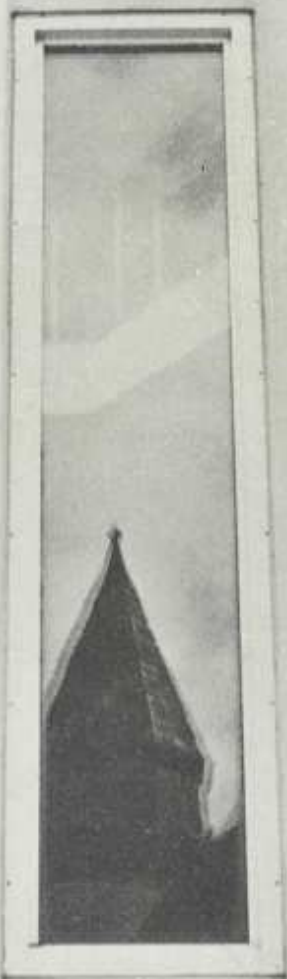


**BULLETIN of
THE UNIVERSITY
OF VERMONT**

MARCH 1971



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V

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OF VERMONT

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V The University of Vermont

The University is located at Burlington, Vermont, overlooking an attractive tree-shaded city situated on the shores of Lake Champlain.

§ Burlington, the largest city in the State, with a population of 40,000, is 95 miles from Montreal, 230 miles from Boston, and 300 miles from New York City. The city has daily plane and bus service to these points.

§ Chartered in 1791, the University is the twentieth oldest institution of higher learning in the United States authorized to grant degrees and the second institution founded by state legislative action to offer instruction at the university level.

§ 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*.

§ Within the seven divisions of the University, instruction is offered in more than one hundred and fifty-one programs leading to thirty-one degrees.

§ The University is accredited by the following associations:

The New England Association of Colleges and Secondary Schools

The National Council for Accreditation of Teacher Education

The National Association of Schools of Music

The American Medical Association

The American Dental Association

The National League for Nursing

The Engineers Council for Professional Development

The American Chemical Society

V Philosophy and Objectives

Today, more than ever before, higher education is in need of a basic philosophy—one which will clarify its purposes and goals, and which, at the same time, will protect it from any loss of its essential characteristics. It is important to note well that a university, the home of higher education, is not a barometer of public opinion, and that it cannot conceivably bend to meet every demand of society if it is to carry out effectively its major responsibilities to scholarship and learning.

A university must be committed to scholarship, it must be dedicated to education in the very highest branches of learning, and it must aspire to the supreme level of excellence.

If, in the constantly changing environment of modern civilization, a university finds itself in the role of a service agency, ready to meet every demand that society may make upon it, then there is real danger that the vital purposes and goals of higher education may be lost. If the danger is recognized and guarded against, however, the integrity of our educational program will not be jeopardized.

What, then, is the basic purpose of the University of Vermont—what is its philosophy of education?

Basically, the University is an institution dedicated to pure learning in the humanities, the natural sciences, and the social sciences. Our responsibility is that of creating a community of scholars, both old and young; of providing an atmosphere for the discovery, exchange, and transmission of ideas; and of furnishing continuing generations with the intellectual means for leading full and purposeful lives.

Institutional Goals

Quite naturally there is a diversity of goals among American institutions of higher education, and inevitably there are differences in the goals of public and private institutions. As a publicly supported institution, the University has accepted the responsibility of providing an educational opportunity for all qualified men and women residing in the State of Vermont.

The University continues to meet this responsibility at the same time that it is able to enhance the educational opportunity afforded Vermonters by the admission of students coming from many large and small communities outside Vermont's borders. This tradition, not enjoyed by many state universities, not only provides a heterogeneity of background and experience for all students, but also makes possible a breadth and depth of academic offerings which the University of Vermont otherwise might not be able to provide for Vermonters alone.

Thus our institutional goals are . . .

. . . to provide a liberal education through individual capacity for the making of intelligent decisions. Such an education becomes meaningful with a knowledge of our historical heritage; it becomes operational through the use of all disciplines, including mathematics and science; and it becomes influential through the art of effective communication

. . . to extend an opportunity for the development of a cultural life by virtue of the arts and the formulation of philosophical and moral values

. . . to provide skill training in preparation for specific professions and careers

. . . to create an atmosphere conducive to research and scholarship through the development of programs which will implement both undergraduate and graduate education

. . . to develop graduate programs leading to the master's and doctor's degree in areas supported by faculty, laboratory, and library facilities as a means of specialization and of complementing desired research and study in selected fields

. . . to carry on a program of adult education through the Evening Division, off-campus activities, cooperative extension, and modern communication media

. . . to provide services to state and local government where University personnel, data, or organization are particularly adaptable to a public need which otherwise may not be filled.

Institutional Means

Clearly, our institutional goals cannot be achieved without a faculty of distinction aided by an administration which recognizes that its obligation is both to provide the facilities and to help create the conditions in

which the faculty and students can pursue their educational responsibilities.

One of the most important of the University's means to the desired end is the development of an undergraduate curriculum which provides a liberal education in every professional program. This is not to say that every student should matriculate in the College of Arts and Sciences. It does mean that the professional and vocational must not crowd out a liberal education simply because the subject matter of each professional field is increasing. It is impossible today to teach everything there is to know in the professions, whether in medicine, law, engineering, business, or agriculture. For this reason it is important that we continually review the curriculum to reevaluate, modify, and consolidate the fundamentals of professional education so that the teaching of effective communication—mathematics, history, science, and the arts—retains its central importance.

Facilitating this is the emphasis placed upon individual excellence, wherein the gifted student may advance more rapidly through small seminars, conferences, individual research assignments, the use of original sources, and student advisory services.

Further means include a constant reviewing of admissions requirements to insure an educational opportunity to those applicants who will receive the greatest benefit from a college education; a fostering of research projects which are related to the teaching program and to our established institutional goals, providing opportunity for research in the social sciences and the humanities as well as in the natural sciences; the development of a full graduate program as rapidly as resources permit; and finally, a sustained plan of university self study to provide a continuing evaluation of achievement and a basis for the consideration of new techniques and methods.

Basic to these means, of course, and a resource without which the institution ceases to be a university, is the library. To make our philosophy of education meaningful, to make our goals realizable, and to make our other means workable, a truly fine library is indispensable.

The University's philosophy of education, then, is to create a community of scholars and provide facilities and an environment for full educational development. Our goals are to ensure the undergraduate a well-rounded academic background, regardless of the field of concentration; to offer sound graduate programs at the master's and doctor's levels; to pursue a program of continuing adult education; and to provide the State and community with professional and cultural services.

CORRESPONDENCE

Admissions

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

Academic Divisions

| | |
|---|-----------------------|
| College of Agriculture and Home Economics | <i>Dean</i> |
| College of Arts and Sciences | <i>Dean</i> |
| College of Education | <i>Dean</i> |
| College of Technology | <i>Dean</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> |

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Technical Information Center *Director*

Transcripts of Records *Registrar*

University Development *Vice President for Development*

Vermont Agricultural Experiment Station *Director*

Vermont Educational Television *ETV Station Manager*

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Hanover, N.H.*

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Winooski, Vt.
Rutland, Vt.*

March, 1968—March, 1974

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ROLAND DIETZ PATZER, M.A. — A

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Senior Vice President and

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Vice President for University Development

Vice President for Business and Financial Affairs

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Economics and Acting Director of Agricultural Experiment Station

Dean, College of Education

Dean, College of Agriculture and Home

Economics and Director Agricultural Experiment Station

Dean, College of Technology

Dean, Administrative Planning and Analysis

Dean, Graduate College

Dean of the Division of Health Sciences and

Dean of the College of Medicine

Dean, Graduate College

Dean of Students

Dean, Continuing Education

Acting Dean of Students and Dean of Men

Acting Dean, College of Arts and Sciences

Director of Administrative Support Services

KEY

A = Sabbatical leave 1970-71

B = Sabbatical leave second semester
1970-71

C = Sabbatical leave 1971-72

D = Sabbatical leave first semester 1971-72

E = Sabbatical leave second semester
1971-72

F = Leave of absence 1970-71

G = Sabbatical leave summers of 1971 and
1972

H = Sabbatical leave May 15, 1971-January
14, 1972

I = Sabbatical leave January 1, 1971-June
30, 1972

J = Military leave to June 1, 1971

K = Military leave to December 31, 1971

L = On leave

M = Resigning June 30, 1971

N = Sabbatical leave (Aug. 1, 1969-July 31,
1970)

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Professor of Psychology
Professor of Home Economics
Professor of Music
Consultant Orthopedic Surgery
Professor of Animal and Dairy Science
Pomeroy Professor of Chemistry and
Dean of the Graduate College
Professor of Economics
Associate Professor of Chemistry
Professor of Anatomy
Associate Professor of Electrical Engineering
Professor of German
Dean, College of Agriculture
and Home Economics
Professor of Psychiatry
Professor of Nursing
Professor of Chemistry
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Professor of Romance Languages
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Professor of History
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Professor of Mathematics
Professor of Clinical Medicine
Professor of Medical Microbiology
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Associate Professor of Religion
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Associate Professor of Electrical Engineering
Professor of Plant and Soil Science
Professor of English
Professor of Classical Languages and Dean of College
of Arts and Sciences
Professor of Home Economics
Assistant Professor of Clinical Psychiatry
Assistant Professor of Chemistry
Professor of Speech
Professor of Electrical Engineering and Dean of
College of Technology
Associate Professor of Commerce and Economics
Professor of Psychology
Professor of Agronomy
Professor Department of Civil Engineering
Dean of College of Agriculture and Home Economics
Instructor in Public Health
Professor of Zoology
Thayer Professor of Anatomy
Professor of Animal and Dairy Science
Associate Professor of Mathematics

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| | |
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FACULTY

Dates after names represent the year of appointment, either original or following a lapse of service

** Asterisk indicates member of Graduate Faculty*

| | |
|---|--|
| JOHN ABAJIAN, JR., M.D. (Jan. 1940-42; 1946) | Professor of Anesthesiology |
| JEROME J. ABRAMS, M.D. (1969) | Associate Professor of Surgery |
| *JOSEPH ANTHONY ABRUSCATO, Ph.D. (1969) | Assistant Professor of Education |
| *P. MARLENE ABSHER, Ph.D. (1968) | Assistant Professor of Medical Microbiology |
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| *RUSSELL MAYNARD AGNE, Ph.D. (1969) | Assistant Professor of Education |
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MARY BROUGHTON, M.A. (1967) *Instructor in English*
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 JOANNE CHANDLER BROWN, M.A. (1967) *Instructor in Mathematics*
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 MARION HUNTINGTON BROWN, M.S. (1942) *Associate Professor, Home Economics Education*
 HENRY POSEY BRUBAKER, Ph.D. (1966) *Instructor in Political Science*
 OTTO ANTON BRUSIS, M.D. (Apr. 1967) *Assistant Professor of Community Medicine*
 LAWRENCE DONALD BRYAN, III, B.S. (1969) *Captain U.S. Army*
 ROGER TRUE BRYANT, M.Ed. (1965) *Assistant Professor of Military Science*
 DAVID P. BUCKE, JR., Ph.D. (1969) *Assistant Professor of Physical Education*
 CLARENCE EDWARD BUNKER, M.D. (Aug. 1968) *Assistant Professor of Geology*
 JOHN D. BURCHARD, Ph.D. (1970) *Assistant Professor of Surgery*
 R. CLAY BURCHELL, M.D. (1968) *Associate Professor of Psychology*
 CAROL A. BURDETT, M.Ed. (1970) *Associate Professor of Obstetrics and Gynecology*
 *JAMES WILLIAM BURGMEIER, Ph.D. (1969) *Adjunct Instructor in Education*
 HENRY DENISON BURNHAM, M.A. (Jan. 1970) *Assistant Professor of Mathematics*
 LEGRAND CANNON BURNS, JR., M.D. (1968) *Clinical Instructor in Psychiatry*
 STANLEY LIVINGSTON BURNS, JR., M.D. (1960) *Clinical Instructor in Medicine*
 RACHEL T. BURROUGHS, B.S. (1968) *Associate Professor of Medicine*
 ROY VEDDER BUTTLES, M.D. (1950) *Instructor in Nursing*
 FRANCIS ARNOLD CACCAVO, M.D. (1960) *Assistant Professor of Pathology*
 ROBERT NOLAN CAIN, M.D. (Jan. 1953) *Clinical Instructor in Surgery*
 CHARLES LYMAN CALAHAN, S.S. (1948) *Assistant Professor of Surgery*
 EDGAR JACOB CALDWELL, III, M.D. (1966) *Lecturer in Plant and Soil Science*
 MARTHA MARIE CALDWELL, M.S. (1954-59; 1960) *Assistant Professor of Medicine*
 *ANTHONY SAMUEL CAMPAGNA, Ph.D. (1965) — C *Associate Professor, Design*
 RICHARD FREDERICK CAMPOLUCCI, M.A. (1969) *Associate Professor of Economics*
 MARTIN JOHN CANNON, M.D. (1953) *and Business Administration*
 FRANK S. CARBONE, JR., M.D. (1968) *Instructor in English*
 LYNDON BELMONT CAREW, JR., Ph.D. (Feb. 1969) *Assistant Professor of Obstetrics and Gynecology*
 RICHARD GEORGE CARLSON, M.A. (1969) *Instructor in Medicine*
 HOWARD JULIAN CARPENTER, M.S. (1947) *Associate Professor of Animal Sciences*
 HOLLIS ANN CARROLL, M.S. (1969) *Instructor in History*
 GEORGE W. CARTER, B.A. (1968), Major, U.S. Army *Associate Professor of Mechanical Engineering*
 *CHARLES WARREN CASE, D. Ed. (1969) *Instructor in Physical Education*
 *ERLING WILLIAM CHAMBERLAIN, Ph.D. (1962) — A *Assistant Professor of Military Science*
 *ALFRED HAYES CHAMBERS, Ph.D. (1948) *Assistant Professor of Education*
 JAMES PATRICK CHAPLIN, Ph.D. (1947) *Professor of Physiology and Biophysics*
 *JAMES G. CHAPMAN, Ph.D. (1968) *Visiting Professor of Psychology*
 MARILYN CHASE, M.Ed. (1965) *Associate Professor of Music*
 *RICHARD XAVIER CHASE, Ph.D. (1966) *Assistant Professor of Physical Education*
 ARTHUR HARRY CHENEY, JR., M.Ed. (Aug. 1969) *Associate Professor of Economics and Business Administration*
 THOMAS L. CHIU, M.D. (1970) *Assistant Professor of Education*
 CHARLES CHRISTENSEN, JR., M.Ed. (1959) *Assistant Professor of Psychiatry*
 *WALLACE WAYNE CHRISTENSEN, Ph.D. (1967) *Assistant Professor of Physical Education*
 JAMES F. CLAPP, M.D. (1970) *Professor of Forestry*
 *VIRGINIA PRESCOTT CLARK, Ph.D. (1963-64; 1965) *Assistant Professor of Obstetrics and Gynecology*
 LORRAINE M. CLARKE, Ed.M. (1970) *Assistant Professor of English*
 JOHN PATTON CLEMENTS, M.D. (1969) *Instructor in Nursing*
 *JACKSON J. CLEMMONS, M.D. (1962) *Assistant Professor of Radiology*
 MARILYN T. CLEVELAND, M.Ed. (1970) *Associate Professor of Pathology*
 ELIZABETH ANN CLEWLEY, M.D. (Feb. 1961) *Adjunct Instructor in Education*
 JUDETH A. COBB, M.S. (1969) *Clinical Instructor in Pediatrics*
 *ROBERT WILLARD COCHRAN, Ph.D. (1954) *Instructor in Mathematics*
 LAURENCE H. COFFIN, M.D. (Dec. 1969) *Professor of English*
 JULIUS GEORGE COHEN, M.D. (1950) *Associate Professor of Surgery*
 JEAN AVERILL CONDON, M.A. (1967) *Clinical Associate Professor of Psychiatry*
 ARTHUR JAMES CONDREN, Ph.D. (Mar. 1969) *Instructor in Physical Education*
 ROBERT A. CONQUEST, Ph.D. (1970) *Assistant Professor of Civil Engineering*
 Adjunct Assistant Professor of Education

- *PHILIP WILLIAM COOK, Ph.D. (1963) Associate Professor of Botany
 *ROGER LEE COOKE, Ph.D. (1968) Assistant Professor of Mathematics
 *ROBERT WILLIAM COON, M.D. (1955) Professor of Pathology
 JAMES P. CORCORAN, M.A. (1970) Instructor in Philosophy and Religion
 JAMES P. COROLOGOS, M.Ed. (1968) Instructor in Education
 *DEAN C. CORRIGAN, Ed.D. (1969) Professor of Education
 LUCIEN M. COTE, B.S. (1969) Adjunct Instructor in Medical Technology
 *REX DEE COUCH, M.D. (1962; 1967) Associate Professor of Pathology
 WILTON WARNER COVEY, M.D. (1966) Clinical Instructor in Psychiatry
 *JOHN EDWARD CRAIGHEAD, M.D. (1968) Professor of Pathology
 ALBERT JAMES CRANDALL, M.D. (1939) Clinical Instructor in Surgery
 EDWARD BYINGTON CRANE, M.D. (Jan. 1961) Instructor in Community Medicine
 GRANT CRITCHFIELD, M.A. (1968) Instructor in Romance Languages
 MARY J. CRONIN, M.Sc. (1970) Associate Professor of Nursing
 MICHAEL W. CRONIN, M.A. (1970) Instructor in Speech and Drama
 GEORGE CHAPMAN CROOKS, Ph.D. (1930) Professor of Chemistry
 JAMES M. CROSS, B.S. (1964) Instructor in Physical Education
 *ALBERT DARY CROWELL, Ph.D. (1955) Professor of Physics
 JOHN CHARLES CUNNINGHAM, M.D. (1946) Shipman Professor of Ophthalmology
 FREDERICK J. CURLIN, M.D. (1970) Instructor in Psychiatry
 NANJI A. CURTIS, M.D. (1970) Instructor in Psychiatry
 FLORENCE MARY CZERNIAWSKI, M.T. (1967) Instructor in Medical Technology
 *MALCOLM DANIEL DAGGETT, Ph.D. (1945) Professor of Romance Languages
 ELLIOT DANFORTH, JR., M.D. (1970) Assistant Professor of Medicine
 *ROBERT VINCENT DANIELS, Ph.D. (1956-57; 1958) Professor of History
 KARYN L. D'AVIGNON, M.Sc. (1969) Instructor in Microbiology and Biochemistry
 JOHN HERSCHEL DAVIS, M.D. (Dec. 1968) Professor of Surgery
 PHILIP HOVEY DAVIS, M.D. (1958) Associate Professor of Orthopedic Surgery
 ROBERT EARLE DAVIS, M.D. (1968) Instructor in Obstetrics and Gynecology
 *JEAN MARGARET DAVISON, Ph.D. (1955) Professor of Classics
 *JOHN AMERPOHL DAVISON, Ph.D. (1967) Associate Professor of Zoology
 WILLIAM EARL DAVISON, M.F.A. (Jan. 1966) Assistant Professor of Art
 *ROBERT FRANK DAWSON, Ph.D. (1964-65; 1969) Associate Professor of Civil Engineering
 ROBERT STUART DEANE, M.B.Bch. (1967) Assistant Professor of Surgery
 WILLIAM NELSON DEANE, Ph.D. (1960) Assistant Professor of Psychiatry
 EDITH FAYE DECK, M.S. (1969) Assistant Professor of Professional Nursing and Sociology
 *LUBOMIR A. D. DELLIN, J.S.D. (1957) Professor of Economics and Business Administration
 ALINE LOUISE DEMERS, M.S. (1960) — C Associate Professor of Nursing
 W. LANDON DENNISON, JR., M.D. (1970) Instructor in Dermatology
 GINO ALDO DENTE, M.D. (1950) Associate Professor of Anesthesiology
 DAVID ALLEN DEPATIE, Ph.D. (1967) Assistant Professor of Physics
 *ROBERT WARREN DETENBECK, Ph.D. (1967) Professor of Physics
 ALBERT INSKIP DICKERSON, JR., Ph.D. (1966) Assistant Professor of English
 MARY JANE DICKERSON (MRS. A. I.) M.A. (1966) Instructor in English
 RAYMOND GEORGE DILLEY, M.A. (1965) Instructor in Speech
 DAVID KENNETH DIMMOCK, M.S. (Jan. 1968) Instructor in Mathematics
 RICHARD BOWDITCH DOES, Ph.D. (1969) Assistant Professor of Psychology
 RAYMOND MADIFORD PEARDON DONAGHY, M.D. (1946) Professor of Neurosurgery
 J. EDWARD DONNELLY, M.A. (1952) Associate Professor of Physical Education
 JOHN ROBERT DONNELLY, Ph.D. (1969) Assistant Professor of Forestry
 *GERALD ALTON DONOVAN, Ph.D. (Nov. 1960) Professor of Animal Sciences
 BARRY L. DOOLAN, Ph.D. (1970) Assistant Professor of Geology
 HELEN MARIE DOREMUS, D.V.M. (Jan. 1970) Assistant Professor of Animal Pathology
 HENRY MEADE DOREMUS, II, D.V.M. (1964) Assistant Professor of Pharmacology and Animal Pathology
 *THOMAS W. DOWE, Ph.D. (1957) — I Professor of Animal Sciences
 *RICHARD NEAL DOWNER, Ph.D. (1967) Assistant Professor of Civil Engineering
 JOHN C. DRAKE, Ph.D. (1970) Assistant Professor of Geology
 *HOWARD DUCHACEK, M.S.A.E. (1949) — C Associate Professor of Mechanical Engineering
 DAVID RICHARD DUFFELL, M.D. (Dec. 1967) Associate Professor of Pathology
 *FRED WILLIAMS DUNIHUE, Ph.D. (1936) Professor of Anatomy
 THOMAS CALVIN DUNKLEY, M.Ed. (1966) Assistant Professor of Physical Education
 MICHAEL J. DUNN, M.D. (Mar. 1969) Assistant Professor of Medicine

- HERBERT ASHLEY DURFEE, JR., M.D. (1957) *Professor of Obstetrics and Gynecology*
 *ALEXANDER HARRY DUTHIE, Ph.D. (Feb. 1964) *Associate Professor of Animal Sciences*
 *JULIUS SOLOMON DWORK, Ph.D. (1954) *Associate Professor of Mathematics*
 SPENCER WRIGHT EARNSHAW, M.A. (1969) *Instructor in Mathematics*
 ROBERT WEBSTER EASTMAN, LL.B. (Feb. 1952) *Adjunct Assistant Professor of Political Science*
 WINSTON MILO EDDY, M.D. (Oct. 1960) *Associate Professor of Medicine*
 ANN I. EGNER, B.A. (1968) *Instructor in Education*
 PHILIP N. ELDERED, Ph.D. (Jan. 1970) *Assistant Professor of Civil Engineering*
 JOHN WIER ELLENWOOD, M.A. (1963-65; 1967) *Assistant Professor of Speech*
 R. DAVID ELLERSON, M.D. (1970) *Instructor in Pediatrics*
 *DAVID MILLER ELLIS, Ph.D. (1968) *Assistant Professor of Electrical Engineering*
 FRANK STONE EMANUEL, B.S. (Jan. 1968) *Instructor in Institutional Administration*
 SYLVIA JANE EMANUEL (MRS. F. S.) M.S. (1966) *Assistant Professor, Clothing and Textiles*
 FAITH GRISCOM EMERSON, M.A. (1959) *Associate Professor of Nursing*
 E. STANLEY EMERY, III, M.D. (1970) *Assistant Professor of Neurology*
 ROBERT HODGSKIN ERDMANN, LL.B. (1967) *Instructor in Economics and Business Administration*
 PAUL ANDERSON ESCHHOLZ, Ph.D. (1969) *Instructor in English*
 LOUIS WILLIAM ESPOSITO, M.D. (Feb. 1944; 1954) *Instructor in Surgery*
 *WARREN O. ESSLER, Ph.D. (1961) *Professor of Electrical Engineering*
 *BUD ETHERTON, Ph.D. (1968) *Associate Professor of Botany*
 JOHN CLIFFORD EVANS, B.S. (1937) — D *Associate Professor of Physical Education*
 *FREDERICK CHRISTIAN EVERING, JR., Ph.D. (1965) — E *Associate Professor of Electrical Engineering*
 DEAN R. EVERT, M.S.E.E. (1970) *Assistant Professor of Plant and Soil Science*
 *JON BAKER FACKLER, Ph.D. (1968) *Assistant Professor of History*
 WILLIAM THOMAS FAGAN, JR., M.D. (1954) *Associate Professor of Urology*
 DAVID SPERBER FAIGEL, D.D.S. (1954) *Assistant Professor of Dental Hygiene*
 GISELA HILDEGUND FALKENBERG, M.D. (Dec. 1969) *Instructor in Anesthesiology*
 FLORENCE EILEEN FARBER, Ph.D. (Aug. 1969) *Assistant Professor of Physiology & Biophysics*
 JOHN EDWARD FARNHAM, D.M.D. (1963) *Assistant Professor of Dental Hygiene and Associate Professor of Surgery*
 SANDRA MORTON FARRELL, M.S. (1962-66; 1968) *Assistant Professor of Physical Education*
 HELEN ELIZABETH FARRINGTON, M.P.H. (1962) — F *Assistant Professor of Nursing*
 DOUGLAS PATTEN FAY, M.S. (1953) *Associate Professor of Civil Engineering*
 EDWARD JOSEPH FEIDNER, M.F.A. (1958) *Associate Professor of Speech*
 *JEREMY POLLARD FELT, Ph.D. (1957) *Professor of History*
 CHRISTIE K. FENGLER, M.A. (1970) *Instructor in Art*
 *JAMES GATES FERGUSON, JR., Ph.D. (1969) *Assistant Professor of Psychology*
 *CHARLES LYNN FIFE, Ph.D. (Dec. 1966) *Assistant Professor of Agricultural Economics*
 JAN FINK, B.S. (1970) *Instructor in Nursing*
 CHARLES L. FISHMAN, LL.M. (1970) *Visiting Associate Professor in the Experimental Program*
 JOHN RICHARD FITZGERALD, M.D. (1961) *Clinical Assistant Professor of Medicine*
 MARTIN EDWARD FLANAGAN, M.D. (1962) *Associate Professor of Surgery*
 *TED BENJAMIN FLANAGAN, Ph.D. (1961) *Professor of Chemistry*
 THEODORE ROSS FLANAGAN, Ph.D. (1953) *Assistant Professor of Plant and Soil Science*
 STEVEN FLANDERS, Ph.D. (1969) *Assistant Professor of Political Science*
 RICHARD F. FLANNERY, M.A. (1970) *Instructor in Political Science*
 SHARI B. FLEMING, M.M. (1970) *Instructor in Music*
 CURTIS M. FLORY, M.D. (1964) *Assistant Professor of Pathology*
 ARTHUR HOWARD FLOWER, JR., M.D. (1950) *Associate Professor of Dermatology*
 JOSEPH CLAYTON FOLEY, M.D. (1954) *Associate Professor of Radiology*
 JEANNETTE RUTH FOLTA, Ph.D. (Aug. 1969) *Associate Professor of Nursing and Psychiatry*
 *MURRAY WILBUR FOOTE, Ph.D. (1947-51; 1953) *Associate Professor of Microbiology and Biochemistry*
 DOROTHY ELLEN FORD, M.D. (Oct. 1968) *Assistant Professor of Rehabilitation Medicine*
 NANCY P. FORD, M.A. (1970) *Instructor in Philosophy and Religion*
 ELIZABETH M. FOREMAN, M.S.N. (Feb. 1969) *Instructor in Nursing*

