant and soil science staff. Alternate years, 1979-80.

221 Advanced Tree Fruit Culture (2-3) Theory and practice of modern commercial fruit science. Nutrition and cultural responses to various management practices. *Prerequisites:* 11 and 61. Three hours. Calahan.

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. MacCollom. Alternate years, 1979-80.

234 Medical Entomology (2-2) The relationships of insects and related arthropods to the causation of pathological conditions in man and animals. *Prerequisite:* An intermediate course in entomology. Three hours. Alternate years, 1978-79.

261 Soil Classification and Land Use (2-4) Classification of soils throughout the world as they relate to soil development and land use. Three Saturday field trips. *Prerequisite:* 61 or a total of six hours in ecology, geography, or geology. Three hours. Bartlett, Watson. Alternate years, 1978-79.

264 Soil Chemistry (3-3) Chemistry and biology of soils affecting plant growth including the properties of clays and organic matter. *Prerequisites:* 61, two semesters chemistry. Four hours. Bartlett. Alternate years, 1979-80.

266 Soil Physics (2-3) Mathematical and physical principles of the soil-water-plant interaction and its relationship to production and management. *Prerequisites:* 61 and one semester of physics. Three hours. Bartlett. Alternate years, 1978-79.

281 Seminar Presentation and discussion of papers on selected topics of current interest by students and staff. Fall semester students with odd number S.S. numbers, Spring semester students with even number S.S. numbers. *Prerequisite:* Senior standing. One hour.

Political Science

COLLEGE OF ARTS AND SCIENCES

Professors Dellin, Hilberg, Little, Staron (Chairman), and Wertheimer; Associate Professors Grabosky, Kinnard, Nelson, Pacy, Rosenbloom, and Simon. Assistant Professors Frankovic, Hoffman, and Nivola.

11 Introduction to Political Science Elements of political science. Three hours. Staff.

13 Introduction to the Problems of Political Thought An examination of basic problems in political philosophy, e.g., morality and law; punishment; freedom; equality; obligation and disobedience. Three hours. Wertheimer.

21 American Political System Institutions, processes, and problems of American government. Three hours.

51 International Relations The state as actor in international relations. Global divisions and problems. Three hours. Hilberg, Kinnard, Pacy.

71 Comparative Political Systems An examination of contrasting patterns of political development, the role played by political culture, politics in elected and non-elected regimes. Three hours.

81 Political Behavior An analysis of how people react to political situations and the ways in which their behavior may be understood. Three hours. Nelson.

96 Seminar Selected topics in political science. Three hours.

121 Law and Politics The politics of civil justice. *Prerequisite:* Three hours in political science or sociology. Three hours. Grabosky.

123 Law, Morality, and Punishment An analysis of the justification and limits of the criminal law, the justification of punishment, and the empirical and philosophical basis of various proposals for maintaining social order. *Prerequisite:* Six hours in political science. Three hours. Wertheimer.

171 Western European Political Systems An examination of the British, German, and French political systems. Three hours. Staron.

172 Russian and Eastern European Political Systems An examination of the Russian and some other Eastern European Communist political systems. Three hours. Staron.

173 Canadian Political Systems Institutions, process, and problems of the Canadian polity. Three hours.

174 Latin American Political Systems Analysis of the formal and informal political structure of Latin American states with emphasis upon contemporary developments. Three hours.

175, 176 Asian Political Systems The development of political institutions and processes in the 20th century with brief historical introductions. First semester: East Asia. Second semester: South and Southeast Asia. Three hours. Little.

179 Contemporary Jewry Emancipation in the diaspora; annihilation under the Nazi regime; the establishment of Israel and its wars with Arab states. Three hours. Hilberg.

181 Political Leadership Methods of identifying leaders, their relationships with non-leaders and with one another, their impact on public policy, and their personalities and social backgrounds. Empirical theories about political leadership. Three hours. Nelson.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

211, 212 History of Political Thought First semester: development of political thought from Plato to Burke. Second semester: Political thought of the 19th and 20th centuries with emphasis on socialist ideologies from Marx to Marcuse. *Prerequisite:* Six hours in political science. Three hours. Staron.

213 Contemporary Political Thought A discussion of the writings of several twentieth-century political thinkers, including writings in related fields such as psychology and economics. *Prerequisite:* Six hours in political science. Three hours. Wertheimer.

216 American Political Thought American political thought from the colonial period to recent times. *Prerequisite:* Six hours in political science. Three hours. Simon.

221, 222 Constitutional Law First semester: emphasis on developing skills of legal analysis. Historical origins and general principles of constitutionalism. Second semester: selected topics in constitutional law. *Prerequisite:* For 221: Six hours in a social science. For 222: 221. Three hours. Hoffman.

223 Comparative Criminal Policy Research seminar focusing on the political bases of criminal law and law enforcement policy: conventional

criminal behavior as well as repression of political activity and deprivation of human rights in cross-national perspective. *Prerequisite:* 121, 122, or permission of the instructor. Three credits. Grabosky.

226 Administrative Law The politics of federal regulation, regulatory agencies and processes, and leading constitutional cases in administrative law. Alternate years. *Prerequisite:* Six hours in political science. Three hours.

227, 228 International Law Principles and applications of public international law. *Prerequisite:* Six hours in political science. Three hours. Little.

231 The Legislative Process Organization, procedure, and behavior of legislative chambers with special attention to the U.S. Congress. *Prerequisite:* Six hours in political science. Three hours. Nelson.

232 Lawmaking and Public Policy Influence of the executive and problems of congressional and parliamentary control. *Prerequisite:* Six hours in political science. Three hours.

233 The National Executive Analysis of the functions and organizations of the Presidency and the bureaucracy in American national government. *Prerequisite:* Six hours in political science. Three hours.

235 Defense Politics U.S. defense politics, policies, and processes. Civil-military relations, strategic policy, arms control, defense-industrial complex, defense budget. *Prerequisite:* Six hours in political science. Three hours. Kinnard.

239 American Politics An examination of the politics of decision-making in the American political system. *Prerequisite:* Six hours in political science. Three hours. Simon.

241 Public Administration Administrative theory and the operation of public bureaucracies. *Prerequisite:* Six hours in political science. Three hours.

242 Problems of Bureaucracy The political problems of the administrative state. *Prerequisite:* Six hours in political science. Three hours.

250 Craft of Diplomacy Emphasis on experiences and reflections of diplomatic personalities, supplemented by studies of specialists. *Prerequisite:* Six hours in political science. Three hours. Pacy.

251, 252 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:* Six hours in political science. Three hours. Kinnard, Hilberg.

256 International Organization Theory and practice in supranational institutions. *Prerequisite:* Six hours in political science. Three hours. Pacy.

257 Political Geography See Geography 257. Three hours. Miles.

258 Problems of Communism See Economics 258. Three hours. Dellin.

261 Urban Government and Politics An analysis of metropolitan areas in terms of their governments, problems, and roles. *Prerequisite:* Six hours in political science. Three hours. Nivola.

262 Urban Public Order Urban crime as a political issue. Institutions of crime control. Urban police systems and law enforcement. *Prerequisite:* Six hours in political science. Three hours. Grabosky.

264 State Administration Problems in planning, policy development and program coordination. *Prerequisite:* Six hours in political science. Three hours. (Not approved for graduate credit.)

265 Intergovernmental Relations Problems of the Federal system.

National-state-local cooperative administration of selected public functions. *Prerequisite:* Six hours in political science. Three hours.

273 Comparative Political Analysis Selected topics. *Prerequisite:* Sophomore standing. Three hours.

274 Ethnic Politics Theories of ethnic group identification, ethnic roots of political behavior, impact of ethnicity on the political structure. *Prerequisite:* Six hours in political science. Three hours. Frankovic.

276 Masses and Elites Structural and attitudinal linkages between governors and governed. The impact of integration or isolation on the political system. Discussion of modern as well as more traditional societies. *Prerequisite:* Permission of the instructor. Three hours.

278 Foreign Policy of the USSR (See History 278) Three hours. Daniels.

281 Political Parties Analysis of political parties with special emphasis upon voting behavior and campaign techniques. *Prerequisite:* Six hours in political science. Three hours. Nelson.

283 Scope and Methods of Political Science Approaches, sources of information, research methods and systematization in the study of political phenomena. Open to graduate students or by permission of instructor. Three hours. Grabosky.

291, 292 Readings and Research For advanced undergraduates and graduate students. Three hours.

295, 296 Seminar Selected topics in Political Science. *Prerequisite:* Six hours in political science. Three hours.

Psychology

COLLEGE OF ARTS AND SCIENCES

Professors, Albee, Ansbacher, Burchard, Forgays, Joffe, Lawson, Leitenberg; Associate Professors, Gordon, Hasazi, Howell, Kapp, Kessler, Leff, Musty (Chairman), Rolf; Assistant Professors, Bond-Dunn, Edwards, Fitzhenry-Coor, Kent, Kirk, Peyser, Rosen; Adjunct Professor Cowles; Adjunct Assistant Professors Dietzel, Does; Visiting Associate Professor Damkot; Visiting Assistant Professors, Gallagher; Part-time Assistant Professors Celani, Conquest, Miller, Thompson.

1 General Psychology Introduction to the entire field, emphasizing the normal adult human being. Three hours. Forgays, Albee, Hasazi, Musty.

109, 110 Principles of Psychological Methodology and Research (2-4) This course prepares students to understand and to do competent research in a variety of areas of psychology. The focus is upon designs, methodologies, and statistical procedures essential for psychological research. Laboratory experiences are included. *Prerequisite:* 1. Four hours. Gordon, Howell, Lawson, Joffe.

119 History of Psychology A review of the major theoretical and empirical developments in psychology, including the schools of psychology that have influenced the contemporary models of psychology. Reviewed are some contemporary models of psychology including behaviorism, social learning, humanism, and personal enrichment experiences. *Prerequisite:* Psychology 1. Three hours. Lawson, Cowles.

121 Biopsychology (S)* Principles of the biological bases of behavior are introduced through classical and contemporary issues in field, including an introduction to the nervous system, physiological and behavioral effects of drugs, chemical bases of behavioral disorders, hormonal control of behavior, intercerebral disorders of behavior, voluntary control of bodily functions, and possible physiological bases of extrasensory perception. *Prerequisite:* 1 or Biology 1. Three hours. Gallagher, Musty.

130 Social Psychology A psychological approach to social phenomena with emphasis on the concepts and methods used in the study of the behavior of individuals in various social situations. *Prerequisite:* 1. Three hours. Leff, Kent.

132 Environment and Behavior (F) An introduction into the various areas of interaction between the behavior of man and the environment. Major dimensions of the new discipline of Environmental Psychology will be discussed. *Prerequisite:* Psychology 1 or a course in environmental studies. Three hours. Forgays.

150 Personality Individual and life problems from the field-theoretical and phenomenological approach with emphasis on Alfred Adler's viewpoint. *Prerequisite:* 1. Three hours. Ansbacher, Kessler.

152 Abnormal Psychology The more unusual mental processes; methods of observing them and interpreting them; their bearing on our understanding of the normal mind. *Prerequisite:* 1. Three hours. Albee, Celani.

153 Behavior Modification (F) A survey of techniques for the manipulation and control of human behavior, and evaluation of their effectiveness. *Prerequisite:* 1. Three hours. Leitenberg, Burchard.

161 Child Development A survey of theories and research which focus upon the development of the child from conception to adolescence. Emphasis is placed upon an experimental analysis of an individual's early social, cognitive, and perceptual development. Development principles and research methodologies relevant for their investigation are examined through reference to both animal and human research. *Prerequisite:* 1. Three hours. Bond-Dunn, Rolf.

162 Development of Sex Differences (S) A critical analysis of theory and research on factors that influence the development of differences between male and female behavior, personality, and cognitive and intellectual functioning (both animal and human). Consideration of relative importance of biological, cognitive and environmental factors, including the influence of parents, schools, societal expectations, and cultural stereotypes. *Prerequisite:* 1. Three hours. Bond-Dunn, Joffe.

193, 194 College Honors

195, 196 Special Topics

197, 198 Research Individual research under staff direction. *Prerequisite:* Departmental permission. Three to six hours.

205 Learning Basic laws of the learning process as revealed by controlled experiments. Laboratory experiences are provided and students may undertake original experiments. *Prerequisite:* 110. Three hours. Howell.

206 Motivation and Emotion (S80) Nature and development of motives, emotions and their relation to other psychological processes. *Prerequisite:* 110. Three hours. Joffe.

207 Thinking (S80) A critical review of the experimental investigation of thought processes. *Prerequisite:* 110. Three hours. Gordon, Howell.*

210 Principles of Human Perception. (S) The course focuses upon basic sensory and perceptual mechanisms that support the acquisition and processing of information relative to the visual environments of animals and humans. Topics include perceptual constancies, object and event perception, attention, memory, and perceptual disorders. *Prerequisite:* 109. Three hours. Kirk, Lawson.

220 Animal Behavior (F) Behavior of animals under controlled experimental conditions and in their natural environments. Consideration of behavior similarities and differences at various levels of the phyletic scale. Three hours. Joffe, Kapp.

221 Physiological Psychology I (F) The structure and function of the mammalian nervous system, with emphasis upon neurological correlates of behavior and receptor mechanisms. Individual laboratory experience. Four hours. Gallagher, Lawson, Musty.*

222 Physiological Psychology II (S) The study of the role of central nervous system mechanisms in the determination of innate behavior arousal, internal inhibition, and learning. Individual laboratory experience. *Prerequisite:* 221. Four hours. Gallagher, Kapp, Musty.*

223 Psychopharmacology (F) An intensive analysis of the effects of drugs (both medical and recreational) on behavior. Topics such as drug effects on learning, memory, motivation, perception, emotions (both normal and abnormal), and aggression will be considered in both animals and men. *Prerequisite:* 110 and 121 or 222 or permission. Three hours. Gallagher, Musty.

230 Advanced Social Psychology (S) Advanced survey covering current research in various fields of social psychology. *Prerequisite:* 110. Three hours. Kent, Leff.

233 Psychology of Environmental Experience (F79) An intensive examination of different ways of thinking (and feeling) about environments. Special emphasis on (a) the underlying processes involved in environmental cognition and on (b) how self-direction of these processes can enhance design creativity, aesthetic experience, and awareness of environmental problems, interrelations, and possibilities. Course includes experiential exercises and group projects as well as study of theory and research. *Prerequisite:* Advanced background in psychology or in environmental studies. Three hours. Leff.

234 Psychology of Social and Environmental Change (S80) An examination of how psychology can increase our understanding of social and environmental transformations, with special emphasis on the implications of various types of change for the quality of human experience. Material from environmental, social, motivational, and cognitive psychology will be used to (a) critically examine existing social and environmental patterns, (b) generate and evaluate alternative, more "utopian" designs (both environmental and societal), and (c) suggest feasible action strategies for moving toward the realization of such designs. *Prerequisites:* Advanced background in psychology or in environmental studies or a social science. Three hours. Leff.

250 Introduction to Clinical Psychology This course is a study of the basic principles of interviewing, testing, assessment from life situations, and report writing. There is an examination of the most common approaches to psychotherapy, such as the client-centered, habit change, cognitive change, emotional change, interpersonal relations, and group therapy approaches. *Prerequisite:* 110. Three hours. Kessler.

251 Behavior Disorders of Childhood Covers a wide range of topics from brain damage to childhood psychoses and nightmares. Each problem

behavior will be considered in the context of normal child development. *Prerequisite:* 110. Three hours. Rolf, Hasazi, Miller, Thompson.

253 Advanced Behavior Modification (S) Application of technique for the manipulation and control of human behavior in a variety of educational and social situations involving the collection and analysis of behavioral data. *Prerequisites:* 153, 109 (F79). Three hours. Burchard, Hasazi.

261 Cognitive Development (F) A critical examination of research and theory concerning developmental changes in the human processing of information, from infancy to adulthood. Among the topics considered are the nature of the child's earliest concepts, language and thought, play and imitation, an environmental and cross-cultural analysis, and a close examination of the theory and research of Jean Piaget. *Prerequisites:* 161 or 109 (concurrently), or permission of the instructor. Three hours. Bond-Dunn.

262 Social Development (S) Examination of psychological research concerning interpersonal change and growth in humans from early childhood through young adulthood. Discussion of prerequisite cognitive structures for the processing of social perceptions and social inferences. Topics include the development of role-taking skills, comprehension of social interaction, stages of ego development and moral judgment. Discussion of the interaction between language sophistication and various stages of social development. *Prerequisites:* 110 and 161 or 261, or permission of the instructor. Three hours. Fitzhenry-Coor.

264 Developmental Psychobiology (F) An analysis of research on the development of humans and animals that emphasizes the effects of events in the prenatal and early neonatal period, the development of physiological systems affecting behavior, and the evolutionary origins of behavior. *Prerequisite:* 109 or 121 or 161. Three hours. Joffe, Lawson.

267 Sensory and Perceptual Development (F79) The course covers theoretical and empirical content relevant to the development of the visual perception of objects and events. Topics include the perceptual constancies, attention, memory, object perception, and reading skills. *Prerequisites:* 109 and 161 or permission of the instructor. Three hours. Lawson, Kirk.

281, 282 Seminar Review and discussion of current psychological research. One hour. Staff.*

295, 296 Contemporary Topics Three hours.

Note: Courses are offered every semester except those noted in parentheses after the course title. Abbreviations: F: Fall semester, S: Spring semester. If date follows, e.g., (S80) indicates semester and year to be offered.

* Not approved for graduate credit.

Radiologic Technology

SCHOOL OF ALLIED HEALTH SCIENCES

Associate Professor Izzo (Chairperson); Lecturers Falby, Farnsworth, Marschke, Patch; Teaching Associate Taylor; Adjunct Instructors Lacasse, Cunningham, Barony.

Core

1 Introduction to Patient Care (2-0) Introduction to patient care and handling, basic physical examination, emergency and isolation procedures,

patients' rights, medical terminology, and medical ethics. *Prerequisite:* Enrollment in Radiologic Technology. Two hours. Farnsworth, Falby.

2 Clinical Radiology for Technologists (3-0) Study of the etiology and radiographic manifestations of human pathology. Offered alternating Spring Semesters. *Prerequisite:* Anatomy 9. Three hours. Falby, Radiology Faculty.

4 Introductory Radiologic Science (3-0) This course introduces students to ionizing radiation, emphasizing its interaction with matter, its effect on the human body, and methods of protecting patients and technologists. *Prerequisites:* Physics 3, Math 9. Three hours. Izzo, Marschke.

91, 92 Special Radiologic Projects Independent projects under the direction of faculty members. *Prerequisite:* Permission of the faculty. Variable credit hours.