- *DONALD G. FORGAYS, Ph.D. (1964) — A Professor of Psychology
 ROSE JULIET FORGIONE, M.A. (1964) Professor of Nursing
 ELISABETH HERTA FORSBERG, M.D. (Jan. 1968) Clinical Instructor in Psychiatry
 BEN RALPH FORSYTH, M.D. (1966) Associate Professor of Medicine
 ELIZABETH HELD FORSYTH, (MRS. B. R.) M.D. (1967) Instructor in Psychiatry
 DONALD CUSHING FOSS, Ph.D. (1968) Assistant Professor of Animal Sciences
 JUDITH L. FOSTER, B.S. (1970) Instructor in Nursing
 ROGER SHERMAN FOSTER, JR., M.D. (Jan. 1970) Assistant Professor of Surgery
 *WAYNE LENIS FOX, Ph.D. (1969) Assistant Professor of Education
 *STEVEN LESLIE FREEDMAN, Ph.D. (1965) Assistant Professor of Anatomy
 EDWARD ESAU FRIEDMAN, M.D. (1963) Instructor in Community Medicine
 JOHN WILLARD FRYMOYER, M.D. (1969) Assistant Professor of Orthopedic Surgery
 *GERALD ROSS FULLER, Ed.D. (Aug. 1968) Associate Professor of Vocational, Technical, Extension Education
 ROBERT WEEKS FULLER, M.S. (Jan. 1966) Assistant Professor of Forestry
 *DANIEL WAYNE GADE, Ph.D. (1966) Associate Professor of Geography
 *JAMES GERARD GALLAGHER, Ph.D. (Oct. 1969) Assistant Professor of Medical Microbiology
 *JOSEPH HERBERT GANS, Ph.D. (1967) Professor of Pharmacology
 EDWARD CHARLES GANZ, A.M. (1967) Instructor in German
 THEODORE JOHN GARBACIK, B.S. (1969) Instructor in Chemistry
 WILLIAM GILBERT GARD, Ph.D. (1966) Assistant Professor of History
 WILLIAM REACE GARRETT, Ph.D. (Jan. 1970) Assistant Professor of Sociology and Anthropology
- MARIE G. GENO (MRS. T. H.) M.A. (1966-68; 1969) — M Instructor in Romance Languages
 THOMAS HOWARD GENO, M.A. (1965) Instructor in Romance Languages
 STOKES GENTRY, M.D. (1962) Clinical Assistant Professor of Pediatrics
 ANTONIO ISAIAS GERMAN, M.D. (1965) Instructor in Pathology
 THOMAS CHOMETON GIBSON, M.B. (Dec. 1962) Associate Professor of Community Medicine and Medicine
 *ALPHONSE HENRY GILBERT, Ph.D. (1969) Assistant Professor of Agricultural Economics
 *BRADY BLACKFORD GILLELAND, Ph.D. (1957) Professor of Classics
 *ERLAND CHENEY GJESSING, Ph.D. (1954) Associate Professor of Biochemistry
 *RICHARD WILLIAM GLADE, Ph.D. (1958) Professor of Zoology
 ARTHUR A. GLADSTONE, M.D. (1933-36; 1941) Clinical Professor of Surgery
 CHARLES MORTON GLUCK, M.D. (1965) Clinical Assistant Professor of Medicine
 *ROBERT JOHN GOBIN, Ph.D. (1965) Associate Professor of Physical Education
 ERIC P. GODFREY, M.A. (1970) Instructor in Sociology
 RICHARD HERRON GOLDSBOROUGH, M.D. (Oct. 1961) Clinical Assistant Professor of Otolaryngology
 JEANNE A. GOLDSTEIN, Ph.D. (1970) Adjunct Assistant Professor of Psychology and Psychiatry
 STEVEN G. GOLDSTEIN, Ph.D. (1970) Associate Professor of Psychology
 ARNOLD GOLODETZ, M.D. (1969) Associate Professor of Medicine and Community Medicine
 ANTONIO J. GOMEZ, M.D. (1970) Assistant Professor of Neurology
 LAWRENCE R. GORDON, M.A. (1970) Assistant Professor of Psychology
 *LYMAN JAY GOULD, Ph.D. (1953) Professor of Political Science
 ARMIN E. GRAMS, Ph.D. (1971) Professor of Human Development
 CORNELIUS O. GRANAI, JR., M.D. (1967) Instructor in Obstetrics and Gynecology
 MARY I. GRANT, M.A. (1970) Instructor in Geography
 DUANE EDGAR GRAVELINE, M.D. (1966) Clinical Instructor in Medicine
 *ALLAN P. GRAY, Ph.D. (1969) Associate Professor of Pharmacology
 DAVID HENRY GRAY, M.D. (1962) Clinical Instructor in Community Medicine
 JUDITH E. GRAY, M.S. (1970) Instructor in Nursing
 MARY JANE GRAY, M.D. (1960) — A Associate Professor of Obstetrics and Gynecology
 GARETH MONTRAVILLE GREEN, M.D. (1968) Associate Professor of Medicine
 DONALD CROWTHER GREGG, Ph.D. (1946) Pomeroy Professor of Chemistry
 *EDWIN CHARLES GREIF, M.S. (1950) Professor of Economics and Business Administration
 HAROLD ALFRED GREIG, M.P.E. (Feb. 1962) Assistant Professor of Physical Education
 GLADYS HOAGLAND GROVES, B.A. (1969) Visiting Professor of Home Economics
 RICHARD GORDON GRUNDLER, D.D.S. (1969) Instructor in Dental Hygiene
 HOWARD THEODORE GUARE, M.D. (1952) Clinical Assistant Professor of Radiology

- SALLY C. GUERETTE, M.S.Ed. (1969) *Instructor in Physical Education*
 ROBERT CESARE GUIDULI, M.D. (1966) *Assistant Professor of Ophthalmology*
 DIETER WALTER GUMP, M.D. (1966) *Assistant Professor of Medicine and Microbiology*
 ROBERT ERWIN GUSSNER, S.T.B. (1969) *Instructor in Philosophy and Religion*
 CHARLES R. HADDEN, D.D.S. (1966) *Instructor in Dental Hygiene*
 CARLETON RAYMOND HAINES, M.D. (1950-52; 1954) *Assistant Professor of Surgery*
 PUZANT SETRAK HALEBIAN, D.D.S. (Oct. 1965) *Instructor in Dental Hygiene*
 *MARY STARRITT HALL (MRS. R. W.) Ph.D. (1961-62; 1965) *Assistant Professor of English*
 *ROBERT WILLIAM HALL, Ph.D. (1957) *Professor of Philosophy and Religion*
 WILLIAM HALPERN, Ph.D. (Aug. 1969) *Assistant Professor of Physiology and Biophysics*
 BURT BENJAMIN HAMRELL, M.D. (Aug. 1968) *Instructor in Physiology, Biophysics and Medicine*
 HARRIET A. HAND, M.S. (1970) *Assistant Professor of Home Economics*
 *SAMUEL B. HAND, Ph.D. (Feb. 1961) *Professor of History*
 *MORRIS HANDELSMAN, Ph.D. (1969) *Professor of Electrical Engineering*
 *EDWARD MICHAEL HANLEY, Ph.D. (1969) *Assistant Professor of Education*
 PETER ROBERT HANNAH, Ph.D. (Jan. 1967) *Assistant Professor of Forestry*
 JOHN SHERWOOD HANSON, M.D. (1958) — C *Associate Professor of Medicine*
 LAWRENCE STANLEY HARRIS, M.D. (Aug. 1968) *Assistant Professor of Pathology*
 BETH A. HART, Ph.D. (1970) *Assistant Professor of Biochemistry*
 JOHN ELLIS HARTFORD, M.D. (Dec. 1969) *Assistant Professor of Anesthesiology*
 JOHN F. HARWOOD, B.S. (1964) *Lecturer in Radiological Safety*
 JOSEPH E. HASAZI, M.A. (1970) *Assistant Professor of Psychology*
 *ROLF N. B. HAUGEN, Ph.D. (1947) *Professor of Political Science*
 *WILLIAM A. HAVILAND, Ph.D. (1965) — C *Associate Professor of Sociology and Anthropology*
 MARGARET ELLEN HAYES, M.S. (1966) *Assistant Professor of Physical Education*
 RICHARD S. HEILMAN, M.D. (1968) *Assistant Professor of Radiology*
 CALEF E. HEININGER, SR., D.D.S. (1970) *Instructor in Dental Hygiene*
 PAUL LEHMANN HEININGER, D.D.S. (1950) *Assistant Professor of Dental Hygiene*
 JOHN WILBUR HEISSE, JR., M.D. (1956) *Assistant Professor of Otolaryngology*
 *E. BENNETTE HENSON, Ph.D. (1965) *Professor of Zoology*
 SUSAN CHANTAL HERMITTE (1969) *Instructor in Romance Languages*
 FRANCIS R. HEWITT, M.A. (1970) *Assistant Professor of Art*
 DANIEL W. HIGGINS, M.F.A. (1969) *Teaching Assistant in Art*
 RAUL HILBERG, Ph.D. (Feb. 1956) *Professor of Political Science*
 *DAVID BYRNE HILL, Ph.D. (1965) *Associate Professor of Mathematics and Community Medicine*
 FRANKLIN THEODORE HOAGLUND, M.D. (Feb. 1968) *Professor of Orthopedic Surgery*
 WILLIAM ELWIN HODGKIN, M.D. (Oct. 1964) *Associate Professor of Pediatrics*
 THOMAS WAYNE HOEKSTRA, B.S.A. (Feb. 1970) *Assistant Professor of Forestry*
 *CHARLES WILLIAM HOILMAN, M.S. (1949) *Associate Professor of Electrical Engineering*
 ROBERT ADAMS HOLDEN, M.D. (1966) *Assistant Professor of Medicine*
 J. LORIMER HOLM, M.D. (1970) *Instructor in Radiology*
 ANNE CAROLINE DODGE HOOPER, M.D. (April 1967) *Instructor in Pathology*
 *RICHARD JOHN HOPP, M.S. (1947) *Professor of Plant and Soil Science*
 EDWARD SCHURR HORTON, M.D. (1967) *Associate Professor of Medicine*
 MARTHA HILTON HOUGHTON, Ed.M. (Jan. 1970) *Lecturer in Speech*
 CHARLES SNEAD HOUSTON, M.D. (Aug. 1966) *Professor of Community Medicine*
 BARBARA J. HOWARD, B.S. (1970) *Instructor in Home Economics*
 PHILLIP LLOYD HOWARD, M.D. (1969) *Assistant Professor of Pathology*
 *JAMES ROBINSON HOWE, Ph.D. (1964) — E *Assistant Professor of English*
 *DAVID CHARLES HOWELL, Ph.D. (1967) *Assistant Professor of Psychology*
 LUC HUANG, Ph.D. (1968) *Assistant Professor of Physics*
 ROBERT BRUCE HUBER, Ph.D. (1946) — B *Edwin P. Lawrence Forensic Professor of Speech*
 HANS ROSENSTOCK HUESSEY, M.D. (1960) *Professor of Psychiatry*
 *MAHENDRA SINGH HUNDAL, Ph.D. (1967) *Associate Professor of Mechanical Engineering*
 *ALLEN STANDISH HUNT, Ph.D. (Feb. 1961) *Associate Professor of Geology*
 *LYMAN CURTIS HUNT, JR., D.Ed. (1966) *Professor of Education*
 ROBERT JACOB HUNZIKER, M.D. (Jan. 1963) *Associate Professor of Radiology*
 PATRICK H. HUTTON, Ph.D. (1968) *Assistant Professor of History*
 *BEAL BAKER HYDE, Ph.D. (1965) — C *Professor of Botany*

- ROBERT WELLS HYDE, M.D. (Oct. 1967)
 JUDITH ANN INGALLS, B.S. (Jan. 1970)
 PETER RUDOLF INGOLD, M.A. (1968) — F
 ROBERT JOHN IORIO, Ph.D. (1969)
 EDWARD SUTER IRWIN, M.D. (Jan. 1963)
 ELIZABETH E. ISHAM, B.S. (1969)
 *YOSHINORI ISHIKAWA, Ph.D. (1968)
 *JOSEPH ANTHONY IZZO, Ph.D. (1956) — G
 LOUIS MARIO IZZO, M.S. (1969)
 *JULIAN JOSEPH JAFFE, Ph.D. (1961)
 GLADYS MARGARET JAMESON, M.Ed. (1968)
 CLINTON DALES JANNEY, Ph.D. (1959)
 RICHARD HARRY JANSON, Ph.D. (1958)
 WILLIAM J. JEWELL, Ph.D. (1970)
 *JUSTIN MANFRED JOFFE, Ph.D. (1969)
 JAN ERIK HUBERT JOHANSSON, M.A. (1969)
 SHIRLEY EVANGELINE JOHNSON, M.A. (1967)
 ELBRIDGE EUGENE JOHNSTON, M.D. (1951)
 *STUART LYNDE JOHNSTON, Ph.D. (1940-42; 1943-44; 1946)
 W. HERBERT JOHNSTON, M.D. (1952)
 *DONALD BOYES JOHNSTONE, Ph.D. (1948)
 JANICE L. JONES, Ph.D. (1970)
 *LEONIDAS MONROE JONES, Ph.D. (1951) — D
 WARNER EDRICK JONES, M.D. (Jan. 1968)
 JANET CAROLYN JOSLYN, M.N. (1969)
 *DAVID W. JUNKER, Ph.D. (1964) — B
 *ROY GEORGE JULOW, Ph.D. (1957) — B
 HARRY HELMUTH KAHN, M.A. (1948-53; 1954)
 ROBERT E. KANICH, M.D. (1969)
 IRWIN SEYMOUR KAYE, M.D. (1966)
 PHILIP CONBOY KELLEHER, M.D. (1963)
 JAY EDGAR KELLER, M.D. (1950)
 WILLIAM HOWARD KELLY, Ph.D. (1969)
 *MARC Z. KESSLER, Ph.D. (1969)
 *JOHN L. KICE, Ph.D. (1970)
 DANIEL U. KILEY (1970)
 *DAVID LESLIE KINSEY, Ph.D. (1950)
 FLORA ELIZABETH KINSEY, (1969)
 JOSEPH P. KISKO, M.A.Ed. (1970) *Adjunct Assistant Professor of Vocational, Technical, and Extension Education*
 THOMAS ROBERT KLEH, M.D. (1965)
 KAREN RUTH KLEILER, M.S. (1969)
 *RICHARD M. KLEIN, Ph.D. (1967)
 MARTHA F. KNIGHT, M.Ed. (1968)
 STEPHEN CECIL KNIGHT, JR., M.S. (1952)
 ESTHER LUCILE KNOWLES, M.S. (1945)
 JOHN HENRY KNOX, M.A. (1969)
 MAURICE EMILE KOHLER, Ph.D. (1965)
 MOLLY F. KOHLER, M.A. (1970)
 *ROY KORSON, M.D. (1950-52; 1954)
 *ANDREW PAUL KRAPCHO, Ph.D. (1960)
 EDWARD L. KRAWITT, M.D. (June 1969)
 *JOHN ERNEST KRIZAN, Ph.D. (1962)
 *MARTIN ERIC KUEHNE, Ph.D. (1961) — B
 RAYMOND FRANK KUHLMANN, M.D. (1951)
 RICHARD P. KUKLIS, M.B.A. (1970)
 ARTHUR F. SAUL KUNIN, M.D. (1957-63; 1964) — A
 EDWARD ANTHONY KUPIC, M.D. (Oct. 1966)
 EDWARD THADDEUS KUSIAK, M.Ed. (1969)
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Instructor in Dental Hygiene
Assistant Professor of Geography
Assistant Professor of Anatomy
Associate Professor of Ophthalmology
Adjunct Instructor in Medical Technology
Instructor in Biochemistry
Professor of Mathematics
Instructor in Radiologic Physics
Professor of Pharmacology
Assistant Professor, Human Development
Professor of Radiology
Professor of Art
Assistant Professor of Civil Engineering
Associate Professor of Psychology
Instructor in Mathematics
Instructor in English
Clinical Assistant Professor of Medicine
Professor of Romance Languages
Assistant Professor of Radiology
Professor of Medical Microbiology
Assistant Professor of Medical Technology
Professor of English
Clinical Instructor in Medicine
Instructor in Nursing
Professor of Physics
Associate Professor of Romance Languages
Associate Professor of German
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Assistant Professor of Psychology
Professor of Chemistry
Adjunct Professor of Civil Engineering
Associate Professor of Music
Instructor in Music
Assistant Professor of Ophthalmology
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Professor of Botany
Instructor in Education
Associate Professor of Civil Engineering
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Instructor in Mathematics
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Instructor in English
Professor of Pathology
Professor of Chemistry
Assistant Professor of Medicine
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Professor of Chemistry
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 *GENE EARL LABER, Ph.D. (1968) *Assistant Professor of Economics and Business Administration*
- LLOYD FRANCIS LACASSE, B.S. (1969) *Instructor in Physical Education*
 *DAVID CHIN LAI, Eng.D. (1965) — C *Associate Professor of Electrical Engineering*
 DENIS EMERY LAMBERT, M.A.T. (1964) *Associate Professor of Physical Education*
 *LLOYD MILTON LAMBERT, JR., Ph.D. (1965) — C *Associate Professor of Electrical Engineering*
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 CHRISTOPHER CHARLES LANE, M.A. (1969) *Visiting Associate Professor of Speech*
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 PETER R. LARDY, M.A. (1970) *Instructor in Speech and Drama*
 CALVIN J. LARSON, Ph.D. (1970) *Associate Professor of Sociology*
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 BETTY J. LATES, M.Ed. (1970) *Adjunct Instructor of Education*
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 GUY WHITMAN LEADBETTER, M.D. (1967) *Professor of Urology*
 DAVID C. LEAVITT, M.Ed. (1970) *Adjunct Assistant Professor of Vocational, Technical, and Extension Education*
- HERBERT L. LEFF, Ph.D. (1970) *Assistant Professor of Psychology*
 LESLIE RAYMOND LEGGETT, D.P.E. (1962) *Associate Professor of Physical Education*
 OLGA LEHOVICH, M.A. (1968) *Instructor in Romance Languages*
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 MICHAEL HEATON LEONARD, Ph.D. (1964) *Assistant Professor of English*
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 EUGENE LEPESCHKIN, M.D. (Dec. 1946) *Professor of Medicine*
 JULIE W. LEPESCHKIN, (MRS. E.) M.A. (1959-61; 1962) *Assistant Professor, Early Childhood Education*
- LOWELL S. LETOURNEAU, (1969) *Adjunct Instructor in Medical Technology*
 HYMAN BERNARD LEVINE, M.D. (Oct. 1961) *Clinical Instructor in Community Medicine*
 ARTHUR MAURICE LEVY, M.D. (1963) *Associate Professor of Medicine*
 *GORDON FIELDING LEWIS, Ph.D. (1961) — A *Professor of Sociology and Anthropology*
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 *WILLIAM J. LEWIS, Ph.D. (1954) *Professor of Speech*
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 *HARRY LIGHTHALL, JR., Ph.D. (1955) *Associate Professor of Mathematics*
 AULIS O. LIND, Ph.D. (1970) *Assistant Professor of Geography*
 PETER CASTLE LINTON, M.D. (Jan. 1965) *Assistant Professor of Surgery*
 WILLIAM C. LIPKE, Ph.D. (1970) *Assistant Professor of Art*
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 GEORGE THOMAS LITTLE, Ph.D. (1950) *Professor of Political Science*
 *JOHN ERNEST LITTLE, Ph.D. (1945) *Professor of Microbiology and Biochemistry*
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 MARSHALL G. LONDON, M.D. (1970) *Assistant Professor of Medicine*
 *NORMAN THEODORE LONDON, Ed.D. (1960) *Professor of Speech*
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 *LITTLETON LONG, Ph.D. (1949) *Professor of English*
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 GEORGE D. LOSEE, M.A. (1970) *Instructor in Speech and Drama*
 ROBERT B. LOW, Ph.D. (1970) *Assistant Professor of Physiology*
 JEROLD FRANCIS LUCEY, M.D. (1956) *Professor of Pediatrics*
 *WILLIAM HOSSFELD LUGINBUHL, M.D. (1960) *Professor of Pathology*

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 CHRISTOPHER PATRICK McAREE, M.B. (Aug. 1962) — A
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 HARRY J. McENTEE, Ph.D. (1970) *Assistant Professor of Education*
 J. BISHOP McGILL, M.D. (1952) *Clinical Assistant Professor of Surgery*
 GERALD FRANCIS McGINNIS, M.D. (1962) *Assistant Professor of Psychiatry*
 JOHN MARSHALL McGINNIS, JR., M.D. (Oct. 1969) *Assistant Professor of Otolaryngology*
 DIANE M. McGRATH, M.A. (1970) *Assistant Professor of Psychology*
 *JERRY LEON McINTOSH, Ph.D. (1964) *Associate Professor of Plant and Soil Science*
 ELIZABETH FOOTE McKAY, M.S.W. (1969) *Instructor in Social Welfare*
 ROBERT JAMES McKAY, JR., M.D. (1949) *Professor of Pediatrics*
 MARION CLAIRE McKEE, M.D. (1958) *Clinical Assistant Professor of Pediatrics and*
Instructor in Neurology
 FRANK P. McKEGNEY, JR., M.D. (1970) *Professor of Psychiatry*
 *HUGH STRATTON McKENZIE, Ph.D. (1967) *Associate Professor of Education*
 *RICHARD WARREN McLAY, Ph.D. (1968) *Associate Professor of Mechanical Engineering*
 E. DOUGLAS McSWEENEY, JR., M.D. (1964) *Assistant Professor of Surgery*
 JOHN HAMILTON MABRY, Ph.D. (1963) *Professor of Community Medicine*
 GEORGE BUTTERICK MacCOLLOM, Ph.D. (1966) *Professor of Plant and Soil Science*
 MURDO MacDONALD, M.D. (1960) *Instructor in Physiology*
 ALBERT GEORGE MACKAY, M.D. (1933) *Professor of Surgery*
 ROBERT STANFORD MacLELLAN, D.D.S. (1969) *Instructor in Dental Hygiene*
 *WILLIAM HOOPER MACMILLAN, Ph.D. (1954) *Professor of Pharmacology*
 JAMES FREDERICK MADISON, M.D. (Nov. 1964) *Assistant Professor of Dermatology*
 JOHN VANSICKLEN MAECK, M.D. (1948) *Professor of Obstetrics and Gynecology*
 FRANCES E. MAGEE, M.S.N. (1968) *Assistant Professor of Nursing*
 *FRANK MANCHEL, Ed.D. (1967) *Associate Professor of English*
 J. EDWARD MARCEAU, D.D.S. (1949-52; 1954) *Assistant Professor of Dental Hygiene*
 CARLTON DEAN MARSHALL, M.D. (1966) *Assistant Professor of Psychiatry*
 GILBERT ADAMS MARSHALL, M.S. (1947) *Associate Professor of Mechanical Engineering*
 KATHLEEN AUDREY MARSLAND, M.S. (1964) *Assistant Professor of Nursing*
 THOMAS WILLIAMS MARTENIS, M.D. (1967) *Assistant Professor of Medicine*
 HERBERT L. MARTIN, M.D. (1965) *Professor of Neurology*
 LUTHER HOWARD MARTIN, JR., S.T.M. (1967) *Instructor in Philosophy and Religion*
 *FRANK MARTINEK, Ph.D. (1967) *Associate Professor of Mechanical Engineering*
 *JAMES WALLACE MARVIN, Ph.D. (1939) — H
 ROBERT L. MASSONEAU, M.D. (1968) *Professor of Botany*
 HUNTINGTON MAVOR, M.D. (Aug. 1969) *Instructor in Medicine*
 ROBERT ARTHUR MAXWELL, Ph.D. (1962-65; 1967) *Associate Professor of Neurology*
 JOHN EDMUND MAZUZAN, JR., M.D. (1959) *Visiting Professor of Pharmacology*
 PHILIP B. MEADE, M.D. (1971) *Associate Professor of Anesthesiology*
Assistant Professor of Obstetrics and Gynecology
 (July 1971)
 HAROLD EDWARD MEDIVETSKY, M.D. (1937) *Clinical Assistant Professor of Medicine*
 CORNELIUS IRVING MEEKER, M.D. (1962) *Assistant Professor of Obstetrics*
and Gynecology
 HAROLD AUSTIN MEEKS, Ph.D. (1964) — A
 R. W. PAUL MELLISH, M.B. (1963) *Associate Professor of Geography*
 *DONALD BURTON MELVILLE, Ph.D. (1960) *Associate Professor of Pediatric Surgery*
 DONALD J. MERCHANT, Ph.D. (1969) *Professor of Biochemistry*
 LEONARD S. MERCIA, M.S. (1954) *Professor of Medical Microbiology*
 EDWARD F. MERRILL, B.S. (1969) *Lecturer in Animal Sciences*
 *BRUCE ELWYN MESERVE, Ph.D. (1964) — C
 MARION ELIZABETH METCALFE, (MRS. W. C.) B.A. (1966) *Adjunct Instructor in Medical Technology*
 *WILLIAM CRAIG METCALFE, Ph.D. (1963) — A
 *WILLIAM LAROS MEYER, Ph.D. (1962) *Professor of Mathematics*
 *GARY KEITH MICHAEL, M.B.A., C.P.A. (1965) — D
Instructor in Music
Associate Professor of History
Associate Professor of Biochemistry
 REGINALD VENN MILBANK, M.S. (1946-48; 1949) *Assistant Professor of Economics and Business Administration*
 *EDWARD JERVIS MILES, Ph.D. (1962) *Professor of Civil Engineering*
 RAYMOND LEE MILHOUS, M.D. (Feb. 1968) *Professor of Geography*
Associate Professor of Rehabilitation Medicine

- DAVID ALLISON MILLER, M.S. (Dec. 1969) *Assistant Professor of Community Medicine*
DONALD BARKER MILLER, M.D. (1951) *Associate Professor of Thoracic and Cardiac Surgery*
GARY E. MILLER, M.A. (1970) *Instructor in English*
WILLARD MARSHALL MILLER, Ph.D. (1969) *Assistant Professor of Philosophy and Religion*
JEAN BEATTIE MILLIGAN, M.Ed. (1953) *Associate Professor of Nursing*
ISABEL CLARK MILLS, M.A. (1932) *Associate Professor of Art*
JOHN HOLLISTER MILNE, M.D. (1964) *Clinical Assistant Professor of Medicine*
HOWARD JAY MINDELL, M.D. (Oct. 1967) *Assistant Professor of Radiology*
ANTHONY B. MINNEFOR, M.D. (1970) *Assistant Professor of Pediatrics*
*GAGAN MIRCHANDANI, Ph.D. (1968) *Assistant Professor of Electrical Engineering*
WILLIAM EDWARD MITCHELL, Ph.D. (1967) *Associate Professor of Psychiatry*
THOMAS JOHN MOEHRING, Ph.D. (Jan. 1968) *Assistant Professor of Medical Microbiology*
MAUREEN KATHERINE MOLLOY, M.D. (1968) *Assistant Professor of Orthopedic Surgery*
JAMES LEO MONAHAN, B.S. (Jan. 1970) *Lecturer in Political Science*
MAURICE EDWARD MONGEON, M.D. (Oct. 1966) *Assistant Professor of Medicine*
DALE BISHOP MONTGOMERY, D.M.D. (Feb. 1965) *Assistant Professor of Dental Hygiene*
PAUL AMOS MOODY, Ph.D. (1927) *Howard Professor of Natural History and Zoology*
JOHN W. MOORE, D.Ed. (1970) *Assistant Professor of Education*
JOHN G. MORGAN, M.B. (1970) *Assistant Professor of Anesthesiology*
JOSEPHINE ANN MORGAN, D.N. (Oct. 1969) *Instructor in Obstetrics and Gynecology Nursing*
PAUL MICHAEL MORRISSEAU, M.D. (Jan. 1970) *Assistant Professor of Urology*
CHARLES THOMAS MORRISSEY, M.A. (1968) *Adjunct Professor of History*
JAMES R. MORROW, M.A. (1970) *Instructor in Mathematics*
RUFUS CLEGG MORROW, M.D. (1951) *Professor of Otolaryngology*
*ELLEN HASTINGS MORSE, Ph.D. (1960) *Professor, Nutrition*
*DONALD EUGENE MOSER, Ph.D. (1960) — A *Professor of Mathematics*
MICHAEL JEROME MOYNIHAN, M.D. (1966) *Assistant Professor of Medicine*
*H. NICHOLAS MULLER, III, Ph.D. (1966) *Assistant Professor of History*
RICHARD E. MURPHY, M.D. (1970) *Instructor in Obstetrics and Gynecology*
BARBARA LEE SPAULDING MURRAY, M.S. (Mar. 1968) *Instructor in Nursing*
JOHN JOSEPH MURRAY, M.D. (1968) *Instructor in Pediatrics*
ROGER WALTER MURRAY, D.V.M. (1968) *Associate Professor of Animal Pathology*
*RICHARD E. MUSTY, Ph.D. (Jan. 1968) *Assistant Professor of Psychology*
CHARLES CHRISTOPHER MYERS, Ph.D. (1969) *Assistant Professor of Forestry*
*MILTON JOSEPH NADWORNYY, Ph.D. (1952) — B *Professor of Economics and Business Administration*
STEPHEN WILLIAM NAGY, Ph.D. (1969) *Assistant Professor of Physics*
KENNETH L. NALIBOW, A.M. (1970) *Instructor in German*
RICHARD MILTON NARKEWICZ, M.D. (1966) *Clinical Instructor in Pediatrics*
*ROBERT JAMES NASH, Ed.D. (1969) *Assistant Professor of Education*
WILLIAM P. NEAL, M.A. (1970) *Instructor in Speech and Drama*
WILLIAM HOWARD NEDDE, JR., M.S. (1967) *Instructor in Physical Education*
GARRISON NELSON, M.A. (1968) *Instructor in Political Science*
DAVID S. NEWCOMBE, M.D. (Oct. 1967) *Associate Professor of Medicine*
CHESTER ALBERT NEWHALL, M.D. (1929) *Thayer Professor of Anatomy*
GEORGE HUBERT NICHOLSON, M.A. (1923) *Lecturer in Mathematics*
ALEXANDER NIES, M.D. (1965) *Assistant Professor of Psychiatry*
KAY MILLIGAN NILSON, Ph.D. (Aug. 1966) *Associate Professor of Animal Sciences*
HOWARD L. NIXON, II, B.A. (1970) *Instructor in Sociology*
JAMES ROBERT NOLFI, II, Ph.D. (1969) *Assistant Professor of Zoology*
*CHARLES PRYOR NOVOTNY, Ph.D. (1968) *Assistant Professor of Medical Microbiology*
MITSUO NUMOTO, M.D. (1962) *Associate Professor of Surgery*
MANUEL NUNEZ-de-CELA, M.A. (1970) *Instructor in Romance Languages*
*ANDREW EDGERTON NUQUIST, Ph.D. (1938) *McCullough Professor of Political Science*
*WESLEY LEMARS NYBORG, Ph.D. (1960) *Professor of Physics*
*ELBERT AUSTIN NYQUIST, M.S., C.P.A. (1953) *Professor of Economics and Business Administration*
JOSEPH H. OAKEY, Ed.M. (1970) *Adjunct Professor of Education*
ROBERT EMMETT O'BRIEN, M.D. (1956) *Clinical Associate Professor of Medicine*
RICHARD WILLIAM OEHLER, B.Ed. (1967) *Lt. Colonel, U.S. Army, Professor of Military Science*