145 Radiation Physics This course is designed for research technicians, and graduate students desiring a basic understanding of radiation physics, biology, and protection. *Prerequisite:* Permission of instructors. One hour. Izzo, Marchke.

191, 192 Advanced Radiologic Projects Independent projects under the direction of faculty members. *Prerequisite:* Permission of Department Chairman. Variable credit hours.

Radiographic Technology

11, 12 Introduction to Radiography (1-2, 1-2) Study of radiographic anatomy and positioning, and introduction to exposure principles. *Prerequisites:* RT 11 for 12. Three hours. Falby, Farnsworth or Patch.

14 Radiographic Clinical Practicum (0-12) Introduction to the hospital setting with involvement in patient handling and basic radiographic procedures. This course includes a 13 week summer experience at a UVM affiliated medical institution. Four hours. Staff.

111 Radiography (2-2) Continued study in radiographic positioning and anatomy with emphasis on skull radiography and exposure principles. *Prerequisites:* RT-12. Three hours. Falby, Farnsworth, Patch.

112 Special Radiographic Procedures (3-0) Study of vascular and non-routine contrast studies and equipment to include sterile technique, pharmacology, and Computerized Tomography. *Prerequisites:* Senior Standing, Anat 9, Physio 10, RT 14, 111. Three hours. Patch.

113, 114 Radiographic Clinical Practice (0-12, 0-12) Continued development of clinical skills emphasizing all radiographic positioning with experience in special procedures, and selected adjunctive techniques. *Prerequisites:* RT-14, Summer internship. Two hours each. Falby, Farnsworth, Patch.

115 Radiographic Science (3-2) A study of radiographic exposure principles including prime factors, radiographic film and processing, grids and intensifying screens, sensitometry and selected adjunctive procedures. *Prerequisites:* RT-4, Phys 3, RT-14. Four hours. Falby, Farnsworth.

Radiation Therapy

21, 22 Introduction to Radiation Therapy (1-0, 1-2) These courses are designed to introduce the students to the theories and practice of radiation therapy technology through discussion and laboratory sessions. *Prerequisites:* Enrollment in Therapy Program. One hour. Two credits. Marschke.

23, 24 Radiation Therapy Clinical Practicum (0-4, 0-12 (xc)) Students are required to observe and participate in the Medical Center Hospital of Vermont Radiation Therapy Department. The second semester course ex-

tends through the 13 week clinical experience at a major affiliation. *Prerequisites:* Same as RT 21, 22. One credit, four hours. Marschke, Faculty.

121, 122 Radiation Therapy Techniques (3-0, 3-2) This course is designed to instruct the students in the theory and clinical techniques involved in radiation therapy. *Prerequisites:* RT 4 for 121, 121 for 122. Three credits, four hours. Marschke.

125 Clinical Oncology (3-0) This course studies the various types of neoplasms and the various methods of treatment available. *Prerequisites:* ANAT 9, RT 121. Three hours. Marschke, Guest Lecturers.

126 Senior Therapy Seminar (2-0) This course is designed to educate the students in areas related to the physical and psychological care of the cancer patient. *Prerequisites:* Senior standing in therapy program. Two hours. Marschke, Guest Lecturers.

123, 124 Senior Radiation Therapy Clinical Practicum (0-12, 0-12) A continuation of RT 23, 24 with emphasis placed on increasing clinical capabilities. *Prerequisites:* RT 23, 24. Two hours each. Marschke, Faculty.

Nuclear Medicine

31, 32 Introductory to Nuclear Medicine Technology (1-0, 1-2) Introduction to basic skills in handling patients, radioactivity, pharmaceuticals, and instrumentation. *Prerequisite:* Enrollment in Radiologic Technology or permission of instructor. One hour, two hours. Izzo, Taylor.

33, 34 Nuclear Medicine Clinical Practicum (0-4, 0-12 (xc)) Observation and participation in the Nuclear Medicine Department at the Medical Center Hospital of Vermont. Emphasis is on obtaining self-confidence in patient interactions. RT-34 continues into the summer for a 13 week experience at an affiliated institution. *Prerequisite:* Enrollment in Radiologic Technology Department. One hour, four hours. Izzo, Taylor.

131, 132 Nuclear Medicine Techniques (2-2, 2-2) The principles of all imaging and *in vitro* studies. Emphasis is on anatomy, physiology, pathology, radiopharmaceuticals, patient positioning, and output evaluation. *Prerequisites:* ANAT 9, PSL 10, RT 31, or permission of instructor. Three hours each. Izzo.

135 Nuclear Medicine Technology (3-2) This course covers the operating principles and quality control of all instrumentation used in a typical nuclear medicine department. *Prerequisite:* RT-4 and 32 or permission of instructor. Four hours. Izzo.

133, 134 Advanced Nuclear Medicine Practicum (0-12, 0-12) A continuation of 33-34. Emphasis is on increased efficiency and responsibility. *Prerequisite:* RT 34. Two hours each. Izzo.

Recreation Management

SCHOOL OF NATURAL RESOURCES

Extension Professor Bevins; *Associate Professors* Gilbert, Lindsay; *Assistant Professor* Manning (*Program Leader*); *Lecturers* Baker, Flinn, Hudspeth, and Koenemann.

8 Freshman Recreation Seminar An introduction to the field of natural resource-based recreation. A broad perspective of recreation management including agencies, policies, history, and trends. Two hours. Manning.

137, 138 Park Design The elements of designing park and recreation facilities in natural environments. *Prerequisites:* Junior standing and permission, and 137 for 138. Six hours. Flinn.

150 Recreation Management Field experience in recreation planning, design, and resource measurement. *Prerequisite:* CE 12. Four weeks in the summer completing the sophomore year. Four hours. Lindsay, Gilbert, Manning.

151 Food and Lodging Business Management Economic decision-making for the food and lodging industry. Emphasis on analysis of business investment and profitability over the recreation firm's life. *Prerequisite:* Permission of the instructor. Three hours. Bevins. Credit cannot be granted for both 151 and AREC 166.

153 Recreation Administration and Operations The administration and operation of public outdoor recreation areas. Special emphasis on recreation administrative structures, personnel management and the maintenance of parks and outdoor recreation areas. *Prerequisites:* Senior standing and permission. Three hours. Baker, Manning.

154 Recreation Policy Formulation The initiation, formulation and implementation of public outdoor recreation resource policy. *Prerequisites:* Senior standing and permission. Three hours. Koenemann.

155 Environmental Interpretation Discussions and application of the principles and techniques used to communicate values, natural systems, and cultural features to park visitors. Exposure to the collecting, analysis, planning, construction and use of interpretive media and related outdoor facilities. *Prerequisites:* Senior standing and permission of the instructor. Three hours. Hudspeth.

157 Ski Area Management An analysis of current management problems affecting private ski areas in Vermont and the Northeast. *Prerequisites:* Senior standing and permission. Three hours. Gilbert.

159 Participation in Recreation Management Supervised field experience in national, state, urban or private park and recreation operations. *Prerequisites:* Junior standing and permission. Three hours. Gilbert, Lindsay, Manning.

182 Senior Recreation Seminar In-depth seminars on current problems in the field of public and private outdoor recreation management. *Prerequisites:* Senior standing and permission. Two hours. Lindsay.

188 Special Topics Readings, investigations, and lecture-discussions in selected areas of recreation management. *Prerequisites:* Junior standing and permission. One to three hours.

225 Economics of Outdoor Recreation and Tourism A socioeconomic analysis of recreation and tourism as an industry. Emphasis on regional, state and community impact. *Prerequisites:* Economics 11, 12, or Resource Economics 61. Three hours. Bevins.

235 Outdoor Recreation Planning The planning of large wild land areas for outdoor recreation use. *Prerequisites:* 150 or FOR 140; PSS 61 or GEOL 1. Three hours. Lindsay. (Not approved for graduate credit.)

240 Park Protection and Management Methods to direct public use and control environmental impacts in park and outdoor recreation areas. *Prerequisites:* 235 and 137. Three hours. Manning.

287, 288 Advanced Special Topics Readings, investigations and discussions of selected topics in recreation management at an advanced level. *Prerequisites:* Graduate standing. One to three hours with a maximum of six cumulative hours. (Not approved for graduate credit.)

Religion

COLLEGE OF ARTS AND SCIENCES

Associate Professors Andrews, Martin (Acting Chairman) and Paden; Assistant Professors Brenneman, Gussner, Sugarman, and Yarian.

21 Introduction to the Study of Religion: Asian Traditions Introduction to the Hindu, Buddhist, and East Asian religious traditions as expressed in their basic symbolisms, writings, practices, and cultural forms. Three hours. Andrews, Brenneman, Gussner, Martin, Paden, Yarian.

22 Introduction to the Study of Religion: Western Traditions Study of the basic motifs, mythic patterns, and historical transformations in the religious life of man from the ancient Near East to the modern West. Three hours. Andrews, Brenneman, Gussner, Martin, Paden, Sugarman, Yarian.

71 The Interpretation of Religion Examination of major theories and methods used in studying and interpreting religious phenomena. Prerequisite: 21 or 22. Three hours. Gussner, Paden, Sugarman.

101 Church, Cult and Totem: The Social Forms of Religious Life Comparative study of the 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. Andrews, Gussner.

104 Mysticism, Shamanism, and Possession A comparative study of the ways in which the inward dimension of religious life finds expression. Prerequisite: Three hours in religion. Three hours. Martin, Paden, Yarian.

108 Myth, Symbol, and Ritual Study of the 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, Paden, Yarian.

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 the nature of man, world, and God. Prerequisite: Six hours in religion. Three hours. Sugarman, Yarian.

114 Hebrew Scriptures Study of the history and writings of the Hebraic-Judaic religion to the first century B.C. Prerequisite: Six hours in religion. Three hours. Sugarman.

116 Judaism An investigation of the sustaining rituals, customs, institutions, and beliefs of normative Judaism. Prerequisite: Six hours in religion. Three hours. Sugarman.

120 The New Testament The origin and nature of early Christianity with emphasis on the New Testament writings. Prerequisite: Six hours in religion. Three hours. Martin.

122 Modes of Christian Expression I: Catholicism A study of the teaching, rites, art and piety of Eastern Orthodox and Roman Catholic Christianity. Prerequisite: Six hours in religion. Three hours. Yarian.

123 Modes of Christian Expression II: Protestantism A study of Protestant Christianity focusing on its orientation to the Word and its responses to developments formative of modern Western culture. Prerequisite: Six hours in religion. Three hours. Yarian.

128 Religion in America A study of the relationship between religion, the cultural ethos, and individual self-understanding in America. Prerequisite: Six hours in religion, including 22. 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:* Six hours in religion, including 21. Three hours. Gussner.

132 The Buddhist Tradition Selected texts, disciplines, and doctrinal developments in Indian, Tibetan, and Chinese Buddhism. *Prerequisite:* Six hours in religion, including 21. Three hours. Andrews, Gussner.

141 Religion in Japan The religion of shrine and temple, of Shinto and Buddhism, and their interaction with the rich folk traditions of Japan. *Prerequisite:* Six hours in religion, including 21. Three hours. Andrews.

145 Religion in China An examination in historical context of the Confucian, Taoist, and Chinese Buddhist traditions from a variety of interpretive perspectives, both Chinese and Western. *Prerequisite:* Six hours in religion, including 21. Three hours. Andrews.

161 'Primitive' Religions A study of the religiousness of man and its external expressions in small-scale hunting and planting societies, with reference to anthropological, sociological, and psychological contributions to the subject. *Prerequisite:* Six hours in religion, or three hours in religion and three in anthropology. Three hours. Gussner.

162 Studies in Cultural Lore An examination of the loric dimensions of the sacred. A look into the little places that disclose those elements and qualities that define the particularity of a given culture, as expressed in tale, legend, festival, custom, craft, and architecture. *Prerequisite:* Six hours in religion, or three hours in religion and three hours in folklore studies. Three hours. Brenneman.

165 Religion and Secular Culture The effects of modern culture on religion, and the emergence of new forms of religious life and expression. *Prerequisite:* Six hours in religion. Three hours. Brenneman, Sugarman.

168 Contemporary Spiritual Life Study of man's involvement with the Spiritual as manifested in contemporary religious groups, or in modern theory and practice of meditation. *Prerequisite:* Six hours in religion. Three hours. Gussner.

175 Art and the Sacred A cross-cultural study of the role and meaning of visual objects and images which are religious expressions themselves or are in important ways related to religious experience, e.g., in the creative process and worship. *Prerequisite:* Six hours in religion, or three hours in religion and three hours in art. Three hours. Yarian.

180 Philosophy of Religion *Prerequisite:* Six hours in religion. Three hours. See Philosophy 135.

185 Rise of Islam *Prerequisite:* Three hours in religion. Three hours. Engroff. See History 117.

187 Tao Te Ching *Prerequisite:* Six hours in religion, including 21. Three hours. See Philosophy 221.

188 I Ching or Book of Changes *Prerequisite:* Six hours in religion, including 21. Three hours. See Philosophy 222.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research Variable credit.

201 Senior Seminar: Creative Hermeneutics Workshop in theory and method incorporating current developments in the field. *Prerequisites:* Twelve hours in religion, including 71; senior standing. Three hours.

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 (#16 recommended). Three hours. May be repeated up to six hours. Sugarman.*

226 Studies in Hellenistic Religion A study of religion in the Mediterranean area during the period from the second century B.C. through the second century A.D. Prerequisite: Nine hours in religion. Martin.*

228 Studies in Western Religious Thought Important figures, issues, movements or texts will be selected for special examination. Prerequisite: Nine hours in religion. Three hours. May be repeated up to six hours. Sugarman, Yarian.*

280 Symbol and Archetype A 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 twentieth-century religious quest. Prerequisite: Nine hours in religion. Three hours. Martin, Paden.*

291, 292 Topics in the History and Phenomenology of Religion Prerequisites: Nine hours in religion; 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; junior standing, and permission of instructor. Three hours.*

* Note: Not approved for graduate credit.

Resource Economics

SCHOOL OF NATURAL RESOURCES

Professor Sargent; Associate Professors Armstrong, Gilbert; Extension Professor Bevins.

AREC 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. Staff.

AREC 121 Resource Economics An evaluation of the economic forces affecting resource allocation, tools of economic analysis, and economic implications of current resource utilization practices. Prerequisite: Economics 11 or Resource Economics 61. Three hours. Gilbert.

AREC 197, 198 Senior Research Work on a research problem under the direction of a staff member. Findings submitted in written form as prescribed by the department. Prerequisite: Senior standing. Three hours. Staff.

SOC 205 Rural Communities in Modern Society The changing structure and dynamics of rural social organization in the context of modernization, and urbanization. Emphasis on rural communities in America. Three hours. Finney, Schmidt.

SOC 207 Community Organization and Development Community as a changing complex of organization within modern society. Special attention will be given to problems of the formulation and implementation of alternative change strategies. Three hours. Schmidt.

AREC 222 Natural Resources Evaluation A critical investigation of current research, allocation procedures, and methods of analysis in natural

resource economics with emphasis on the public sector. *Prerequisite:* 121. Three hours. Gilbert.

RM 225 Economics of Outdoor Recreation An economic analysis of demand and supply of natural resources for outdoor recreation. Emphasis on current policy issues and management of recreational business firms. *Prerequisite:* Economics 11, 12, or Resource Economics 61. Three hours. Bevins.

CE 230 Urban Planning Techniques (3-0) Theories on the size, spacing, and functions of cities; economic, social, and physical determinants of various land use elements; basic studies for urban planning; and the process of land use planning including location and space requirements and the development of the land use plan. *Prerequisite:* Senior or graduate standing. Three hours. Dawson, Oppenlander.

CE 231 Urban Planning Analysis (3-0) History and development of urban planning; approaches to planning with attention to city design and appearance, quantitative methods in planning, and social welfare planning; plan implementation; organization and administration of planning agencies; and financial planning. *Prerequisite:* Senior or graduate standing. Three hours. Oppenlander.

CE 232 Community Design Basic principles and methods of planning and designing the total community; site selection; and elements of physical layout and design. Design projects dealing with community elements such as subdivisions, industrial parks, new towns, etc. Three hours. Oppenlander.

AREC 233 Regional Planning Delineation of regional boundaries, determination of public goals, tools of planning, rural environmental planning and the legal and political process of planning. *Prerequisite:* Senior standing and Economics 11, 12, or equivalent. Three hours. Sargent.

AREC 234 Practicum in Regional Planning Off-campus planning experience for seniors and graduate students. *Prerequisite:* AREC 233 or consent of instructor. Students should advise of their intent to take this course by the end of the previous semester to provide time to make necessary arrangements. 1 to 6 hours credit. Sargent, Lapping.

NR 235 Legal Aspects of Planning and Zoning An examination of Vermont planning and zoning law with comparisons with other states. Cases in planning and zoning and land use controls. *Prerequisite:* Senior standing. Three hours.

GEOG 243 Spatial Analysis The analysis of spatial pattern and interaction in geography through quantitative models. An introduction to measurement, sampling and covariation within a spatial framework. *Prerequisites:* Six hours in geography or other social sciences. Three hours. Leinbach.

AREC 255, 256 Special Topics in Resource Economics Readings and discussion of selected topics in economics at an advanced level. *Prerequisite:* Departmental permission. Credit as arranged. Staff.

Romance Languages

COLLEGE OF ARTS AND SCIENCES

Professors Ugalde (Chairman) and Weiger; Associate Professors Crichfield, T. Geno, Julow, Wesseling and Zarate; Assistant Professors Carrard, Whatley, Whitebook and Wiley-Sandler; Lecturer M. Geno.

French 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 total sequence in each language represents a continuum into which a student with previous experience in the language will be placed according to his level of achievement, regardless of how many or how few years he may have studied it. For placement in advanced language course (100 or above), first-year students should consult with this department. Those who have already taken courses here should simply follow the levels represented by the number sequences, 1-99, 100-199, etc. For convenience, we offer the following guidelines for placement in elementary and intermediate; in all cases of doubt students should seek the advice of this department.

French Language

1-2 Elementary For students who have had no previous study or less than two years of high school French. The fundamentals of French pronunciation, speaking, reading, and writing are taught by use of dialogues, drills, some lab work, and short written assignments. Participation in class activities is essential. Students with more background in French should enroll in 09 or 51. French 1-2 is a two-semester course. Eight hours. Wiley-Sandler, Staff.

09 Basic French Review Grammar The primary aim of this course is to give students a solid review of French grammar at the second-year level through the use of oral pattern drills, dialogues, short reading passages, written exercises, and work in the language laboratory. Three hours.