- DONALD CLARK OLIVEAU, M.D. (1968) *Assistant Professor of Psychiatry*
 HERLUF V. OLSEN, JR., M.H.A. (Oct. 1967) *Professor of Hospital Administration*
 JAMES PAUL OLSON, Ph.D. (1969) *Assistant Professor of Civil Engineering*
 *JOSEPH CLARENCE OPPENLANDER, Ph.D. (Jan. 1969) *Professor of Civil Engineering*
 *RALPH HARRY ORTH, Ph.D. (1959) *Professor of English*
 MARILYN MAY OSBORN, M.Ed. (1968) *Instructor, in Home Economics Education*
 CLARE MARSHALL O'SHEA, M.D. (1955-64; 1967) *Instructor in Medicine*
 *JOHN OGDEN OUTWATER, Sc.D. (1956) *Professor of Mechanical Engineering*
 *JAMES HARRIS OVERFIELD, Ph.D. (1968) *Assistant Professor of History*
 EDWIN MERTON OWRE, M.F.A. (1969) *Assistant Professor of Art*
 JAMES STEVEN PACY, M.A. (1967) *Assistant Professor of Political Science*
 *WILLIAM EDWARD PADEN, Ph.D. (1965) — C *Assistant Professor of Philosophy and Religion*
 PAUL PAGANUZZI, Ph.D. (1961) — E *Associate Professor of Russian*
 H. GORDON PAGE, M.D. (1954) *Clinical Professor of Surgery*
 MARY ELLEN HUNT PALMER, M.S. (1953) *Associate Professor of Nursing*
 PHYLLIS E. PAOLUCCI, M.Ed. (1970) *Adjunct Instructor in Education*
 *IPPOCRATES PAPPOTSIAKIS, M.Mus. (1940) *Professor of Music*
 MICHAEL J. PARENTI, Ph.D. (1970) *Associate Professor of Political Science*
 DAVID RAYMOND PARK, M.D. (1969) *Clinical Instructor in Medicine*
 BRUCE L. PARKER, Ph.D. (1965) *Lecturer in Plant and Soil Science*
 MALCOLM SKEELS PARKER, D.M.L. (1953) *Associate Professor of Romance Languages*
 *RODNEY LAWRENCE PARSONS, Ph.D. (1967) *Assistant Professor of Biophysics and Biophysics*
 ALAN KIMMEL PASKOW, M.A. (1968) *Instructor in Philosophy and Religion*
 STEPHEN L. PASTNER, B.A. (1970) *Instructor in Sociology*
 *WAYNE CURTIS PATTERSON, Ph.D. (Jan. 1965) *Associate Professor of Psychology*
 HENRI ROGER PAUCKER, Ph.D. (1969) *Assistant Professor of German*
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 PHYLLIS G. PERELMAN, M.Ed. (1963) *Instructor in Education*
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 *MERVYN WILLIAM PERRINE, Ph.D. (1961) — A *Associate Professor of Psychology*
 *JAMES ALLAN PETERSON, Ed.D. (1966) *Associate Professor of Education*
 OSCAR SYLVANDER PETERSON, JR., M.D. (1944) *Clinical Associate Professor of Radiology*
 MARY MARGARET PETRUSICH, Ph.D. (1962) — A *Associate Professor of Education*
 C. ALAN PHILLIPS, M.D. (1966) *Associate Professor of Medicine and Medical Microbiology*
 CAROL FENTON PHILLIPS, M.D. (Aug. 1968) *Assistant Professor of Pediatrics*
 LORRAINE W. PHILLIPS, D.N.S. (1970) *Associate Professor of Nursing*
 RAYMOND V. PHILLIPS, Ph.D. (1958) *Professor of Education*
 RONALD CHESTER PICOFF, M.D. (1965) *Associate Professor of Pathology*
 DAVID BOGART PILCHER, M.D. (1969) *Assistant Professor of Surgery*
 BLANCHE R. PODHAJSKI, M.A. (1970) *Lecturer in Speech and Drama*
 *SIDNEY BORIS POGER, Ph.D. (1962) *Associate Professor of English*
 ELEANOR R. POLLARD (1969) *Adjunct Instructor in Medical Technology*
 ZANDER PONZO, Ph.D. (Jan. 1970) *Assistant Professor of Education*
 LUCENE LOUISE POOLEY, (MRS. J. E.), B.S. (Jan. 1970) *Instructor in Home Economics*
 WILLARD BISSELL POPE, Ph.D. (1934) *Professor of English*
 CHARLES MARCEL POSER, M.D. (Dec. 1968) *Professor of Neurology*
 *MILTON POTASH, Ph.D. (1951) *Professor of Zoology*
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 EDWARD V. POWELL, B.S. (1970) *Instructor in Music*
 PLATT RUGAR POWELL, M.D. (1949) *Clinical Professor of Urology*
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 *RONALD EUGENE PRATHER, Ph.D. (1969) *Associate Professor of Mathematics*
 WILLIAM ARTHUR PRATT, M.D. (1954) *Clinical Instructor in Medicine*
 FAITH KENYON PRIOR, M.S. (1967) *Assistant Professor, Family Economics*
 ANN PEMRICK QUINN, M.A. (Jan. 1967) — M *Instructor in Nursing*
 *DAVID WILLIAM RACUSEN, Ph.D. (1958) *Professor of Agricultural Biochemistry*
 CHARLES RATHBONE, Ph.D. (1970) *Assistant Professor of Education*
 CHARLES LEWIS RAVARIS, M.D. (1965) *Associate Professor of Psychiatry*

- EVELYN R. READ, M.M. (1969) *Instructor in Music*
 THOMAS LAWRENCE READ, M.M. (1967) *Assistant Professor of Music*
 RICHARD REA REED, D.D.S. (1969) *Instructor in Dental Hygiene*
 PAUL THOMAS REINHARDT, B.S.E. (1968) *Instructor in Physical Education*
 *ERNEST REIT, Ph.D. (Dec. 1965) *Associate Professor of Pharmacology*
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 VERONICA CHRISTINE RICHEL, Ph.D. (1969) *Assistant Professor of German*
 WILLIAM G. RIEDERER, B.S. (Oct. 1969) *Capt. U.S. Army, Assistant Professor of Military Science*
 DONALD L. RIFE, M.D. (Jan. 1970) *Clinical Assistant Professor of Psychiatry*
 *HEATH KENYON RIGGS, Ph.D. (1940-42; 1953) *Professor of Mathematics*
 B. ALBERT RING, M.D. (1959) *Associate Professor of Radiology*
 *SOL ALEXANDER RIPPA, Ed.D. (1960) *Professor of Education*
 *DONALD STETSON ROBINSON, M.D. (1968) *Associate Professor of Medicine*
 ALICE KELLY RODGERS, M.S. (1962) *Assistant Professor of Nursing*
 MARGARET DAMM ROLAND, Ph.D. (1966) *Assistant Professor of Art*
 JON ERIK ROLF, B.A. (Jan. 1970) *Assistant Professor of Psychology*
 *ALFRED BROOKS ROLLINS, JR., Ph.D. (1967) *Professor of History*
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 ALFRED FELIX ROSA, M.A. (1969) *Instructor in English*
 CHARLES ROBERT ROSS, L.L.B. (Jan. 1969) *Adjunct Professor in the Experimental Program*
 RAYMOND JOSEPH ROSS, D.Ed. (Jan. 1970) *Associate Professor of Vocational, Technical and Extension Education*
 *WILFRED ROTH, Ph.D. (1964) — A *Professor of Electrical Engineering*
 *HOWARD ROTHSTEIN, Ph.D. (1962) — E *Professor of Zoology*
 *KENNETH S. ROTHWELL, Ph.D. (1970) *Professor of English*
 BLANCHE E. ROYCE, B.S.Ed. (1970) *Adjunct Professor of Education*
 VIRGINIA C. RUDWICK, (1970) *Instructor in Obstetrics and Gynecology*
 BARBARA McNEIL RULE, M.Ed. (Feb. 1969) *Instructor in Nursing*
 CARL FREDERICK RUNGE, M.D. (1969) *Assistant Professor of Medicine*
 *STANLEY RUSH, Ph.D. (1962) *Professor of Electrical Engineering*
 ELEANOR MARY RUSSELL, B.S. (1967) *Instructor in Medical Technology*
 JOSEPH N. RUSSO, M.D. (1968) *Clinical Assistant Professor of Obstetrics and Gynecology*
 CHARLES BRUSH RUST, M.D. (1948) *Clinical Associate Professor of Orthopedic Surgery*
 WILLIAM JOHN RYAN, M.D. (Jan. 1970) *Clinical Instructor in Medicine*
 RICHARD ALAN RYDER, M.D. (1967) *Assistant Professor of Medicine*
 THOMAS DUDLEY SACHS, Ph.D. (Feb. 1962) *Assistant Professor of Physics*
 *ALBERT WILLIAM SADLER, Ph.D. (1956) *Professor of Philosophy and Religion*
 HARVEY SALGO, M.A. (1969) *Assistant Professor of Economics and Business Administration*
 *FREDERIC OBERLIN SARGENT, Ph.D. (Aug. 1962) *Professor of Agricultural Economics*
 KENNETH P. SAURMAN, D.Ed. (1970) *Assistant Professor of Education*
 HERBERT SAVEL, M.D. (1967) *Assistant Professor of Medicine*
 WADI ISSA SAWABINI, D.D.S. (1951) *Associate Professor of Dental Hygiene*
 JANET RUTH SAWYER, Ph.D. (1968) *Associate Professor of Nursing*
 ROBERT NEWTON SAXBY, M.D. (1954) *Assistant Professor of Radiology*
 JANET M. SCANLON, B.S. (1969) *Adjunct Instructor in Medical Technology*
 *LEONARD MICHAEL SCARFONE, Ph.D. (1963) *Professor of Physics*
 *WARREN IRA SCHAEFFER, Ph.D. (Dec. 1967) *Assistant Professor of Medical Microbiology*
 *ARNOLD HAROLD SCHEIN, Ph.D. (1947) *Associate Professor of Biochemistry*
 WILLIAM MURRELL SCHENK, M.A. (1965) *Assistant Professor of Speech*
 *ROBIN RUDOLF SCHLUNK, Ph.D. (1967) *Assistant Professor of Classics*
 CARL LUDWIG SCHMIDER, M.A. (1968) *Instructor in Speech*
 FREDERICK E. SCHMIDT, M.S. (1970) *Assistant Professor of Sociology*
 *WOLFE WILHELM SCHMOKEL, Ph.D. (1962-64; 1965) *Associate Professor of History*
 EDWIN CALVIN SCHNEIDER, M.S. (1946) *Professor of Agricultural Engineering*
 LAURA E. SCHNEIDER, A.B. (1968) *Instructor in Education*
 PETER SCHOFIELD, D.Ph. (1970) *Assistant Professor of Biochemistry*
 *NORMAN JAMES SCHOONMAKER, Ph.D. (1956) *Professor of Mathematics*
 *HAROLD SEESSEL SCHULTZ, Ph.D. (1946) *Professor of History*
 *HERBERT LOUIS SCHULTZ, M.A. (1957) *Associate Professor of Music*
 JAN R. SCHULTZ, M.S. (1969) *Assistant Professor of Community Medicine*

- JOSEPH DONALD SCHULTZ, M.D. (April 1970) *Assistant Professor of Community Medicine*
 GEORGE ADAM SCHUMACHER, M.D. (1950) *Professor of Neurology*
 ROBERTA B. SCHWALB, M.A. (1958) *Assistant Professor of Nursing and Obstetrics and Gynecology*
- BENJAMIN F. SCHWEYER, L.L.B. (1963) *Adjunct Assistant Professor of Economics and Business Administration*
- JO ANN SCRANTON, M.S. (1968) *Instructor in Nursing*
 FINLEY ALEXANDER SEAGLE, M.D. (1969) *Clinical Instructor in Medicine*
 KENNETH A. SEID, Ph.D. (1970) *Assistant Professor of English*
 ANTHONY DOMINIC SERRA, M.A. (1967) — M *Instructor in Romance Languages*
 MALCOLM FLOYD SEVERANCE, Ph.D. (1951-52; 1953) *Associate Professor of Economics and Business Administration*
- PETER JORDAN SEYBOLT, Ph.D. (1969) *Assistant Professor of History*
 JAMES DOUGLAS SHARPE, M.D. (Jan. 1965) *Assistant Professor of Psychiatry*
 WILLIAM IRELAND SHEA, M.D. (1952) *Clinical Assistant Professor of Surgery*
 *ALLEN GLASS SHEPHERD, III, Ph.D. (1965) — D *Associate Professor of English*
 PHILIP F. SHERIDAN, M.A. (Jan. 1967) *Instructor in English*
 ELIZABETH ANNE SHERMAN, B.S. (1969) *Instructor in Art*
 TAMOTSU SHINOZAKI, M.D. (1967) *Assistant Professor of Surgery*
 LESTER SILBERMAN, M.D. (1971) *Assistant Professor of Obstetrics and Gynecology (July 1971)*
- *KENNETH ROGERS SIMMONS, Ph.D. (Jan. 1963) *Associate Professor of Animal Sciences*
 MORRIS LEON SIMON, M.A. (1954) — B *Associate Professor of Political Science*
 RENO THOMAS SIMONE, JR., M.A. (1968) *Instructor in English*
 JAMES EDWIN SIMPSON, M.D. (1953) *Clinical Assistant Professor of Orthopedic Surgery*
 ETHAN ALLEN HITCHCOCK SIMS, M.D. (1950) *Professor of Medicine*
 WARREN FREDERICK SIMS, JR., M.D. (1966) *Assistant Professor of Obstetrics and Gynecology*
- *ROBERT ORVILLE SINCLAIR, Ph.D. (1953-55; 1956) *Professor of Agricultural Economics*
 *ROBERT ERIK SJOGREN, Ph.D. (1967) *Assistant Professor of Microbiology and Biochemistry*
- HOWARD DARRELL SLACK, D.D.S. (1950) *Assistant Professor of Dental Hygiene*
 HUBERT R. SLACK, M.H.A. (1970) *Adjunct Assistant Professor of Physical Education*
 WILLIAM JOSEPH SLAVIN, M.D. (May 1943) *Professor of Obstetrics and Gynecology*
 MARY GREENLAW SLOANAKER, B.S. (1968) *Instructor in Dental Hygiene*
 *ALBERT MATTHEW SMITH, Ph.D. (1957) *Professor of Animal Sciences*
 *ANDREW GEORGE SMITH, Ph.D. (June 1969) *Associate Professor of Medical Microbiology*
 DENNIS BERNARD SMITH, M.D. (Dec. 1969) *Assistant Professor of Neurology*
 *DURWOOD JAMES SMITH, M.D. (Jan. 1953) — C *Professor of Pharmacology*
 HOWARD MARSHALL SMITH, JR., M.S. (1947) — L *Professor of Electrical Engineering*
 NEIL GIBSON SMITH, M.A. (1968) *Lecturer in Speech*
 VELMA M. SMITH, M.Ed. (1970) *Instructor in Education*
 DAVID LEE SOBERS, Ph.D. (1965) *Assistant Professor of Philosophy and Religion*
 WALTER D. SODERBERG, M.Ed. (1970) *Assistant Professor of Physical Education*
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 FELIX SOMMER, M.D. (Jan. 1965) *Clinical Instructor in Psychiatry*
 ARTHUR BRADLEY SOULE, JR., M.D. (1929) *Professor of Radiology*
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 *THOMAS JOHN SPINNER, JR., Ph.D. (1957-59; 1962) *Associate Professor of History*
 *THOMAS SPROSTON, JR., Ph.D. (1946) *Professor of Botany*
 DEBORAH T. SPURLOCK, B.S. (1970) *Instructor in Nursing*
 *HORACE HARRISON SQUIRE, Ph.D. (1962) *Associate Professor of Economics and Business Administration*
- JAMES WARD STACKPOLE, M.D. (1962) *Clinical Assistant Professor of Pediatrics*
 *ROBERT EVERETT STANFIELD, Ph.D. (1969) *Associate Professor of Sociology and Anthropology*
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 *ROLFE SEATON STANLEY, Ph.D. (1964) — C *Associate Professor of Geology*
 ERNEST STARK, M.D. (1945) *Associate Professor of Pathology*
 JOHN NEWHALL STARK, M.D. (Jan. 1967) *Instructor in Psychiatry*
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- HENRY JOHN STEFFENS, Ph.D. (1969) Assistant Professor of History
- WILLIAM ALEXANDER STEPHANY, Ph.D. (1968) Assistant Professor of English
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- CARYL J. STEWART, M.S.W. (1968) Instructor in Psychiatry
- *WARREN R. STINEBRING, Ph.D. (Dec. 1967) Professor of Medical Microbiology
- MARK A. STOLER, M.A. (1970) Instructor in History
- PATRICIA ANN STONE, Ph.D. (1967) Assistant Professor of Psychology
- WILLIAM HAYDN STOUCH, M.D. (1967) Assistant Professor of Medicine
- *NEIL RALPH STOUT, Ph.D. (1964) — A Associate Professor of History
- NORMAN KENNETH STRASSBURG, M.Ed. (1946) Assistant Professor of Physical Education
- *MICHAEL JOHN STRAUSS, Ph.D. (1968) Assistant Professor of Chemistry
- LINDA R. SUESS, M.S. (1970) Instructor in Nursing
- RICHARD I. SUGARMAN, M.A. (1970) Instructor in the Experimental Program
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- *DAVID LUTHER SYLWESTER, Ph.D. (1965) — C Associate Professor of Mathematics and Community Medicine
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- BURTON SAMUEL TABAKIN, M.D. (1954) — A Professor of Medicine
- DAVID LATHAM TABER, M.D. (1953) Assistant Professor of Obstetrics and Gynecology
- JOHN PETER TAMPAS, M.D. (1962) Professor of Radiology and Pediatrics
- RICHARD LAURENCE TANNEN, M.D. (Mar. 1969) Assistant Professor of Medicine
- JOHN S. TANNER, M.D. (1970) Instructor in Pediatrics
- *CHARLES FRANCIS TAYLOR, Ph.D. (Feb. 1964) — A Associate Professor of Electrical Engineering
- FRED HERBERT TAYLOR, Ph.D. (1943) Professor of Botany
- HOWARD CANNING TAYLOR, III, M.D. (1962) Associate Professor of Pathology
- CHRISTOPHER MARLOWE TERRIEN, M.D. (1939) Clinical Associate Professor of Medicine
- LOUIS GEORGE THABAUT, M.D. (1939) Assistant Professor of Surgery
- WILFRED LOUIS THABAUT, M.D. (Jan. 1958) Assistant Professor of Obstetrics and Gynecology
- *JOHN WALTER THANASSI, Ph.D. (Aug. 1967) Assistant Professor of Biochemistry
- GORDON C. G. THOMAS, M.D. (Dec. 1968) Assistant Professor of Psychiatry
- HILAIRE D. THOMAS (1969) Adjunct Instructor in Medical Technology
- MARY ELIZABETH THOMPSON, M.A. (1958) Instructor in Nursing
- RUTH EMILY THOMSON, M.S. (1969) Assistant Professor of Social Work, Psychiatry
- *PETER THURNAUER, Ph.D. (1966) Assistant Professor of Physics
- CHARLES ALLEN TILLINGHAST, M.A. (1967) Instructor in English
- WILLIAM ALLAN TISDALE, M.D. (Aug. 1965) Professor of Medicine
- JAMES MARTIN TODD, Ph.D. (1969) Clinical Assistant Professor of Psychiatry
- HELENE WALLACE TOOLAN, (MRS. J. M.) Ph.D. (1964) Associate Professor of Pathology
- JAMES MICHAEL TOOLAN, M.D. (1964) Assistant Professor of Psychiatry
- DAVID M. TORMEY, M.D. (Aug. 1968) Associate Professor of Community Medicine
- THOMAS DERMOTT TRAINER, M.D. (1960) Associate Professor of Pathology
- KARL TREIAL, M.D. (1968) Clinical Instructor in Psychiatry
- *RAYMOND HERMAN TREMBLAY, Ph.D. (1953) — E Professor of Agricultural Economics
- *JACK TREVITHICK, Ph.D. (1946) Professor of English
- BENOIT P. TROTTIER, D.D.S. (1970) Instructor in Dental Hygiene
- KEITH FRANK TRUAX, M.D. (1932) Clinical Associate Professor of Surgery
- *MARSHALL MACDONALD TRUE, Ph.D. (1966) Assistant Professor of History
- JOHN Y. TRUMPER, M.D. (1970) Instructor in Pediatrics
- CHARLES FREDERICK TSCHOPP, M.D. (Aug. 1968) Associate Professor of Otolaryngology
- HENRY M. TUFO, M.D. (1970) Associate Professor of Medicine
- ARTHUR FREDERICK TUTHILL, M.S. (1943) Professor of Mechanical Engineering
- JOHN CUSHMAN TWITCHELL, M.D. (1961) Assistant Professor of Medicine and Instructor in Community Medicine
- *LOUIS MALDONADO UGALDE, Ph.D. (1962) Associate Professor of Romance Languages
- HELENA A. URE, M.S. (1968) Assistant Professor of Nursing
- H. CARMER VANBUREN, M.D. (1962) Assistant Professor of Medicine
- FREDERICK WILLIAM VANBUSKIRK, M.D. (1946) Professor of Radiology
- KENNETH EVERSON VARNEY, M.S. (1946) Assistant Professor of Plant and Soil Science

- JANE ROSE VINCENT, M.A.T. (1969) *Instructor in Mathematics*
 *HUBERT WALTER VOGELMANN, Ph.D. (1955) — B *Professor of Botany*
 JAMES ANTHONY VOLLKOMMER, M.S. (1967) *Instructor in Geology*
 BRANIMIR F. von TURKOVICH, Ph.D. (1971) *Professor of Mechanical Engineering*
 *WILLIAM PHILIP WAGNER, Ph.D. (1966) *Assistant Professor of Geology*
 LOUIS J. WAINER, M.D. (1969) *Instructor in Medicine*
 DAVID HAWKES WAITE, M.A. (1969) *Instructor in Speech*
 NELSON LEE WALBRIDGE, Ph.D. (1924) *Professor of Physics*
 H. ALAN WALKER, M.D. (Jan. 1969) *Clinical Instructor in Medicine*
 MARGARET BRANNAN WALKER, (1968-69; Jan. 1970) *Instructor in Art*
 JULIAN ARNOLD WALLER, M.D. (1968) *Professor of Community Medicine*
 GORAN CARL WALLGREN, M.D. (Jan. 1970) *Visiting Professor of Medicine*
 LESTER JULIAN WALLMAN, M.D. (1948) *Professor of Neurosurgery*
 MAURICE JAMES WALSH, M.D. (Jan. 1968) *Instructor in Community Medicine*
 RICHARD RALPH WARNER, M.A. (1967) *Assistant Professor of Political Science*
 FRANK J. WATSON, M.A. (1971) *Instructor in Education*
 ROBERT JAMES WATSON, D.M.D. (March 1968) *Clinical Instructor in Dental Hygiene*
 LEON ASHLEY WEAVER, JR., Ph.D. (1962) *Assistant Professor of Psychiatry*
 *GEORGE DAYTON WEBB, Ph.D. (June 1966) *Associate Professor of Physiology and Biophysics*
 *FRED CLARENCE WEBSTER, Ph.D. (1951-53; 1956) *Professor of Agricultural Economics*
 SELINA WILLIAMS WEBSTER, (MRS. T. M.) M.S. (1948-51; Feb. 1960) *Associate Professor, Clothing and Textiles*
 *TRUMAN MARION WEBSTER, Ph.D. (1945) *Professor of German*
 MAIDA EWING WEDELL, M.A. (1967) *Instructor in Art*
 LAURA WEED, M.D. (1969) *Assistant Professor of Medicine*
 LAWRENCE L. WEED, M.D. (1969) *Professor of Medicine*
 THOMAS ALLEN WEIDMAN, Ph.D. (1969) *Assistant Professor of Anatomy*
 *JOHN GEORGE WEIGER, Ph.D. (1958-62; 1964) *Associate Professor of Romance Languages*
 SHELDON WEINER, M.D. (1970) *Assistant Professor of Psychiatry*
 FRANCIS ALEXANDER WEINRICH, M.A. (1950) *Assistant Professor of Music*
 *JAMES GRAHAM WELCH, Ph.D. (Jan. 1968) *Professor of Animal Sciences*
 *DAVID LLOYD WELLER, Ph.D. (Oct. 1967) *Assistant Professor of Agricultural Biochemistry*
 *JOSEPH WELLS, Ph.D. (1968) *Associate Professor of Anatomy*
 GEORGE WILLIAM WELSH, M.D. (Jan. 1956) *Associate Professor of Medicine*
 *EUGEN EMMANUEL WELTIN, Dr.sc.nat. (1966) *Assistant Professor of Chemistry*
 EMMA FRANCA WENNBERG, (MRS. J. E.) M.D. (1967) *Assistant Professor of Anatomy*
 JOHN EGMONT WENNBERG, M.D. (1967) *Assistant Professor of Community Medicine and Medicine*
 ALAN PHILIP WERTHEIMER, Ph.D. (1968) *Assistant Professor of Political Science*
 PIETER WESSELING, M.A. (1967) *Assistant Professor of Romance Languages*
 *ALAN HAROLD WHEELER, Ph.D. (1969) *Associate Professor of Education*
 JUDITH R. WHITAKER, M.A. (1970) *Associate Professor of Nursing*
 WENDELL JENNISON WHITCHER, Ph.D. (1952) *Associate Professor of Chemistry*
 JAMES FELLOWS WHITE, Ph.D. (1955) *Professor of German*
 *WILLIAM NORTH WHITE, Ph.D. (1963) *Professor of Chemistry*
 SUSAN MARION WHITEBOOK, (MRS. B. B.) B.A. (1969) *Assistant Professor of Romance Languages*
 DAVID WHITEHORN, Ph.D. (1970) *Assistant Professor of Physiology*
 *ROY ALVIN WHITMORE, JR., M.F. (1958) *Associate Professor of Forestry*
 MARGARET BEACH WHITTLESEY, M.S.W. (1964) *Assistant Professor of Social Welfare*
 ELBERT BENJAMIN WHORTON, JR., Ph.D. (June 1968) *Assistant Professor of Community Medicine and Mathematics*
 WILLIAM E. WICKER, II, Ph.D. (1970) *Assistant Professor of Economics and Business Administration*
 *SAMUEL CLAUDE WIGGANS, Ph.D. (Feb. 1963) *Professor of Plant and Soil Science*
 CLYDE R. WIGNESS, Ph.D. (1970) *Assistant Professor of Music*
 NANCY M. WILBUR, B.A. (1969) *Adjunct Instructor in Medical Technology*
 JEANETTE T. WILCOX, B.S. (1969) *Instructor in Dental Hygiene*
 KAREN FERN WILEY, M.A. (1969) *Instructor in Romance Languages*
 RAYMOND SCOTT WILKES, M.A. (1967) *Instructor in Speech*
 *JAMES MATTHEW WILLARD, Ph.D. (1969) *Assistant Professor of Biochemistry*

- *BLAIR WILLIAMS, M.S. (1946-48; 1949) — C Associate Professor of Home Economics
 RONALD W. WILLIAMS, Ph.D. (1970) Assistant Professor of Electrical Engineering
 CLODIUS WILLIS, Ph.D. (1969) Assistant Professor of Romance Languages
 LEWIS R. WILLMUTH, M.D. (1970) Assistant Professor of Psychiatry
 *DAVID M. WILSON, Ph.D. (1969) Assistant Professor of Botany
 *MARY SWEIG WILSON, Ph.D. (1969) Assistant Professor of Speech
 PETER B. WILSON, B.A. (1970) Instructor in English
 CALVIN H. WILVERT, Ph.D. (1970) Assistant Professor of Geography
 WILLIAM GERARD WINTERS, M.D. (1968) Assistant Professor of Medicine
 SARAH ALLENE WISE, B.S. (1967) Instructor in Medical Technology
 GEORGE A. WOLF, JR., M.D. (1970) Professor in Medicine
 ARTHUR D. WOLK, M.D. (1970) Instructor in Pediatrics
 GLEN MEREDITH WOOD, Ph.D. (1950) Associate Professor of Plant and Soil Science
 NORMA LOWYN WOODRUFF, Ed.D. (1952) Professor of Nursing
 RICHARD S. WOODRUFF, M.D. (1950) Assistant Professor of Pathology
 WILLIAM ALOYSIUS WOODRUFF, M.B. (1962) Associate Professor of Psychiatry
 *ROBERT CUMMINGS WOODWORTH, Ph.D. (1961) Associate Professor of Biochemistry
 *GERALD WOOLF, Ph.D. (1968) Associate Professor of Speech
 A. PETER WOOLFSON, Ph.D. (1970) Assistant Professor of Sociology
 JOHN K. WORDEN, M.S. (1970) Instructor in Speech and Drama
 IAN A. WORLEY, M.S. (1970) Assistant Professor of Botany
 *ROBERT KINGMAN WRIGHT, Ph.D. (1966) Associate Professor of Mathematics
 *CLAUS ADOLF WULFF, Ph.D. (1965) — C Associate Professor of Chemistry
 ALBERT WILHELM WURTHMANN, M.A. (Jan. 1947) Assistant Professor of German
 *ROY EDWARD WUTHIER, Ph.D. (1969) Assistant Professor of Biochemistry
 DHARAM PAUL YADAV, Ph.D. (Jan. 1970) Assistant Professor of Speech
 STANLEY O. YARIAN, Ph.D. (1970) Assistant Professor of Philosophy and Religion
 BRIAN J. YOUNG, M.A. (1970) Instructor in History
 *WILLIAM JOHNSON YOUNG, II, Ph.D. (May 1968) Professor of Anatomy
 ARMANDO E. ZARATE, Ph.D. (1970) Assistant Professor of Romance Languages
 MARJORIE B. ZEUCH, M.A. (1968) Instructor in English
 ELIZABETH K. ZIMMERLI, Ed.D. (1967) Associate Professor of Physical Education
 LEONARD M. ZUBKO, M.M.E. (1970) Adjunct Professor of Mechanical Engineering

Associates in Instruction and Research

- ROSEMARY C. BREWSTER, M.D. Clinical Associate in Psychiatry
 BARBARA D. CHENG, A.B. (1970) Research Associate in Psychology
 HARRY LIVINGSTON COLOMBO, M.D. Clinical Associate in Medicine
 JOHN PATRICK CORLEY, M.D. Clinical Associate in Medicine
 WILLIAM P. GIFFORD, B.A. (1970) Research Associate in Regional Medical Program
 WILLIAM HENRY HEININGER, M.D. Clinical Associate in Medicine
 HERMAN CONRAD HERRLICH, Ph.D. Research Associate in Experimental Medicine
 PATRICIA KATHERINE HICKCOX, B.A. Research Associate in Regional Medical Program
 J. LORIMER HOLM, M.D. Clinical Associate in Radiology
 M. STEPHEN HUNTLEY, Ph.D. Research Associate in Psychology
 YOSHINORI ISHIKAWA, D.Ag.Sci. Research Associate in Biochemistry
 SHIGEMASA IKEDA, M.D. Research Associate and Clinical Associate in Anesthesiology
 KATHRYN DYKSTRA IORIO, M.D. Research Associate in Regional Medical Program
 RICHARD HARRY JAGELS, Ph.D. Research Associate in Botany
 GEORGE LUCCHINA, M.D. Research Associate in Physiology
 GEORGE E. LUCIA, JR., M.D. Clinical Associate in Surgery
 JOAN MOEHRING, Ph.D. Research Associate in Medicine
 CHARLES E. MOISAN, JR., M.D. Clinical Associate in Medicine
 JOHN LOUIS SAIA, M.D. Clinical Associate in Medicine
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Administration

- DAVID RICHARD ABBOTT, M.A. (1965) Assistant Dean, College of Arts and Sciences
 EDWIN BARTLETT ABBOTT (1921) Auditor Emeritus
 HARRIS GRIFFITH ABBOTT, A.S. (1969) Civil Engineer, Land Records Office

- STEPHEN P. ADAMS, B.A. (1967) *Administrative Associate, Department of Medicine*
 RICHARD WALKER AMIDON, M.D. (1950) *Medical Director, University Health Services*
 SARA WALTON ANDREWS, M.S.L.S. (1969) *Catalog Librarian, Dana Medical Library*
 HAROLD C. AVERY, JR., B.S. (March 1967) *Associate Accountant, Sponsored Projects*
 DAVID BABBOTT, M.D. (Aug. 1967) *Assistant Dean, College of Medicine*
 HERBERT A. BAHRENBURG, B.Ch.E. (1969) *Director of Physical Plant*
 JOHN E. BAKER, Ph.D. (1963) *Assistant Dean, College of Education*
 RICHARD OTTO BARWIN, M.A. (1968) *Executive Assistant to the Dean, Graduate College*
 NORMAN C. BASLOW (Jan. 1970) *Superintendent, Project Construction*
 THOMAS DAY SEYMOUR BASSETT, Ph.D. (1958) — A *Curator, Wilbur Collection and University Archivist*
 JAMES HENRY BATES, M.Ed. (Jan. 1958) *Executive Assistant to the Dean, Division of Health Sciences*
 DAVID E. BEE, Ph.D. (1969) *Statistician, Dean's Office, College of Agriculture*
 NORMAN ASHLEY BISHOP, SR., B.S. (1965) *Construction Engineer*
 NORMAN A. BLAIR, B.S. (1967) *Budget Officer*
 SELMA S. BLOOMBERG (1961) *Associate Accountant, Sponsored Projects*
 DALLAS RICHARD BOUSHEY (1966) *Demonstrator, Department of Anatomy*
 JOHN A. BOVE, JR., M.Ed. (1970) *Assistant in Football*
 MARY EVELYN BREEN, B.S. (1957) *Assistant Director, School of Allied Health Sciences*
 ARTHUR M. BRINK, JR., B.S. (1968) — J *Alumni Secretary, External Affairs*
 HECTOR E. BRODEUR, Dip. (1968) *Associate Accountant, Accounting Office*
 FLORENCE K. BRODIE (1933) *Assistant Director of Purchasing*
 OTTO ANTON BRUSIS, M.D. (1967) *Project Manager, Regional Medical Program*
 ROGER TRUE BRYANT, M.Ed. (1965) *Head Athletic Trainer*
 CLAIRE ELLEN BUCKLEY, M.S. (1968) *Reference Librarian, Bailey Library*
 JOHN LEWIS BUECHLER, M.A. (1962) *Head of Special Collections, Bailey Library*
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 JOHN ROBERT BUSHEY, B.S. (1966) *Director, Evening Division and Conferences*
 MITCHELL NELSON CALL, A.B. (Jan. 1967) *Special Assistant to the Dean of Administrative Planning and Analysis*
 WILLARD GUY CAMPBELL (1969) *Assistant Chief Engineer, ETV*
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 MELVIN ALFRED CARLSON, JR., M.S. (Mar. 1969) *Catalog Librarian, Bailey Library*
 ROBERT W. CHAMBERS, B.A. (1966) *Writer-Editor for Social Sciences and the Arts, Public Relations*
 NORBERT FABIAN CHARBONNEAU, M.A. (1961) *Operations Manager, Computation Center*
 ARTHUR H. CHENEY, JR., M.Ed. (1969) *Coordinator, Center for Research and Field Study*
 PAUL AMEDEO CHRISTOFOLETTI (1969) *Associate Accountant, Accounting Office*
 THOMAS PAUL CLAIRMONT, M.Ed. (1955) *Assistant Director of Admissions*
 GEORGE NAY CLERKIN (1931) *Treasurer*
 HAROLD CAMPBELL COLLINS, B.S. (1947) *Director of Admissions*
 ROBERT WILLIAM COON, M.D. (1955) *Director, School of Allied Health Sciences and Associate Dean, Division Health Sciences*
 JOHN HAMILTON COONS, M.S. (1962) *Associate in Development*
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 NORMAN L. CRANFORD (1968) *Director of the Print Shop*
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 MILTON HARLEY CROUCH, M.S. (1969) *Head of Readers Service, Bailey Library*
 FRED A. CURRAN, M.Ed. (1969) *Acting Director, Institutional Studies*
 ROBERT V. DANIELS, Ph.D. (1958) *Director, Experimental Program*
 DONALD JOHN DANIELSON, MHA. (1969) *Assistant Director, Regional Medical Program*
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Retired Officers of Administration

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- FORREST WILKINS KEHOE *Superintendent of Buildings and Grounds, and Associate Registrar*
- LAURA LOUDON *Assistant in Public Relations*
- MARJORIE ELLINDWOOD LUCE *State Home Demonstration Leader*
- MARGARET MacDONOUGH *County Extension Agent*
- MARY JEAN SIMPSON, Ph.B. *Dean of Women*

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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| THOMAS WHITFIELD DOWE, Ph.D. — I | Dean and Director |
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| FRANK HARRIS ARMSTRONG, M.F. | Assistant Forester |
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| DONALD JAMES BALCH, Ph.D. | Associate Animal Scientist |
| RICHMOND JAY BARTLETT, Ph.D. | Soil Scientist |
| DAVID E. BEE, Ph.D. | Statistician |
| MALCOLM IRVING BEVINS, M.S. | Associate Resource Economist |
| WESSON DUDLEY BOLTON, D.V.M. | Animal Pathologist |
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Director and Electrical Engineer
Civil Engineer
Mechanical Engineer

RELATED SERVICES STAFF

The Related Services Division renders various services in the fields of agriculture and home economics, such as inspection of feed, seeds, and fertilizer; analysis of soils, milk, and other agricultural products on request; diagnosis of diseases of plants, poultry and other livestock; and analyses for the Vermont Parimutuel Racing Commission.

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Dean and Director
Animal Pathologist
Seed Analyst
Dairyman
Associate Animal Pathologist
Associate in Dairy Manufacturing
Associate Chemist
Animal Pathologist
Chemist

Extension Service Staff

The Cooperative Extension Service is a cooperative undertaking of the State of Vermont, the College of Agriculture and Home Economics, 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.

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 Middlebury
 Middlebury
 Middlebury

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Bennington
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 St. Johnsbury
 St. Johnsbury

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 Essex Junction
 Essex Junction

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St. Albans
 St. Albans
 St. Albans
 St. Albans

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 Morrisville

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 Chelsea

Orleans County

ROGER DAVIS WHITCOMB, B.S.
 JOHN ROBERT PRICE, B.S.
 MRS. MARION McIVER BUCKLAND, B.S.
 WILLIAM TARBELL ZELLER, B.S.

Newport
 Newport
 Newport
 Newport

Rutland County

WILLIAM MICHAEL COREY, M.S.
 DAVID PAUL NEWTON, M.S.
 MRS. BETHIA NOBLE MUNGER, B.S.
 CHESLEY PECK HORTON, M.Ed.

Rutland
 Rutland
 Rutland
 Rutland

Washington County

EDWARD L. BOUTON, B.S.
 MRS. HAZEL C. BROWN, M.S.
 DONALD ROBERT WHAPLES, M.S.

Montpelier
 Montpelier
 Montpelier

Windham County

RAYMOND IRVING PESTLE, JR., M.S.
MRS. RUTH DENSMORE HERTZBERG, B.S.
HOWARD HARRY SMITH, B.S.

Brattleboro
Brattleboro
Brattleboro

Windsor County

JOYCE WILLIAM SUMNER, B.S.
MRS. DOROTHY FLORENCE BENT, M.A.T.
EDWARD WALTER GOODHOUSE, B.S.

Woodstock
Woodstock
Woodstock

V University Committees

STANDING COMMITTEES OF THE SENATE 1970-71

Admissions

R. G. Julow (1972-73)
H. K. Riggs (1970-71)
Miss A. Powell (1971-72)
Mrs. K. Marsland (1971-72)
R. N. Haugen (1971-72)
W. W. Christensen (1972-73)
Miss M. Chase (1972-73)
H. Leitenberg (1973-74)
D. C. Lai (1973-74)
S. Burns (1974-75)
H. C. Collins (X)
B. Silverstein (S)
C. Dufresne (S)
R. Gerard (X)
L. Snyder (X)

Buildings and Grounds

E. A. H. Sims (1974-75), Chair-
man
Miss E. Knowles (1970-71)
R. F. Dawson (1970-71)
E. J. Miles (1970-71)
L. R. Leggett (1972-73)
H. H. Squire (1972-73)
R. L. Larson (1973-74)
S. Rush (1974-75)
G. C. Crooks (X)
P. M. Lovell (X)
R. Nickelsberg (S)
A. Gassman (S)

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G. J. Antony (1970-71)
Mrs. S. Webster (1971-72)
E. Owre (1972-73)
R. Korson (1973-74)
Mrs. M. Hall (1974-75)
M. Horn (S)

Ceremonies

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Chairman
G. T. Little (1974-75), Co-Chair-
man
P. W. Cook (1970-71)
Miss M. Caldwell (1971-72)
R. J. Gobin (1971-72)
Miss A. Rodgers (1974-75)
R. A. Whitmore, University Mar-
shal
A. W. Sadler (X)
Mrs. J. Phillips (S)
Miss E. Wood (S)

Curriculum

A. M. Levy (1971-72), Chairman
W. J. Beckett (1970-71)
H. Duchacek (1970-71)
W. W. Schmokel (1972-73)
A. M. Smith (1972-73)
H. Lighthall (1974-75)
A. Wheeler (1974-75)
L. O. Farnsworth (S)
G. H. Barnes (S)

Library

D. W. Gade (1972-73), Chairman
J. S. Pacy (1970-71)
N. R. Stout (1970-71)
J. Abruscato (1970-71)
F. W. Lidral (1970-71)
Miss M. Petrusich (1971-72)
W. Meyer (1971-72)
R. B. Lawson (1973-74)
G. E. Laber (1973-74)
R. F. Dawson (1974-75)
J. L. McIntosh (1974-75)
P. Kebabian (X)
Miss P. Renaud (S)
G. Owen (S)

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Board of Trustees*

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Chairman
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R. V. Daniels (1973-74)
R. Korson (1974-75)
R. O. Sinclair (1975-76)
S. M. Temple (S)
S. A. Rapp (S)
Paul Jerry (S)

Policy

M. J. Nadworny (1970-71), Chair-
man—1st Semester
S. A. Rippa (1970-71), Chairman
—2nd Semester
L. J. Wallman (1971-72)
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R. V. Daniels (1973-74)
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E. C. Greif (1971-72)
F. R. Bliss (1972-73)
R. N. Downer (1972-73)

A. H. Duthie (1972-73)
M. A. Kuehne (1972-73)
A. J. Andrea (1973-74)
H. S. McKenzie (1973-74)
D. G. Stevens (1973-74)
F. C. Evering (1973-74)
R. A. Fordham (X)
C. Smith (S)
D. Pilachowski (S)

Student Excellence

R. X. Chase (1973-74), Chairman
S. B. Poger (1970-71)
C. A. Wulff (1971-72)
T. J. Spinner (1972-73)
Mrs. H. Lang (1973-74)
M. L. McCormack (1974-75)
J. G. Weiger (X)
R. L. Gerard (X)
W. Roth (S)
Miss C. Cartier (S)
L. Snyder (X)

Student Life

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T. M. Webster (1970-71)
E. Ganz (1971-72)
J. A. Peterson (1971-72)
E. C. Schneider (1972-73)
Miss A. Demers (1973-74)
W. Gard (1974-75)
G. Mirchandani (1974-75)
R. W. Amidon (X)
Miss J. Gribbons (X)
R. D. Patzer (X)
R. W. Powers (X)
Miss B. Morrison (S)
A. E. McKeever (S)

AD HOC COMMITTEES OF THE SENATE

1970-71

*Elimination of Final**Examination Period*

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 Miss V. Allen
 A. J. Andrea
 E. McLay
 Miss A. Powell
 T. C. Parkhill (S)
 R. White (S)
 Miss K. Herzog (S)
 M. Weinberg (S)

Equal Opportunities Committee

R. R. Warner, Chairman
 D. Conrad
 J. P. Felt
 H. Lighthall
 H. L. McCrorey
 Miss M. Whittlesey
 Brooks McCabe (S)

Study of the AAUP Resolutions

R. R. Warner, Chairman
 A. A. Alnasrawi
 L. C. Hunt, Jr.
 D. Sylwester
 R. C. Woodworth

UNIVERSITY COMMITTEES

1970-71

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 J. W. Marvin (1970-71)
 P. H. Davis (1971-72)
 D. C. Gregg (1971-72)
 C. Christensen (1973-74)
 R. W. Cochran (1973-74)
 G. Minarsky (S)
 D. Ojala (S)
 R. Rodger (S)
 J. Stowell (S)

*Computation Center**Advisory Committee*

W. C. Patterson, Chairman
 D. Bee
 A. Cheney
 F. A. Curran
 B. R. Forsyth
 J. Gilbert (Castleton State College)
 L. Gordon
 W. Halpern
 D. B. Hill
 G. E. Laber
 D. B. MacPhail

R. W. Purdum

L. L. Snyder

C. F. Taylor

C. Wolf

W. R. Wonkka (Vermont Technical College)

Evening Division Committee

R. V. Phillips, Chairman
 L. J. Gould
 J. A. Izzo
 B. Williams
 J. E. Weiger
 D. Corrigan
 F. Rutz (S)

Institutional Grants Committee

D. B. Johnstone, Chairman

Subcommittee A (Biological Sciences)

M. L. McCormack, Chairman
 J. A. Davison
 E. I. Schaeffer
 G. Webb
 J. Welch

(S) Student Representative

(X) Ex-Officio

Subcommittee B (Physical Sciences)

J. S. Brown, Chairman
 C. W. Allen
 F. C. Evering
 M. S. Hundal
 D. Sylvester

R. W. Powers
 F. O. Sargent
 R. A. Fordham
 D. Dana (S)
 A. Tuscany (S)
 P. Devine (S)
 F. Barrett (X)
 M. Call (X)

Subcommittee C (Social Sciences and Humanities)

H. S. Schultz, Chairman
 H. G. Barnum
 R. W. Cochran
 J. S. Pacy
 W. C. Patterson

Radiological Safety Committee

O. S. Peterson, Chairman
 J. F. Harwood, Secretary
 C. D. Janney (Radiological Safety Officer)
 E. L. Amidon
 S. L. Burns
 J. W. Clemmons
 A. D. Crowell
 D. B. Hill
 D. B. Melville
 D. W. Racusen
 F. W. VanBuskirk
 W. H. Luginbuhl (X)

Jurisdiction Committee

R. Nash
 F. A. Canavan (S)
 L. C. Maloney (S)
 J. B. Yacker (S)
 J. M. Gribbons (X)
 R. W. Powers (X)

Lane Series Committee

M. Paulsen, Chairman (S)
 J. Trevithick, Executive Secretary
 E. J. Feidner
 F. W. Lidral
 L. E. VanBenthuyssen
 C. Wolf
 B. A. Boshier (S)
 A. C. Bugbee (S)
 P. R. Renaud (S)
 D. T. Standard (S)
 J. C. Davis (S)
 J. W. Garrow (S)
 A. M. Giard (S)
 M. Grodsky (S)
 P. A. Hunt (S)
 L. Lawrence (S)
 S. C. Rackliffe (S)
 W. Thiess (S)

Residence Committee

H. C. Collins, Chairman
 G. A. Donovan
 L. L. Snyder
 S. L. Burns
 L. D. Latham
 G. N. Clerkin

Student Aid Committee

D. Hyerstay, Chairman
 D. R. Abbott
 Z. P. Ambrose
 W. J. Beckett
 D. Babbott
 G. A. Donovan
 H. J. Carpenter
 N. K. Strassburg
 G. Thompson
 J. MacDonald (S)
 J. F. Czachor (S)
 R. Gerard (X)
 M. Dean (X)
 H. J. Painter (X)
 J. Moore (X)

Parking Commission

H. L. Martin, Chairman
 C. W. Case
 P. M. Lovell
 A. E. Nuquist

(S) Student Representative

(X) *Ex-Officio*

V Introduction

The University of Vermont was founded in 1791, taking its place among the handful of colleges founded in this country in the eighteenth century for the higher education of young colonials and Americans of the first post-revolutionary generation. The University was the fifth New England college chartered, the second established by a state to grant the bachelor's degree, and the twentieth in the nation to do so.

Though it has enjoyed a long tradition which has seen it receive substantial private support, University development has been closely identified with that of the State since 1791, when Vermont's founding General Assembly granted a charter to the University and set aside about 29,000 acres throughout the State with the intent that rents from this land would support the new educational institution.

That same Vermont General Assembly established that the by-laws of the University should give no preference to any religious sect or denomination or discriminate against any, making the University of Vermont the first in this country and possibly in history to be on public record as supporting freedom of religion upon its campus.

Colleges and Curricula

The University consists of the College of Arts and Sciences, the College of Agriculture and Home Economics, the College of Technology, the College of Education, the Division of Health Sciences with its College of Medicine, School of Nursing, and School of Allied Health Sciences; the Graduate College, and the Summer Session and Evening Division.

Regional Cooperation

The University of Vermont is an active participant with the Universities of Connecticut, Maine, Massachusetts, New Hampshire, and Rhode Island; and with Lowell Technological Institute, and the public two-year colleges and technical institutes in a program of regional coopera-

tion aimed at increasing educational opportunities for qualified young men and women of the New England states. Under the program New England residents are given admissions preference and resident tuition privileges in certain specialized curricula. A special brochure detailing these specialized curricula, has been prepared by the New England Board of Higher Education and is available through the Board, 20 Walnut Street, Wellesley, Mass. 02181, the University of Vermont admissions office, and from the other New England participants.

The University of Vermont offers the following programs in which the Vermont in-state tuition rate is available for students from the states named.

| OFFERED BY VERMONT | REGIONAL PROGRAMS | | | | |
|---------------------------------|-------------------|-----|---------------|------|------|
| | TO | | STUDENTS FROM | | |
| | Conn. | Me. | Mass. | N.H. | R.I. |
| Agricultural Technology | | x | | x | |
| Anthropology | | | | x | x |
| Art Education | x | | | | x |
| Canadian Area Studies | x | x | x | x | x |
| Classics | | x | | | x |
| Dental Hygiene* | x | x | x | x | |
| Radiologic Technology* | x | x | x | x | x |
| Food and Nutrition Science | | | | x | |
| Forestry | x | | | | x |
| Geography | | x | | | |
| Latin | | | | | x |
| Management Engineering | x | x | | x | |
| Medical Laboratory Technicians* | x | x | x | x | |
| Physical Therapy | | x | x | x | x |
| Recreation | | x | | | x |
| Religion | x | x | x | x | x |
| Social Service | x | x | x | | x |
| Speech and Hearing Therapy | | | | | x |
| Wildlife Management | | | | | x |

* Two-year program

The Vermont Campus

The campus and present buildings had their origin in 1800, when Burlington was virtually still frontier territory.

The University's inaugural president and his first four students felled trees from ground which is today's College Green for timber for the first college building. From their labors and from financial contributions of the citizens of Burlington, the first college building rose. When, in the early 1820's fire destroyed this first structure, it was rebuilt, again through support of Burlington residents. General Lafayette laid the

cornerstone in 1825 for that second building, the Old Mill. A classroom addition, Lafayette Hall, was dedicated in 1958 with a descendant of General Lafayette present for the ceremonies.

Following its earliest tradition, much of the University's growth in terms of buildings has been the result of alumni and private philanthropy.

The Billings Library, now serving as a student center, was one of several buildings constructed in the late 1800's. A fine example of the work of Henry Hobson Richardson, the well-known American architect, the Library was the gift of Frederick Billings of Woodstock. The gift of Dr. and Mrs. Edward H. Williams of Philadelphia, Williams Science Hall, the first completely fire-proofed college building in this country, was built in 1896 to house the expanding departments of the several sciences. It was built and furnished at a cost of \$160,000.

Converse Hall, an unusual design of Gothic architecture, was completed in 1895. John H. Converse, class of 1861, purchased the land on which Converse stands, erected the building, and presented the completed gift to his alma mater. He also gave two houses for faculty members on the "south common".

Morrill Hall, named to honor Vermont's Senator Justin S. Morrill, father of the Land-Grant Act, was the first university building to be provided by an appropriation from the State of Vermont. It was erected in 1907 and houses administrative offices for the College of Agriculture and Home Economics.

The twentieth century has seen the construction of several buildings of Georgian architecture. The Ira Allen Chapel, with an imposing bell tower was completed in 1927. It was the gift of James B. Wilbur, who also made a generous gift to provide scholarships for Vermont residents. In 1955 a sixty-four-bell electronic carillon was installed in the tower, a gift of winter carnival funds, and dedicated to all men and women of the University who served in the armed forces. Mr. Wilbur's bequest also contributed to the building of the Fleming Museum. Named for Robert Hull Fleming, class of 1862, the Museum was made possible by a gift from Miss Katherine Wolcott of Chicago, Mr. Fleming's niece, and by gifts from other friends of the University. Completed in 1931, it houses the University's art collection, and a fine Arena Theater.

The Waterman Building, dedicated in 1941, was the gift of Charles W. Waterman, class of 1885, and Anna R. Waterman. It contains administrative offices, classrooms, laboratories, and a dining hall. A language laboratory in Waterman offers tape-recording facilities and listening stations as an aid to pronunciation, aural comprehension, and pattern practice in French, German, Hebrew, Russian and Spanish. Also

housed in Waterman are the Computation Center and Data Processing facilities.

In 1949, a group of buildings financed by state appropriation was erected on the East campus: the Hills Agricultural Science Hall, named to honor Joseph L. Hills, for many years Dean of the College of Agriculture; the Bertha M. Terrill Home Economics Building, named in honor of the originator and first chairman of the department of home economics; and the Joseph E. Carrigan Hall which houses the department of animal sciences and the popular Dairy Bar.

The University dedicated a new \$3,000,000 physical education facility in 1962, with alumni and private philanthropy contributing \$1,000,000 of the total. The State of Vermont provided a \$2,000,000 bond issue, the major share of which will be repaid by student fees. The gymnasium is named to honor Roy L. Patrick, '98; the pool to honor Frank D. Forbush, '86; and the Field House to honor Albert L. Gutterson, a 1912 graduate who won in that same year an Olympic Gold Medal in the broad jump. The baseball facilities in the Field House Cage honor two Vermont alumni who achieved prominence in Major League baseball—Larry Gardner and Ray Collins, both members of the Class of 1909.

A new \$1,895,000 engineering building, made possible by a state appropriation, houses electrical, civil, and mechanical engineering departments. Opened in the spring semester of 1964, it is named to honor the late Josiah Votey, a graduate of 1884, who served as dean of the then College of Engineering at Vermont from 1901 until his death in 1931.

Alumni and private philanthropy has proved the key to a modern building program of the College of Medicine. Vermont medical alumni led the nation in terms of the total amount given in the first year of a three-year fund drive which saw alumni contributions more than match a federal grant which permitted completion of the \$1,200,000 Medical Alumni Building.

So impressive was this record of alumni giving that it attracted the interest and support of private philanthropy which made it possible for the University to match a second federal grant in completing in 1962 the second \$1,500,000 unit of the program.

Construction of the \$8,700,000 third unit of the medical building program marks the successful completion of the most ambitious single building fund campaign ever undertaken by the University of Vermont. A \$2,000,000 gift from the Given Foundation, the largest single building gift ever received by the University was included in the total raised to match grants made under the Medical Facilities Act of 1964.

The College of Medicine, together with the affiliated Medical Center Hospital, has meant for Burlington and Vermont a modern medical center which serves citizens of all three northern New England states, as well as many residing in upper New York.

In 1968, the University and the Medical Center Hospital of Vermont joined to dedicate three new facilities—a new hospital wing named to honor David G. Baird; the Given Medical Building, named to honor Irene Heinz Given and John LaPorte Given; and a new Life Sciences Building, named to honor George Perkins Marsh. New library and auditorium facilities of the Given Building are named to honor Charles A. Dana, and Harlow and Martha Carpenter, respectively. The auditorium of the Marsh Life Sciences Building is named to honor George Wyllys Benedict.

A new University Bookstore was completed in 1967 on the East Campus as an adjunct to this instructional area.

The Redstone campus for women was originally a large estate. The mansion and the carriage house now serve as Redstone and Robinson Halls. Mable Louise Southwick Memorial Building was completed in 1936 as a center for women's activities. A gift from the family of Miss Southwick, a University graduate in the class of 1905, a bequest from Miss Shirley Farr, federal funds, and a student subscription provided the building and its furnishings.