51, 52 Reading and Conversation Intermediate French is designed to help students speak better and to progress from a basic knowledge of French to the ability to read and understand spoken French well. Three hours each course.

101, 102 Composition and Conversation Conversational French with frequent practice in writing. Reading of texts about contemporary French attitudes and problems, French newspapers and magazines, oral presentations, skits and games with vocabulary building an important goal. A written assignment per week. Three hours each course.

201, 202 Advanced Composition and Conversation The purpose of this course is to improve both written and oral proficiency. The textbook for the course is not followed closely. It is rather the responsibility of the group to suggest projects and discussions and to prepare topics for the class. Three hours each course.*

209 Advanced Grammar Designed to help the student progress from an average workable knowledge of French grammar to a much more sophisticated level of speaking and writing French. Treats the general structure of the language with attention to those aspects of special concern to American students. Written and oral exercises are employed to facilitate understanding and retention of all points of grammar discussed. Three hours. M. Geno.

210 Romance Philology Phonological and morphological development of French, Spanish and Italian from their Latin origins, with emphasis on study of existing documents. Prerequisites: Junior standing and intermediate level in at least two of the languages (French, Latin, Spanish, Italian), or permission of the instructor. Course will be taught in English. Three hours. Whitebook. Alternate years, 1978-79.

215 Methods of Text Analysis An introduction to procedures and terminology used in the analysis of texts of various genres. Three hours. Car-rard.

216 Stylistics On a comparative basis, study of the main idiomatic difficulties faced by English-speaking people who learn French; translation; analysis of the various "levels of speech" in French, with their stylistic features. Three hours. Carrard.

Spanish Language

1-2 Elementary For students who have had no previous study or less than two years of high school Spanish. The fundamentals of Spanish pronunciation: speaking, reading and the structure of the basic Spanish sentence. Three hours per week of classroom practice and discussion supplemented by two required language lab periods for additional oral practice. Students with more background in Spanish should enroll in 09 or 51. Spanish 1-2 is a two-semester course. Eight hours. Ugalde.

09 Basic Spanish Review Grammar An intensive review of the fundamentals of Spanish grammar. Abundant oral exercises. Designed to enable the student to proceed to an Intermediate Reading and Conversation course. Three hours.

51, 52 Intermediate Reading and Conversation The emphasis in this course is on reading. Several modern Spanish texts will be read for content and discussed in Spanish. Students will be asked to write simple descriptive paragraphs based on these texts, chosen for each section by the instructor who teaches it. A small part of the time may be used for topical grammar review. It is recommended that this course be taken after Spanish 09 or together with it. Three hours each course.

101, 102 Composition and Conversation The course offers writing practice, sentence structure, correct expression and guided discussions in Spanish of assigned relevant topics. There will be a written assignment per week. Students are expected to have a good command of basic grammar. Three hours each course. Wesseling, Weiger, Zarate.

201, 202 Advanced Composition and Conversation The purpose of this course is to improve both written and oral proficiency. A textbook, supplemented by materials on topics of current interest, provide the basis for panel discussions, debates, translation and a weekly composition. Three hours each course. Ugalde.*

209 Advanced Grammar An in-depth study of Spanish grammar, its rules and practices, going beyond conventional good usage into the reasons and theories for same. Three hours. Ugalde.

* Note: Not approved for graduate credit.

Literature Courses in French and Spanish

As the language courses offer a continuum for the learning of the four skills, the literature courses provide a sequential study of the development of French and Spanish literatures from the Middle Ages to the present. In addition, they offer both practice and continued training in the four language skills. While the literature courses are divided into centuries, with sub-categories of genres, themes, and individual authors, it is not essential to adhere strictly to chronological order. IN GENERAL, A ONE HUNDRED-LEVEL LITERATURE COURSE OR ITS EQUIVALENT IS THE PREREQUISITE FOR ALL OTHER LITERATURE COURSES; EXCEPTIONS ARE REGULARLY 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 chairman.

French Literature and Civilization

155, 156 Masterworks An overview of French literature (155: Middle Ages to the Revolution; 156: 19th and 20th centuries) through reading of outstanding works representing major authors, periods, themes and forms. Study of the cultural and historical context of the works as well. Prerequisite: Intermediate French (French 51 or 52 or equivalent). Three hours each course. Crichfield.

175 French Humor Analysis of theories of humor; comparison of French and American styles of humor. Authors from the standard repertory such as Rabelais, Moliere, Feydeau, Voltaire, Camus, Ionesco; medieval farces; great modern humorists such as Cami, Allais, Pierre Dac, Sempe, Lautreamont, Daninos. Three hours. Whitebook. Alternate years, 1978-79.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

225, 226 Medieval French Literature (1100-1500) Lectures and readings on aspects of Medieval culture, history, philosophy, and their relation to the literature of the period. 1st semester: Old French language; major 12th century epics, e.g., *La Chanson de Roland*, *Le Pelerinage de Charlemagne*, *La Chanson de Guillaume*; Breton lays; Marie de France. 2nd semester: Prerequisite: 1st semester.

Romances of the 12th and 13th centuries: Chretien de Troyes, Guillaume de Lorris and Jean de Meung; lyric poetry, 12th to 15th century: Bernard de Ventadorn; Guillaume de Machaut; Christine de Pisan; Charles d'Orleans; Francois Villon; Theatre: Rutebeuf and various farces and miracle plays. Three hours each course. Whitebook. Alternate years, 1979-80.

235 16th Century France: A World in Transition The 16th Century as a pivotal era between medieval and modern society, focusing on literary and esthetic movements, related to their historical and social contexts. Texts presented will illustrate the changing attitudes toward man and his place in the world. Some topics to be covered include: the new nationalism, the educational reforms, Rabelais and the conteurs, the emergence of the "Renaissance man," the Pleiade poets, the Lyons school of poetry, religious ferment and the civil wars, Montaigne, the baroque period. Three hours. Wiley-Sandler. Alternate years, 1979-80.

236 The Developing Renaissance in France The cultural, historical, social and esthetic origins of Renaissance ideals, their development through the years 1530-1560, the breakdown of their influence, and some of their lasting effect in French thought. Among the topics to be covered: Humanism, the Italian influence, classical models and imitation, educational reforms, women writers, Rabelais, Du Bellay, Sceve, Ronsard, Montaigne. Three hours. Wiley-Sandler. Alternate years, 1979-80.

245 The Baroque Age 1600-1650 A study of the literature after France's religious civil wars, up to the triumph of classicism. Readings may include religious, lyric and political poetry; idealistic, picaresque and fantastic novels; Corneille and Rotrou; the *Pensees* of Pascal. Three hours. Whatley. Alternate years. 1978-79.

246 17th Century Selected works of the Century with emphasis on Corneille, Racine and Moliere. Three hours. Julow. Alternate years, 1978-79.

255 18th Century Literature Readings in writers of the early 18th century such as Bayle, Fontenelle, Montesquieu, Marivaux, Prevost, Voltaire. Topics to be treated might include: the impact of the new science on thought and art; the reflection in literature of new social types; the "pursuit of hap-

piness;" the early evolution of the novel. Three hours. Whatley. Alternate years, 1979-80.

256 18th Century Literature Readings in writers such as Rousseau, Diderot, Laclos, Bernardin de Saint-Pierre, Sade: the literature of the generation before the Revolution. Topics to be treated might include: the attempts to define "natural man;" the relationship between the arts and morality; the relationship between liberty and libertinism. Three hours. Whatley. Alternate years, 1979-80.

265 The Romantic Period Major figures, themes and tenets of the Romantic movement, including Chateaubriand, Madame de Stael, Victor Hugo, Balzac, Stendhal, Constant, Musset, Vigny. Topics may include the revolt against Classicism, the Romantic view of nature, the *roman d'analyse*, *le vague de passions*, among others. Three hours. Crichfield. Alternate years, 1979-80.

266 The Second Empire through 1900 The rise of modern literary realism, Naturalism, Symbolist poetry, Decadence. Authors will include Flaubert, Zola, Maupassant, Baudelaire, Verlaine, Rimbaud, Mallarme, Huysmans. Topics may include the image of *la bourgeoisie*, the theme of Paris vs. *la Province*, symbolism and Impressionist painting and music, the influence of Positivism on the novel, and others. Three hours. Julow. Alternate years, 1979-80.

275, 276 Twentieth Century Literature Selected topics, dealing with poetry and/or narrative related either to an historical period or a literary movement. Subjects may include: The Novel in the *Entre-deux-guerres*, Politics and the Novel, World War II and Literature, Surrealism, The Literature of Existentialism, The New Novel, The Development of Modern Poetry (1870-1940), etc. Each may be repeated up to six hours. Three hours. Carrard. Alternate years, 1978-79.

277 Topics in 20th Century French Theatre Subjects may include:

1. *le theatre traditionnel*: Claudel, Sartre, Giraudoux, Salacrou, Anouilh, etc.
2. *le theatre "De l'absurde"*: Ionesco, Beckett, Genet, Arrabal, etc.
3. *le theatre de la marge*: Ghelderode, Pinget, Vian, Shehade, Audiberti, etc.
4. *la vision totale*: a combination of all the above.

Each may be repeated up to six hours. Three hours. T. Geno. Alternate years, 1978-79.

285 Literature of the French of North America An analysis of the French novel of North America as it relates to the socio-cultural and ecological contexts of the French of America (cultural values, social structures and human aspirations in the rural and urban contexts). Three hours. Alternate years, 1978-79.

286 Literature of the French of North America A study of the French novel, poetry and theatre of North America in so far as they depict the psychology of the individual in relation to the socio-cultural and ecological contexts. Three hours. Alternate years, 1978-79.

289 African Literature of French Expression A study in *La Francophonie* drawing our attention to Africa by way of the Antilles and the USA. A survey of oral literature, poetic expression, theatrical expression and the novel seen through the culture and civilization of Africa's past and present and through the influence of France's colonial empire. Authors studied will include: Senghor, Damas, Césaire, Fanon, Diop, Oyono, Kane. Three hours. T. Geno. Alternate years, 1979-80.

291 Civilization of France A study of the geographical, political, social, economic and intellectual development of France from the Middle Ages to the present. Three hours. M. Geno.

293 French Civilization of North America From the French empire of the seventeenth century to Quebec separatism of the 1960's this course examines the sociocultural, ecological and psychological meaning of being French in North America. Material studied is drawn from the areas of cultural history, architecture, literature, language, the popular arts, song, folk traditions and painting. Three hours. Alternate years, 1979-80. (Not approved for graduate credit.)

295, 296 Advanced Special Topics

297, 298 Advanced Readings and Research

Spanish Literature and Civilization

155 Masterworks Representative novels, plays, poetry of the period before 1800. Lectures on significance of content and on the cultural, political and social background of the material; open discussion part of the time. *Prerequisite:* Intermediate Spanish or instructor's permission. Three hours. Wessling. Alternate years, 1978-79.

156 Masterworks Representative plays, novels, poetry since 1800. Lectures on significance of content and on the background of the material; open discussion part of the time. *Requirements:* two exams, four essays on aspects of the material read, in Spanish. Three hours. Wessling. Alternate years, 1978-79.

158 History of Modern Spain Topical approach to the study of Spanish history since 1808. Liberal crises, traditionalist and leftist institutions and forces, endemic civil war. Emphasis on causes and issues of the Civil War of 1936. Three hours. Wessling. Alternate years, 1979-80.

185 Readings in Spanish American Literature A survey of the literature of Spanish America from pre-Columbian times through the colonial period and Romanticism. Three hours. Zarate. Alternate years, 1979-80.

186 Readings in Spanish American Literature A survey of the literature of Spanish America from Modernismo through Vanguardismo, *Realismo Magico* to the present. Three hours. Zarate. Alternate years, 1979-80.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

235, 236 Golden Age The picaresque novel, the drama and poetry of the 16th and 17th Centuries, with emphasis on Lope de Vega, Calderon, Quevedo, Tirso de Molina. Three hours each course. Weiger. Alternate years, 1978-79.

245, 246 Cervantes *Don Quijote*, the *Novelas Ejemplares*, and the theatre of Cervantes. Three hours each course. Weiger. Alternate years, 1979-80.

265 19th Century Spanish Literature Romanticism and realism: 1. Romantic theater, prose, poetry; 2. the realist and naturalist novelists: Galdos and Leopoldo Alas. Three hours. Wessling. Alternate years, 1979-80.

276 The Reawakening in the 20th Century Origins and main aspects of the intellectual conflicts in modern Spain as reflected in the literary works from the "Generation of 1898" to the present. Three hours. Ugalde. Alternate years, 1979-80.

285, 286 Spanish-American Literature of Social Protest The Literature of the Spanish-American peoples as a reflection of and contribu-

Russian

EDITOR'S NOTE: PLEASE INCLUDE AS PAGE 270 A IN 1978-1979 CATALOG

COLLEGE OF ARTS AND SCIENCES

Associate Professor Nalibow; Assistant Professor Pomar.

1-2 Elementary Russian Four hours each course.

11, 12 Intermediate Russian *Prerequisite:* 1-2. Four hours each course.

101, 102 Introduction to Russian Literature Outstanding authors of the 19th and 20th centuries from Pushkin to Pasternak and Solzhenitsyn. Oral discussion of readings, written practice. *Prerequisites:* 11, 12. Three hours each course. Nalibow, Pomar.

103, 104 Russian Civilization Introduction to the history of Russian culture including Russian secular and ecclesiastical painting, architecture and music from the earliest periods to the present. *Prerequisites:* 11, 12. Three hours each course. Pomar.

***193, 194 College Honors**

***195, 196 Special Topics**

***197, 198 Readings and Research**

203, 204 Advanced Russian Advanced oral and written drill, grammar review, lexical problems, roots of the Russian language. Lectures and discussions on the Russian language. Three hours each course. Nalibow, Pomar.

271, 272 Seminar in Slavic Linguistics Course 271, the linguistic prehistory of Slavic and the study of Old Church Slavic. Course 272, history of the Russian language. Three hours each course. Nalibow. Alternate years, 1979-80.

281, 282 Senior Seminar Required of all senior concentrators. Three hours each course. Pomar.

General Literature

181 Russian Literature in Translation Nalibow. (See Extradepartmental Courses).

182 Soviet Literature in Translation Pomar. (See Extradepartmental Courses).

*The series 193-198 is taught in Russian.

tion to the social problems of the area. Reading of major works by genre and by period, following the various directions of social protests against: a) the Spanish political system, b) local governments, c) imperialism. The second half of the course will stress the contemporary scene. Three hours each course. Zarate. Alternate years, 1978-79.

291 Civilization of Spain Topical approach to the study of Spanish Civilization with emphasis on ideas, art, literature and music. Social and cultural problems arising from the loss of the last vestiges of empire at the turn of the century. Three hours. Ugalde. Alternate years, 1978-79.

293 Latin American Civilization A study of history and culture of Latin American people from the formation of the Indian civilization to the present ideals and problems. The periods studied will be the following, Pre-Hispanic civilization, colonization and modern states. Artistic, literary and musical manifestations of these periods will be covered. Three hours. Zarate. Alternate years, 1979-80.

295, 296 Advanced Special Topics

297, 298 Advanced Readings and Research

The following extra-departmental courses may be taken for credit toward a major in the Department of Romance Languages:

General Literature 72 Romance Literature in Translation (see page 202).

Linguistics 101, 102 (see page 203).

For Graduate Courses (300 level), Please See Graduate College Bulletin.

Sociology

COLLEGE OF ARTS AND SCIENCES

Professors Folta (Chairperson), Lewis, Mabry, Sampson, Stanfield; Associate Professors Finney, Loewen, Nixon, Steffenhagen, Underhill, Waitzkin; Assistant Professors Danigelis, Deming, Fengler, McCann, Mintz, Payne, Schmidt.

10 Introduction to Sociology Fundamental principles and problems in the sociological analysis of the structure and dynamics of modern society. Three hours. Danigelis, Finney, Loewen, Mintz.

100 Fundamentals of Social Research Introduction to theory and research methods in sociology. Includes examination of basic problems in research design, measurement, data collection, data analysis and the presentation and interpretation of research findings. *Prerequisite:* Three hours of sociology. Three hours. Danigelis, Deming, Loewen, McCann, Payne, Underhill.

101 Social Problems Analysis of a selected number of major social problems in contemporary society. Three hours. Fengler, Finney, Lewis, Mintz, Payne, Schmidt.

102 Population, Environment and Society Analysis of the consequences of the varying relationships among population size, social organization, technology and resource base. *Prerequisite:* Three hours of sociology. Three hours. Deming, Fengler, McCann, Payne.

105 The Community Analysis of the structure and dynamics of communities. Emphasis on American communities. *Prerequisite:* 10. Three hours. Lewis, Loewen, Mabry, Schmidt, Waitzkin.

109 The Self and Social Interaction Analysis of the social nature of human personality. Special emphasis will be given to the roles of social interaction and language in the formation and structure of the self, socialization as a continuous process throughout the life-cycle, and the impact on individual attitudes and behavior of social stimulus situations. Three hours. Folta, Sampson.

114 Deviance and Social Control Analysis of social behavior that violates norms and the range of reactions to such behavior. Special attention will be given to the examination of the causes and consequences of deviance in social organization, the process of becoming a deviant, the structure of the deviant's world, and the forms of deviance control. Three hours. Folta, McCann, Payne, Stanfield, Waitzkin.

119 Minority Groups Analysis of the causes and consequences of the subordination of ethnic, racial, and religious groups in society. Special attention will be given to an examination of group prejudice and discrimination, minority group members' worlds and their relationships with dominant groups and the institutions of society. Three hours. Danigelis, Loewen, Payne.

122 Women and Society Analysis of the changing roles of women in modern society. Special attention will be given to changes in sex role differentiation and dedifferentiation, female socialization and opportunity and their consequences for major institutions in modern society. Three hours. Deming, Fengler, Folta, Lewis, Mintz.

125 Alienation in Modern Society An examination of the nature and sources of social alienation in modern industrial society. Special attention will be given to the effects of the social organization of work, bureaucracy, urbanization and mass culture in the United States. Three hours. Sampson, Steffenhagen.

126 Social Problems in Organizations A selective review of problems of individuals working in organizations, of common problems of organizations as social systems, and of problems caused by bureaucracy in modern society. Possible problems to be covered include worker dissatisfaction and alienation, democratic participation and control, problems of voluntary self-help organizations, organizational effectiveness, public accountability, corporate crime, corruption, corporate and multi-national concentration, and "alternatives" to bureaucracy. *Prerequisites:* Sociology 10 or three hours of sociology, or permission of instructor. Three hours. Finney, McCann, Nixon, Sampson.