Slade Hall, built in 1929, is of Colonial-type architecture. Mrs. William G. Slade made a gift toward this building, in memory of her daughter, Harriet Slade Crombie. In 1947, the Grace Goodhue Coolidge Hall, a residence hall for women, was built adjacent to Southwick. Grace Goodhue, class of 1902, was the wife of President Calvin Coolidge.

Coolidge Hall and the three men's residence halls, Buckham, Chittenden and Wills Halls, were the first University residence halls to be financed by a bond issue guaranteed by the State of Vermont. Room rents are used to liquidate the bond issue.

Also built on these terms are the three residence halls for women south of Coolidge. Mason, Simpson, and Hamilton Halls were completed in 1957 and named to honor three distinguished women. Mason Hall and Hamilton Hall honor Vermont's first two women graduates, Lida Mason Hodge and Ellen Hamilton Woodruff, class of 1875, who were also the first women admitted to Phi Beta Kappa at the University. Simpson Hall honors Dean of Women Emeritus Mary Jean Simpson, class of 1913. A three-unit residence and dining facility for men is named to honor James Marsh, distinguished scholar who served as president of the University from 1826-33, and who introduced the works of Coleridge in this country; Professor Frederick Tupper, a noted scholar

of Chaucer; and for Warren R. Austin, a Vermont graduate of the class of 1899, who served as the U.S. Representative to the United Nations from 1946-53. The units were completed in the fall of 1961 under the federal housing loan program. A unit for women, named to honor former Dean of Women Marian Patterson was also completed in 1961, and two new units, Wright and Christie, the former containing a dining hall, were added in September, 1964. These are named to honor Jessie Elvira Wright Whitcomb, a Vermont graduate of 1887, and Jean Alice Christie Chandler Bull, a graduate of 1886.

In the fall of 1969, the University dedicated three new residence halls to honor Gertrude Severance Davis and H. Sylvia Wilks, whose generous gifts have enriched opportunities for young men and women at Vermont, and Margaret Wing, who served the University for many years as assistant dean of women.

Ground was broken in 1969 for a new \$6.5 million physical sciences building which will provide new and expanded resources for the departments of chemistry and physics. The building is named to honor the late Dr. Clinton D. Cook, former chemistry chairman and the University's first Dean of Faculties and Academic Vice President.

Other buildings of interest include Grassmount, a gracious Georgian mansion which was the home of a former Governor of Vermont; Pomerooy Building, erected in 1829 for the medical department and now used to house the department of speech. The Wasson Infirmary, believed to have been an underground railway stop for escaping slaves at the time of the Civil War, was purchased for the University in 1944 by a group of faculty and alumni, and named for the first dean of women, Pearl Randall Wasson. A modern home management laboratory, named to honor the late Miss E. Blundell, a member of the University's home economics faculty, was completed on the Redstone campus in 1961.

To support the teaching, research and Extension programs of the College of Agriculture and Home Economics, the University maintains animal, dairy and poultry science facilities on Spear Street in South Burlington, approximately a mile from the main campus; has entered into a contract with the U. S. Forest Service for establishment of a forestry research center nearby; maintains the Blasberg Horticultural Research Center off Shelburne Road in South Burlington; the Vermont Research Forest with units in Charlotte, Jericho, Williston, and Wolcott; the Proctor Maple Research Farm in Underhill; and the Weybridge Research Center and Morgan Horse Farm at Weybridge, about 35 miles south of the University's main campus at Burlington. The Weybridge

facility attracts many visitors each year who come to admire, and many to buy, the University's Morgan Horses.

The University Libraries

The main Library, dedicated in 1961, is named to honor the late Guy W. Bailey, thirteenth president of the University. It holds the largest book collection in Vermont, and acquires regularly the major periodicals, scholarly journals and indexing and abstracting services. The University collections also include books in medicine and health-related sciences, and a strong collection in medical periodical literature, maintained in the Dana Medical Library of the Division of Health Sciences.

Support of the Library is derived mainly from University operating funds, with some additional income available from endowments designating the Library as beneficiary.

The Bailey Library is a depository for United States and Canadian government publications, and acquires newspapers, pamphlets, maps, and materials in microfilm. The collections include the books and manuscripts from the library of George P. Marsh, the Howard-Hawkins Civil War collections, and the Whittingham-Stevens collection of Chiswick imprints.

The James B. Wilbur collection, rich in books and manuscripts relating to Vermont, the Dorothy Canfield collection of books, correspondence and manuscripts, and the papers of Ira Allen, Henry Stevens, and Warren Austin are significant holdings of the Bailey Library Special Collections Department.

The Physics and Chemistry Library is located in the Clinton D. Cook Physical Sciences building.

The Robert Hull Fleming Museum

The Museum, an integral part of the University's teaching program, provides a fourfold educational service to the University and the people of Vermont through its permanent collections covering the history of art, temporary exhibitions, the Fleming Museum Association, and children's classes.

The permanent collection is arranged to augment in so far as possible the University's teaching in varied fields. Particular galleries are devoted to ancient, medieval, and renaissance art; baroque and modern painting and sculpture; American art; primitive art; and the Orient. Two galleries are devoted to temporary exhibitions that survey various aspects of painting, sculpture, graphic arts, and architecture. The Museum has a

collection of several thousand photographs of painting and sculpture, and study area for courses in art.

The Fleming Museum Association, open to the public, is composed of friends of the Museum whose support makes possible certain special exhibitions, guest lectures and films. Gallery talks related to exhibitions and the permanent collections are given from time to time and guide service for schools and clubs is available. Children's classes offer instruction in art to youngsters of the community.

The ground floor of the Museum houses an arena theater with about three hundred seats. The arrangement provides the intimate atmosphere of a small theater and has contributed much to the dramatic offerings of the college year. It also houses the annual summer Shakespeare Festival.

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 Philharmonia, 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, Rudolf Serkin, Artur Schnabel, Van Cliburn, Isaac Stern, Nathan Milstein, Andres Segovia, The Vienna Choir Boys, 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, and a number of plays including *Tea and Sympathy*, *Li'l Abner*, *Camelot*, *Man for All Seasons*, *Look Homeward, Angel*, *J. B.*, and *Hello, Dolly!*

In addition to three major series presented during each academic year, the Lane Series also sponsors a Chamber Arts Series in the spring semes-

ter, the Lane Summer Series, several youth concerts and special events, and extension series in St. Johnsbury and Springfield.

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.

Educational Television

Vermont Educational Television is a state-wide network serving the schools and general public of the State of Vermont, and is owned and operated by the University of Vermont. The UHF television facility transmits in-school programming for grades 1 through 12 each week day. Evening programming includes network and locally-produced programs of both entertainment and instructional variety. In-service programs for specific vocational interests are aired, and courses are given for credit through the Evening Division of the University of Vermont.

Vermont Educational Television has received several national awards for locally produced programs.

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

The Alumni Council

The aim of the Alumni Council is to give organization and aid of the highest efficiency to all efforts of the Alumni of the University of Vermont for the benefit of the University, and more particularly in the following respects: to act as a clearing house for alumni sentiment and the interchange of alumni ideas; to consider, recommend, and approve projects to be put forth in the alumni name; to act as the official spokesman of alumni sentiment to the administration, and as the avenue of approach by which the administration should have access to the Alumni collectively; to recommend on such undertakings, or to provide for their being carried on, as are reasonably within the province of alumni activity, and are of benefit to the University; to plan and activate programs and services for the classes and clubs.

Offices of the Council consist of a president, vice-president, secretary, and treasurer, who shall be the treasurer of the University. The president and vice-president are elected biennially, and neither office may be held by the same individual for more than one term. The secretary shall be a staff member of the University selected in conference between the Executive Committee of the Council and the President of the Council or his delegated representative.

V Student Life

The general welfare of students is the responsibility of the Office of the Dean of Students.

Student Personnel Services

Student Personnel Services are available to assist students in the development of individual or group goals. These services include the offices of Student Personnel Deans, Director of Intercollegiate Activities, Director of Testing and Counseling, Director of Admissions, Director of Financial Aid, Director of Placement, Director of University Health Services, Advisor to Foreign Students and Scholars, Director of Housing, and the Director of Student Activities.

Extensive resources applicable to group goals, purposes and organizational problems are offered through consultation with these offices. The student personnel staff is trained to work with individuals and groups in an effort to obtain optimum educational objectives and experiences.

COUNSELING AND TESTING CENTER The Counseling and Testing Center has been established to aid students toward becoming maximally effective as students and as persons. To help each student benefit from his university career and develop to the full limit of his potentialities, professional psychological services are provided for a wide range of problems—educational, vocational, and personal. The Center offers individual counseling and testing on a confidential basis to all matriculating students. Referral to other appropriate specialties such as Psychiatric Services, Reading Center, and Placement Office is also available.

PLACEMENT SERVICE To assist graduating Seniors and Alumni in exploring and selecting among various employment possibilities, the University operates an extensive Placement Program. A large number of representatives from business organizations, governmental agencies, and school systems come to the campus each year to interview for full-time positions. Related services include individual

career planning and the preparation of confidential credentials. For undergraduates, occupational information is available in the Placement Office and career planning lectures are given during the semester.

FINANCIAL AID The University Financial Aid office counsels students on financial problems, administers the University's Scholarship and Loan Funds, and assists students in obtaining part-time employment.

VETERANS ADMINISTRATION BENEFITS Students who are eligible to receive educational benefits from the Veterans Administration under the provisions of Public Laws 634 (veteran's child), 894 (disabled veteran), or 89-358 (veteran who served on active duty with the Armed Forces after January 31, 1955) should present a "Certificate for a Program of Education" or a "Certificate of Eligibility" to the Office of Financial Aid at the time of registration. If the student is presently in training at another institution, he should complete a "Request for Change of School" form which may be obtained from his regional V.A. office. Questions regarding Veterans Administration benefits should be directed to the office of Financial Aid.

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.

SPEECH AND HEARING CENTER Services of the Speech and Hearing Center, located in Pomeroy Hall 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.

University Health Services

The University has complete resources for maintaining the physical well-being of members of the student body. The Health Service, with its headquarters at the Wasson Memorial Infirmary, provides medical,

minor surgical, orthopedic and psychiatric care for all students. Major medical, surgical, orthopedic and psychiatric cases will be treated at the Medical Center Hospital of Vermont, adjacent to the campus, or if feasible, arrangements made for such care at a hospital nearer the student's home. Long-term psychiatric cases will be treated by a local psychiatrist outside the Health Service at the student's expense. Athletic teams are examined prior to activity and care of injuries in these sports is supervised by the Health Service.

The Health Service is staffed by a medical director, associate physicians, and psychiatric consultants, who have regular clinic hours. An orthopedic consultant holds a regular clinic at the infirmary.

The infirmary is staffed by an administrative director, full staff of registered nurses, a part-time laboratory technician, and physical therapists who are also the athletic trainers. The infirmary is never closed. One of the staff physicians is on call at all times in addition to the scheduled office hours. A student may employ a private physician at his own expense and use the infirmary facilities.

Parents are notified of illness by phone or letter, depending on seriousness of the illness or injury.

Every student who pays full tuition for the normal college year of nine months is entitled to a maximum of five days of infirmary care and such routine medical care as is needed and as the infirmary and health service can render during the academic year. Students who require infirmary care for more than five days in the college year are charged at the rate of \$12.00 per day.

Every student at the University is required to participate in the physical education program for one year. Normally this work is taken in the freshman and sophomore years, but may be postponed on the advice and authorization of the medical director, or the student's own physician, who must forward statements to the medical director concerning disability.

Housing

The University provides housing for all full-time undergraduate students except for commuting students and those who desire and are eligible to live off campus. Upper class students who are active or pledges of a fraternity or a sorority may register for University residence hall housing or chapter housing. Men and women students who have completed two full semesters as of June 15 of the current year or also those who reach the age of 21 years as of December 31 of the current year may register for University residence hall housing or off-campus hous-

ing. The University is not responsible for the approval of off-campus housing facilities. The Director of Housing will furnish a listing and information on housing facilities that are available in the Burlington Area.

A. Residence Halls. All undergraduate men and all unmarried undergraduate women are eligible to live in University residence halls. Contracts for room and board are binding for the college year unless cancelled for due cause with the sanction of the Student Personnel Deans. In August each new student will receive notification of a housing assignment and the date and hour of the opening of his or her residence hall. Rooms may not be occupied until the date specified. Each student is expected to leave the residence hall not later than twenty-four hours after his or her last examination at the close of each semester.

Facilities for doing personal laundry are provided in residence areas as well as space for the storage of trunks, baggage and skis. Bed linen and towels may be furnished by the student or rented from a commercial linen service which provides weekly delivery of two sheets, a pillow case, and three towels. Students provide their own window draperies, pillows, metal wastebaskets, bureau covers, desk and reading lamps. All students living in the residence halls must have board contracts in the appropriately assigned dining hall, with the exception of upperclass students who are members of fraternities or sororities who may elect to take their meals in the chapter house.

In order to facilitate maximum educational growth from the residence hall experience each residence hall will house a pro-rated number of residents from each of the four undergraduate classes. Each residence hall is under the guidance and direction of a Resident Adviser who is a member of the Student Personnel Staff. In addition, the Resident Adviser 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 residence hall student government organization which represents student opinion and which provides educational and social programs for its constituents.

B. 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, interfraternity sings, dances, social work projects, house operations, meal service, and educational programs. Fraternities and sororities are under the jurisdiction of the Student Personnel Dean. Fraternity

activities are coordinated by the Interfraternity Council and sorority activities are coordinated by a Panhellenic Council.

Student Activities

The University officially recognizes the activities of a number of organizations supplementing the social and recreational needs of students, developing their cultural and religious interests, providing them with valuable business and executive experience, and broadening their contacts. Because it is within this area that qualities of leadership may be developed, the University encourages participation consistent with its scholastic requirements. The students manage the affairs and finances of these organizations within the framework of the University's regulations.

RELIGIOUS LIFE Although the University cannot itself attempt to guide the religious life of its students, this work is carried out by several independent agencies: the B'nai B'rith Hillel Foundation; the Catholic Center; the Council for a Cooperative Ministry (sponsored by the American Baptist, Methodist, and Presbyterian churches, and the United Church of Christ); and the Episcopal Church at the University of Vermont. In addition, the Inter-Varsity Christian Fellowship, the Christian Science College Organization, and the Church of Jesus Christ of Latter-Day Saints are represented on campus. Students desiring information on any of these groups are referred to the office of the Consultant on Religious Programs.

THE BILLINGS CENTER The major function of this multi-purpose building, located in the former Billings Library, is to provide the "where" for co-curricular activities in an atmosphere consistent with the goals of the University for individual development. Billings provides facilities for lectures and other programs sponsored by the various student organizations; small group conference rooms; study and recreational lounges; and snack bar facilities in the Catamount Den.

As the focal point of many student activities, most campus organization offices are located in Billings. Included are the Director of Student Activities; Student Association; Inter-Residence Association; Panhellenic Council; Interfraternity Council; Student Committee on Discipline; University of Vermont Music and Film Festival; *Cynic*; *Ariel*; and Billings Center Governing Board.

UVM STUDENT ASSOCIATION All students enrolled in the undergraduate colleges and schools are charged a student activity fee and thus become members of the UVM Student Association. A Senate, consisting of elected officers and representatives, holds weekly meetings during the year and conducts the regular business of the association. However, the student body may be convoked by the Senate or by any group of students to hold a referendum or to conduct extraordinary business. There are many opportunities for students to participate in the work of the standing or ad hoc committees.

STUDENT COMMITTEE ON DISCIPLINE The judicial authority of the Student Association is vested in the Supreme Court, which consists of student representatives of each of the undergraduate colleges. The court has jurisdiction in all cases concerning interpretation of the Constitution and By-laws of the Student Association and legislation enacted in pursuance thereof. The Committee hears cases referred to it by the Student Personnel Deans or the Standing Committee on Jurisdiction.

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.

HONORARY SOCIETIES 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. 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. Although membership in Mortar Board comes as a great honor for a University of Vermont woman 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 proved their ability to do research in one of the sciences and, if 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; and Alpha Lambda Delta, freshman women's scholastic; Ethan Allen Rifles, outstanding students in the Reserve Officers Training Corps; Pershing Rifles, a military fraternity.

RECOGNITION SOCIETIES The several class societies recognize contributions to the University of Vermont and leadership in campus life. The Boulder Society, a local society for senior men, recognizes responsible student leadership, as does Mortar Board for senior women. Election to these societies is counted one of the highest honors that a University of Vermont man or woman can achieve. Other class recognition societies are Key & Serpent, a junior society, and Gold Key, a sophomore society.

The Staff & Sandal, recognition society for junior class women, and the Sophomore Aides, for women of the sophomore class, recognize leadership and scholastic achievement.

ATHLETICS AND INTRAMURAL PROGRAMS A program of intercollegiate competition for men is maintained in baseball, basketball, cross-country, football, golf, hockey, indoor track, rifle marksmanship, skiing, soccer, swimming, tennis, track. The athletic policies of the University are under the direction 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, of the National Collegiate Athletic Association, the New England Intercollegiate Athletic Association, and the Eastern College Athletic Conference. The Department of Physical Education for Men offers an excellent program of intramural sports which provides for voluntary participation by men in all classes. Competition in nineteen different sports activities is arranged among fraternities, residence halls, independent groups, and individuals. In addition to regularly scheduled intramural contests, the facilities of Patrick Gymnasium are available at various times during the week for recreational free play in a wide variety of sports activities. Equipment for free play is provided by the University and is available on a loan basis by presentation of the student's ID card.

The Women's Recreation Association, open to all women students, sponsors intramural, extramural, and intercollegiate sports events for women in a variety of team sports, individual, dual, and recreational activities. Through its program, WRA endeavors to provide opportunity for leadership and to encourage participation in and administration of recreational activities and service projects for all women students.

The Outing Club sponsors mountain climbing expeditions, ski trips, and other outdoor activities for both men and women students.

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, interfraternity sings, dances, social work projects, house operation, and meal service. Fraternities and sororities are under the jurisdiction of the Student Personnel Deans. Policies regarding the establishment of new chapters and the operation of present groups on the campus are subject to the authority of the University Council. Fraternity activities are coordinated by the Interfraternity Council and sorority activities are coordinated by a Panhellenic Council. The following are active chapters of national and local fraternities: Acacia, Alpha Epsilon Pi, Alpha Gamma Rho, Alpha Tau Omega, Delta Psi, Kappa Sigma, Lambda Iota, Phi Gamma Delta, Phi Delta Theta, Phi Mu Delta, Sigma Alpha Epsilon, Sigma Nu, Sigma Phi, Sigma Phi Epsilon, Tau Epsilon Phi, Theta Chi and Zeta Beta Tau. Chapters of the following national sororities are represented: Alpha Chi Omega, Alpha Delta Pi, Delta Delta Delta, Gamma Phi Beta, Kappa Alpha Theta, and Pi Beta Phi.

MUSICAL ACTIVITIES Opportunities for participation and appreciation are provided for students with strong musical interests. The University Band, the University Choir and Women's Chorus, the University Madrigal Singers, 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 military reviews, University of Vermont Winter Music and Film Festival, and football games, presents two formal concerts, and makes a spring concert tour. The University Choir and Women's Chorus give three annual concerts and the Madrigal Singers sing for various groups around the State. The University Or-

chestra presents two annual concerts, assists the Choir in a third, and plays for musical productions.

UNIVERSITY OF VERMONT WINTER MUSIC AND FILM FESTIVAL The out-

standing social event of the year is the Winter Festival in February. Festivities include a ball at which a king and queen are crowned, snow sculptures, a jazz concert, and a special skiing program. Fraternities, residence halls, student organizations and other independent groups compete with one another in the presentation of original films and skits.

The aims of the Film Festival are to create a common ground for competition between organizations within the University community to enhance the unification and total participation of all competing groups; to provide a medium of competition that is flexible enough to move with contemporary trends and interests; to challenge the industry and creativity of all competitors in the University community and to present a production which will afford a superior form of entertainment to the more than 8,000 people who will audience it.

FINE ARTS FESTIVAL A Fine Arts Festival is held each spring primarily to show student talents and works in the fine arts.

Among the highlights of the Festival are exhibitions of paintings, sculpture, and arts and crafts. Productions include an opera, a dance program, and student directed plays, as well as choral and orchestral concerts. Exhibitions, lectures and movies are scheduled at the Fleming Museum.

DRAMA, DEBATING, TELEVISION, AND RADIO The Arena Theatre in the Fleming Museum

is the home for the Season of Plays presented each year by the Department of Speech and Dramatics 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, Speech and Dramatics, 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.

The Lawrence Debate and Discussion Club provides opportunities for participation in all types of forensic activities—debate, discussion, oratory, after-dinner, and extemporaneous speaking. Members of the club

appear before service clubs, farm organizations, high schools, and other groups throughout the state. The members of the club participate in more than three hundred intercollegiate debates annually, with the beginners getting as extensive an experience as the veterans. The club travels to various discussion programs and to outstanding tournaments in the East. Outstanding performers receive recognition by election to Delta Sigma Rho-Tau Kappa Alpha, the national honorary forensic fraternity.

Two radio stations and one television station are located on campus. WRUV-AM is a wired-wireless station which has been broadcasting primarily to the campus since 1954. It is managed and staffed by undergraduate students. WRUV-FM is a 10-watt-educational station which began operation in 1965. Under faculty supervision, students operate this station as an integral part of the academic program in broadcasting offered by the Department of Speech. The station serves the area within 10-15 miles of the University. Opportunity is provided for students to participate in the production of these programs.

STUDENT PUBLICATIONS A college newspaper, a literary magazine, and an annual yearbook offer interested students the opportunity for journalistic, literary, and editorial expression. The newspaper, the *Vermont Cynic*, is published on a scheduled basis by the students. The *Ariel*, the annual yearbook, published by members of the senior class. The annual *Freshman Record Book* for all incoming students is published by a committee of the Student Association. *Departure* is the student-supported literary magazine.

CLASS ORGANIZATIONS The members of each freshman class form a class organization which retains its identity throughout the undergraduate years of its members and extends through subsequent years as long as there are living alumni of the class. Members of each undergraduate class elect officers each spring, except that officers elected at the end of the junior year serve through the senior year and to the end of the first reunion. Each senior class conducts the events of Senior Week.

V The Admission of Students

To be fully qualified for admission an applicant must have his completed application on file with the Director of Admissions before February 1 of the year in which admission is sought. Applications filed after this date can be considered only as curriculum and dormitory capacities allow. Forms for admission will be sent upon request. A non-refundable application fee of \$15 is required of all applicants.

Admission to the freshman class is selective and is determined after careful consideration of the high school record, rank in graduating class, recommendation of the high school principal, and scores on the College Entrance Examination Board Scholastic Aptitude Test. A personal interview may be requested by the Director of Admissions. The Scholastic Aptitude Test should be taken not later than the January testing date in the senior year.

Candidates for admission are expected to present not less than sixteen units from high school. These must include:

| | |
|-------------------------------------|------------------|
| English | Four years |
| Mathematics (as specified below) | Two years |
| Foreign Language, ancient or modern | Two years of one |
| Science | Two years |
| Social Studies | Two years |

The two years of mathematics should be one year of algebra and one year of geometry. One year of social studies should be European or world history; or European or world geography. Students who plan to specialize in engineering, forestry, mathematics or science should present both a second year of algebra and a course in trigonometry for a total of four years of mathematics.

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 recommended as desirable preparation for college. Students who present such courses will be given preference for admission. A student planning to major in music

must arrange for an audition and interview with the chairman of the music department during the year preceding entrance.

The Nursing program is approved by the Vermont Board of Nursing and is fully accredited by the National League for Nursing, Inc. Applicants must satisfy the general admission requirements for the University. High School courses in biology, chemistry, and physics are highly recommended.

Types of Enrollment

DEGREE STUDENTS (Previously called "Matriculated" students) Students who have presented appropriate credentials for admission and have been accepted as students in a degree program.

NON-DEGREE STUDENTS (Previously called "Non-Matriculated" students) Students who have presented minimum credentials and are permitted to undertake *limited* course work for a purpose *other than* the earning of a degree. Non-degree students must be officially approved and registered as such, and are subject to all regulations of the University.

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 apply for approval to the Graduate College.

College Entrance Examinations

The College Entrance Examination Board will administer a series of tests during 1971 on November 6 and December 4, and in 1972 on January 8, March 4, April 15, May 6 and July 8. Complete information may be obtained from the College Entrance Examination Board, P.O. Box 592, Princeton, New Jersey 08540.

Admission to Advanced Standing

All applicants for admission who have attended another collegiate institution are required to file with the Director of Admissions an official transcript of high school and college records. A confidential report from the college attended is also required.

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.

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. Departments will review Advanced Placement examinations and the scores received in order that qualified students may not be required to repeat work already covered adequately.

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 receive 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 matriculated student who wishes to do so may, under the following conditions, receive credit for a course by taking a special examination.

A request for such an examination must be made in writing at least one month before the date of the examination, and it must be approved by the student's advisor, the 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. 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.

Pass-No Pass Option

Students, starting with the sophomore year, may elect to take certain of their courses on a pass-no pass option, with approval of their advisor.

Orientation Program

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. The scores on all tests are used in advising students regarding the course of study and the selection of courses. New students are required to come to the campus for a two-day orientation and enrollment. Schedules and dates of these meetings are mailed with the Certificate of Admission. The student will plan his course program with the advice of his advisor and academic dean and complete his registration for the September opening of college.

V

The student expenses outlined in the following paragraphs are only anticipated charges for the academic year

An application fee of \$15.00 is charged each applicant for admission to the University.

An orientation fee of \$21.50 is charged each new student to cover the costs of attending an orientation session.

DEPOSIT A deposit of \$50.00 is required of every applicant after he has received notification of his acceptance as a student at the University. This deposit is held until he graduates or discontinues his course of study, at which time the deposit minus any indebtedness to the University will be returned to him.

An applicant to an undergraduate college who gives written notice of cancellation of an application prior to July 15 will receive a refund of \$15.00.

TUITION The tuition charges are in accordance with the following schedule.

1. VERMONT RESIDENTS

All full-time students (twelve hours or more)\$750.00 per year
(\$375.00 per semester)

Part-time students (fewer than twelve hours).....\$35.00 per credit hour

2. NON-RESIDENTS OF VERMONT

NON-RESIDENTS OF VERMONT:
All full-time students (twelve hours or more)\$2200.00 per year
(\$1100.00 per semester)

Part-time students (fewer than twelve hours).....\$95.00 per credit hour

SPECIAL CONDITIONS Undergraduate students who, by reason of conditions over which they have no control, require more than four years to complete the requirements for a degree shall be charged no more than the full tuition for four years.

In the College of Medicine students allowed to repeat a year are charged full tuition for that year.

In the Graduate College a tuition fee of \$25.00 per semester is charged each graduate student who has completed all course requirements but who is in residence for the purpose of completing his thesis.

FEES FOR COURSES IN MUSIC, PERFORMANCE STUDY Private lessons are approximately one-half hour in length, fifteen being given in each semester. Students who enroll as regular full-time students in a music curriculum, paying full tuition, are charged one-half the regular rates for performance study for such courses as are required in the curriculum. All others pay the scheduled charge.

One lesson a week\$ 60.00 per semester
Two lessons a week\$120.00 per semester

FORESTRY SUMMER PROGRAM The charges for the Forestry Summer Program (see page 87) are Vermont resident tuition \$200.00. Non-resident tuition \$288.00. In addition there may be charges for transportation.

ROOM CHARGE Rooms in college residence halls are rented for the academic year and the prices are uniform in all residence halls. For each occupant of a room in a residence hall, \$230.00 per semester is charged. The charge for a single room, when available, is \$520.00 (\$260.00 per semester). The residence halls are closed during the University recess periods and the University reserves the right to use student rooms to house University students in any of the residence halls during these recess periods. Normal charges for use of certain electrical appliances may be levied upon occupants of the residence halls. A \$6.00 fee is charged each dormitory resident to be used for the Inter-Residence Association.

Written notice is required of any student cancelling his room contract. Any student cancelling his contract after June 30 but before the beginning of the Fall Semester, will be assessed a \$50.00 penalty. Unless specifically authorized by the appropriate Student Personnel Dean, no cancellations will be honored after the opening of the Fall Semester.

A room key deposit of \$1.00 per year is also required, and returned upon the surrender of the key.

BOARD All students who live in a University residence hall are required to have meal contracts for twenty meals per week at a cost of \$270.00 per semester. Students with meal contracts will be assigned by the University to appropriate residential dining halls. Members of a University fraternity which provides meal service may contract for that service with their fraternity.

LIBRARY BOND FEE A library fee of \$30.00 per year (\$15.00 per semester) is charged to all full-time students 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 \$15.00 per year (\$7.50 per semester). Students enrolled in three hours or less are not subject to the library fee. This fee is assessed by legislative act and turned over to the State of Vermont each year to the extent necessary to fund the debt retirement on the bond issue that was used to fund the construction of Bailey Library.