129 Sex, Marriage and the Family A description and analysis of contemporary patterns in American sexual, marital and familial behavior, including their historical development, variant patterns and the evolving alternatives to traditional patterns. Three hours. Fengler, Lewis, Mabry.

132 Affluence and Poverty in Modern Society An examination of the structure of social inequality in contemporary America. Special attention will be given to the distribution of wealth in the United States and its association with power, prestige and opportunity. Three hours. Danigelis, Finney, Mabry, McCann, Nixon, Schmidt, Underhill.

136 Technology and Social Change Comparative analysis of the way in which technology interacts with human culture and social institutions. Current theories of social evolution and change are evaluated in the light of historical, cross-cultural, and cross national data. Special attention will be given to the development and change of industrial technologies. Three hours. McCann, Underhill.

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 relationship to other institutions in society. Three hours. Lewis, Loewen.

151 Religious Deviance, Magic and the Occult Analysis of the social and cultural organization of groups professing spiritual, occult, mystical and/or magical beliefs and their relationship to the major social institutions of society. Three hours. Steffenhagen.

154 Social Organization of Death and Dying Comparative examination of the nature of cultural and social adaptations to mortality in society. Special attention will be given to the ways in which family, medical, legal, religious and economic institutions respond to the fatally ill and dead in contemporary society. Three hours. Folta.

157 Drugs and Society Analysis of the nature of drug use and abuse in society. Special attention will be given to an examination of the social, cultural, psychological, legal and medical aspects of drug taking and its causes and consequences in contemporary society. Three hours. Steffenhagen, Waitzkin.

161 Sociology of Leisure Analysis of the types and social organization of non-work activity in society. Special attention will be given to the examination of the relationships of life style, social class factors, education and work to recreation and leisure use patterns in modern society. Three hours. Danigelis.

163 Sociology of Sport Analysis of the types and social organization of amateur and professional athletics in society. Special attention will be given to the social origins of athletes, the structure and dynamics of athletic groups and their fans, and the relationship of sports to the major institutions of modern society. Three hours. Nixon.

165 The Social Structure of the United States I Examination of the major institutional structures and processes of contemporary American society. Special attention will be given to the analysis of the changing ecological and demographic bases, age and sex roles, and the kinship, stratification and economic institutions in the United States. May be taken independently of 166. Three hours. Sampson, Schmidt. Alternate years, 1979-80.

166 The Social Structure of the United States II Examination of the major institutional structures and processes of contemporary American society. Special attention will be given to the changing role of bureaucracy; the political, educational, scientific, religious and medical institutions; ethnic and race relations; and socio-cultural modes of integration, conflict and deviation and change in the United States. May be taken independently of 165. Three hours. Sampson, Schmidt. Alternate years, 1979-81.

167 Social Structure of Canada An analysis of Canada as a social system. The course uses the theory and methodology of sociology for the study of such topics as the Canadian identity, the unity or integration of an ethnically plural society, the resolution of national and regional interests, and the distribution of persons within the social structure. *Prerequisite:* Three hours in sociology or three hours in Canadian studies. Three hours. Stanfield.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

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 10 and an introductory in biology, economics, geography or zoology. Three hours. Deming, McCann, Payne.

204 Ecological Perspective on Human Communities Analysis of the relationships between forms of social organization and their environments with special emphasis upon community contexts. Attention given to the impact on various kinds of communities of the differential location of socio-economic, racial and cultural groups. Three hours. Deming, Mabry, Schmidt.

205 Rural Communities in Modern Society The changing structure and dynamics of rural social organization in the context of modernization and urbanization. Emphasis on rural communities in America. Three hours. Finney, Schmidt.

206 Urban Communities in Modern Society The changing structure and dynamics of urban social organization in the context of modernization and urbanization. Emphasis upon cities and metropolitan areas in America. Three hours. Deming, Lewis, Loewen.

207 Community Organization and Development Community as a changing complex of organization within modern society. Special attention will be given to problems of the formulation and implementation of alternative change strategies. Three hours. Schmidt.

209 Small Groups An examination of the structure and dynamics of interpersonal relations and informal interactions in small groups. Three hours. Nixon, Steffenhagen.

210 Collective Behavior Analysis of the nature and types of emergent, non-institutional behavior, especially responses to shared stressful or crisis situations. Includes the examination, social origins, development and consequences of crowd, riot, disaster and craze behavior. Three hours. Finney, Stanfield, Underhill.

211 Social Movements Analysis of the nature and types of relatively organized collective action to promote social or cultural change. Special attention will be given to the genesis, structure and social consequences of political and religious movements. Three hours. Finney, Folta, Stanfield.

212 Culture and Personality The cross-cultural comparison of personality development; the problem of delineating modal personality types. *Prerequisites:* 10, Anthropology 21 and one 100-level course in sociology or anthropology. Three hours. Mabry, Magnarella (Anthropology), Steffenhagen. (Cross-listed in anthropology.)

214 Delinquency Analysis of the nature and types of juvenile behavior that violates law, the mechanisms for defining such behavior as delinquent, and the relationships between delinquency and the social situations of juvenile offenders. Three hours. Folta, McCann, Payne.

215 Crime Analysis of the nature and types of adult behavior that violates law, the mechanism for defining such behavior as criminal, and the relationships between crime and the social situation of adult offenders. Three hours. Folta, McCann, Payne, Stanfield.

216 Criminal Justice Analysis of the social structures and processes involved in the specification of behavior as being legally deviant and the labeling of individuals as delinquent or criminal offenders. Criminal law, its enforcement and the courts. Three hours. Folta, Payne, Stanfield.

217 Corrections Analysis of the social structures and processes involved in dealing with individuals who have been designated as offenders of criminal law. Probation, prison, parole, programs of prevention and rehabilitation. Three hours. Stanfield.

219 Race Relations Examination of racial subordination in social and historical context. Special attention will be given to the analysis of the forms of interracial contacts, racial sub-cultures and social structures, social psychological and protest responses to racial prejudice and discrimination. Emphasis on American experience. Three hours. Danigelis, Loewen, Payne.

225 Organizations in Modern Society Analysis of the structure and dynamics of organizations. Special attention given to theory and research on both the internal structure and the environmental relations of organizations, including their role in modern society. Although various forms and types of organizations, such as "total institutions," corporations, schools, and voluntary associations, will be treated, primary emphasis will be given to relationships that are applicable to organizations in general. Three hours. Finney, Nixon, Sampson.

226 Small Groups in Complex Organization Analysis of the emergence, structure and consequences of informal interaction in large, formal organizations. Special attention will be given to the reciprocal effects of small groups and their complex organizational environments. Three hours. Nixon, Steffenhagen.

228 Organizational Development and Change An introduction from an applied sociological perspective to the field of organization development and to related issues of organizational innovation and change. Substantial attention is given to the relevance of sociological theory and research on organizations to the theory of organizational development, including a review of the research evidence regarding its effectiveness. The course will also deal with the relevance of basic research on organizational innovation to organization development. Occasional class exercises will illustrate the nature of various organizational development techniques. *Prerequisite:* One course on organizations, or equivalent, or permission of instructor. Three hours. Finney, Sampson, Steffenhagen.

229 The Family as a Social Institution Description and analysis of the family as one of society's major social institutions; the varying theoretical perspectives used in studying the family; the family in cross-cultural perspective; the role of social values in understanding continuity and change in the American family institution. *Prerequisite:* Sociology 129 or six hours in sociology. Three hours. Fengler, Lewis, Mabry.

230 Social Value Patterns in American Family Life A detailed examination of both the similarities and differences in social value patterns characteristic of the different segments of American family life and the relation of each to the larger American society. Attention will be given to both continuity and change in value patterns, including radical alternatives, and their significance for future developments in the family and society. Three hours. Lewis.

232 Social Class and Mobility Comparative analysis of the social causes, structures and consequences of the differential ranking of individuals and groups in society. Special attention will be given to the criteria for social ranking, their measurement and association and intergenerational social mobility. Three hours. Danigelis, Finney, Lewis, Mintz, Nixon, Schmidt, Underhill.

237 Occupations and Professions Analysis of the social organization of economic roles and associations in industrial society. Special attention will be given to an examination of the impact of the structure of work on the individual and the relationship of occupations and professions to other institutions in society. Three hours. Mabry, Underhill.

240 Political Sociology Analysis of the social organization of political roles and associations in modern society. Special attention will be given to

an examination of the changing structure of the political institution and its relationship to other institutions in society. Three hours. Danigelis, Loewen, Nixon, Waitzkin.

241 Public Opinion Analysis of the factors affecting social attitude formation and change. Special attention will be given to political and social ideology. Three hours. Underhill.

248 Social Organization of Science Examination of science as a social institution, its social structure and its relationship with other institutions in society. Topics will include organization of research, stratification, social control, communication, and the relationship to such other institutions as educational, economic and political structures. Prerequisites: (1) Six hours of social science or (2) three hours of social science and six hours of natural science. Three hours. McCann.

249 Sociology of Knowledge Reviews the development and present state of sociological theory and research on the emergence and role of belief and normative systems in society. Special attention will be given to systematic attempts to understand the causes and consequences of shared constructions of social reality. Three hours. Loewen, McCann, Sampson.

251 Sociology of Religion Analysis of the social organization of religious roles and associations in modern society. Special attention will be given to the changing structure of the religious institution and its relationship to other institutions in society. Three hours. Sampson.

254 Sociology of Health and Medicine The socio-cultural environment of physical well-being and illness. Special attention will be given to the role of socio-cultural factors in the etiology, identification, definition and treatment of illness in society. Three hours. Folta, Mabry, Steffenhagen, Waitzkin.

255 Sociology of Mental Health The socio-cultural environment of mental well-being and illness. Special attention will be given to the role of socio-cultural factors in the etiology, identification, definition and treatment of mental illness in society. Three hours. Folta, Mabry, Steffenhagen, Waitzkin.

258 Sociology of Law Analysis of the social organization of legal roles and associations in modern society. Special attention will be given to the changing structure of the legal institution and its relationship to other institutions in society. Three hours. Folta, Stanfield.

273 Methodology of Social Research Basic issues in the construction and empirical testing of sociological descriptions, predictions and explanations. Consideration will be given to the philosophy and logic of social research and the socio-cultural nature of scientific inquiry; theoretical frames of reference; concept formation, measurement and validation; socio-cultural causation and measures of association; models, theories and verification; and the formalization of theories. Three hours. Danigelis, McCann, Sampson.

274 Methods of Data Gathering in Social Research An examination of the methods available for studying social phenomena including laboratory and field experiments, observational techniques, social surveys, content analysis, cross-cultural comparisons and others. Basic problems in research design, sampling methods, and measurement and scaling will be investigated. Three hours. Danigelis, Deming, Loewen, Mabry, McCann, Schmidt, Underhill.

275 Methods of Data Analysis in Social Research An examination of approaches to the quantitative analysis of sociological data, including table analysis, regression and path analysis, scaling and factor analysis, and the

analysis of variance with emphasis on the multivariate techniques. Three hours. Danigelis, McCann, Payne, Underhill.

278 The Development of Sociological Theory An examination of the major classical traditions in social theory and their contemporary research relevance. Detailed critical attention will be given, but not necessarily confined to, the theoretical and methodological contributions of Marx, Durkheim and Weber. Three hours. Danigelis, Loewen, McCann, Payne, Sampson, Schmidt.

279 Contemporary Sociological Theory A detailed examination of selected major theoretical approaches and issues in modern sociology. Three hours. Prerequisite: Sociology 278. Loewen, McCann, Sampson, Schmidt, Stanfield.

281, 282 Seminar Presentation and discussion of advanced problems in contemporary sociological analysis. Prerequisites: Twelve hours in sociology and permission of the department. Three hours.

288, 289 Seminar: Research and Methods of Teaching Sociology The development and evaluation of teaching strategies in sociology. Open only to graduate students and advanced undergraduate sociology majors who are serving concurrently as teaching assistants in the department. Prerequisites: Twelve hours in sociology and permission of the department. Three hours. Danigelis, Deming, Finney, Loewen, McCann, Mintz, Payne, Underhill.

295, 296 Special Topics

297, 298 Readings and Research

Statistics

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION
Statistics Program Steering Committee: Professors McCrorey, Sylwester (Director); Associate Professors Gordon, Haugh, Howell, Newton; Assistant Professors Ashikaga, Fritz and Tashman; Assistant Research Professor Costanza; Adjunct Assistant Professor Dorsey; Lecturer Aleong.

51 Discrete Probability Models Non-calculus introduction to probability concentrating on developing and analyzing discrete stochastic models of real world phenomena (e.g., genetics, learning theory, screening for diseases, discrete birth and death processes). Prerequisite: Two years of secondary school algebra. Three hours. No credit for juniors or seniors in the mathematical sciences. Staff.

89 Topics in Statistics Lectures, reports and directed readings at an introductory level. Prerequisite: As listed in schedule of courses. 1-3 credit hours as announced. Staff.

111 Elements of Statistics Basic statistical concepts and methods: averages, correlation, regression, sampling theory, confidence intervals, and hypothesis tests. Realistic problems as laboratory projects with instruction in use of the computer for computations. Prerequisite: Two years of high school algebra. Three hours. Staff.

141 Basic Statistical Methods A traditional introductory methods course for students planning to take additional statistics courses or quantitative methods courses in their respective fields. Emphasis is on developing a fundamental working knowledge, including necessary calculational

skills, in statistical description, estimation, and hypothesis testing. **Prerequisite:** College algebra or one semester of calculus, sophomore standing. **Three hours.** A student may receive credit for only one of 111, 141 and 211, unless special permission has been given by the Statistics Program. Staff.

151 Applied Probability Development and application of discrete and continuous probability models to real world phenomena. Emphasis on the classical distributions: hypergeometric, binomial, geometric, uniform, normal, exponential, gamma and Weibull. Introduction to statistical theory of parameter estimation and hypothesis testing used in studying probability models. Same as Math 151. **Corequisite:** Mathematics 121. **Three hours.** Sylwester.

162 Introduction to Statistical Inference Continuation of statistical theory begun in 151: parameter estimation, hypothesis testing, chi-square tests, regression analysis, and analysis of variance. Same as Math 206. **Prerequisite:** 151. **Three hours.** Haugh.

192 Thesis Candidates for the B.S. degree may carry out an independent investigation and prepare an acceptable thesis under the supervision of a staff member. **Prerequisite:** Permission of the Program Director. Credit as arranged.

193 Special Projects Candidates for the B.S. degree may work on a special project, under the supervision of a staff member, culminating in a report. **Prerequisite:** Junior or senior standing and permission of the Program Director. Credit as arranged.

211 Statistical Methods I Fundamental ideas and techniques of statistics, with applications, used in experimental design and data analysis; descriptive and inferential statistics, especially, parameter estimation and hypothesis testing. Introduction to correlation, regression, and analysis of variance. One section of 211 is cross-listed as PSYC 340. **Prerequisite:** College Algebra. **Three hours.** Staff.

221 Statistical Methods II Continuation of 211 concentrating on linear and multiple regression, analysis of variance and covariance, multiple comparisons, chi-square tests, and non-parametric methods. **Prerequisite:** Any one of 141, 162, 211, or 262. **Three hours.** Aleong.

225 Applied Regression Analysis The nature and applications of basic regression-correlation models in investigating relationships, testing hypotheses and making predictions. Emphasis on the art of developing appropriate models and evaluating existing research. Same as BSAD 244. **Prerequisite:** Any one of 111, 141, 162, 211, or 262. **Three hours.** Tashman.

227 Statistical Methods for the Behavioral Sciences (3-1) See PSYC 341.

229 Statistical Methods for the Engineering Sciences Multiple regression modeling, factorial design of experiments with analysis of variance. Statistical quality control, attribute and variable inspection schemes, control charts. Probability distributions used in queuing, reliability, life testing. **Prerequisites:** Any one of 141, 162, 211, or 262; 111 with instructor permission. **Three hours.** Haugh. Not approved for graduate credit.

231 Experimental Design Experimental design techniques, survey of basic experimental design, complete and incomplete blocking, factorial designs; response surface methodologies, fixed and random effects models; multiple comparisons. **Prerequisites:** Any one of 162, 225 or 262 with permission of instructor; or any one of 221, 227, 229 or 313. **Three hours.** Haugh.

233 Sample Survey Methods Presentation of implementing and estimating parameters for various sampling schemes including simple ran-

dom, stratified random, systematic, and cluster sampling. Relative efficiencies of designs. *Prerequisite:* Any one of 141, 162, 211, 262, or 313. *Corequisite:* 151 or 251. Three hours. Ashikaga. Alternate years, 1979-80.

235 Multivariate Methods Properties and statistical methods, with applications, for the multivariate normal distribution; multiple regression; nonlinear regression, discriminant functions, principal components and factor analysis. Experience in data analysis using computer programs. *Prerequisites:* 162 or Corequisite 262 plus any one of 221, 225, 227, 229, or 313. Three hours. Ashikaga. Alternate years, 1978-79.

237 Nonparametric Methods Nonparametric procedures for hypothesis tests and confidence intervals, including rank procedures and those based on the binomial distribution. Selecting the optimum procedure for a particular problem. *Prerequisite:* Any one of 141, 162, 211, or 262. Three hours. Alternate years, 1978-79.

251a, b Probability Theory **251a** is a three credit non-measure theoretic course in probability, meeting for 11 weeks. Derivation of classical distributions, laws of large numbers and central limit theorems. **251b** is a one credit introduction to statistical theory, meeting 4 weeks. Fundamentals of parameter estimation and hypothesis testing. Same as MATH 207a, b. *Prerequisites:* MATH 121 for 251a; 251a for 251b. Three or four hours. Cooke.

252a, b, c Stochastic Processes and Time Series Analysis Three one-credit mini-courses: **252a**, Discrete processes: random walks, Markov chains and discrete branching processes; **252b**, Continuous processes, Poisson process, birth and death processes, Brownian motion; **252c**, Time series analysis. Students may enroll in from one to three units for one credit each. *Prerequisites:* 151 with instructor's permission or 251a for 252a; 252a for 252b; 251a or any one of 141, 162, 225, or 211 for 252c. One to three hours. Alternate years: 1978-79. Haugh.

262 Statistical Theory Continuation of statistical theory begun in 251. Methods of point estimation, interval estimation, hypothesis testing, and decision theory. Application of general principles to specific areas such as non-parametric tests, sequential analysis and linear models. Same as MATH 208. *Prerequisites:* 252 or 151 and 162. Four hours. Costanza.

281 Statistics Practicum Intensive experience in carrying out a complete statistical analysis for a specific research project in a substantive area with close consultation with the project investigator. 1-4 credit hours. *Prerequisites:* One year of statistics and elementary computer programming ability. Staff.