ATHLETIC BOND FEE An athletic fee of \$30.00 per year (\$15.00 per semester) is charged to all full-time students. Students have the privilege of using the facilities in the gymnasium at scheduled times.

This fee is assessed by legislative act and turned over to the State of Vermont each year to the extent necessary to fund the debt retirement on the bond issue that was used to fund the construction of Patrick Gymnasium.

STUDENT HEALTH SERVICE FEE A fee of \$20.00 each semester is charged to all degree students at the University of Vermont. Please see page 45 for services provided.

STUDENT ACTIVITY FEE Full-time undergraduate students enrolled are charged a fee of \$21.50 per year (\$10.75 per semester). This fee is allocated by the Student Association toward the support of student organizations and student activities. First-year medical students who enter the College of Medicine after three years in the College of Arts and Sciences are charged this same fee.

Graduate students, part-time students, and students in the College of Medicine may, by paying this fee, become entitled to the benefits listed above.

MEDICAL STUDENT ACTIVITY FEE All students in the College of Medicine are charged a fee of \$10.00 per year. This covers the cost of the medical year book and other student activities.

TECHNICAL NURSING SUMMER PROGRAMS The tuition for the summer session (see page 131) will be at the summer session credit hour rate. Room and board are available for those desiring University housing.

LOCKER-TOWEL FEE All men enrolled in physical education activity courses and those who wish to have an assigned locker must pay a four dollar locker-towel fee each year or any portion thereof. This fee provides a lock and clean towel after each use of the gymnasium facility.

PENALTY PAYMENT Failure to complete financial arrangements and registration by specified dates will result in a penalty of \$10.00.

ADVANCED DEGREE FEE A fee of \$35.00, payable during the semester prior to graduation, is charged degree candidates in the Graduate College. This fee includes the cost of thesis binding and the academic hood.

Estimated Expenses Per Year¹

Estimated expenses (excluding transportation, laundry and spending money), based on the regular tuition for undergraduate students include the following:

| | |
|------------------------------------|-----------|
| Resident Tuition | \$ 750.00 |
| Non-Resident Tuition | 2200.00 |
| Meals (contract 20 per week) | 540.00 |
| Room (per person) | 460.00 |
| Library and Athletic Fees | 60.00 |
| Student Health Service Fee | 40.00 |

| | |
|---|------------|
| Student Association Fee | 21.50 |
| Residence Hall Activities Fee | 6.00 |
| Books and Supplies ¹ (estimated) | 165.00 |
| <hr/> | |
| Resident Total | \$ 2042.50 |
| Non-Resident Total | \$ 3492.50 |

Payment of Bills

All fees and tuition for the semester (one-half of the above yearly total) are payable upon notification and not later than at the time of registration. Checks should be made payable to The University of Vermont. The University reserves the right to withhold all information regarding the record of any student who is in arrears in the payment of fees or other charges including student loans.

TIME PAYMENT The University of Vermont offers a time payment plan to students or parents. For further details contact the Bursar's Office.

Refunds

TUITION

1. In the event of voluntary withdrawal from college, during the first week of any semester the full tuition is refunded; thereafter, 20 percent is retained by the University for each week that has elapsed.
 2. Any student who has paid in full the tuition for a semester and who withdraws for reasons of health or other causes beyond his control before the end of the semester, may, with the permission of his college dean and in lieu of any refund, elect to enroll for a ninth (final) semester without charge for tuition.
 3. If a student is suspended, no cash refund is made; the student and his parents are informed that a credit balance for the amount actually paid for tuition by the student or his parents will be retained on the University's books and applied to his tuition charges, if he re-enrolls within three years of his suspension; no scholarship grants will be included in such credit.
 4. If a student is dismissed for cause, a refund of tuition is made proportionate to the number of weeks remaining in the semester at the time of dismissal.
 5. In case of death of a student, tuition paid is refunded in full.
 6. A student who changes his status from full-time to part-time (fewer than twelve hours) by an approved change of enrollment during the first three weeks of a semester may be entitled to partial refund of tuition, gymnasium, and library fees, since the charges will be adjusted to fit his new status.
1. Engineering students add about \$50 for instruments. Dental hygiene students add about \$225, and nursing students should add about \$125 in the sophomore year, for uniforms and special equipment.
- Students in the professional nursing program add about \$75.00 for uniforms and special equipment prior to beginning clinical nursing experiences; students in the technical nursing program add about \$75 at the time of registration.

OTHER CHARGES AND FEES

1. Refund of payments for board is made on a *pro rata* basis.
2. There is no refund of room rent.
3. There is no refund of student fees (Library, Gymnasium, Student Activity), except as noted under 6. above under TUITION.

Check Cashing Facilities

The University Store cashes small personal checks for students in good standing on presentation of a current student identification card.

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. The extent of need and the type of financial assistance which can be awarded is determined by the Director of Financial Aid.

New students should request application forms for aid from the Director of Admissions, the Director of Financial Aid, or from their principal if they are attending a Vermont high school. All applicants for financial assistance must submit a Parents' Confidential Statement to the College Scholarship Service in addition to the application for financial aid. These forms may be obtained from the local high school principal.

Applications for students entering the University should be filed before Feb. 1. Only in cases of emergency will applications after that date be considered.

A complete list of scholarships and loan funds will be found on page 332. A brochure presenting in more detail the types of aid available may be obtained from the Financial Aid office.

V General Information

The following rules of residence, adopted by the Board of Trustees on October 18, 1952, used in determining a student's eligibility to benefit from the reduced tuition rate for residents of Vermont, be and hereby are amended, effective with the beginning of the fall semester in 1971, to read as follows:

Definition of "Vermont Resident"

1. A student who is of age at the beginning of a semester of the University shall be deemed to be a *Vermont resident during such semester* if, and only if, he had his domicile in Vermont for a period of one year next preceding the beginning of such semester, except as otherwise provided by these rules.
2. A student who is a minor at the beginning of a semester of the University shall be deemed to be a *resident of Vermont during such semester* if, and only if, his parents had their domicile in Vermont for one year preceding the beginning of such semester, except as otherwise provided in these rules.
3. A student who at the beginning of a semester of the University has his domicile fixed by a special rule of law (as a student under guardianship, a married woman, etc.) shall be deemed to be a Vermont resident during such semester if, and only if, the circumstances claimed to have made the student a resident shall have taken place at least one year prior to the beginning of such semester; provided, however, that a guardianship of a minor student shall not be deemed a basis for residence if the primary purpose of the guardianship is to qualify the minor for resident tuition.
4. Whenever a resident student shall lose his Vermont domicile (as in the case of a minor whose parent or guardian moves from Vermont but excepting women who lose such domicile by marrying non-residents) the student shall be reclassified as a non-resident effective at the beginning of the next semester for which the student enrolls; and it shall be incumbent upon any student whose status so changes from resident to non-resident to inform the Dean of his college, or the Registrar, promptly, of the facts relating to his residence.
5. The burden of proof shall in all cases rest upon the student claiming to be a resident of the State of Vermont.
6. The Board of Trustees may whenever justice requires make exceptions to these rules.

The Committee on Residence has been authorized by the Board of Trustees to consider exceptions as stated in rule 6 above. Appeals from the decision of the committee may be made to the Board of Trustees.

Application for change of residence classification should be made to the Director of Admissions who is chairman of the Committee on Residence.

Academic Discipline

CONDUCT The general principle governing the conduct of students is set forth in the following "ancient law" of the University:

The conduct of the students toward all men is to be regulated by those plain rules of politeness, honor, and religion which are binding on every

free and virtuous community. They are to conform to every requirement of the faculty, which may arise from their relations as instructors, counselors and guardians, and as upright men and good citizens they shall use all lawful exertions to prevent and expose all violations of the laws of God and of the country, and whatever is at variance with the objects of the University.

Toward this end, 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 students and their parents are referred to the booklet *Privileges and Regulations for Students* in which University rules concerning discipline and academic procedures are given in detail. Each student is responsible for knowledge of these.

**Policy Statement on Campus Dissent and Disruption Adopted by
the Trustees on December 5, 1970**

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

Board of Trustees, May 1969

As the above quotation suggests, the University functions within the rules governing a larger society. It was created by that society for a special purpose: the facilitation of learning and teaching.

It follows that the University's regulations must conform with the law as well as take account of the particular role of educational institutions.

Fundamental to our entire philosophy is our firm belief that rights guaranteed by the First and Fourteenth Amendments to the Constitution of the United States must be protected on the campus as elsewhere in our society and further, that civil laws must prevail on the campus.

Within the University setting as within society at large, the exercise of one's rights must be tempered by recognition of the rights of others. For example, the exercise of free speech may unreasonably infringe upon the right to learn. It should not be surprising that conflict may arise between parties engaged in activities which are individually lawful, for a fundamental function of social organization is the reconciliation of competing interests.

Within the University setting more than any other, the appropriate means for conflict resolution is rational discourse. The processes fundamental to the

existence of the University cannot be abandoned under stress, especially since they represent the most effective means for progress. Further, the criteria employed to seek lawful accommodation of various interests must grant special attention to the central mission of the University; learning and teaching.

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

It is within this context that the University rejects the use or threat of force as a means of resolving differences. Violence is both unnecessary and inappropriate for those who have access to reasoned discourse and is unacceptable within an institution dedicated to reason. For those who will not or cannot contend within this arena, the University must, after efforts at persuasion have failed, resort to the use of any legal remedy deemed necessary. Such persons, consequently, may expect appropriate responses from either the University or civil authorities or both. Normally, the University will respond first, when failure to do so would present a clear and imminent threat to proper functions of the University. Civil action will be invoked when non-students are involved or when the severity of disruption requires such a step.

GUIDELINES

Since a clear differentiation between legitimate dissent and coercive disruption is difficult, it is the purpose here to provide explanatory guidelines:

1) The Board of Trustees, Administration, Faculty, Staff, Alumni, and Students recognize the crucial importance of maintaining open communication and dialogue in the process of identifying and resolving problems which evolve from the dynamics of University life.

2) Coercive disruption initiated by any person or persons within the University community will be met by that action of the University which is necessary to restore order and the communication required for rational solution of problems. Such action may include suspension, expulsion and/or arrest. Coercive disruption is generally defined here as activity which imposes the will of other persons or groups within the University community, outside of established procedures for the expression of opinion and the resolution of differences.

Coercive disruption is construed to include activity which:

- a) Denies the rights of students, the faculty, the staff or guests of the University.
- b) Disrupts or obstructs educational and other activities of the University.
- c) Reacts to the expression of the peaceful discourse of dissent of others by attempting to deny their rights.
- d) Obstructs or restricts free movement of persons on any part of the University campus.
- e) Denies the proper use of offices or other facilities to the students, faculty, officers, staff, or guests of the University.

- f) Endangers the safety of any person on the University campus.
- g) Threatens, or results in, the destruction of property.

It is to be understood that the phrase "educational and other activities of the University," includes the duly registered and lawful activities of recognized student organizations as well as other agencies of the University.

3) Because of its purpose, nature and function, it would be self-defeating for a University to attempt to prohibit or to even discourage dissent. Lawful and peaceful demonstration as an expression of favor or dissent should be permitted and protected.

4) Members of the academic community must be free to organize, discuss, pass resolutions, distribute leaflets, circulate petitions, picket and take other action which is not only lawful, but consistent with University policies and procedures; but they have an obligation to preserve the University's free and unhampered search for truth.

5) The activities of an individual or group of individuals cannot be allowed, in the name of free speech, to disrupt or interfere with the educational program.

6) Trespassers may be arrested and removed from University premises. Failure of a person on University property to follow a reasonably founded request to leave University facilities, expressed by one duly authorized to make such a request, makes him a trespasser.

7) The University may decide to exercise its authority as property owner to eject members of the public who seriously abuse their privilege of coming upon the campus.

8) When groups organize a demonstration on campus which becomes disruptive, action may be taken against the group as well as individuals involved.

9) Becoming a member of the University community in no way abrogates, or compromises the rights which the Constitution of the United States guarantees to all persons. This principle applies to the adjudication of violations of campus policies as well as all other areas.

Policy Statement on Discrimination Adopted by the University Senate September 13, 1968

As a public institution, the University of Vermont opens its doors and facilities to any student on the basis of his or her character and ability and irrespective of race, religion, color or nationality.

Use of English

Correct English usage is demanded by all departments in 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 remanded 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.

Reserve Officers' Training Corps

The mission of the Army ROTC is to produce qualified leaders with the training and attributes essential to their progressive development in the United States Army as reserve or career officers. The objective is to prepare college students for positions of responsibility commensurate with their education.

The University offers Military Science as an important contribution to national defense. The U.S. Army ROTC is a recognized part of the University's organization, and all qualified male students are encouraged to satisfy in part, their military obligation under the Universal Military Training and Service Act by participating in the program on a voluntary basis.

The Military Science curriculum is designed to provide a basic education in military subjects and to develop the leadership potential of the student. Instruction is given in subjects common to all branches of the Army with emphasis on national security policy, military technology, U.S. military history, military management, logistics, instruction, and the exercise of command. Qualified graduates are commissioned as lieutenants of armor, military intelligence, artillery, engineers, finance, infantry, medical service, signal, ordnance, quartermaster, transportation, or other branch, depending upon aptitudes, the individual's choice, and the needs of the Army.

ROTC SCHOLARSHIPS Students motivated toward a career as an Army officer may qualify for one of 5,500 Army ROTC scholarships authorized by Public Law 88-647 (ROTC Vitalization Act), which provides full payment of tuition, books, laboratory fees, and similar educational expenses, plus \$50.00 a month subsistence pay. Grants are made on a competitive basis for a two-year, three-year or four-year period, but are contingent on enrollment in the four-year ROTC program. Student agrees to serve on active duty for four years.

Applications for the four-year scholarships are made during the senior year in high school. Normally the cut-off date for submission is in January. News media keep the public informed as to the exact date. Interested students should request application forms from the U.S. Army Headquarters nearest to their home. Students living in the Eastern United States should write to: Commanding General, First United States Army, ATTN: AHAAG-CA, Fort George G. Meade, Maryland 20755.

OPTIONAL PROGRAMS Two programs are offered: (1) A four-year program comprising 90 hours of classroom and laboratory work per academic year during the freshman and sophomore years (basic course) and 120 hours during the junior and senior years (advanced course). (2) A two-year program (advanced course) identical to the junior and senior years of the four-year program, with the following prerequisite: a student who wishes to enroll in the two-year program is required to attend a basic ROTC camp for six weeks during summer vacation at one of the five U.S. Army Basic Training Centers located regionally throughout the United States. Basic camp pay is approximately \$170.00, plus travel and major living expenses. The basic camp must be completed prior to entering the junior academic year.

Advanced course students become members of the Army Reserve during the period of enrollment, receive \$50.00 a month subsistence pay during the junior and senior years, and are required to attend an advanced ROTC camp for six

weeks during summer vacation at the end of their junior year. A student normally attends a camp within the army area in which his home is located. Camp pay for advanced course students is approximately \$290.00, plus travel and major living expenses. The advanced course camp may be deferred for one year for cogent reasons when approved by the department.

ADVANCED PLACEMENT With the concurrence of the Military Science Department, advanced placement may be granted for equivalent training as substantiated by a military training certificate issued by an accredited military or secondary school.

UNIFORMS Uniforms are furnished without cost to each student enrolled in the ROTC program. Upon graduation he receives a uniform allowance of \$300.00 which is ample to meet the initial cost of uniforms required of an Army officer on active duty.

FLIGHT TRAINING PROGRAM The Army ROTC Flight Training Program is open to qualified seniors. It is designed to train a reserve pool of Army aviators and affords students the opportunity to qualify for a Federal Aviation Agency private pilot's license. On-campus ground and flight instruction under FAA licensed instructors is provided without cost.

DISTINGUISHED MILITARY STUDENTS Members of the senior class, including ROTC scholarship students, who have demonstrated outstanding motivation toward a military career, and whose academic standing is well above average, may be designated Distinguished Military Students and offered a commission in the Regular Army.

POSTGRADUATE DEFERMENT Upon graduation, ROTC students are normally commissioned as officers in the U.S. Army Reserve and agree to serve on active duty for two years, subject to call to such duty. However, active duty may be deferred for as many as four years for those who wish to pursue an advanced degree while studying as full-time graduate students.

Physical Education

One year of physical education, normally completed during the freshman or sophomore years, is required of all undergraduate students. 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. Students twenty-five years of age or older are exempt from physical education requirements. The semester hours listed for physical education are in addition to the total number of hours required for graduation in a specific curriculum.

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.

Student Health Insurance

Through an arrangement with a commercial insurance company, students are able to procure a policy providing for payment up to \$2,000.00 for each illness or each accident. The present cost for one year's coverage is \$24.00. Married students may procure coverage for their spouse and children. Further details may be obtained from the Treasurer's Office, Room 358, Waterman Building.

Enrollment and Registration

Every student is required to enroll and register for each semester on the designated days, unless excused in advance by the dean of the college concerned. Any student in attendance who does not enroll and register for the next semester at the designated time will be considered as a dropped student and may apply for readmission after one semester. Specific directions are published for each semester.

Changes in Enrollment

Any changes in enrollment must be authorized by the dean of the college in which the student is registered. A student may add a course only during the first week of classes, but may drop a course without academic penalty during the first five weeks of classes. Change of enrollment forms are obtained from the departmental offices or advisers.

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, the course is not entered on the permanent record, and no grade credit is given for the work. For students paying full tuition, no additional charge is made; for all others, tuition is charged at the applicable rate. Under no circumstances will a change be made after the enrollment period to allow for courses audited.

The approval of the Dean of Evening Division and Summer Session is necessary for auditing courses in those divisions.

Undergraduate Degree Requirements

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

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

To be eligible for graduation, a student must have attained a cumulative average of 1.70 or higher in the courses for which he has been 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 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 in addition to that taken to qualify for the first degree.

Honors

The Bachelor's degree 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*. In the College of Medicine, the five students who have attained the highest average of marks during the entire four years' course are graduated *cum laude*. The names of those who receive these honors and of those who win academic awards are printed in the commencement program.

Dean's List

The deans of the undergraduate colleges publish at the beginning of each semester the names of those full-time students who have attained an average of at least 3.0 in their college credit courses during the preceding semester.

Grades and Reports

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 |

Penalties for 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 but under stated academic conditions according to college policies.
- b. Students are placed "on trial" by the dean, or the designated committee of the college concerned, who may also set the special academic conditions of the trial in each case. Normally the period of trial is one semester.

- c. The circumstances under which students are 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 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 receives grades below passing in one-half or more of the semester hours of his enrollment in any semester unless he 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 does not come within the provision above.
- c. A student dismissed for low scholarship must address his application for readmission to the college from which he was dropped.

PASS—NO PASS course enrollments have been 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 (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. These courses may not include any required by the student's major department, either for the major or for the degree. 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, in addition, any John Dewey Fellow may be permitted to take all his courses in a given semester on a Pass—No Pass basis, including his required courses. He may do this, after consultation with his adviser, as many semesters as he chooses, beginning in his sophomore year. The instructor will be informed of the student's status and may impose special work requirements for the course. The student will receive full credit for passing these courses. He may request any of his instructors to file a written evaluation of his work (NOT a grade) with the Registrar to be available, at the student's request, to admissions committees, employers, and the like.

Procedure—

1. Obtain a PASS—NO PASS Request Form from the Registrar's Office and consult your academic adviser.
2. Obtain your adviser'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 five weeks of the semester. Requests to be removed from that status must be filed during the same period.

Repeated Courses

A student who repeats a course loses any previous credit on record for that course. The previous grade is included in computing his cumulative grade average.

Academic Advisers

The policy regarding the selection of academic advisers is determined by each college. Students having questions, or requesting a change of academic adviser, should consult the dean of their college.

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 adviser to veterans in the Financial Aids Office.

Withdrawal

A student who wishes to withdraw from college must first notify his academic dean and the Student Personnel Deans, in person or in writing.

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.

Absence from Semester Final Examinations—

1. A student who is absent from an examination for any reason must report that fact and the reason, in person or in writing, to his academic dean within twenty-four hours. If the absence was due to illness, a statement from the University physician must be presented. On the basis of this information, the dean may excuse the absence, in which case the grade is reported as "incomplete," and the student may take the examination at a designated time.
2. If the absence is not reported as described above, or is not excused by the academic dean, the course is recorded as failed.

Absence from Graduation Exercises

All recipients of degrees will attend graduating exercises.

Priority of University Exercises

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

1. Regularly scheduled classes have priority over special scheduled common hour examinations.
2. Common hour examinations have priority over attendance at other activities.

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.

Other grades are:

- Inc. Incomplete. This grade applies to work of acceptable quality when the full amount is not completed because of illness or other 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.
- NP Not Passed, not used in average computation.
- P Passed, not used in average computation.
- W Withdrawn, without penalty, not used in average computation.
- WF Withdrawn, failing. This grade is weighted as an "F" in the computation of averages.

A quality point average of 1.70 is the minimum graduating average. All students enrolled in the undergraduate colleges receive reports of final grades from the Registrar after the close of each semester. These reports are also sent to the parent or guardian of each freshman student and to the principal of the second-

dary school from which he was graduated. Reports of upperclass students are sent to parents only upon request. Special reports of low standing are sent by the deans' offices about the middle of each semester to the students concerned.

Each student, former student, or graduate student may procure one photostatic transcript of his record without charge. For additional orders the charge is one dollar when one transcript is ordered. When more than one transcript is ordered at a time, the charge is one dollar for the first copy and fifty cents for each additional copy.

V The College of Agriculture and Home Economics

The College of Agriculture and Home Economics performs four public functions: it teaches resident students; investigates problems; disseminates information; and performs related services. These four areas of work are performed respectively 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 are offered employment in management, specialized services, education, and research—all these in areas related to agriculture, family and consumer science, conservation, recreation, and international service.

The evolution of society necessitates continual progress and change, especially in technology, management of natural resources, and human relationships. Thus the challenge of preparing students to excel now, yet adjust to future changes, is being met through programs designed to give a foundation in the social sciences and humanities plus a fundamental technical education. These programs encompass such areas of study as agriculture, forestry, home economics, preveterinary medicine, and biological sciences.

Most programs in the College of Agriculture and Home Economics leading to the Bachelor of Science degree require 120 semester hours of prescribed and elective courses, plus credit for required courses in physical education. The Forestry Program requires 138 semester hours of prescribed and elective courses, eight hours of which are earned during an eight-week summer program of instruction between the sophomore and junior years. (See page 59 for expenses.) The normal semester program includes fifteen to eighteen credit hours of courses plus physical education.

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 concentra-

tion. Faculty advisers counsel students in the selection of elective courses and educational problems.

THE HONORS PROGRAM

This program of the College of Agriculture and Home Economics is designed to help the superior student. It provides an environment for such students which will insure that they are constantly challenged by the most advanced work their talents will allow.

Students are selected on the basis of their academic performance—usually after the completion of the sophomore year. Their curricula are developed in consultation with their adviser and an honors committee. Special colloquia or consultations may be arranged in lieu of regular class work. Prerequisites may be waived, and in general the student is encouraged to work as an individual.

DEGREE REQUIREMENTS

The degree of Bachelor of Science is awarded in each of the following programs:

Biological Science
Environmental Studies
General Studies
Recreation Resource Management
Agricultural Economics
Resource Economics
Foreign Service
Agricultural Engineering Technology
Professional Agricultural Engineering
Laboratory Animal Technology
Preveterinary
Animal Industry
Animal Technology
Basic Animal Science
Dairy Technology

Botany
Forest Management
Wildlife Management
Biochemical Science
Plant and Soil Science
Agricultural Education
Industrial Education
Technical Education
Clothing, Textiles and Design
Early Childhood Development
Home Economics in Education
Human Development
Housing and Home Management
Human Nutrition and Food
Social Welfare

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 this degree, in consultation with his adviser, must choose one of the above programs upon entering the college. The candidate must then fulfill the requirements stated below.

Required of All Students

- A. The successful completion of a minimum of 120 credit hours of course work plus credit in required courses in physical education.
- B. The successful completion of at least two courses in each of the following areas:
 1. Fine arts and humanities
 2. Science and mathematics
 3. English, speech/drama, and writing
 4. Social sciences

Applicability of courses to specific areas will rest with the adviser and, if necessary, with the concurrence of the dean of the college. It is further recom-

mended that courses chosen to fulfill these requirements be taken outside the department in which the student's program of study is located.

PROGRAMS OF STUDY

TWO-YEAR BIOLOGICAL SCIENCES CORE This program is designed for those students initially interested in a general biological sciences curriculum. Students may enroll in this interdisciplinary program for the freshman and sophomore years.

Students must, during the sophomore year, decide upon a specific biological field of concentration in which to major.

Required courses and sample options available as upperclass majors are as follows:

Freshman Year

Fall

English
Chemistry
Mathematics
Biology
Elective

Spring

English
Chemistry
Mathematics
Biology
Electives

Sophomore Year

Fall

Physics
Organic Chemistry
Social Science or
Humanities
Electives

Spring

Physics
Organic Chemistry
Social Science or
Humanities
Electives

Students at completion of sophomore year must decide on an option in which to concentrate their academic programs.

Year

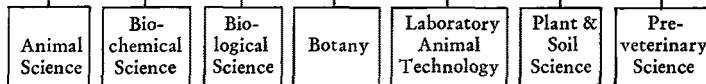
Program

Freshman
Sophomore

Biological Sciences Core Program

Junior

Senior



BIOLOGICAL SCIENCE PROGRAM Students desiring to major in biology may enroll in this option. The program provides students with a sufficient foundation in the biological sciences and supporting subjects to prepare them for graduate study or positions requiring a general biology background.

Required courses:

First two years same as "Biological Sciences Core."

Junior and Senior years (11 courses as follows)

| | |
|--|---|
| 2 courses from: | |
| Zoo. 101 Genetics | Zoo. 209 Field Zoology |
| Zoo. 103 General Structure and Function | Bot. 109 Systematics and Phylogeny |
| Micro. & Biochem. 201 General Biochemistry | Bot. 105 Developmental Plant Structure |
| Math. 110 or For 208 Statistics | Zoo. 150 Invertebrate Zoology |
| 3 courses from: | |
| Zoo. 104 Comparative Structure and Function | Bot. 160 Plant Ecology |
| An. Sci. 58 Avian Biology | Zoo. 102 Environmental Zoology |
| Bot. 104 Physiology of the Plant Body | Micro. & Biochem. 220 Environmental Microbiology |
| Bot. 117 Plant Pathology | Pl. & Soil Sci. 102 Natural Resource Conservation |
| An. Sci. 271 Endocrinology | |
| Micro. & Biochem. 55 Introductory Microbiology | |
| Pl. and Soil Sci. 108 Forest entomology | |

ENVIRONMENTAL STUDIES PROGRAM This program is offered to provide education in various areas of concern for our environment. The student is offered a University-wide, cross-discipline program in environmental studies. This curriculum provides for either a "generalist" or an "in-depth" approach to a study of the many problems of our environment.

There are 120 credit hours required for the degree. A core of required courses which is designed to be common to both of the above approaches is as follows:

| <i>Required Courses</i> | <i>Credit Hours</i> |
|--|---------------------|
| Two courses in communications | 6 |
| Two courses in physical or biological sciences: | |
| Botany, Chemistry, Geology, Physics, Zoology (not to include Biology 3)..... | 8 |
| Two courses in social sciences (1 course each in 2 different fields) | 6 |
| Two courses in fine arts, humanities | 6 |
| Five credit hours in mathematics and statistics | 5 |
| Introductory Plant & Soil Science—P&SS 11* | 3 |
| Introductory Animal Science—AS 2* | 4 |
| Environmental Quality—P&SS 99 | 3 |
| <hr/> | |
| Total 41 | |

* May substitute Biology 3, Biology and Man, for one.

Additional Requirements

1. The student selecting the in-depth approach will satisfy the requirements for a major(s) in an environmentally related department(s); see list below. In addition, students with a single major will take two or more courses in each of five additional departments. Students with a double major will take two or more courses in each of two additional departments.
2. The student selecting the generalist approach will major in Environmental Studies, and will take two or more environmentally related courses in each of ten departments from the following list.

| | | |
|--------------------------|------------------------|--------------------------|
| Agricultural Economics | Civil Engineering | Philosophy & Religion |
| Agricultural Engineering | Mechanical Engineering | Plant & Soil Science |
| Animal Sciences | Forestry | Political Science |
| Art | Geography | Psychology |
| Botany | Geology | Sociology & Anthropology |
| Chemistry | History | Vocational, Technical |
| Economics & Business | Home Economics | & Extension Education |
| Administration | | Zoology |

Courses in other departments may be selected with the approval of the Environmental Studies Program Steering Committee.

GENERAL STUDIES PROGRAM 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 twenty-four hours in the College of Agriculture and Home Economics. All additional courses must be selected in consultation with and have the approval of the student's adviser.