295 Special Topics For advanced students. Lecturers, reports and directed readings on advanced topics. *Prerequisite:* Consent of instructor. Credit as arranged. Staff.

Technology

COLLEGE OF ENGINEERING, MATHEMATICS AND BUSINESS ADMINISTRATION
Professors Evering, Roth, Rush, Tuthill and von Turkovich

The College of Engineering, Mathematics and Business Administration offers the following courses on a non-departmental basis.

4a, b, c Topics in Technology A sequence of four-week, one-credit minicourses offered during the spring semester on topics to be announced in advance. Open to all students. One, two or three hours. Staff.

7 Man's Place in the Universe (1-0) Philosophy has been, over the years, mainly concerned with the problems of understanding man; his activities, his beliefs, his relationship to his fellows and his significance in the larger universe. This course endeavors to integrate and interpret existing scientific data to make comprehensible these areas of human concern. The guiding principle is that all life must conform to the requirements of Darwin's Theory of Natural Selection and be consistent with the world's known evolutionary history. Topics include: theories of the development of the universe, nature's technique of design-by-chance, a scientific critique of religion and philosophy, the evolutionary basis of human and animal psychology and behavior, the genetic code and double-helix, the survival benefits of the religious impulse. The course will be presented in non-technical language for persons interested in practical philosophy. One hour. Rush.

51 Technology and Society (3-0) An examination of the effects of modern technology on society. Non-technological views as well as those of engineers and scientists are presented. Readings from the current literature. Group study projects. *Prerequisite:* Sophomore standing. Three hours. von Turkovich.

52 Technology and the Environment (3-0) Practical information on solving environmental problems with emphasis on pollution. Interrelationships and control of land, air, and water environments. Lectures supplemented by discussion and field trips. *Prerequisite:* One semester of college chemistry or permission of the instructor. Three hours. Staff.

53 Energy and the Environment (3-0) Physical principles underlying various energy conversion devices for the generation of electricity. Hydroelectric, fossil fuel and atomic power plants. Direct energy conversion: photoelectric, fuel cell, and magnetohydrodynamic devices. Present and future availability of fuels, their costs, and the environmental impact of various sources of power. Three hours. Staff.

54 Our Electronic World (3-0) Fundamentals of common electronic systems including telephone, radio, television, phonograph, magnetic tape recorder, and controls. Qualitative discussion of theory and practice and live demonstrations of basic principles. *Prerequisite:* high school algebra. Three hours. Roth.

64 Concepts and Design for Thermal Comfort (3-0) A study of the factors and their control, that affect the thermal comfort of humans, including climate and shelter, building materials, heat loss and gain, and mechanical systems for thermal environment modification. *Prerequisite:* high school algebra. Three hours. Tuthill.

101 Introduction to System Dynamics (3-0) Introduction to the theory and practice of computer simulation modeling. Intended for biologists, economists, engineers, foresters, geographers, sociologists and other natural and social scientists interested in determining effects of individual causal relationships on total system behavior. Mechanisms underlying growth, stagnation and cyclic fluctuations are studied. Importance of delays, nonlinearities and feedback loops are stressed. Students analyze models of industrial, ecological, social, economic, biomedical, political and engineering systems to determine relationships between system structure and time response. Provides foundation for advanced study of theory and application of dynamic simulation models. *Prerequisite:* Math 18, 20, 22 or equivalent; operating experience with UVM computer system. Roth.

201 System Dynamics Seminar (0-3) Review of system dynamics literature. Detailed study of conceptualization, paradigms, generic structures, validation and implementation. Term project and paper in field of interest of student are required. *Prerequisite:* TECH 101 Introduction to System Dynamics. Staff.

251 Technology and Society Seminar (3-0) Current views on the influence of technology on society through extensive study of contemporary writings and involvement in seminars, discussion and project assignments. *Prerequisites:* Either Tech 51 or permission of the instructor and Senior or Graduate standing. Three hours. von Turkovich.

Theatre

COLLEGE OF ARTS AND SCIENCES

Professors Feidner (Chairman); Associate Professors Bryan, and Schenk; Assistant Professor Cover.

1 Introduction to Theatre Three hours, I, II. Feidner, Bryan.

5 Oral Interpretation of Literature A study of communicating orally to an audience, from the printed page, the meaning and beauty of a literary work. Three hours. I, II. Cover.

6 Stage Speech Elements of speech and phonetics for the improvement of voice and articulation in communication for the theatre. *Prerequisite:* 1. Three hours. I, II. Staff.

10 Acting *Prerequisites:* 1, Sophomore standing. Three hours. I, II. Staff.

15 Stagecraft Scenic elements of play production; analysis of theatre forms, study and application of basic elements of scenery construction. *Prerequisite:* 1. Three hours. I, II. Schenk.

40 Fundamentals of Stage Costuming A primary skills course in the area of stage costuming. *Prerequisite:* 1. Three hours. I, II. Staff.

41 Historic Costume for the Stage An overview of period costume and its adaptation for the stage. *Prerequisite:* 1. Three hours. I. Staff.

105 Oral Interpretation of Literature *Prerequisite:* 5 or 105. Three hours. I, II. 105 may be repeated up to nine credit hours. Cover.

110 Acting *Prerequisites:* 1, Sophomore standing. Three hours. I, II. Staff.

115 Basic Scene Design Fundamental principles of scenic design, history and practice. *Prerequisite:* 1. Three hours. I. Schenk.

120 Lighting Theory Practice in the illumination of stage productions and the creation of aesthetic effects. *Prerequisites:* 1, 15. Three hours. II. Schenk.

125 Dramatic Analysis: Form An examination of the structural characteristics of the basic forms of drama and the manner in which they affect theatrical representation. *Prerequisites:* 1 plus three additional hours in Theatre. Three hours. I. Bryan.

126 Dramatic Analysis: Style An examination of the manner in which a playwright's manipulation of the parts of a drama is affected by his intellectual and cultural milieu and the physical shape of the theatre for

which he is writing. *Prerequisites:* 1 plus three additional hours in Theatre. Three hours. II. Bryan.

127 The Classical Theatre Earliest dramatic rituals and the theatres of Greece and Rome as evidenced by historical remains and extant dramas. *Prerequisites:* 1 plus three hours. I, 1978-79. Bryan.

128 The Medieval and Renaissance Theatre Medieval and Renaissance theatre, accompanied by an evaluation of relevant historical materials and representative dramas. *Prerequisites:* 1 plus three hours. Three hours. II, 1978-79. Bryan.

129 Seventeenth and Eighteenth Century Theatre Dramas and theatrical conditions in Europe and America from the closing of the English theatres to the end of the eighteenth century. *Prerequisites:* 1 plus three hours. Three hours. I, 1979-80. Bryan.

130 Nineteenth and Twentieth Century Theatre Backgrounds, theatrical conventions, and dramas representative of Romanticism, Realism, and revolts against Realism. *Prerequisites:* 1 plus three hours. Three hours. II, 1979-80. Bryan.

140 Stage Costume Design Elements, principles, and styles of design applied to the visual creation of a dramatic character. *Prerequisites:* 1, 40. Three hours. II. Staff.

193, 194 College Honors

195, 196 Special Topics

197, 198 Readings and Research

215 Advanced Scene Design Analysis of the drama from the standpoint of its visual creation upon the stage; audience-stage relationships, styles of production. *Prerequisite:* 115. Three hours. II. Schenk.*

243 Repertory Theatre Operation *Prerequisite:* permission. Summer only.*

250 Play Directing *Prerequisite:* Six hours, including 1. Three hours. I, II. Feidner.*

283, 284 Seminar*

297, 298 Senior Reading and Research*

* Note: Not approved for graduate credit.

Vocational Education and Technology

COLLEGE OF AGRICULTURE

Professor Fuller (Chairman); Associate Professor Kelly; Assistant Professors Bloom, Ferreira and Lampe; Extension Associate Professor Moore; Extension Assistant Professors Patterson and Wells.

General

5 Introductory Agricultural Engineering (2-2) Introduction to building, wiring, water supply, sewage disposal, soil and water engineering, mechanical principles, and engines, for residential, recreational and farm use with environmental considerations. Three hours.

102 General Shop (0-6) Wood and metal working by hand and machine, sheet metal, welding, rope, and tool fitting. Shop layout, selection of equipment. *Prerequisite:* Sophomore standing. Three hours.

104 Leadership Preparation (3-0) Group and independent study and practice of methods for teachers, officers, administrators and group members to increase their leadership ability. *Prerequisite:* Junior standing or departmental permission. Three hours. Alternate years, 1978-79.

112 Extension and Community Education (3-0) Introduction to community education programs and techniques. Includes field trips, group activities, and independent study. *Prerequisite:* Sophomore standing. Three hours. Kelly.

152 Introduction to Career Oriented Education (3-0) Orientation to career education, and principles and philosophy of occupational and practical arts education. Includes field trips and independent study. *Prerequisite:* Sophomore standing. Three hours.

156 Developing Instructional Materials for Teaching (3-0) For students who will have educational program responsibilities in business, government, or schools. Materials will be prepared for auto-tutorial devices, audio-visual presentations, and other teaching techniques. *Prerequisite:* Sophomore standing. Three hours. Fuller.

207, 208 Understanding Students with Special Needs in Vocational Education (2-3) Overview of special educational needs of students resulting from physical, intellectual or emotional disabilities and/or from restrictive social, cultural or environmental conditions; implications for planning and programming for special needs youth in vocational, industrial and home economics education. (207 will focus on handicapped; 208 considers disadvantaged.) *Prerequisite:* Junior standing, Home Economics 80 or equivalent or permission of the instructor. (Restricted to students enrolled in an approved vocational teacher certification concentration.) Two or three hours.

253 Teaching Adults Problems related to organizing and planning adult education programs for schools, community organizations, government agencies or business. Techniques for teaching adults will be analyzed. *Prerequisite:* Senior standing. Three hours. Kelly.

Agricultural Engineering and Technology

121 Soil and Water Management (2-3) Analysis of agricultural, recreational, and other rural soil and water problems; surveying fundamentals related to design and application of conservation practices for environmental protection. *Prerequisites:* Math 2 or knowledge of plane trigonometry; PSS 109 desirable. Three hours. Alternate years, 1978-79. Wells.

131 Residential, Recreational and Agricultural Buildings (2-2) Site planning, building planning, material selection. Functional and structural considerations including heating, ventilation and insulation. Consideration of environmental relationships. *Prerequisite:* Sophomore standing. Three hours. Alternate years, 1979-80. Moore.

140 Power and Machinery for Agriculture, Recreation and Forestry (2-3) The principles of operations and maintenance of engines, tractors, and machinery used in agriculture, recreation and forest management. Power and machinery selection and management. *Prerequisite:* PHYS 3, MATH 9, or approval by instructor. Three hours. Alternate years, 1979-80. Wells.

162 Electricity, Water Systems, and Sewage Disposal in Residential, Recreational and Agricultural Use (2-2) Wiring systems and applications of electricity, water sources and systems, sewage disposal for agriculture, residences, recreation, and rural development with environmental con-

siderations. *Prerequisite:* Sophomore standing. Three hours. Alternate years, 1978-79. Moore.

Occupational and Extension Education

20 Introduction to Manufacturing (2-2) An introduction to the basic principles, organization, processing equipment, methods, operations, procedures, and design utilized by contemporary industries. Special emphasis will be given to laboratory experiences reflective of competencies needed by public school teachers in the areas of wood, metal, and plastic. Three hours. Alternate years, 1979-80. Ferreira.

30 Introduction to Construction (2-2) An introduction to the construction industry encompassing residential, commercial, industrial, agricultural, and civil areas, emphasis on codes, plans, specifications, construction methods, materials, and equipment used and elements of project control. Three hours. Alternate years, 1978-79. Ferreira.

100 Laboratory Processes in Industrial Arts Education (1-3) A study of the major industrial arts technical areas currently taught in the public schools of Vermont; emphasizing specific competencies in the technologies of wood, metal and power. The course will be divided into twelve content modules of instruction of which the student will select two modules per semester. Each student will spend four clock hours per week in the lecture and laboratory setting per module. *Prerequisite:* A drafting course or exhibited competency or permission of instructor. Two hours per module. Bloom, Ferreira.

150 Technical Internship Planned, supervised, off-campus educational internship during summers and/or junior year. Technical theory plus practical application in field experiences. A student may enroll more than one time and accumulate up to 30 hours credit. *Prerequisite:* Departmental permission. Credit as arranged. Offered by request. I, II.

153, 154 Teaching Internship in Occupational Education Seminars for newly employed teachers of occupationally oriented subjects plus two consecutive semesters of supervised teaching. *Prerequisites:* Employment as a teacher, a teaching methods course or concurrent enrollment, and departmental permission. Four hours each. Through Continuing Education Division. Bloom, Fuller.

155 Teaching Practicum in Occupational Education Supervised teaching in a high school or junior college; *Prerequisites:* 152, concurrent enrollment in 251; acceptance into teacher education program. Eight hours. Bloom, Fuller, I, II.

157 Organizing and Managing Occupational Education Laboratories (3-0) Study of the vocational-technical laboratory as a teaching and learning environment. Includes: purchasing, inventory control, equipment placement, maintenance, and safety. Three hours. Alternate years, 1978-79. Ferreira.

158 Evaluating Achievement in Occupationally Oriented Education (3-0) Introduction to evaluation techniques for occupational and technical subjects. Includes: test construction, teacher-made tests, and statistical analysis of scores. *Prerequisite:* A teaching methods course or concurrent enrollment, or departmental permission. Three hours. Alternate years, 1979-80. Bloom.

159 Developing Courses for Occupational Education (3-0) Systematic development of course materials used in teaching occupationally oriented subjects. Includes: occupational analysis, performance objectives, course content, and supplementary instructional materials. *Prerequisite:* A teaching methods course or concurrent enrollment, or departmental permis-

sion. Three hours. Alternate years, 1978-79. Bloom.

251 Methods for Teaching Occupationally Oriented Subjects (3-0) Advanced teaching techniques combined with micro-teaching. Emphasis placed upon teaching and program management at high school or junior college level. *Prerequisite:* Concurrent enrollment in 153 or 155 or departmental permission. Three hours. Fuller.

270 Introduction to Diversified Occupations Education for Special Needs Students Introduction to Vermont Model for vocational preparation of mentally retarded adolescents; considers program philosophy, organization and objectives. *Prerequisites:* Acceptance into Diversified Occupations teacher preparation concentration and concurrent enrollment in VOTC 277, or special permission. Variable credit: 2-3 hours; 2 for lecture/recitation; 1 for course-related research; 3 for combination. Lampe.

271 Teaching Diversified Occupations "Heavy Lab" for Students with Special Needs Objectives, procedures, materials, media and instructional strategies appropriate for teaching "heavy lab" activities to mentally retarded adolescents in Vermont's Diversified Occupations programs. *Prerequisites:* Acceptance into the Diversified Occupations teacher preparation concentration and concurrent enrollment in VOTC 277, or special permission. Variable credit: 2-3 hours; two for lecture/recitation; one for course related research; three for combination. Offered by request.

272 Teaching Diversified Occupations "Light Lab" for Students with Special Needs Objectives, procedures, materials, media and instructional strategies appropriate for teaching "light lab" activities to mentally retarded adolescents in Vermont's Diversified Occupations programs. *Prerequisites:* Acceptance into the Diversified Occupations teacher preparation concentration and concurrent enrollment in VOTC 277, or special permission. Variable credit: 2-3 hours; two for lecture/recitation; one for course related research; three for combination. Offered by request.

274 Teaching Vocational Related Academics for Students with Special Needs Prepares students to teach vocationally related and life-relevant academic subjects appropriate for mentally retarded adolescents in Vermont's Diversified Occupations programs. Course will be divided into four basic content modules, each focusing on a specific area of vocationally related academic instruction. *Prerequisites:* Acceptance into the Diversified Occupations teacher preparation concentration, VOTC 270 and concurrent enrollment in VOTC 277 or special permission. Variable credit: 2-3 hours; two for lecture/recitation; one for course related research; three for combination. (May be repeated for up to nine hours of credit.) Lampe.

275 Developing Vocational Instruction for Students with Special Needs Curriculum content and instructional objectives appropriate for students with special needs in vocational, industrial and home economics education; consideration given to planning for individual student needs in regular and "special" vocational education settings. *Prerequisites:* Junior standing, VOTC 207, 208 or equivalent and permission of the instructor. (Restricted to students enrolled in an approved VOTEC and Home Economics teacher certification concentration.) Variable credit: 2-3 hours; two for lecture/recitation; one for course related research; three for combination. Summer Sessions.

276 Resources and Procedures for Teaching Students with Special Needs in Vocational Education Instructional strategies, materials and media for teaching handicapped students in vocational, industrial and home economics education; emphasis on adapting instruction to the individual learning styles of students. *Prerequisites:* Junior standing, VOTC 207, 208 or equivalent and permission of the instructor. (Restricted to students enrolled

in an approved VOTEC and Home Economics teacher certification concentration.) Variable credit: two to three hours; two for lecture/recitation; one for course related research; three for combination. Summer Sessions.

277 Practicum in Diversified Occupations Education Supervised practicum designed to provide Diversified Occupations teacher education students to have direct involvement with mentally retarded adolescents in a vocational education setting. Individually planned to give students an opportunity to apply course related learning in a supervised teaching situation. *Prerequisites:* Acceptance into the Diversified Occupations teacher preparation concentration and concurrent enrollment in one of the following related courses VOTC 270, 271, 272, 274 or permission of the instructor. Variable credit: one hour per related course per semester. (Students should plan to spend a minimum of four hours per week in a selected school setting per credit.) Lampe I, II, Summer.

282 Seminar Follow-up of teaching practicum. Required for all students completing 155. *Prerequisite:* 155. One hour.

Independent Study and Research

197 Special Problems Individual investigation of a problem selected to meet special needs of students. Students may enroll more than one time and accumulate up to six hours. *Prerequisite:* Departmental permission. Credit as arranged. Offered by request. Summer. I, II.

295 Special Topics Lectures, laboratories and/or readings and reports to provide background and specialized knowledge relating to contemporary areas of study. Students may enroll more than one time and accumulate up to nine hours. *Prerequisites:* Senior standing, departmental permission. Credit as arranged. Offered by request. Summer. I, II.

Wildlife Biology

SCHOOL OF NATURAL RESOURCES

Associate Professors Hoekstra and LaBar; Assistant Professor Capen; Lecturer Fuller.

130 Ornithology Identification, taxonomy, behavior, ecology, and field studies of birds, emphasizing resident species. *Prerequisite:* Biology 1, 2 or equivalent. Four hours. Capen. (Summer session).

151 Wildlife Biometry Measurement, analysis, description, and mapping of wildlife habitat; censusing and surveying wildlife populations. *Prerequisite:* Forestry 122, 144. Four hours. Hoekstra.

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. *Prerequisite:* Biology 1, 2 or equivalent. Four hours. LaBar.

174 Principles of Wildlife Management Plant and animal ecology applied to management of wildlife populations; properties of species, populations, and habitats; consideration of game, nongame, and endangered species. *Prerequisites:* BIOL 1, 2 or equivalent; an ecology course or concurrent enrollment. Three hours. Fuller.

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. Prerequisite: Junior standing and submission of a project prospectus for permission. One to five hours total enrollment.

232 Ichthyology Biology of fishes. Study of the structure and function of systems; behavior and ecology of modern fishes. Prerequisites: Zoology 104 or 219 or equivalent, Wildlife Biology 161. Four hours. LaBar.

264 Nongame Wildlife Management Selected topics which emphasize nongame birds and mammals: endangered species, vertebrate pests, urban wildlife, specialized survey and management practices. Prerequisite: Wildlife Biology 174. Three hours. Capen.

271 Wetlands Wildlife Ecology Life histories and management emphasizing North American waterfowl and furbearers: integration of aesthetic, ecological, recreational, and socio-economic values with contemporary uses of land and water. Field studies and one weekend trip. Prerequisites: Courses in ornithology and mammalogy, Wildlife Biology 174. Four hours. Fuller.

272 Uplands Wildlife Ecology Integration of ecological principles, wildlife biology, land use, and human dimensions in wildlife. Emphasis on development and maintenance of wildlife habitat, and population regulation of upland species. Prerequisites: Courses in ornithology and mammalogy, 151, 174. Four hours. Hoekstra.

281, 282 Wildlife Seminar A topical seminar in contemporary issues of fish and wildlife conservation presented by students, faculty and visiting personnel. Permission. One hour.

285, 286 Advanced Special Topics

287, 288 Graduate Special Projects Advanced readings and discussions or special field and/or laboratory investigations dealing with a topic beyond the scope of existing formal courses. Prerequisites: Undergraduate major in wildlife biology or ecology. Others by permission. Credit arranged. (Not approved for graduate credit.)

Zoology

COLLEGE OF ARTS AND SCIENCES

Professors Bell, Glade, Happ (Acting Chairman), Henson, Potash, Associate Professors Davison, Landesman, Stevens, and Woods; Assistant Professor Kilpatrick; Visiting Assistant Professors Ellington, Elvin, Jillson, and Merrill.

Biology

1, 2 Principles of Biology (3-3) Introduction to structure, functions, and evolution of animals and plants. Concepts important for advanced study in a Life Science and for understanding the biological world. Prerequisite: 1 for 2. Four hours. Davison and Barrington.*

3 Biology and Man An introduction for nonscience majors. Selected biological topics relevant to man such as cancer, human genetics, environmental toxicants; biological principles and concepts necessary for an understanding of these problems. No prerequisite. Three hours. Potash and Landesman.*

7 Biological Aspects of Environmental Problems (II) Biological effects of environmental problems. The harmful biological impact of air and water pollutants; their physiological, genetic and ecological action on plants and animals, particularly man. Three hours. Potash.

101 Genetics Structural basis of inheritance; gene mutations; chromosomal aberrations; genes and enzymes; gene action in differentiation; genetics of populations; nonchromosomal inheritance *Prerequisite:* 103 or permission. Three hours. Kilpatrick.

102 Environmental Biology (3-3) An ecological introduction to adaptation of organisms and populations, and to the structure and dynamics of biological populations, natural communities and the biosphere. *Prerequisites:* 1, 2. Four hours. Jillson.

103 Cell Structure and Function (3-3) Structure and physiology of cells, with emphasis on basic features common to all forms of life. *Prerequisites:* 1, 2 and chemistry. Four hours. Landesman.

105 Genetics Laboratory (0-3) Illustration of concepts presented in BIOL 101. *Prerequisites:* 101 or concurrent enrollment and permission of the instructor. One hour. Kilpatrick.

* Credit will not be given for both Biology 1, 2 and Botany 4, or Zoology 9. Credit will not be given for both Biology 1, 2 and Biology 3. Botany and Zoology majors will not receive credit for Biology 3.

Zoology

5-6 Human Anatomy and Physiology (3-2) Dissection of the cat, plus various vertebrate organs, with direct comparisons to corresponding structure in the human body; physiological experiments; microscopic study of tissues. Three hours. Merrill.*

9 Introductory Zoology Principles of Zoology from the cellular to the organismal level, including animal diversity, elementary genetics, evolutionary biology, and the relationship between form and function of the vertebrate. Four hours. Stevens.**

104 Comparative Structure and Function Anatomy and physiology of organs and organ systems in animals with emphasis on basic physiology common to all forms. *Prerequisite:* Biology 103. Four hours. Elvin.***

193, 194 College Honors

195, 196 Special Topics

197, 198 Undergraduate Research Individual laboratory research under the guidance of a faculty member. *Prerequisites:* Junior or Senior standing and departmental permission. Three hours or six hours.

201 Control of Growth and Differentiation Three hours. *Prerequisites:* Biology 101 and Chemistry 131, 132. Davison.

202 Quantitative Biology Mathematical concepts applied to biological problems such as growth, metabolism, temperature effects, kinetics, and graphic interpretation of data. Statistics will not be treated. *Prerequisite:* At least one intermediate level course in biology, Mathematics 9, or permission of the instructor. 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. Jillson.

204 Biological Aspects of Water Quality Management (3-2) Designed to meet the needs of students who are developing careers in any of the various aspects of water resources. The biological and limnological viewpoints of the aquatic systems (lakes and streams); practical experience in methodology and interpretation in the field and laboratory. Credit will not

be given for both Zoology 236 and this course. *Prerequisites:* Upper class or graduate standing, a year of chemistry, two advanced courses in related areas, and permission of the instructor. Four hours. Henson.

205 Natural History of Birds and Mammals (2-4) History, identification, evolution, ecology, behavior, zoogeography, conservation and aesthetics. *Prerequisite:* 104 or Biology 102. Four hours. Woods. Alternate years, 1978-79.

* May be taken for credit in the College of Arts and Sciences but does not satisfy the requirements of a course in biology for premedical and predental students. Students will not receive credit for both this course and Zoology 104 or Zoology 9.

** This course is not intended for students who plan to become Biology or Zoology majors but may be taken by transfer students who have already taken a semester of botany. Credit will not be allowed for both Zoology 9 and Biology 1, 2 or Zoology 5-6.

*** Students will not receive credit for Zoology 104 and Zoology 5-6, nor for Zoology 104 and Anatomy 9 and/or Physiology 10.

207 Natural History of the Lower Vertebrates Classification, ecology, behavior, evolution, and distribution of fish, amphibians, and reptiles. *Prerequisite:* 104. Three hours. Bell. Alternate years, 1978-79.

208 General Entomology (2-4) Morphology, physiology, and evolution of insects. *Prerequisite:* 104 or Biology 102. Four hours. Bell. Alternate years, 1979-80.

209 Field Zoology (2-4) Collection and identification; study of local habitats, their nature, and adaptations to them; factors governing distribution; methods of preparing study specimens. *Prerequisite:* 104 or Biology 102. Four hours. Bell.

211 Embryology (2-4) Principles exemplified by typical invertebrate and vertebrate embryos. *Prerequisite:* 104. Four hours. Glade.

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. Glade.

216 Human Genetics Inheritance; population genetics; interaction of heredity and environment; application to human problems. *Prerequisite:* Biology 101. Three 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. Woods.

222 Experimental Embryology (2-6) Theoretical approach based on research in embryology, genetics, physiology, bacteriology, and related fields. *Prerequisites:* 211 and departmental permission. Four hours. Glade. Alternate years, 1978-79.

223 Biochemical Embryology Biochemical and structural differentiation of cells and tissues during oogenesis and embryogenesis. *Prerequisites:* 101, 211. A course in biochemistry is recommended. Three hours. Landesman.

225 Environmental Physiology (2-4) Processes by which animals cope with moderate, changing, and extreme environments. *Prerequisites:* Biology 102 and 104. Four hours. Merrill. Offered for three hours, 1978-79.

231 Cell Physiology (2-4) Experimental techniques used to elucidate chemical and physical mechanisms within living cells. *Prerequisites:* Biology 103, Chemistry 131, 132, and departmental permission. Four hours. Ellington.

236 Limnology (2-4) The ecology of standing waters: the biota of lakes as related to the geological, physical, and chemical conditions of lakes. *Prerequisites:* Biology 102, Introductory Chemistry, and Junior standing. Four hours. Henson.

237 Ecology of Running Waters (2-4) Stream and river environments, adaptations of organisms to varying physical, chemical, and biotic conditions. *Prerequisites:* Biology 102, Introductory Chemistry, and Junior standing. Four hours. Potash.

240 Invertebrate Ecology of the Mountains An intensive study of the invertebrate fauna of Camel's Hump and vicinity. *Prerequisite:* Biology 102 or a course in invertebrate or insect taxonomy. Four hours. Bell.

242 Vertebrate Evolution Theoretical and paleontological evidence for origin, evolution, and classification of vertebrates. Several optional weekend field trips to see fossil vertebrates in collections and area museums. *Prerequisites:* Biology 1, 2; Zoology 104 or Geology 121, or permission of the Instructor. Geology 1 is strongly recommended, especially for graduate students interested in entering fields of evolution and paleontology. Three hours. Woods. Alternate years, 1979-80.

250 Invertebrate Zoology (2-4) Anatomy, physiology, and life histories of representatives of the more important phyla. *Prerequisite:* 104. Four hours. Elvin.

255 Comparative Animal Physiology (2-6) General principles of function in invertebrates and vertebrates. *Prerequisites:* 104, Chemistry 131, 132. Four hours. H. Ellington.

262 Biological Basis of Behavior The structure and function of neural and hormonal mechanisms involved in animal behavior with emphasis on phylogeny. *Prerequisite:* Biology 103 or permission of the instructor. Three hours. Stevens.

270 Modern Evolutionary Theory Contributions of modern research in genetics, systematics, distribution, experimental embryology, serology, and related fields to problems of evolutionary change. *Prerequisite:* Biology 101 (Biology 102 recommended). Three hours. Kilpatrick.

271 Advanced Limnology Analyses of current concepts and problems. *Prerequisite:* 236. Four hours. Henson.

281 through 283 Seminar Review and discussion of current zoological research. Graduate students and seniors in zoological research programs may enroll. Without credit.

295, 296 Special Topics

University of Vermont

Personnel

THE BOARD OF TRUSTEES

COOR, LATTIE F., A.B., M.A., Ph.D., President

Ex-Officio

Snelling, Richard A., A.B., Governor

Ex-Officio

March, 1973 — March, 1979

Crandall, Galen A., III*

Hewitt, Merritt S., Jr., A.S.

O'Connor, Timothy J., Jr., B.A., B.S., L.L.B.

Swainbank, Louise, R., A.B.

Wilson, Leonard U., B.A.

Hinesburg, Vt.

North Bennington, Vt.

Brattleboro, Vt.

St. Johnsbury, Vt.

Waitsfield, Vt.

March, 1974 — March, 1980

Burke, J. Douglas, B.A.

Corbett, Joseph E., B.S.

Kinsler, Richard G., A.B.

Pearl, Andrea L.*

Weston, Mass.

Burlington, Vt.

Longmeadow, Mass.

White Plains, N.Y.

March, 1975 — March, 1981

Ballard, Alden G.

Morgan, John T., A.B.

Niquette, Russell F., J.D.

Plante, Peter P., B.A., J.D.

St. Albans, Vt.

Woodstock, Vt.

Winooski, Vt.

Norwich, Vt.

March, 1976 — March, 1982

Janke, Carl W., B.S.

McCabe, Brooks F., Jr., B.S., Ed.D.

Paul, R. Allan, A.B., J.D.

Lexington, Mass.

Charleston, W. Va.

Burlington, Vt.

March, 1977 — March, 1983

Balch, Frank A.

Beauchamp, Alfred J., B.S., A.B.

Ketcham, Chester S., B.S., L.L.B.

Smith, Kermit A.

Burlington, Vt.

Rutland, Vt.

Middlebury, Vt.

Derby, Vt.

March, 1978 - March, 1984

Bailey, Everett C., B.S.

Bickford, Robert L., Jr., B.S., M.S.

Davis, Edward M., B.S., M.S., Ph.D.

Burlington, Vt.

Ho-ho-kus, N.J.

Burlington, Vt.

* Effective start of appointment — March, 1978

OFFICERS OF INSTRUCTION

FACULTY

*Dates after names represent the year of appointment, either original or following a lapse of service. * Asterisk indicates member of Graduate Faculty.*

- | | |
|---|---|
| ABAJIAN, JOHN C., M.D. (1974) | Instructor of Anesthesiology |
| ABRAMS, JEROME S., M.D. (1969) | Professor of Surgery |
| * ABRUSCATO, JOSEPH A., Ph.D. (1969) | Professor of Teaching and Learning
Specialties |
| * ABSHER, RICHARD G., Ph.D. (1968) | Professor of Electrical Engineering and
Associate Professor of Computer Science |
| ADAMS, DORIS E., M.S. (1974) | Assistant Professor of Professional Nursing |
| * AGGARWAL, VIJAY B., Ph.D. (1969) | Assistant Professor of Mathematics and
Computer Science |
| * AGNE, RUSSELL M., Ph.D. (1969) | Professor of Teaching and Learning Specialties |
| AITKEN, PHIL A., M.D. (1977) | Assistant Professor of Surgery |
| ALBARELLI, HENRY P. (1969) | Clinical Instructor in Medical Technology |
| * ALBEE, GEORGE W., Ph.D. (1971) | Professor of Psychology |
| * ALBERTINI, RICHARD J., M.D., Ph.D. (1972) | Associate Professor of Surgery |
| ALDEN, PETER D., M.D. (1964) | Clinical Associate Professor of Medicine |
| * ALEONG, JOHN, Ph.D. (1976) | Lecturer in Mathematics |
| ALLARD, WILLIAM E., JR., M.D. (1974) | Clinical Associate Professor of Medicine and
Clinical Assistant Professor of Family Practice |
| * ALLEN, CHRISTOPHER W., Ph.D. (1967) | Professor of Chemistry |
| * ALLEN, ROY F., Ph.D. (1973) | Assistant Professor of German |
| ALLEN, SINCLAIR T., JR., M.D. (1948) | Professor of Medicine |
| ALNASRAWI, ABBA S., Ph.D. (1963) | Professor of Economics |
| * ALPERT, NORMAN R., Ph.D. (1966) | Professor of Physiology and Biophysics |
| AMBROSE, JANE P., M.A. (1965) | Assistant Professor of Music |
| * AMBROSE, Z. PHILIP, Ph.D. (1962) | Professor of Classics |
| AMIDON, RICHARD W., M.D. (1949) | Clinical Assistant Professor of Medicine |
| ANDERSON, GERALD G., M.D. (1977) | Professor of Obstetrics and Gynecology |
| ANDERSON, JUDITH C., M.A. (1971) | Associate Professor of Physical Therapy |
| ANDERSON, RICHARD L., Ph.D. (1978) | Visiting Professor of Electrical Engineering |
| * ANDREA, ALFRED J., Ph.D. (1967) | Associate Professor of History |
| * ANDREWS, ALLAN A., Ph.D. (1970) | Associate Professor of Religion |
| ANSBACHER, HEINZ L., Ph.D. (1946) | Professor of Psychology |
| ANTIL, JOHN H., M.B.A. (1977) | Instructor of Business Administration |
| ARMSTRONG, FRANK H., Ph.D. (1968) | Associate Professor of Forestry |
| ARNS, ROBERT G., Ph.D. (1977) | Professor of Physics |
| ARONSON, JEFFREY B., M.A. (1972) | Lecturer in History |
| ARONSON, RICHARD A., M.D. (1978) | Clinical Instructor in Pediatrics |
| ASCHENBACH, WALTER P., (1959) | Lecturer in Art |
| ASHFORD, GREGORY, B.A. (1974) | Lecturer in Physical Education |
| * ASHIKAGA, TAKAMARU, Ph.D. (1973) | Assistant Professor of Mathematics and
Epidemiology and Environmental Health |
| * ATHERTON, HENRY V., Ph.D. (1953) | Professor of Animal Sciences |
| ATWOOD, ELIZABETH F., M.S. (1966) | Associate Professor of Clothing, Textiles and
Design |
| AZAR, MASSOUD, M.D. (1973) | Clinical Assistant Professor of Neurology |
| BABBOTT, DAVID, A., M.D. (1967) | Associate Professor of Medicine |
| BABBOTT, FRANK L., JR., M.D. (1963) | Associate Professor of Epidemiology and
Environmental Health |
| BAKER, DAVID A., M.D. (1977) | Instructor in Obstetrics and Gynecology |