RECREATION RESOURCE MANAGEMENT This program is designed to prepare students for professional careers in the management of recreational resources. These recreational resources include national, state, regional, county and urban parks, campgrounds and recreation areas, as well as privately managed ski areas, campgrounds, hunting and fishing preserves, and other specialized recreational areas and facilities.

Due to the diversity of recreation resources and opportunities, students are given the opportunity to pursue a course of study which is both geared to their area of interest and compatible with professional requirements. Professional compatibility of the curriculum is developed and maintained through periodic consultations with professionals in the field.

All majors in Recreation Resource 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 three areas: Private Recreation Management, Urban Park and Recreation Management, and Outdoor Recreation Management. In addition to formal course work, each student must also complete two months of seasonal employment in his chosen area of concentration prior to graduation.

Department of Agricultural Economics

Each student majoring in programs offered within this department shall successfully complete a minimum of 30 hours in the social sciences. Of these, at least 24 hours shall be in Agricultural Economics or Economics, of which at least 12 hours shall be Agricultural Economics courses requiring advanced standing. All courses must be selected in consultation with the student's departmental adviser.

AGRICULTURAL ECONOMICS This program provides students with a basic understanding of economic theory and concepts that apply to the fields of agribusiness, marketing, farm management, and agricultural policy. Students in this program prepare themselves for work in business management, farming, extension, sales, and marketing.

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, planning, and administration.

FOREIGN SERVICE This option is designed for students interested in economic development or business in foreign countries.

Department of Agricultural Engineering

AGRICULTURAL ENGINEERING TECHNOLOGY This program leads to the Bachelor of Science Degree. It provides the student with technical and practical instruction in agricultural engineering technology including relevance to problems of environmental concern. It offers work in the areas of buildings, utilities, machinery, soil and water, and economics as well as the general education courses required of all students in the College of Agriculture and Home Economics. The graduate is qualified for employment in agribusiness and public service. Some areas of employment are: Agricultural Extension; Farm Equipment Manufacture—Sales Liaison and Management; Farm Equipment Sales and Service; Agricultural Cooperative—Sales and Management; Building Construction and Materials Adviser; Power Company Adviser; Rural Area Development; Farm Management; Rural Contracting—Buildings and Services, and Earth Work; Banks—Agricultural Adviser; Government Agencies—State and Federal; Recreational Development.

Required courses: Each student selecting this option will be required to satisfactorily complete 15 semester hours in agricultural engineering, 121, 131, 140, 160, and 164. Also required are: engineering graphics 1, chemistry 1-2, physics 5 and 6, plant and soil science 11 and 61, animal science 2, civil engineering 12, mathematics 110, economics 11 and 12, and farm shop 102 from which the student may be excused if found qualified on examination by the instructor. All courses must be selected in consultation with and have the approval of the student's departmental adviser.

PROFESSIONAL AGRICULTURAL ENGINEERING This provides the first two years of study in a four-year professional agricultural engineering curriculum. The last two years of professional education must be taken at an institution which confers the degree of Bachelor of Science in Agricultural Engineering. Special arrangement with the University of Maine permits Vermont resident students in good standing to continue their agricultural engineering education at that university after completion of the two-year program. They will receive full credit for all courses passed and they will pay the same tuition as resident students in Maine. Transfers may be made to other institutions under the usual conditions. Non-resident students enrolled in this program complete their last two years as transfer students to the University of Maine or to any other institution of their choice.

The graduate is prepared 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.

| | | 1st | 2nd | | | 1st | 2nd |
|---------------------------------|--|----------|-----|------------------------------|--|----------|-------|
| The Freshman Year | | SEMESTER | | The Sophomore Year | | SEMESTER | |
| Engineering Mathematics | | | | Engineering Mathematics, | | | |
| Math. 13, 14 | | 4 | 4 | Math. 123 | | 4 | ..... |
| General Physics, Physics 17, 18 | | 3 | 3 | Appl. Math for Engineers & | | | |
| English, 1-2 | | 3 | 3 | Scientists I, Math. 201 |  | ..... | 3 |
| Engineering Graphics, I-II, | | | | Physics 27, 128 | | 4 | 4 |
| M.E. 1, 2 | | 2 | 2 | Plane Surveying, C.E. 12 | | 4 | ..... |
| Introductory Chemistry, | | | | Statics, C.E. 1 | | 3 | ..... |
| Chem. 1-2 | | 4 | 4 | Thermodynamics, M.E. 113 |  | ..... | 3 |
| | | | | Dynamics, C.E. 2 |  | ..... | 3 |
| | | | | Programming and Elementary | | | |
| | | | | Numerical Methods, Math. 31 | | 2 | ..... |
| | | | | Introduction to Plant | | | |
| | | | | Biology or Principles of | | | |
| | | | | Biology or Bot. 4 or Biol. 1 |  | ..... | 4 |

Note: The Junior and Senior years may be taken at the University of Maine under Regional Cooperation Program. (See page 34). Freshman admission (at the Maine resident tuition) to this curriculum at the University of Maine will be allowed for Vermont resident students.

University of Maine curriculum

| | | 1st | 2nd | | | 1st | 2nd |
|----------------------------|--|----------|-------|-------------------------------|--|----------|-------|
| The Junior Year | | SEMESTER | | The Senior Year | | SEMESTER | |
| Agricultural Processing | | 3 | ..... | Agricultural Machinery | | 3 | ..... |
| Strength of Materials | | 4 | ..... | Soil & Water Engineering | | 4 | ..... |
| Materials in Agr. Eng. | | 3 | ..... | Seminar | | 0 | ..... |
| Fundamentals of Public | | | | Special Problems in Agr. Eng. | | 1 | ..... |
| Speaking | | 3 | ..... | Technical Elective | | 3 | 6 |
| Farm Structures |  | ..... | 3 | Humanities Elective | | 3 | 3 |
| Agricultural Power |  | ..... | 3 | Agricultural or Biological | | | |
| Elementary Circuits |  | ..... | 3 | Science Elective | | 3 | 6 |
| Fluid Mechanics |  | ..... | 3 | Special Topics in Agr. Eng. |  | ..... | 3 |
| Humanities Elective | | 3 | 3 | | | | |
| Agricultural or Biological | | | | | | | |
| Science Elective |  | ..... | 3 | | | | |

Department of Animal Pathology

LABORATORY ANIMAL TECHNOLOGY This provides fundamental training in the care and management of colonies of experimental animals used in scientific research. Humane methods of handling, space and temperature requirements, proper sanitation, feeding and maintenance are emphasized. Students are taught basic laboratory techniques used in examination of blood, urine, fecal and tissue specimens. Assistance with preoperative and postoperative care, recordkeeping, experimental design and problems of colony management are included. Senior students are assigned laboratory responsibilities under the guidance of the professional staff.

Students satisfactorily completing 120 semester hours plus credit for required physical education receive the degree of Bachelor of Science. Graduates are eligible for certification by the examining board of the American Association for Laboratory Animal Science and are also eligible to apply for admission to colleges of veterinary medicine or for further graduate training. Employment opportunities are available in the pharmaceutical industry, federal and state government agencies, diagnostic laboratories, medical schools, and institutions engaged in biological research.

| | | 1st SEMESTER | 2nd SEMESTER |
|--------------------------|------------------------|--------------|--------------|
| The Freshman Year | | | |
| English | Freshman English | 3 | 3 |
| Chemistry 1-2 | Introductory Chemistry | 4 | 4 |
| Math. 9 | College Algebra | 3 | ..... |
| Biology 1, 2 | Principles of Biology | 4 | 4 |
| Math. 2 | Plane Trigonometry | ..... | 3 |
| | Electives | ..... | 2-5 |

Note: No electives for the first semester

| | | 1st SEMESTER | 2nd SEMESTER |
|---------------------------|----------------------------|--------------|--------------|
| The Sophomore Year | | | |
| Chem. 131-132 | Organic Chemistry | 4 | 4 |
| Microbiol. 55 | Introductory Microbiology | 4 | ..... |
| An. Sci. 55 | Fund. of Livestock Feeding | 4 | ..... |
| Speech 11 | Public Speaking | ..... | 3 |
| | Electives | 4-7 | 9-12 |

| | | 1st SEMESTER | 2nd SEMESTER |
|------------------------|------------------------------|--------------|--------------|
| The Junior Year | | | |
| Microbiol. 201 | General Biochemistry | 4 | ..... |
| An. Path. 107-108 | Laboratory Animal Techniques | 3 | 3 |
| An. Path. 105 | Anatomy and Physiology | 3 | ..... |
| Zool. 101 | Genetics | 3 | ..... |
| An. Path. 106 | Animal Diseases | ..... | 3 |
| | Electives | 3-6 | 10-13 |

| | | 1st SEMESTER | 2nd SEMESTER |
|------------------------|------------------------|--------------|--------------|
| The Senior Year | | | |
| An. Path. 217-218 | Laboratory Animals | 3 | 3 |
| An. Path. 220 | Laboratory Assignments | ..... | 3 |
| | Electives | 13-16 | 10-13 |

PREVETERINARY SCIENCE This program offers preparation for entrance to colleges of veterinary medicine. Individual programs may be adjusted to meet requirements of different colleges. The School of Veterinary Medicine at the University of Pennsylvania now requires 3 years (90 semester hours) of preveterinary college work. Cornell University requires two years but as in the past, only exceptional two-year students will be considered for admission. In addition Cornell requires farm experience and applicants are encouraged to work with a practicing veterinarian if possible.

As a result the Department of Animal Pathology now offers the following four-year preveterinary program leading to the degree of Bachelor of Science. Candidates must complete a total of 120 semester hours plus credit for required physical education. Students with a 3 point (B) average or better can apply to colleges of veterinary medicine at any time after they have completed admission requirements. In recent years over half of the applicants admitted to colleges of veterinary medicine have the Bachelor of Science degree. Opportunities for graduate veterinarians include general practice, the armed services, public health, teaching and research, pharmaceutical laboratories, and federal, state and municipal disease control work.

Elective courses will be selected in consultation with department advisers to provide concentration in a major undergraduate area. Students not accepted in colleges of veterinary medicine will thus have a field of concentration and could qualify for graduate college if they so desire.

The preveterinary program follows:

| | | 1st SEMESTER | 2nd SEMESTER |
|-------------------|------------------------|-----------------|-----------------|
| The Freshman Year | | | |
| English | Freshman English | 3 | 3 |
| Chemistry 1-2 | Introductory Chemistry | 4 | 4 |
| Biology 1, 2 | Principles of Biology | 4 | 4 |
| Math. 9 | College Algebra | 3 | ..... |
| Math. 2 | Plane Trigonometry | ..... | 3 |
| | Electives | ..... | 2-5 |

Note: No electives for the first semester

| | | 1st SEMESTER | 2nd SEMESTER |
|--------------------|------------------------------|-----------------|-----------------|
| The Sophomore Year | | | |
| Chem. 131-132 | Organic Chemistry | 4 | 4 |
| Physics 5, 6 | Elementary Physics | 4 | 4 |
| | Political Science or History | 3 | 3 |
| | Electives | 5-8 | 5-8 |

| | | 1st SEMESTER | 2nd SEMESTER |
|-----------------|------------------------|-----------------|-----------------|
| The Junior Year | | | |
| Zool. 101 | Genetics | 3 | ..... |
| An. Path. 105 | Anatomy and Physiology | 3 | ..... |
| Speech 11 | Public Speaking | 3 | ..... |
| An. Path. 106 | Animal Diseases | ..... | 3 |
| Math. 11 | Anal. Geom. & Calculus | ..... | 5 |
| | Electives | 7-10 | 8-11 |

| | | 1st SEMESTER | 2nd SEMESTER |
|--|--|-----------------|-----------------|
| The Senior Year | | | |
| Electives selected in consultation with the student's adviser. | | 16-19 | 16-19 |

Department of Animal Sciences

Each student majoring in programs offered within 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.

DAIRY TECHNOLOGY This option 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 option 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 option 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 option 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.

Department of Botany

BOTANY Botany is that sub-division of Biology concerned with plants. Students in both the College of Agriculture and Home Economics and the College of Arts and Sciences may major in Botany. An undergraduate together with a departmental adviser selects a program suitable to provide a liberal education including broad areas of botanical and other biological sciences, as well as physical sciences. Both the botany courses and related courses emphasize concepts, intellectual skills, and the techniques and methodology of modern biological and physical science. An apprenticeship program in environmental action enables an undergraduate to work closely with a faculty member who is concerned with environmental preservation or planning, and gives the student the opportunity for decision making related to the Vermont environment. Students may choose to prepare themselves for careers that do not require education beyond the Bachelor's degree. On the other hand, they may prepare for graduate education in Botany. They may also receive preparation for advanced work leading to careers in botanical and biological fields such as medicine, dentistry, agricultural biology, biochemistry, environmental sciences, government service, secondary school teaching, and research.

Required courses:

| | |
|--------------------|-------------------------------|
| Biology 1, 2 | Principles of Biology |
| Botany-Zoology 101 | Genetics |
| Botany 104 | Physiology of the Plant Body |
| Botany 105 | Developmental Plant Structure |
| Botany 109 | Phylogeny and Systematics |
| or | or |
| Botany 160 | Plant Ecology |
| Chemistry 131, 132 | Organic Chemistry |
| Physics 5, 6 | General Physics |
| Mathematics 11, 12 | Calculus |

Two additional semester courses in Botany. 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.

Department of 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 options normally commences in the Junior Year after completion of the Biological Sciences Program (pg. 77). Students are required to complete a minimum of 3 hours of physical chemistry (or 8 hours for the Molecular Biology option), 12 hours of biochemistry and three advanced biology courses, two of which would be in their specialty (e.g., Nutrition, Physiology, Genetics, etc.).

Department of Plant and Soil Science

PLANT AND SOIL SCIENCE Students interested in horticultural plants, agronomic plants, or in soils as they relate to the science of food, feed, and fiber production or recreation and management may select a course of study in areas including agronomy, horticulture, soils, or plant environment. These areas provide a liberal education in biological sciences as a basis for understanding how man grows and uses plants. Students may place their primary interest in either science or in agri-business. The program is flexible and allows students to concentrate in one of several different areas.

Students interested in technical positions or in graduate study usually select more of the basic science courses such as botany, chemistry, mathematics, and physics. These courses help lay good foundations for future teaching and research careers.

Students interested in careers in industry, business, marketing, sales, or production generally select several courses in marketing, economics, accounting, business, and management.

Required courses: Each student must take Introductory Plant Science, Introductory Soil Science, and two semesters of Plant and Soil Science Seminar, in addition to the courses in science and humanities required of all agricultural students. Majors in the department also are required to take four courses in Plant and Soil Science at or above the 100 level. These are usually courses concerned with horticultural crops, agronomic crops, soils, or plant environment, depending on where the student wishes to specialize. Certain advanced courses in other departments may be taken in lieu of one or two of these four 100 level courses with the consent of the student's adviser.

Department of Vocational, Technical and Extension Education

Students in other departments or programs in the college may find it possible to develop a double major by combining either the Agricultural Education or Technical Education program with their major. They may also earn a minor in Extension Education by completing 11 hours of course work in this department.

AGRICULTURAL EDUCATION Graduates will be certified to teach agricultural subjects in high schools and area vocational centers. Completion of this program requires 19 hours of course work in education, including 14 hours in vocational and technical education, and 40 hours in an agricultural area. Majors in this department may wish to concentrate their study in production, agricultural supplies and services, agricultural machinery sales and services, ornamental horticulture, forestry, conservation or recreation.

TECHNICAL EDUCATION The course requirements are similar to the Agricultural Education program. A student may prepare to teach agricultural subjects in a junior college or post high school technical institute and also meet the requirements for teacher certification. Students should plan to complete an advanced degree in their agricultural field of study. The course work includes an eight-week teaching practicum in a junior college or post high school technical institute.

INDUSTRIAL EDUCATION A student electing this program will prepare to teach one of the trade or industrial subjects offered in high schools and area vocational centers. Each student will complete 19 hours of course work in education, including 14 hours of course work in vocational and technical education. This program includes a summer and junior year industrial internship during which students may receive pay while earning 30 semester hours of credit. The industrial internship is arranged and supervised by the department staff. Students having previous industrial experience may receive up to 30 semester hours credit upon examination. This program is not open to students in other departments.

Department of Forestry

Curricula in the Department of Forestry provide a liberal education in the humanities and sciences and a professional education in forestry or wildlife ecology. The programs are designed to prepare individuals for positions in forestry, in wildlife ecology, or for graduate study in the forest or wildlife sciences.

A minimum of 138 semester credit hours of prescribed and elective courses is required for graduation.

Forestry and Wildlife Ecology and Wildlife Management

| | | 1st | 2nd | | | 1st | 2nd |
|---------------------------------------|-------|----------|-----|-------------------------------|-------|----------|-----|
| The Freshman Year | | SEMESTER | | The Sophomore Year | | SEMESTER | |
| College Algebra, Math. 9 ¹ | 3 | ..... |  | Elementary Statistics, Math. | | | |
| Trigonometry, Math. 2 | ..... | 3 | | 110 | ..... |  | 3 |
| Engineering Graphics, M.E. 1 | ..... | 2 | | Silvics, For. 122 | ..... |  | 3 |
| English | 3 | 3 | | Dendrology, For. 5 | 4 | ..... |  |
| Principles of Biology, Biol. 1, 2 | 4 | 4 | | Plane Surveying, C.E. 12 | 4 | ..... |  |
| Introduction to Forestry, For. 1 | 2 | ..... |  | Principles of Economics, | | | |
| Freshman Seminar, For. 2 | ..... | 1 | | Econ. 11, 12 | 3 | 3 | |
| Introductory Chemistry, | | | | Public Speaking, Speech 11 | ..... | 3 | |
| Chem. 1-2 | 4 | 4 | | Elementary Physics, Physics 5 | 4 | ..... |  |
| | | | | Forest Biometry I, For. 144 | ..... | 3 | |
| | | | | Electives | 2-3 | 2-3 | |

Summer Field Program

| | |
|--|---|
| Forest Biometry II, For. 140 ² | 4 |
| Forest Bioecology, For. 100 ² | 4 |
| Wildlife Biometrics, For. 170 ³ | 4 |

FORESTRY This program emphasizes the science and technique of coordinating the management of forest and wildland for forest products, water, wildlife, and recreation. Graduates may be employed by Federal and State agencies, by forest products and related industries, and by private consulting forestry firms.

A. Forestry Program

| | | 1st | 2nd | | | 1st | 2nd |
|-------------------------------|-------|----------|-----|-----------------------------------|-------|----------|-----|
| The Junior Year | | SEMESTER | | The Senior Year | | SEMESTER | |
| Forest Fire Control, For. 132 | ..... | 2 | | Forest Economics, For. 151 | 3 | ..... |  |
| Silviculture, For. 123 | 3 | ..... |  | Forest Management, For. 136 | ..... | 3 | |
| Forest Entomology, For. 107 | 3 | ..... |  | Forest Recreation Mgt., For. 133 | 2 | ..... |  |
| Wood Technology, For. 162 | ..... | 3 | | Timber Harvesting, For. 163 | 3 | ..... |  |
| American Government, | | | | Forest Pathology, For. 112 | ..... | 3 | |
| Pol. Sci. 21 | 3 | ..... |  | Forest Policy and Administration, | | | |
| Electives ⁴ | 7-9 | 11-13 | | For. 152 | ..... | 3 | |
| | | | | Seminar, For. 282 | ..... | 1 | |
| | | | | Electives ⁴ | 8-10 | 6-8 | |

WILDLIFE ECOLOGY This program emphasizes the science and technique of managing wildlife populations in forests and in other types of wildlands. Graduates may be employed principally by Federal and State agencies.

1. Qualified students may substitute Math. 11 or 13 for Math. 9 and 2.
2. For forestry majors only—courses in eight week program immediately following the second semester of the sophomore year.
3. For wildlife majors only—course in four week program immediately following the second semester of the junior year.
4. A minimum of 18 restricted credits are required—(a) a total of nine hours from two or more of the following: Arts, Humanities, Mathematics, Military Science, or Social Sciences; (b) two approved courses in communications; (c) one approved course in earth sciences.

B. *Wildlife Ecology Program*

| The Junior Year | 1st SEMESTER | 2nd SEMESTER | The Senior Year | 1st SEMESTER | 2nd SEMESTER |
|---|-----------------|-----------------|-------------------------------------|-----------------|-----------------|
| Structure & Function, Zoo. 103, 104 | 4 | 4 | Wildlife Diseases, An. Path. 110 | ..... | 3 |
| Silviculture, For. 123 | 3 | ..... | Wildlife Mang't I, For. 271 | 4 | ..... |
| Systematics & Phylogeny, Bot. 109 | 3 | ..... | Seminar, For. 282 | ..... | 1 |
| Principles Wildlife Mang't, For. 174 | ..... | 3 | American Gov't Pol. Sci. 21 | 3 | ..... |
| Avian Biology, An. Sci. 158 | ..... | 4 | Forest Entomology, P&SS 107 | 3 | ..... |
| Field Zoology, Zoo. 209 | 4 | ..... | Technical Reporting, VOTEX 174 | 3 ⁵ | ..... |
| Environmental Zoology, Zoo. 102 | ..... | 4 | Electives ⁴ | 3-5 | 12-14 |
| Electives ⁴ | 2-4 | 1-3 | | | |

Department of Home Economics

The department offers two major programs, the Program in Home Economics with several areas of professional concentration, and the Program of Social Welfare.

Home Economics deals with man's physical, social and psychological well-being within the increasing complexity of society. It is very closely allied with many areas of learning from the fine arts to the highly scientific study of human nutrition; it holds interest for men and women with minds that are analytical as well as for those that are highly creative.

CLOTHING TEXTILES AND DESIGN This concentration provides the opportunity for study in the field of clothing, textiles and design for the person and the home. By the addition of selected courses to meet individual needs and goals, the area can be used effectively as preparation for careers in merchandising, consumer research and counseling, educational and promotional work in the fashion and textiles industries, and the Extension Service through writing, radio, television and speaking. The program also provides a strong background for further work leading to careers in fashion and textiles designing. Graduate work will be necessary for jobs at certain levels, such as college teaching and textiles research.

Professional Requirements: 33 credits in Clothing, Textiles and Design; 24 credits in the Humanities, 15 credits in Social Sciences, and 8 credits in Chemistry. Of the remaining 40 credits required for graduation, 18 are to be selected from other areas of Home Economics.

EARLY CHILDHOOD EDUCATION This program prepares men and women students for professional roles in a variety of early childhood programs. Teacher certification is available from the State Department and is reciprocal with states cooperating with Vermont. Candidates are involved in action programs throughout the four years in the laboratory

4. A minimum of 18 restricted credits are required—(a) a total of nine hours from two or more of the following: Arts, Humanities, Mathematics, Military Science, or Social Sciences; (b) two approved courses in communications; (c) one approved course in earth sciences.
5. Satisfies one of the required communications electives.

early childhood center and in the surrounding communities. The curriculum is individualized as much as possible to adapt to student goals.

HOME ECONOMICS IN EDUCATION Through this option students may prepare for a variety of teaching opportunities including the usual high school programs of homemaking—consumer education and wage earning plus newly developing areas of middle and elementary education in Living Arts, and Adult Teaching 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)

Professional Requirements: 69 credits in professional emphasis, 15 credits in each of the areas of the Humanities and Social Sciences and 6-8 credits in the Physical and Biological Sciences. Elective credits complete the graduation requirement of 120.

HUMAN DEVELOPMENT This program provides opportunities and experiences for men and women better to understand the many-faceted nature of the human developmental process. Nutrition and physical growth, physiological functioning and maturation, individuality and interpersonal relationships in the family and community, and their dynamic interaction will be studied. Practicum experiences with individuals and families in various settings will form a substantial part of the learning experience. Close ties with other programs within the department of home economics as well as other departments in the university will be cultivated.

A student in this program may arrange to spend an academic year at the Merrill-Palmer Institute of Human Development and Family Life, Detroit, Michigan. Interested students should contact program faculty early in their college experience for details about necessary program adjustments.

Professional opportunities are found as family and child development consultants, staff members in agencies dealing with children and families, and in conjunction with other professional programs, in such settings as preschools and a variety of educational and social services.

HOUSING AND HOME MANAGEMENT Career opportunities in this option are: Home Service Representative for electric or gas companies or appliance dealers; Retailing—department stores, furniture stores, office furniture dealers; Interior Design Consultant—paint and wallpaper companies, carpet companies, drapery and upholstery firms, motel chains, wholesale furniture outlets; Consultant for urban renewal relocation, city planning, architectural and building firms, kitchen planning centers; management of housing for the elderly and low-income families; equipment, home furnishings, housing, family finance editors for state and national newspapers, magazines, radio and TV; consumer education and research and development for manufacturers; and homemaking rehabilitation for the handicapped, college teaching and Extension Service.

Emphasis may be directed toward one of the following professional goals: Housing and Equipment, Housing and External Environment, Housing and Interior Design, Family Economics or Home Management.

Professional Requirements: 30 to 46 credits depending upon professional emphasis; 15-25 credits in the Humanities, 12-27 credits in the Social Sciences, and 0-14 credits in the Physical Sciences. Additional electives to meet 120 credits for graduation.

HUMAN NUTRITION AND FOOD This program prepares students for positions in the fields of human nutrition, food testing, food promotion, food service management, and the hospitality industry. Academic requirements for membership in the American Dietetic Association are met. Those students interested in careers as administrative, therapeutic, or clinic dietitians are advised to plan on an internship after completing their undergraduate program. Course work is planned to give a strong background for graduate study which will qualify the student for positions in college teaching, extension service, research or public health.

Professional Requirements:

Dietetics: 37 credits in professional emphasis, 15 credits in the Humanities, 15 credits in the Social Sciences and 21 credits in the Physical and Biological Sciences with 32 elective credits for graduation.

Food Service Administration: 43 credits in professional emphasis, 15 credits in each of the areas of Humanities and Social Sciences and 11 credits in the Physical and Biological Sciences with 36 elective credits for graduation.

General Concentration in Foods or Human Nutrition: 29 credits in Foods and Human Nutrition, 15 credits in each of the areas of the Humanities and Social Sciences, and 21 credits in the Physical-Biological Sciences; 40 elective credits for graduation.

SOCIAL WELFARE PROGRAM The Social Welfare Program provides a liberal education in the social sciences and humanities.

The program is designed to prepare students for graduate study in social work and for positions in social agencies. Career opportunities in the field of social welfare 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 120 semester credit hours of prescribed and elective courses is required for graduation.

Freshman Year

| | |
|---|-----|
| SW 2 Orientation to Social Work | 1* |
| Psychology 1 | 3* |
| Sociology 22 Cultures of Man | 3* |
| Economics 3 Current Economic Problems | 3* |
| Zoology 5, 6 or Biology 1, 2 | 6-8 |
| English | 6 |
| Electives | 9 |

Sophomore Year

| | |
|---|----|
| SW 51 Human Needs and Social Services | 3* |
| SW 166 Social Welfare as a Social Institution | 3* |
| Sociology 21 Principles of Sociology | 3* |
| Sociology 141 Social Problems | 3 |
| Political Science 21 American Political Systems | 3* |
| Home Economics 52 Socio-Economic Aspects of Housing | 3 |
| Home Economics 63 Human Development and Personality | 3 |
| Electives | 12 |

Junior Year

| | |
|---|----|
| SW 167 Social Welfare as a Social Institution | 3* |
| SW 168 Social Work as a Profession | 3* |
| Home Economics 163 Dynamics of Family Development | 3* |
| Home Economics 290 Introduction to Research | 1* |
| Electives | 18 |

Senior Year

| | |
|-----------------------------------|-----|
| SW 170 Field Experience | 15* |
| SW 291, 292 Special Problem | 6* |
| Electives | 9 |

* Asterisk indicates required courses

V The College of Arts and Sciences

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 critical 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 man as man and only secondarily with man as a job description.

The Liberal Arts Curriculum

The curriculum in liberal arts, leading to the degree of Bachelor of Arts, offers instruction in language, literature, philosophy, religion, the fine arts, the social sciences, the physical and biological sciences and mathematics.

Every candidate for this degree must fulfill the requirements described in sections I and II below, and present a total of 120 semester hours of credit, plus credit in required courses in physical education. At least 75 of the minimum 120 credit hours must be in subjects outside the major discipline.

The Studies Committee of the College will rule upon petitions for exceptions to the College regulations.

The College expects entering students to be able to write correct, clear and effective English, and no student unable to do so shall obtain the B.A. degree.

I. Required for all students

In addition to the two semesters of physical education required of all students by the University, the following distribution requirements must be met: Each student shall present nine semester courses (3 credits or more each) by choosing *three courses from each of any three of the following categories*:

A. LANGUAGE AND LITERATURE

| | | |
|---------|---------------------------|----------|
| English | *Hebrew | *Russian |
| *French | *Italian | *Spanish |
| *German | *Latin | |
| *Greek | Literature in translation | |

No more than two of the three required courses may be chosen from any one discipline. Students may not fulfill the requirement by combining English with Literature in Translation.