- BAKER, ROGER D., M.D. (1971) Clinical Instructor in Pediatrics
 BALCH, DONALD J., Ph.D. (1952) Professor of Animal Sciences
 BARANY, JANET F., A.S. (1977) Clinical Instructor in Radiologic Technology
 BARASCH, ROBERT I., Ph.D. (1977) Adjunct Assistant Professor of Psychology
 BARBOUR, JAMES R., Ed.D. (1974) Assistant Professor of Early Childhood and Human Development
 BARNEY, BERNARD B., M.D. (1955) Associate Professor of Surgery
 * BARNUM, H. GARDINER, Ph.D. (1965) Associate Professor of Geography
 BARRETT, EVALINE I., M.S. (1968) Associate Professor of Professional Nursing
 * BARRINGTON, DAVID S., Ph.D. (1974) Assistant Professor of Botany
 * BARTLETT, RICHMOND J., Ph.D. (1958) Professor of Plant and Soil Science
 BATES, THOMAS C., M.D. (1967) Clinical Associate Professor of Pediatrics
 * BATES, TIMOTHY M., Ph.D. (1974) Associate Professor of Economics
 BATTELLE, PETER E., M.B.A. (1970) Assistant Professor of Business Administration
 BEASLEY, RALPH D., M.D. (1977) Assistant Professor of Surgery
 BEATY, HARRY N., M.D. (1967) Professor of Medicine
 BEDARD, LOUISE T. (1970) Clinical Assistant Professor of Medicine
 BEEKEN, WARREN L., M.D. (1965) Professor of Medicine
 BEEKER, BARBARA A., Ed.D. (1977) Professor of Professional Nursing
 BELFIGLIO, E. JAMES, D.M.D. (1974) Instructor in Dental Hygiene
 BELINSON, JEROME L., M.D. (1977) Assistant Professor in Obstetrics and Gynecology
 * BELL, ROSS T., Ph.D. (1955) Professor of Zoology
 BELL, ROY W., F.A.C.A. (1969) Assistant Professor of Anesthesiology
 BENNETT, JAMES W., Ph.D. (1978) Visiting Assistant Professor of Wildlife Biology
 BERGDAHL, DALE R., M.S. (1977) Assistant Professor of Forestry
 BERGNER, ARTHUR, M.D. (1970) Clinical Associate Professor of Medicine
 BERGNER, RENEE S., M.D. (1970) Clinical Associate Professor of Pediatrics
 BERNSTEIN, ELIZABETH, R.B.A. (1977) Clinical Instructor in Psychiatry
 BERNSTEIN, RICHARD A., M.D. (1976) Assistant Professor in Psychiatry
 BERRY, JOHN F., M.S. (1968) Associate Professor of Hospital Administration
 BERTOCCHI, PAUL V., M.D. (1976) Clinical Assistant Professor of Family Practice
 * BIDDLE, ARTHUR W., Ph.D. (1970) Assistant Professor of English
 BINGHAM, RICHARD L., M.S.W. (1975) Clinical Associate Professor of Psychiatry
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 BLAND, JOHN H., M.D. (1949) Associate Professor of Medicine
 BLAND, WALTER P., B.S. (1977) Lecturer in Physical Education
 BLASDEL, GREGG N., M.F.A. (1975) Assistant Professor of Art
 BLISS, FRANCIS R., Ph.D. (1966) Professor of Classics
 * BLOOM, THOMAS K., Ed.D. (1973) Assistant Professor of Vocational Education and Technology
 BOARDMAN, JOHN D., M.D. (1955) Associate Professor of Obstetrics and Gynecology
 BODMAN, ANDREW R., Ph.D. (1978) Visiting Assistant Professor of Geography
 BOEMIG, MARGARET A., A.S. (1977) Lecturer in Dental Hygiene
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 BOND, LYNNE A., Ph.D. (1976) Assistant Professor of Psychology
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 BOTELHO, MICHAEL J., M.B.A. (1977) Assistant Professor of Military Studies
 BOUCHARD, RICHARD E., M.D. (1955) Professor of Medicine and Family Practice
 BOURQUE, ADRIAN R., M.D. (1977) Assistant Professor of Radiology
 BOUSHEY, DALLAS R. (1966) Assistant Professor of Anatomy
 BOUSQUET, DANIEL W., M.B.A. (1975) Lecturer in Forestry
 BOWEN, CHARLES R., D.M.D. (1972) Clinical Instructor in Surgery and Instructor in Oral Surgery

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 BOYER, NEIL V., M.M. (1973) Instructor in Music
 BOYLE, KATHLEEN, M.S. (1975) Clinical Instructor in Professional Nursing and Pediatrics
- * BRADLEY, ANTHONY G., Ph.D. (1969) Associate Professor of English
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 BRAUEN, MARSHA L., M.A. (1978) Visiting Instructor in Political Science
 BRAUN, THEODORE E., JR., M.D. (1970) Associate Professor of Obstetrics and Gynecology
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 BRENNEMAN, WALTER L., JR., Ph.D. (1969) Associate Professor of Religion
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 BRIGHT, WILLIAM E., II, Ed.D. (1971) Assistant Professor of Organizational and Human Resource Development
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 BRONSON, DAVID L., M.D. (1977) Assistant Professor of Medicine
 BROOKS, GEORGE W., M.D. (1953) Clinical Professor of Psychiatry
- * BROUGHTON, T. ALAN, M.A. (1966) Professor of English
 BROWER, MARGARET S., M.S.Ed. (1975) Lecturer in Early Childhood and Human Development
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 BROWN, JANET M., M.S. (1973) Associate Professor of Professional Nursing
- * BROWN, JOHN S., JR., Ph.D. (1966) Professor of Physics
 BROWN, PETER M., M.M. (1975) Assistant Professor of Music
 BROWNLOW, MARY R., M.F.A. (1978) Assistant Professor of Theatre
 BRUCKEL, DENNIS W., M.S. (1966) Lecturer in Plant and Soil Science
 BRUSH, VIRGINIA R., M.S.W. (1976) Clinical Instructor in Psychiatry
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 BRYAN, GEORGE B., Ph.D. (1971) Associate Professor of Theatre
 BRYAN, PHOEBE E., M.A. (1977) Instructor in English
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 * BUCKE, DAVID P., JR., Ph.D. (1969) Assistant Professor of Geology
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 BURCHELL, R. CLAY, M.D. (1968) Clinical Professor of Obstetrics and Gynecology
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- DAVIS, PHILIP H., M.D. (1958) Clinical Associate Professor of Orthopaedic Surgery
- DAVIS, ROBERT E., M.D. (1968) Clinical Associate Professor of Obstetrics and Gynecology
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- * DAVISON, JOHN A., Ph.D. (1967) Associate Professor of Zoology
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- DIETRICH, PETER A., M.D. (1971) Associate Professor of Radiology
- DIETZEL, CLEASON S., Ph.D. (1971) Adjunct Assistant Professor of Psychology
- DIONNE, VINCENT E., Ph.D. (1975) Research Assistant Professor of Physiology and Biophysics
- DOANE, HEIKE A., Ph.D. (1977) Assistant Professor of German
- DODGE, CARROLL W., Ph.D. (1970) Visiting Professor of Botany
- DOES, RICHARD B., Ph.D. (1969) Adjunct Assistant Professor of Psychology
- DOLIN, RAPHAEL, M.D. (1979) Professor of Medicine
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- * DONNELLY, JOHN R., Ph.D. (1969) Associate Professor of Forestry
- * DOOLAN, BARRY L., Ph.D. (1970) Assistant Professor of Geology
- DOPP, SARAH L., B.S. (1977) Clinical Instructor in Medical Technology
- DOREMUS, HENRY M., D.V.M. (1960) Associate Professor of Pharmacology and Animal Pathology
- DORSEY, FRANK C., Ph.D. (1975) Adjunct Assistant Professor of Mathematics
- * DOWE, THOMAS W., Ph.D. (1957) Professor of Animal Sciences
- * DOWNER, RICHARD N., Ph.D. (1967) Associate Professor of Civil Engineering
- * DRAKE, JOHN C., Ph.D. (1970) Associate Professor of Geology
- DUCHACEK, HOWARD, M.E. (1949) Professor of Mechanical Engineering
- * DUCHARME, EDWARD R., Ed.D. (1973) Professor of Teaching and Learning Specialties
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- DUNHAM, CHARLES R., M.S. (1967) Lecturer in Civil Engineering
- DUNKLEY, THOMAS C., M.Ed. (1966) Assistant Professor of Physical Education
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- * DUTHIE, ALEXANDER H., Ph.D. (1964) Professor of Animal Sciences
- DWORK, JULIUS S., Ph.D. (1954) Associate Professor of Mathematics
- DWORSKY, RICHARD F., M.S. (1978) Lecturer in Natural Resources
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- EDELMAN, SUSAN E., B.S. (1976) Lecturer in Special Education and Teaching
- EDWARDS, JOYCE A., Ph.D. (1972) Associate in Physical Therapy
- EDWARDS, KAREN S., Ph.D. (1977) Clinical Assistant Professor of Psychology
- EDWARDS, KEITH R., M.D. (1977) Assistant Professor of Early Childhood and Human Development
- * EDWARDS, MARGARET F., Ph.D. (1971) Instructor in Neurology
- ELLEM, KAY A., Ph.D., M.B.B.S. (1977) Associate Professor of English
- ELLERSON, R. DAVID, M.D. (1970) Professor of Biochemistry
- ELLINGTON, WILLIAM R., Ph.D. (1977) Clinical Instructor in Pediatrics
- ELLIOTT, CECIL M., Ph.D. (1977) Visiting Assistant Professor of Zoology
- ELLISON, RICHARD A., M.D. (1975) Assistant Professor of Chemistry
- ELVIN, DAVID W., Ph.D. (1975) Clinical Assistant Professor of Psychiatry
- EMANUEL, FRANK S., B.S. (1968) Visiting Assistant Professor of Zoology
- EMANUEL, SYLVIA J., M.S. (1966) Instructor in Human Nutrition and Food
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- EMERSON, FAITH G., M.A. (1959) Associate Professor of Professional Nursing
- EMERY, E. STANLEY, III, M.D. (1970) Associate Professor of Neurology and Pediatrics
- ENGROFF, JOHN W., Ph.D. (1972) Instructor in Teaching and Learning Specialties and History
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- ERDMANN, ROBERT H., L.L.B. (1967) Instructor in Business Administration
- ERVIN, WILLIAM C., M.D. (1978) Clinical Instructor in Medicine
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- * ETHERTON, BUD, Ph.D. (1968) Associate Professor of Botany
- EVANS, CONSTANCE L., M.A.C.T. (1978) Instructor in Physical Therapy
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- * EVERING, FREDERICK, JR., Ph.D. (1965) Professor of Electrical Engineering
- EVERT, DEAN R., Ph.D., (1970) Associate Professor of Plant and Soil Science
- FABIAN, EDWARD J., Ph.D. (1977) Adjunct Assistant Professor of Organizational and Human Resource Development
- FAGAN, WILLIAM T., JR., M.D. (1954) Associate Professor of Urology
- FAIR, DAVID, M.A. (1978) Visiting Instructor in Philosophy
- FAIRBANK, JONATHAN T., M.D. (1976) Assistant Professor of Radiology
- FALBY, JAMES B., M.E. (1971) Lecturer in Radiologic Technology
- FARNHAM, JOHN E., D.M.D. (1963) Clinical Professor of Oral Surgery and Associate Professor of Dental Hygiene
- FARNHAM, RICHARD A., B.S. (1974) Lecturer in Physical Education
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- FAY, DOUGLAS P., M.S. (1953) Associate Professor of Civil Engineering
- FEIDNER, EDWARD J., M.F.A. (1958) Professor of Theatre
- FEITELBERG, SAMUEL B., M.A. (1971) Professor of Physical Therapy and Associate Professor of Rehabilitation Medicine
- * FELT, JEREMY P., Ph.D. (1957) Professor of History
- FENGLER, ALFRED P., Ph.D. (1976) Assistant Professor of Sociology
- FENGLER, CHRISTIE K., Ph.D. (1970) Assistant Professor of Art
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- FISHMAN, LAURA T., M.A. (1976) Instructor in Sociology
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- FITZHENRY-COOR, INA, Ph.D. (1976) Assistant Professor of Psychology and Psychiatry
- * FIVES-TAYLOR, PAULA M., Ph.D. (1976) Associate Professor of Medical Microbiology
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- FOLEY, JOSEPH C., M.D. (1954) Professor of Radiology
- * FOLTA, JEANNETTE R., Ph.D. (1969) Professor of Sociology
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 FOSTER, ROGER S., JR., M.D. (1970) Associate Professor of Surgery
 FOX, TIMOTHY J., B.A. (1976) Lecturer in Special Education
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 FULLER, ROBERT W., M.S. (1966) Lecturer in Wildlife Biology
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- * TASHMAN, LEONARD J., Ph.D. (1971) Associate Professor of Business Administration
- TAYLOR, RICHARD H., A.S. (1977) Teaching Associate in Radiologic Technology
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- THOMAS, THOMAS R., B.A. (1971) Lecturer in Computer Science
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- * THOMPSON, JOYCE L., Ph.D. (1972) Assistant Professor of English
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- TICHE, CARLA T., B.S. (1975) Clinical Instructor in Physical Therapy
- TILLINGHAST, CHARLES A., Ph.D. (1967) Assistant Professor of English
- TINDLE, BARBARA H., M.D. (1977) Associate Professor of Pathology
- TISDALE, WILLIAM A., M.D. (1965) Professor of Medicine
- * TODLAN, HELENE W., Ph.D. (1964) Clinical Associate Professor of Pathology
- TORMEY, DAVID M., M.D. (1968) Associate Professor of Epidemiology and Environmental Health and Family Practice
- TRAINER, THOMAS D., M.D. (1960) Professor of Pathology
- * TREMBLAY, RAYMOND H., Ph.D. (1947) Professor of Agricultural and Resource Economics
- TRUE, MARSHALL M., Ph.D. (1966) Associate Professor of History
- TRUMPER, JOHN Y., M.D. (1970) Clinical Instructor in Pediatrics
- TUFO, HENRY M., M.D. (1970) Professor of Medicine
- TURNER, TERRY L., M.S. (1971) Lecturer in Forestry
- TUTHILL, ARTHUR F., M.S. (1946) Professor of Mechanical Engineering
- TWITCHELL, JOHN C., M.D. (1961) Associate Professor of Medicine and Instructor in Epidemiology and Environmental Health
- * TYZBIR, ROBERT S., Ph.D. (1973) Assistant Professor of Human Nutrition and Food
- UDELL, CARLTON L., M.Div. (1975) Clinical Assistant Professor of Psychiatry
- * UGALDE, LOUIS M., Ph.D. (1962) Professor of Romance Languages
- * ULLRICH, ROBERT S., Ph.D. (1973) Assistant Professor of Botany
- UNDERHILL, RALPH H., Ph.D. (1974) Associate Professor of Sociology
- VAN BUREN, H. CARMER, M.D. (1962) Associate Professor of Medicine
- * VANDER MEER, CANUTE, Ph.D. (1973) Professor of Geography
- VASSALLE, MARIO, M.D. (1978) Visiting Professor of Physiology and Biophysics
- VASWANI, ASHOK N., M.D. (1978) Research Assistant Professor of Medicine
- * VOGELMANN, HUBERT W., Ph.D. (1955) Professor of Botany
- VOGELMANN, MARIE, B.S. (1972) Instructor in Music
- * VON TURKOVICH, BRANIMIR, Ph.D. (1971) Professor of Mechanical Engineering
- WADE, DAVID O., M.Ed. (1975) Lecturer in Special Education
- * WAGNER, WILLIAM P., Ph.D. (1966) Associate Professor of Geology
- WAINER, LOUIS J., M.D. (1959) Clinical Instructor in Medicine
- WAITE, DAVID A., B.A. (1978) Adjunct Assistant Professor of Computer Science
- WAITZKIN, HOWARD B., M.D., Ph.D. (1975) Associate Professor of Sociology
- WALKER, DOUGLAS R., M.Ed. (1977) Lecturer in Special Education
- WALKER, H. ALAN, M.D. (1969) Clinical Instructor in Medicine
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- WALLER, JULIAN A., M.D. (1968) Professor of Epidemiology and Environmental Health
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- WALSH, MAURICE J., M.D. (1976) Clinical Instructor in Medicine
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- WEAVER, LELON A., JR., Ph.D. (1957) Assistant Professor of Psychiatry
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- WEED, LAURA, M.D. (1969) Clinical Associate Professor of Medicine
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- WEINER, SHELDON, M.D. (1970) Professor of Psychiatry
- WEINRICH, FRANCIS A., M.A. (1950) Assistant Professor of Music
- * WELCH, JAMES G., Ph.D. (1968) Professor of Animal Sciences
- * WELLER, DAVID L., Ph.D. (1967) Professor of Microbiology and Biochemistry
- * WELLS, JOSEPH, Ph.D. (1968) Associate Professor of Anatomy
- WELSH, DEBRA L., A.S. (1976) Lecturer in Dental Hygiene
- WELSH, GEORGE W., M.D. (1956) Associate Professor of Medicine
- * WELTIN, EUGEN E., D.S. (1966) Associate Professor of Chemistry
- * WERTHEIMER, ALAN P., Ph.D. (1968) Professor of Political Science
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- WHATLEY, MALCOLM C., Ph.D. (1977) Visiting Assistant Professor of Physics
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- * WHITE, WILLIAM N., Ph.D. (1963) Professor of Chemistry
- WHITEBOOK, SUSAN M., Ph.D. (1969) Assistant Professor of Romance Languages
- * WHITEHEAD, LAWRENCE W., Ph.D. (1976) Assistant Professor of Epidemiology and Environmental Health
- * WHITEHORN, DAVID, Ph.D. (1970) Associate Professor of Physiology and Biophysics
- * WHITMORE, ROY A., JR., M.F. (1958) Professor of Forestry
- WHITMORE, WILLIAM L., B.S. (1977) Lecturer in Physical Education
- WHITTLESEY, MARGARET B., M.S.W. (1964) Associate Professor of Organizational and Human Resource Development
- WIERENGA, JAN W., (1977) Instructor in Military Studies
- * WIGGANS, SAMUEL C., Ph.D. (1963) Professor of Plant and Soil Science
- WIGNESS, GLYDE R., D.M.A. (1970) Associate Professor of Music
- WILBUR, NANCY M., B.A. (1969) Clinical Instructor in Medical Technology
- WILLIAMS, BARBARA A., M.A. (1978) Lecturer in Mathematics
- WILLIAMS, JUDITH, Ph.D. (1978) Assistant Professor of Theatre
- WILLIAMS, RONALD W., Ph.D. (1970) Associate Professor of Electrical Engineering

WILLIAMS, WAYNE W., Ph.D. (1976)	Assistant Professor of Special Education
WILLMUTH, LEWIS R., M.D. (1970)	Associate Professor of Psychiatry
WILLMUTH, MARY E., M.F.A. (1977)	Adjunct Lecturer in Teaching and Learning Specialties and Clinical Instructor in Psychiatry
WILSON, ALBERT L., A.G.S. (1977)	Instructor in Military Studies
* WILSON, MARY S., Ph.D. (1969)	Professor of Communication Science and Disorders
WINN, WASHINGTON C., JR., M.D. (1977)	Associate Professor of Pathology
WITHERELL, LINDEN E., M.P.H. (1975)	Assistant Professor of Epidemiology and Environmental Health
WOLF, GEORGE A., JR., M.D. (1970)	Professor of Medicine
WOLK, ARTHUR D., M.D. (1970)	Clinical Instructor in Pediatrics
WOOD, GLEN M., Ph.D. (1950)	Professor of Plant and Soil Science
WOOD, HAZEN F., M.Ed. (1975)	Lecturer in Teaching and Learning Specialties
WOODRUFF, WILLIAM A., L.M.C.C. (1962)	Associate Professor of Psychiatry
* WOODS, CHARLES A., Ph.D. (1971)	Associate Professor of Zoology
WOODS, HAROLD D., M.E. (1969)	Instructor in Teaching and Learning Specialties
* WOODWORTH, ROBERT C., Ph.D. (1961)	Professor of Biochemistry
* WOOLFSON, A. PETER, Ph.D. (1970)	Associate Professor of Anthropology
WOOLFSON, ANNE M., M.A. (1976)	Lecturer in Teaching and Learning Specialties
WOOTTON, DOROTHY J., M.S. (1973)	Assistant Professor of Dental Hygiene
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WORLEY, IAN A., Ph.D. (1970)	Associate Professor of Botany
WRIGHT, ALICE L., M.D. (1971)	Clinical Assistant Professor of Psychiatry
* WRIGHT, ROBERT K., Ph.D. (1966)	Professor of Mathematics
WRIGHT, WILLIAM C., M.D. (1974)	Clinical Instructor in Medical Technology
* WULFF, CLAUS A., Ph.D. (1965)	Professor of Chemistry
WYLLIE, JOAN M., B.S. (1972)	Clinical Instructor in Medical Technology
* YADAV, DHARAM P., Ph.D. (1970)	Assistant Professor of Communication
YARIAN, STANLEY O., Ph.D. (1970)	Assistant Professor of Religion
YATES, H. TAYLOR, M.D. (1978)	Clinical Instructor in Pediatrics
YATES, JEROME W., M.D. (1974)	Associate Professor of Medicine
* YORK, ROBERT T., M.S. (1975)	Assistant Professor of Special Education
YOUNG, PAUL C., Ph.D. (1972)	Associate Professor of Pediatrics
* YOUNG, WILLIAM J., JR., Ph.D., (1968)	Professor of Anatomy
* ZARATE, ARMANDO E., Ph.D. (1970)	Associate Professor of Romance Languages
ZICKLIN, GILBERT, Ph.D. (1978)	Visiting Assistant Professor of Sociology
ZIV, MOSHE, M.D. (1978)	Assistant Professor of Otolaryngology

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ABSHER, P. MARLENE, Ph.D. (1968)	Research Associate In Medicine
ADLER, KENNETH, M.S. (1975)	Research Associate in Pathology
CANTRILL, STEPHEN V., M.D. (1973)	Research Associate in Medicine
CIOSEK, CARL P., JR., Ph.D. (1973)	Research Associate in Medicine
CLARKE, ROBERT P., M.S. (1962)	Research Associate in Agriculture and Human Nutrition and Food

- COLLINGS, NEIL, Ph.D. (1977) Research Associate in Electrical Engineering
- DAMOKOSH-GIORDANO, ANIKO, Ph.D. (1976) Research Associate In Vermont Lung Center
- DAVIS, LAYTON W., B.S. (1973) Research Associate in Medicine
- DOMANN, FREDERICK E., Ph.D. (1975) Research Associate in Physics
- ECKHARDT, SHOREH B., B.A. (1976) Research Associate in Pharmacology
- GRAVES, STUART M., M.D. (1973) Research Associate in Medicine
- HERRLICH, HERMAN C., Ph.D. (1955) Research Associate in Medicine
- HERTZBERG, RICHARD Y., B.A. (1974) Research Associate in Medicine
- HOLLAND, ROBERT R., M.D. (1973) Research Associate in Medicine
- KHAZANIE, PRABHAKER, Ph.D. (1976) Research Associate in Pathology
- LAGRANGE, BETTY M., Ph.D. (1975) Research Associate in Medicine
- LAING, FREDERICK M., M.S. (1953) Research Associate in Botany
- LUCCHINA, GEORGE G., Ph.D. (1968) Research Associate in Physiology and Biophysics
- MCNEILL, DONNA (1972) Research Associate in Medicine
- MEYER, DIANE H., Ph.D. (1974) Research Associate in Biochemistry
- MORSELLI, MARIA FRANCA, Ph.D. (1972) Research Associate in Botany
- SCHULTZ, JAN, M.S. (1969) Research Associate in Medicine
- SCHWARTZ, CHARLES E., Ph.D. (1978) Research Associate in Biochemistry
- SZETO, HAZEL H., M.D., Ph.D. (1977) Research Associate in Obstetrics and Gynecology
- THANASSI, NATALIE M., Ph.D. (1977) Research Associate in Medicine
- TIERNEY, BRIAN, Ph.D. (1978) Research Associate in Biochemistry
- TULP, ORIEN L., Ph.D. (1977) Research Associate in Medicine
- VALLYATHAN, VELAYUDHAN, Ph.D. (1974) Research Associate in Pathology
- WALLEN, JACQUELINE, M.A. (1974) Research Associate in Sociology
- WALTON, PETER L., M.D. (1974) Research Associate in Medicine

Officers of Administration

COOR, LATTIE F., Ph.D. (1976)	President
ARNS, ROBERT G., Ph.D. (1977)	Vice President for Academic Affairs
FORSYTH, BEN R., M.D. (1966)	Interim Vice President for Administration
SNELLING, BARBARA W., B.A. (1974)	Vice President for Development and External Affairs
BUSHEY, JOHN R., B.S. (1964)	Acting Director, Continuing Education
COWARD, RAYMOND T., Ph.D. (1979)	Director, School of Home Economics
DOWE, THOMAS W., Ph.D. (1957)	Dean, College of Agriculture
ENGROFF, JOHN W., Ph.D. (1972)	Acting Director, Living and Learning Center
GADEN, ELMER L., JR., Ph.D. (1975)	Dean, College of Engineering, Mathematics and Business Administration
GRAMS, ARMIN E., Ph.D. (1971)	Acting Director, School of Home Economics
IZZO, LOUIS M., M.S. (1969)	Director, School of Allied Health Sciences
JEWETT, JOHN G., Ph.D. (1977)	Dean, College of Arts and Sciences
JOHN, HUGO H., Ph.D. (1974)	Director, School of Natural Resources
KEBABIAN, PAUL B., B.A. (1966)	Director of Libraries
LAPPING, MARK B., Ph.D. (1977)	Acting Director, Environmental Program
LAWSON, ROBERT B., Ph.D. (1966)	Associate Vice President for Research and Dean, Graduate College
LUGINBUHL, WILLIAM H., M.D. (1960)	Dean, Division of Health Sciences, and Dean, College of Medicine
MILLIGAN, JEAN B., Ed.D. (1953)	Director, School of Nursing
MISER, KEITH M., Ed.D. (1971)	Dean of Students
SHIMEL, WILLIAM A., Ph.D. (1978)	Director, Extension Service
TESCONI, CHARLES A., JR., Ed.D. (1978)	Dean, College of Education and Social Services

Experiment Station Staff

AGRICULTURAL

The Agricultural Experiment Station has as its essential functions to conduct research in agriculture and home economics, to administer certain regulatory statutes, and to publish the results of such work.

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ASHMAN, MARGUERITE G., B.A. (1974)	Assistant Editor
ATHERTON, HENRY V., Ph.D. (1953)	Bacteriologist
BARTLETT, RICHMOND J., Ph.D. (1958)	Soil Scientist
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BIGALOW, CHARLES W., M.S. (1964)	Coordinator of Computer Services
BLOOM, THOMAS K., Ed.D. (1973)	Resource Specialist
BOLTON, WESSON D., D.V.M. (1947)	Animal Pathologist
BOYCE, BERTIE R., Ph.D. (1958)	Horticulturist
CAREW, LYNDON B., JR., Ph.D. (1969)	Nutritionist
CLARKE, ROBERT P., M.S. (1974)	Research Associate
CURRIER, WILLIAM W., Ph.D. (1977)	Associate Animal Pathologist
DUTHIE, ALEXANDER H., Ph.D. (1964)	Dairy Scientist
ETHERTON, BUD, Ph.D. (1968)	Plant Physiologist

EVERT, DEAN R., Ph.D. (1970)
 FIFE, C. LYNN, Ph.D. (1966)
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 HYDE, BEAL B., Ph.D. (1965)
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 LITTLE, JOHN E., Ph.D. (1945)
 MACCOLLOM, GEORGE B., Ph.D. (1954)
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 MERROW, SUSAN B., M.Ed. (1946)
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 SARGENT, FREDERIC O., Ph.D. (1962)
 SCHLENKER, ELEANOR D., Ph.D. (1975)
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 SIMMONS, KENNETH R., Ph.D. (1963)
 SINCLAIR, ROBERT O., Ph.D. (1953)
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 SMITH, ALBERT M., Ph.D. (1957)
 TREMBLAY, RAYMOND H., Ph.D. (1947)
 TUXBURY, VERNON W., JR., M.E.E. (1966)
 ULLRICH, ROBERT C., Ph.D. (1974)
 VOGELMANN, HUBERT W., Ph.D. (1955)
 WALES, LARAE H., M.A. (1975)
 WEBSTER, FRED C., Ph.D. (1956)
 WELCH, JAMES G., Ph.D. (1968)
 WELLER, DAVID L., Ph.D. (1967)
 WELLS, GRANT D., Ph.D. (1974)
 WIGGANS, SAMUEL C., Ph.D. (1963)
 WOELFEL, CHRIS G., Ph.D. (1968)
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 WORLEY, IAN A., Ph.D. (1970)

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 Associate Agricultural Economist
 Associate Biochemist
 Associate Poultry Scientist
 Associate Agricultural Economist
 Assistant Animal Scientist
 Assistant Plant Pathologist
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 Assistant Editor
 Horticulturist
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 Associate Entomologist
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 Assistant Editor
 Economist
 Animal Scientist
 Biochemist
 Agricultural Engineer
 Horticulturist
 Dairyman
 Associate Agronomist
 Associate Ecologist

Extension Service Staff

The Cooperative Extension Service is a cooperative undertaking of the State of Vermont, the University of Vermont and State Agricultural College, the United States Department of Agriculture, and the several counties of the State. It has a State staff, with headquarters at the University, and a staff of

county extension agents in the University Extension Service Centers in each county. Its purpose is "to aid in diffusing among the people . . . useful and practical information on subjects relating to agriculture, home economics, resource development, community development and related subjects, and to encourage the application of the same." It also brings general University educational information to the people of the State. Its programs are available to all the people of the State, including both adults and youth.

SHIMEL, WILLIAM A., Ph.D. (1978)	Director
HONNOLD, ROBERT E., Ed.D. (1974)	Associate Director of Programs and Extension Professor
TUXBURY, VERNON W., JR., M.E.E. (1966)	Assistant Director of Operations and Extension Associate Professor
EDGERTON, JAMES A., M.E.E. (1955)	Area Program Coordinator and Extension Professor
STEELE, DORIS H., Ph.D. (1958)	Area Program Coordinator and Extension Professor
STONE, WILLIAM W., M.A. (1946)	Area Program Coordinator and Extension Professor
ASHMAN, MARGUERITE G., B.A. (1974)	Extension Assistant Professor
ATHERTON, HENRY V., Ph.D. (1953)	Bacteriologist
BEVINS, MALCOLM I., M.S. (1956)	Extension Professor
BIGALOW, CHARLES W., M.S. (1964)	Extension Associate Professor
BINGHAM, WILLIAM H., M.S. (1968)	Extension Assistant Professor
BLAIR, ALICE J., B.S. (1955)	Extension Associate Professor
BOLTON, WESSON D., D.V.M. (1947)	Animal Pathologist
BOUSQUET, DANIEL W., M.B.A. (1975)	Extension Associate Professor
BOYD, JUDY K., M.S. (1977)	Extension Assistant Professor
BRITT, MARILYN S., M.S. (1969)	County Extension Agent
BROOK, MUNRO S., M.A. (1975)	Extension Associate Professor
BURCZY, SARA A., B.S. (1977)	Extension Instructor
BURT, MARTHA A., B.S. (1973)	Extension Instructor
BUXTON, BEATRICE F., M.S. (1971)	Extension Associate Professor
CARLSON, MARY C., B.A. (1968)	Extension Assistant Professor
COFFEY, F. ALINE, M.S. (1960)	Extension Professor
CORDNER, R. LEE, JR., B.S. (1978)	Extension Instructor
COREY, WILLIAM M., M.S. (1949)	Extension Professor
COSTANTE, JOSEPH F., M.S. (1976)	Extension Assistant Professor
CUSHING, SHIRLEY A., B.S. (1964)	Extension Assistant Professor
DESROSIERS, ROBERT E., M.S. (1978)	Extension Instructor
DUMVILLE, ROBERT W., B.A. (1969)	Extension Assistant Professor
EDDY, DWIGHT K., M.E.E. (1955)	Extension Professor
ELLIOTT, NORRIS A., B.S. (1967)	Extension Assistant Professor
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FITZGERALD, CAROL R., M.A.T. (1977)	Extension Assistant Professor
FLANAGAN, THEODORE R., Ph.D. (1953)	Extension Instructor
FOULDS, RAYMOND T., JR., M.F. (1948)	Extension Professor
FREY, LOIS M., B.S. (1977)	Extension Instructor
GIBSON, KENNETH S., M.S. (1964)	Extension Associate Professor
GOODHOUSE, EDWARD W., B.S. (1959)	Extension Associate Professor
GOTLIEB, ALAN R., Ph.D. (1974)	Extension Assistant Professor
GRIME, PHILIP K., M.E.A.E. (1951)	Extension Professor
HALVORSEN, LISA, B.A. (1975)	Extension Instructor
HARVEY, LYDIA M., B.S. (1976)	Extension Instructor
HORTON, CHESLEY P., M.E. (1956)	Extension Assistant Professor

HOUGHABOOM, VERLE R., Ph.D. (1947)	Extension Professor
HOWRIGAN, BRIDGET A., B.S. (1977)	Extension Instructor
JARVIS, LYNVILLE W., M.A. (1967)	Extension Assistant Professor
JODOIN, VIRGINIA A., B.S. (1968)	Extension Assistant Professor
KEY, DAVID M., II, B.S. (1976)	Extension Instructor
KRISTIANSSON, KARIN, M.A. (1953)	Extension Professor
LAING, FREDERICK M., M.S. (1953)	Extension Associate Professor
LAMB, DIANNE H., B.S. (1973)	Extension Assistant Professor
LANOUE, NANCY L., B.S. (1971)	Extension Assistant Professor
LEAMY, WILLIAM P., M.S. (1943)	Extension Associate Professor
MACCOLLOM, GEORGE B., Ph.D. (1954)	Entomologist
MACKILLOP, JOHN A., JR., B.S. (1977)	Extension Instructor
MAIR, BARBARA A., B.A. (1972)	Extension Assistant Professor
MAREK, LINDA G., M.S. (1977)	Extension Instructor
MCCORMICK, THOMAS J., M.E.E. (1960)	Extension Professor
MCFEETERS, DONALD J., M.S. (1963)	Extension Associate Professor
MERCIA, LEONARD S., M.S. (1954)	Extension Professor
MOORE, MILO J., M.S. (1969)	Extension Associate Professor
MUNGER, BETHIA N., B.S. (1960)	Extension Associate Professor
MYOTT, LAWRENCE B., B.S. (1975)	Extension Instructor
NEWTON, DAVID P., M.S. (1954)	Extension Professor
NICHOLS, ERIC C., M.Ed. (1977)	Extension Assistant Professor
NIELSEN, GORDON R., Ph.D. (1965)	Extension Assistant Professor
PAGE, JOHN C., M.S. (1952)	Extension Professor
PAQUETTE, LUCIEN D., M.E.E. (1940)	Extension Professor
PATTERSON, THOMAS F., JR., B.A. (1973)	Extension Assistant Professor
PELLETT, NORMAN E., Ph.D. (1967)	Extension Associate Professor
PORTER, MONICA B., M.E.E. (1969)	Extension Associate Professor
PRATT, RICHARD W., M.A.T. (1974)	Extension Assistant Professor
PRICE, JOHN R., B.S. (1954)	Extension Assistant Professor
ROWE, S. ELLEN, B.S. (1970)	Extension Assistant Professor
SMITH, HOWARD H., B.S. (1961)	Extension Associate Professor
SNOW, WILLIAM C., B.S. (1969)	Extension Assistant Professor
STEPHENSON, JOHN F., M.E.E. (1951)	Extension Professor
STRASSBURG, KATHLEEN R., M.A.T. (1965)	Extension Associate Professor
STRYKER, BARENT W., III, M.S. (1969)	Extension Associate Professor
SUMNER, JOYCE W., B.S. (1954)	Extension Assistant Professor
TENNEY, JUDY L., B.S. (1977)	Extension Assistant Professor
THOMPSON, NOAH C., M.E.A.E. (1963)	Extension Associate Professor
TOWNSEND, ROBERT L., M.S. (1974)	Extension Assistant Professor
WADSWORTH, JAMES R., V.M.D. (1951)	Extension Professor
WASSON, LOUELLEN, B.S. (1966)	Extension Assistant Professor
WAY, WINSTON A., M.S. (1951)	Extension Professor
WEBSTER, FRED C., Ph.D. (1956)	Economist
WELCH, ANNE W., B.S. (1973)	Extension Assistant Professor
WELLS, GRANT D., Ph.D. (1974)	Extension Assistant Professor
WHAPLES, DONALD R., M.S. (1967)	Extension Professor
WHITE, ROBERT E., B.S. (1948)	Extension Assistant Professor
WOELFEL, CHRIS G., Ph.D. (1968)	Extension Professor
WRIGHT, ALICE, B.S. (1969)	Extension Assistant Professor
YOUNG, BARBARA E., B.S. (1975)	Extension Instructor

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ACADEMIC CALENDAR

FALL 1978

Labor Day	September 4	Monday
Registration	September 5	Tuesday
Classes begin	September 6	Wednesday
Rosh Hashanah	October 2-3	Monday-Tuesday
Yom Kippur	October 11	Wednesday
Jewish Tabernacles	October 16-17	Monday-Tuesday
Concl. of Tabernacles	October 23	Monday
Simchat Torah	October 24	Tuesday
Enrollment	November 13-17	Monday-Friday
Thanksgiving Recess	November 22-25	Wednesday-Saturday
Classes end	December 14	Thursday
Exams begin	December 16	Saturday
Exams end	December 22	Friday

SPRING 1979

Registration	January 15	Monday
Classes begin	January 16	Tuesday
Washington's Birthday	February 19	Monday
Town Meeting Recess	March 5-6	Monday-Tuesday
Spring Recess	April 9-14	Monday-Saturday
Passover	April 12-13	Thursday-Friday
Honors Day	April 18	Wednesday (no classes after 3:00)
Concl. of Passover	April 18-19	Wednesday-Thursday
Enrollment	April 30-May 4	Monday-Friday
Classes end	May 4	Friday
Exams begin	May 7	Monday
Exams end	May 12	Saturday
Commencement	May 18-20	Friday-Sunday

NOTE: The calendar for 1979-80 has not yet been established by the Faculty Senate.

CALENDAR

1978

JANUARY

S M T W T F S

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DECEMBER

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1979

JANUARY

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