* Intermediate level or above

B. FINE ARTS AND PHILOSOPHY

| | | |
|-------|--------|------------|
| art | music | philosophy |
| drama | speech | religion |

No more than two of the three required courses may be chosen from any one discipline.

C. SOCIAL SCIENCES

| | |
|--------------|-------------------|
| anthropology | history |
| economics | political science |
| geography | psychology |
| | sociology |

No more than two of the three required courses may be chosen from any one discipline.

D. SCIENCES AND MATHEMATICS

| | |
|-----------|-------------|
| biology | geology |
| botany | physics |
| chemistry | zoology |
| | mathematics |

No more than two of the three required courses may be chosen from any one discipline. (Biology, botany and zoology are considered one discipline)

MAJOR FIELD Each student, in consultation with his adviser, must choose a major field during his sophomore year. The specific courses making up the field, as well as the student's entire program for the last two years, are chosen in consultation with the chairman of the department in which the major part of the work is to be taken and must have his approval. The following minimal requirements must be met.

1. The field must be a well integrated whole, adapted to the student's special interest.
2. It 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, not more than 45 of which may be required in the major discipline.
3. Courses taken to fulfill distribution requirements may also be counted toward the major credit requirements.

II. Specific Departmental Requirements for Majors

AREA AND INTERNATIONAL STUDIES Anthropology 21; Economics 11, 12; Geography 11, 12; History 13; Political Science 51, 71; nine hours selected from two disciplines listed under "Fine Arts and Philosophy" or "Science and Mathematics"; plus eighteen hours of advanced undergraduate courses dealing with the selected area, including six hours of advanced foreign language and literature (except for Asian studies), six hours of history, and six hours of another social science. Concentration must be approved by the respective program directors or the chairman of the Committee

on Area Studies. Areas of concentration are Asia, Canada, Latin America, Russia and Eastern Europe.

ART 36 hours in Art with a minimum of 9 hours each in art history and studio, including 1, 2, 5, 6 and an additional 12 hours in one of these areas including a semester of seminar or independent studies in the senior year; plus 6 hours at the advanced level in each of two related subjects chosen from different distribution fields.

BOTANY Mathematics 9, 2, or 7, 8, or 11; Physics 5, 6; Chemistry 131, 132; Biology 1, 2; Botany 101, 104, 105, and 109 or 160, and two additional semester courses in Botany. 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 Mathematics 121 or 123; Physics 6 or 27; Chemistry 11-12 (or 1-2 and 123), 131, 132, 134, 141-142, 224, and two of the following three courses: 135, 144, and 212. No advanced related course is required. These are the minimum requirements for a concentration in chemistry. This program does not provide an adequate background for graduate study nor for a professional career in chemistry. Chemistry concentrators should consult advisers in the chemistry department as early as possible. Accreditation by the American Chemical Society requires completion of Chemistry 135, 144, 212, 184, six additional hours in advanced courses, German 11-12, and one year of English.

ECONOMICS Twenty-seven hours in Economics including 11, 12, 186, 188, 190, 285 or 295 and three courses from the Economics list which are numbered 100- or above. In addition, 12 credits chosen from among the following disciplines: anthropology, geography, history, mathematics, philosophy, political science, psychology, religion, sociology.

ENGLISH Twenty-four hours of advanced courses distributed according to departmental group requirements; two semesters of literature numbered 100- or above in a foreign language; one year of history and 12 hours (6 in courses numbered 100 or above) in a related field. The English Department considers courses in Latin to be a distinct aid to students concentrating in English.

GEOGRAPHY Twenty-seven hours in Geography (including Geography 11, 12, 71, 281, an additional six semester hours at the 200- level and nine other semester hours in Geography); four semester courses in approved related fields and either one year of a foreign language at the intermediate level or one year of quantitative methods in Geography or its equivalent.

GEOLOGY Twenty-four hours in Geology, including six hours at the 200 level. Twelve hours in Physical Science, Biological Science, Mathematics, or Engineering. (Field experience recommended).

GERMAN Eight semester courses of advanced level including 101, 102 plus the senior seminar; four semester courses of English; two semester courses of European history to be selected from 11, 12, 13, 233, 234, 235, 236; an advanced related course to be selected in consultation with the department.

GREEK 11, 12 and fourteen additional hours in courses numbered above 100, including 111, 112. Either 151 or 153 may be included, but not both.

HISTORY Twenty-seven hours (12 at the 100 level) including one two-semester civilization survey, two 200-level courses (3 credits each), 6 hours in European history at any level; one foreign language through the intermediate level or a year of statistics and quantitative methods; 12 hours in another discipline approved by the department.

LATIN Twenty-three hours in courses numbered above 100 including 111, 112. Either 152 or 154 may be included, but not both. Courses in Greek are strongly recommended, particularly to those who contemplate graduate work in classics.

MATHEMATICS Thirty-six semester hours of courses numbered 11 or higher, including 102, 124 and fifteen additional semester hours in courses numbered above 100.

MUSIC 1, 2, 5-6, 105-106, 221, 222 and six hours of performance study including piano; six hours in another discipline as approved by the department. Students who wish to meet accreditation requirements of the National Association of Schools 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.

A senior recital is required of all students majoring in music. One foreign language through the intermediate level is required of students on combinations (a) or (b).

PHILOSOPHY Twenty-four hours including 3, another course under 100, 101, 102, 197 or 198 in the junior year, and three 200 level courses, two of which must be in the following areas: theory of knowledge, theory of value and metaphysics. An additional twelve hours in a related discipline, or disciplines, is required. Students considering graduate work in philosophy are urged to study a foreign language.

PHYSICS Thirty-six hours of physics and related courses normally including 17, 18, 27, 128 and necessarily including 211, 213 and 271 or 265 plus six hours of laboratory in physics at the junior-senior level; mathematics through 121 or 123 and either one more advanced course in mathematics or Physics 216. An additional laboratory science and a reading knowledge of French, German or Russian are strongly recommended.

POLITICAL SCIENCE Twenty-seven hours including nine hours selected from among the "core courses" (13, 21, 51, 71, 81) and at least six hours in courses numbered above 200; twelve hours (including six hours of advanced courses) in a related discipline.

PSYCHOLOGY Twenty-six hours including 1, 5, 109, 110, 123, and two courses numbered above 200 (225-226 is considered a single course).

RELIGION Twenty-seven hours in Religion, including two courses chosen from among 101, 112, 122; one course from the 140-159 range; one course from 160-179 range; 201; plus one other course from the offerings listed above 180; plus nine hours in a related discipline.

ROMANCE LANGUAGES Twenty-four 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. In addition, the senior seminar is required of all majors. Related area: a minimum of twelve hours of courses from another department or departments, chosen in consultation with departmental major advisers and specifically approved by them.

SOCIOLOGY AND ANTHROPOLOGY Students may choose one of three options, as follows: Sociology: 22, 250, 251, 255, and at least five additional semester courses in sociology; psychology 5. Anthropology: 21; any two of the following: 24, 26, 150, 225, 228 or 229, and 290; five other advanced courses. Combined concentration: 21; sociology 22, 251, 255, and at least two additional semester courses in sociology; anthropology 225, 290, and at least two additional semester courses in anthropology (including at least one advanced); psychology 5.

SPEECH AND DRAMA Students may choose one of four options:

Mass communication: 1, 11, 63, 161, 162, 165, 263, 264, and three additional hours; plus nine hours of related courses.

Communication and public address: 1, 11, 14, 31; any two among 39, 63, 74, 121; twelve additional hours; plus six hours of related courses.

Speech pathology-audiology: 1, 11, 74, 101, 270, 271 or 272, 281, and five additional hours; plus nine hours of related courses.

Theatre: 1, 11, 39, and eighteen additional hours; plus nine hours of related courses.

ZOOLOGY Mathematics 11 or 7 and 8 (Mathematics 7 and 8 should be chosen only by students certain that they will not wish to study branches of zoology in which mathematics is an important tool); Physics 5, 6; Chemistry 1-2 or 11-12 to be taken the freshman year if possible; Biology 1, 2; Zoology 101, 102, 103, 104; plus seven hours chosen from 105, and 200-level courses.

Special Provisions Concerning Credit

Courses offered in other colleges or divisions of the University of Vermont by departments which offer a major in Arts and Sciences (as approved by the Faculty of Arts and Sciences) receive full credit toward the B.A. degree. Courses offered in other colleges or divisions of the University by departments which do not offer a major in the College of Arts and Sciences may be taken without any limitation by Arts and Sciences students, but *only 24 semester hours of such courses may be applied to the minimum 120 credits required for the B.A. degree.* (At the present time, majors in departments outside the College are available in Botany, Chemistry, and Mathematics).

Courses in Economics and Business Administration
Acceptable Toward the B.A. Degree

Economics 3, 11, 12, 13, 14, 15, 16, 101, 105, 121, 141, 142, 181, 183, 186, 188, 190, 203, 204, 216, 238, 240, 241, 256, 258, 267, 277, 285, 290, 291, 292, 295, 297, 298.

The Business Administration Curriculum

The Department of Economics and Business Administration offers two curricula: one leads to a Bachelor of Arts with a major in Economics, the other to a Bachelor of Science in Business Administration.

The business administration curriculum is intended to provide a sound basic training in the various phases of business activity. The several areas of concentration enable students to emphasize such specialized studies as accounting, banking, industrial management, and marketing management. The Department of Economics and 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, in Albany, N.Y. Students completing the requirements of the accounting option will thus be eligible for admission to the New York State licensing examination in Certified Public Accountancy.

A minimum of 120 approved semester hours is required for the Bachelor of Science in Business Administration degree plus required courses in physical education. Students must take Principles of Economics (11, 12) and Principles of Accounting (13, 14) in the first two years.

After the first two years a student may elect various concentrations of courses to emphasize selected aspects of business administration. The following courses, however, are required of all candidates for the Bachelor of Science in Business Administration degree:

| | Hours |
|--|-------|
| Principles of Marketing, BA 121 | 3 |
| Industrial Management, BA 143 | 3 |
| Elementary Statistics, Math. 110 and BA 188 | 6 |
| Macroeconomic Theory, Econ. 190 ¹ | 3 |
| Introduction to Integrated Data Processing and Computers, BA 160 | 3 |

In addition to the courses listed above, a student must take a minimum of 12 hours in his chosen area of concentration. Courses by areas of concentration are listed below:

Finance

| | Hours |
|--|-------|
| Money and Banking, Econ. 101 | 3 |
| Corporate Finance, BA 207 | 3 |
| Basic Federal Taxes, BA 164 | 3 |
| International Trade and Finance, Econ. 105 | 3 |
| Principles of Investment, BA 206 | 3 |

1. Accounting majors will substitute BA 101, Money and Banking.

Marketing Management and Sales Promotion

| | Hours |
|---|-------|
| Problems in Marketing, BA 122 | 3 |
| Sales Management and Promotion, BA 130 | 3 |
| Fundamentals of Advertising, BA 132 | 3 |
| Current Marketing Developments, BA 228 | 3 |
| Marketing Management, BA 229 | 3 |
| Personal Selling in the Economy, BA 123 | 3 |
| Research Methods in Marketing, BA 127 | 3 |

Industrial Management

| | Hours |
|---|-------|
| Labor Economics, Econ. 141 | 3 |
| Collective Bargaining, Econ. 142 | 3 |
| Personnel Administration, BA 251 | 3 |
| Methods Engineering, M.E. 175 | 3 |
| Plant Organization, M.E. 176 | 4 |
| Scientific Management and Labor, BA 254 | 3 |
| Executive Decision-Making, BA 252 | 3 |
| Cost Accounting, BA 272 | 3 |

Accounting

All Accounting majors are required to take the following courses:

| | Hours |
|-------------------------------------|-------|
| Business Law, BA 9, 10 | 6 |
| Intermediate Accounting, BA 161-162 | 6 |
| Cost Accounting, BA 272 | 3 |
| Advanced Accounting, BA 266 | 3 |
| Basic Federal Taxes, BA 164 | 3 |
| Auditing, BA 271 | 3 |
| Corporate Finance, BA 207 | 3 |

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.

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 include in his undergraduate course substantial elections in the fields of languages, literature, history, economics, political science, and philosophy.

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 34) 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 adviser, 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 11, 12 (recommended for able students)
- (b) Mathematics 11 (adequate)
- (c) Mathematics 9, 11 or 9, 2 (adequate)
- (d) Mathematics 7, 8 (acceptable but not recommended for most students)

Chemistry, two years minimum, *with laboratory*

Chemistry 1-2 or 11-12 (Chemistry 1-2 preferred)

Chemistry 131, 132 (required)

Chemistry 123 (required by many medical colleges, including UVM)

Physics, one year minimum, *with laboratory*

Physics 5, 6 or 17, 18, 27 (Physics 5, 6 preferred)

Biology, one year minimum, *with laboratory*

Biology 1, 2

Zoology 101 or 103

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 two years of college work. 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.

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, including student teaching, can count as electives in the Arts and Sciences program (utilizing the right to count 14 hours in non-Arts and Science courses plus certain education courses that can be counted without restriction). Students completing this program are eligible for Secondary Teacher's Certification.

College Honors

The honors program at both the junior and senior levels 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 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-departmental activity of the University conducted by the Committee on Area Studies appointed by the President, and an Executive Committee elected by the faculty of the individual programs. The chairman of the Committee serves as Director of the Center.

The purposes of the Center are to encourage and coordinate interdisciplinary and comparative study and research of selected foreign areas. The Center sponsors also 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 the four foreign areas: Asia, Canada, Latin America, and Russia and Eastern Europe. For the general requirements for concentration in Area Studies see under the Liberal Arts curriculum.

Undergraduates interested in taking Area Studies should consult as early as possible in their college careers, the Chairman of the Committee on Area Studies and/or the directors of the individual programs. The Center is located at 479 Main Street.

Undergraduates who select to major in Area Studies usually accumulate sufficient credits enabling them to also fulfill departmental requirements in one of the social sciences, humanities, or foreign languages.

Study Abroad

The Vermont Overseas Study Program 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 Vermont colleges and universities. Intended primarily for students concentrating in French, the program is also open to qualified students 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 work, the student receives appropriate credit (usually thirty hours) toward his degree. For further information about the Vermont Overseas Study Program, an interested student should speak to his academic dean or to the director of the program.

A student wishing to attend a foreign university on his own or under another program and receive transfer credit should consult with his academic dean and obtain approval, in advance, of his plans. In general, to gain approval a student will be expected to have completed two full years of work, to have an average of at least 2.5, to have a valid academic objective, and to have a good working knowledge of the language of the country to which he proposes to go.

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 chairman of the Department of Classics.

The Government Research Center

The Government Research Center, established in 1950 as the Government Clearing House, provides research and informational services for students, state and local officials, members of civic groups, and the public. Activities include the following: 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; operating a public affairs research center, conducting research projects, and publishing studies in state and local government; and preparing background materials for conferences on public questions.

Many of the activities of the Government Research Center are sponsored in cooperation with state officials, local officials, or civic groups. The annual Listers' Schools are sponsored jointly with the Governor and the Vermont State Tax Department. Many state and local officers participate in the series of one-day Town Officers Educational Conferences, which originated in the late 1930s and which are held annually in several locations throughout Vermont. A two-day conference on citizenship, in which high school juniors, high school faculty members and administrators, and University personnel participate, has become an annual event, with the cooperation of the State Department of Education and various educational associations.

A Public Affairs Library collection is maintained as a memorial to the late James P. Taylor, whose effort to expand citizen interest in effective government is well known throughout the State. The Government Research Center also sponsors the annual Taylor Town Report Contest in Vermont and cooperates with the New England Council relative to the region-wide contest.

The Government Research Center is a program of the Department of Political Science.

The Experimental Program

The Experimental Program of the College of Arts and Sciences is based on the "living-learning" residential college concept of decentralized university work. Students who are selected for the program live in a designated dormitory complex (if they choose to live on campus) and take a special instructional program based on small seminar groups, graded on a pass-fail basis. Upon successful completion of two years in the Experimental Program, students are awarded 60 credit hours and the distribution requirements in Arts and Sciences are considered satisfied. Students then take regular Arts and Sciences courses and complete departmental majors during their junior and senior years. However, they may continue to reside with the Experimental Program as upperclass participants. Specific departmental major requirements and advanced course prerequisites must still be met. (Students should consult their advisers as to the Experimental Program work that may be counted toward departmental major requirements and advanced course prerequisites.)

Students are admitted to the Experimental Program by invitation only, on the basis of a random sample of the entering freshman class in the College of Arts and Sciences. Invited students are not obliged to enroll in the Program, and those who do enroll may transfer to the regular program at the end of any

semester, with appropriate credit being decided by the faculty of the Program. However, it is not possible for a student to transfer into the Experimental Program once he has begun work in the regular program.

Students in the Experimental Program normally take three seminars together with one conventional course in the regular program. All students have an adviser who is teaching in the program, and individual tutorials are occasionally provided in the case of special interests and preparation. (For seminar offerings, see under courses of instruction.)

Courses of Instruction

Experimental Program

Professors Crowell (Physics)*, Daniels (History, Director of the Experimental Program), Gilleland (Classics), Gregg (Chemistry), Houston (Community Medicine)*, Hyde (Botany)*, Pappoutsakis (Music), Rollins (History, Vice President for Academic Affairs)**, White (Chemistry)**; Adjunct Professor Ross (Economics); Associate Professors Gade (Geography)*, Hill (Mathematics), Simon (Political Science)*, Stanfield (Sociology, Associate Director of the Experimental Program), Wulff (Chemistry)**; Assistant Professors Allen (Chemistry)*, Andrea (History), Berkman (Sociology), Brubaker (Political Science)*, Cooke (Mathematics), Davison (Art), Doolan (Geology), Fackler (History), Hall (English), Leff (Psychology), Leonard (English), Lipke (Art), Nolfi (Zoology), Paden (Religion), Seybolt (History), Steffens (History), Stepheny (English), Whitehorn (Physiology)*, Worley (Botany)**, Yarian (Religion)**; Visiting Assistant Professor Fishman (Law)*; Adjunct Assistant Professor Goldstein (Psychology); Instructors Bailey (Philosophy), Corologos (Education)*, Geno (Romance Languages)*, Johnson (English), Lehovich (Romance Languages)*, Lopez-Escobar (Physics)**, Pastner (Sociology), Schmider (Speech), Sherman (Art), Simone (English), Sugarman (Philosophy), Wiley (French)**

Seminars in the Experimental Program are designed by the individual instructors, and the content and variety of seminars will change from year to year. The Seminars as offered in 1970-71 are listed for the purpose of illustration:

Art:

Mr. Davison (spring semester)
Miss Sherman (both semesters)
Art History. Mr. Lipke (fall semester)
Film and Sound. Mr. Davison (fall semester)
Landscape and Nature. Mr. Lipke (spring semester)

Biology:

The Nature of Inquiry in Biology. Mr. Hyde (fall semester)
The Structure of a Science: Ecology. Mr. Worley (spring semester)

Chemistry:

Mr. Gregg (both semesters)
Messrs. White and Wulff (spring semester)
Models of Physical Science. Mr. Allen (fall semester)

*fall semester, 1970

**spring semester, 1971

Classics:

The Beginning of the European Novel. Mr. Gilleland (fall semester)
Early European Literature. Mr. Gilleland (spring semester)

Ecology:

Problems of the Environment. Messrs. Doolan, Gade, Geier, Houston, Metcalf, Nolfi, and Ross (fall semester)
Films and the Environment. Mr. Nolfi (spring semester)

Economics:

Mr. Ross (both semesters)

Education:

Education and Psychology. Mr. Corologos (fall semester)

English:

Concept of the Hero. Miss Becker (spring semester)
Film and Propaganda. Messrs. Nolfi and Simone (fall semester)
Introduction to Dante and Tolstoy. Mr. Simone (spring semester)
Literature. Miss Becker (fall semester)
Literature. Mrs. Hall (fall semester)
Literature and Art. Miss Johnson (fall semester)
Men and Women. Miss Johnson (spring semester)
19th Century Western Prose Fiction. Mrs. Hall (spring semester)
Reading and Writing. Mr. Stephany (fall semester)
Relevance. Mr. Leonard (both semesters)
Tragedy. Mr. Stephany (spring semester)
Writing. Miss Johnson (spring semester)

Geology:

Planet Earth. Mr. Doolan (spring semester)

History:

American Education. Messrs. Fackler and Oestreicher (spring semester)
American Reformers. Messrs. Fackler and Oestreicher (fall semester)
Aristotle, Galileo and Newton. Mr. Steffens (fall semester)
China. Mr. Seybolt (fall semester)
European History. Mr. Andrea (fall semester)
History of the Indo-China War. Messrs. Daniels and Seybolt (spring semester)
Personality and Politics. Mr. Rollins (spring semester)
Revolution. Messrs. Cowan and Daniels (fall semester)
Science and Culture. Mr. Steffens (spring semester)
Utopias. Messrs. Cowan and Oestreicher (spring semester)
Western Civilization. Mr. Andrea (spring semester)

Law:

Civil and Political Rights. Mr. Fishman (fall semester)

Mathematics:

Calculus. Mr. Cooke (both semesters)
Computer Science. Mr. Hill (both semesters)

Medical Science:

Physiology. Mr. Whitehorn and staff (fall semester)

Music:

Music in Western Culture. Mr. Pappoutsakis (both semesters)

Philosophy:

- Mr. Sugarman (fall semester)
- Introduction to Modern Philosophy. Mr. Bailey (spring semester)
- Plato and the Moderns. Mr. Sugarman (spring semester)
- Social Philosophy and Existentialism. Mr. Bailey (fall semester)

Physics:

- Intelligent Life in the Universe. Mr. Lopez-Escobar (spring semester)
- Physics of Space. Mr. Crowell (fall semester)

Political Science:

- American Political Problems. Mr. Simon (fall semester)
- Political Campaigning. Mr. Brubaker (fall semester)

Psychology:

- Child Psychology. Mrs. Goldstein (spring semester)
- Clinical Psychology. Mrs. Goldstein (both semesters)
- Psychology and Social Problems. Mr. Leff (spring semester)
- Social Psychology. Mr. Leff (fall semester)

Religion:

- Christian Faith and its Cultural Expression. Mr. Yarian (spring semester)
- Varieties of Mystical Experience. Mr. Paden (spring semester)
- World Views. Mr. Paden (fall semester)

Romance Languages:

- Comparative Literature. Miss Lehovitch (fall semester)
- French. Mr. Geno (fall semester)
- French Conversation and Creative Writing. Miss Wiley (spring semester)

Sociology:

- Mr. Berkman (fall semester)
- Cultures in Confrontation. Mr. Pastner (both semesters)
- 20th Century Man's Collective Search for Identity. Mr. Berkman (spring semester)

Speech:

- Oral Reading Interpretation. Mr. Schmider (spring semester)
- Psychology of Oral Communication. Mr. Schmider (fall semester)

Zoology:

- Ecology. Mr. Nolfi (spring semester)

Independent Study:

- Self. Mr. Geier (spring semester)

V The College of Education

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

Undergraduate programs are offered in:

- Art Education
- Elementary Education
- Music Education
- Physical Education
- Secondary Education

These curricula are designed to prepare teachers for the kindergarten-elementary level, middle and 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.

General Education Requirements

Each student in the College of Education 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. General education courses required for certification such as English and Social Science or the College 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. English
- d. Music
- e. Speech and Drama

II. Science and Mathematics

- a. Biology
- b. Botany
- c. Chemistry
- d. Geology
- e. Mathematics
- f. Physics
- g. Statistics
- h. Zoology

III. Social Sciences

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

IV. Humanities

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

V. Health or Physical Education

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

Personal Component

Students in each teacher education program, beginning with the Class of 1974 (with the exception of those in Music Education), are also required 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 and to make a contractual arrangement with his personal component adviser to fulfill the terms of the contract. Multiple contracts and renewal contracts are possible. 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.

Admission and Accreditation

The College of Education has the responsibility for maintenance of standards approved by the National Council for the Accreditation of Teacher Education (NCATE). Although initial acceptance to the University freshman year may be as a student in the College of Education, official admission to the College is made during the sophomore year. During the freshman and sophomore years 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 National Council for the Accreditation of Teacher Education.

All teacher education candidates are expected to complete admission procedures before the beginning of the junior year in order to fulfill degree requirements. Throughout one's program a Coordinator of Educational Career Planning, whose office is in 404 Waterman Building, will assist students in career planning and placement.

The programs to be described are the programs through which the UVM College of Education achieves accreditation by the National Council for Accreditation of Teacher Education and the Vermont State Department of Education Program Approval Plan. Students completing an NCATE 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 Student Information Service Center, 311 Waterman Building.

Art Education

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, 48 hours in studio art, art history or related subjects, and the Personal Component (Ed. 198). Graduates satisfy College of Education 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 application to the Art Education program must be made before the end of the sophomore year.

A typical program is as follows:

| Freshman Year | | 1st SEMESTER | 2nd SEMESTER | Sophomore Year | | 1st SEMESTER | 2nd SEMESTER |
|---|--|--------------|--------------|--|--|--------------|--------------|
| English (select from 1-18) | | 3 | or 3 | English (select from 21-198) | | 3 | or 3 |
| Speech 11 or 31 (81 with permission) | | 3 | or 3 | Psychology 1 | | 3 | or 3 |
| Foundations of Education | | 3 | or 3 | Participation (Ed. 15) | | 2 | or 2 |
| Social Science | | 3 | or 3 | Design (3 & 4 or equivalent) | | 3 | 3 |
| One elective from the Science & Math. areas | | 3 | or 3 | Encounter with Art (Art 140-141) | | 3 | 3 |
| One elective from the Humanities area | | 3 | or 3 | Studio Electives |  | ..... | ..... |
| Physical Education | | 1 | 1 | Related Electives |  | ..... | ..... |
| Design (1 and 2) | | 3 | 3 | | | | |
| Art History (5 and 6) | | 3 | 3 | | | | |
| Junior Year | | 1st SEMESTER | 2nd SEMESTER | Senior Year | | 1st SEMESTER | 2nd SEMESTER |
| Learning & Human Development (Ed. 145-146) | | 3 | 3 | History of Educ. Thought | | 3 | or 3 |
| Curriculum & Practice in Art Ed. (Art 177) | | 3 | ..... | Special Problems in Art Educ. (Art 184) | | 3 | or 3 |
| Issues in Art Ed. (Art 183) | | 3 | ..... | Secondary Methods & Procedures (Ed. 178) |  | ..... | 3 |
| Studio Electives |  | ..... | ..... | Student Teaching (Ed. 181) |  | ..... | 8 |
| Related Electives |  | ..... | ..... | Studio Seminar (Art 281) | | 3 | ..... |
| | | | | Studio Electives |  | ..... | ..... |
| | | | | Related Activities |  | ..... | ..... |

Personal Component (Ed. 198)—7 hrs.

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 offices.

Elementary Education

The elementary education program is intended to prepare teachers for the elementary schools. Elementary education majors may be certified for *Vermont* kindergarten teaching by satisfactorily completing a program with advisement

by the College of Education and the Home Economics Department. The Bachelor of Science in Education is awarded upon satisfactory completion of an approved program.

The elementary 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 may use electives during the four years to build an academic area of concentration of twenty-four to thirty-three credits. Specific information about academic majors or general education requirements may be obtained from advisers or from the Student Information Services Center, 311 Waterman Building. In addition, the program includes a planned sequence of professional courses, laboratory experiences, and the Personal Component (Ed. 198).

The professional program begins with the introduction of the student to education as a field of study during his freshman year. Each student is made aware of the social foundations and relationships of education, introduced to the extensive resources available to him for learning about the field in depth, and impressed with the developmental need for his delving into the literature and research as a basis for making critical judgments concerning education. The characteristics of teaching as a profession are also stressed.

In the sophomore year, the students are offered field experiences with children's groups in the community. These experiences serve the dual purpose of giving first-hand information about children and of providing opportunity for determining the satisfaction which association with children of different age levels brings to the student.

The junior year emphasizes professional course work and special content courses for elementary teaching. Professional courses include classroom observation and participation in local elementary schools.

The senior year continues the professional methods courses and includes eight full weeks of student teaching in the elementary schools of the Greater Burlington area and adjacent communities.

In addition to the above academic and professional requirements, the following courses are recommended to meet specific state and national certification requirements, in elementary education: six credits of English (selected from Eng. 1-198), Human Geography (Geog. 11), Music Methods & Literature (Ed. 111 & Music 10), American History (History 23 & 24), Fundamental Concepts of Elementary School Mathematics (Math 125-126), and American Government (Political Science 21).

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 Coordinator of Professional Laboratory Experiences, 412 Waterman Building.

A grade of at least C must be attained in the one required course in each of the five general education areas, in the Area of Concentration if one is selected, and in minimum required credits in professional education courses.

A typical program is as follows:

| Freshman Year | | 1st SEMESTER | 2nd SEMESTER | Sophomore Year | | 1st SEMESTER | 2nd SEMESTER |
|--|--|-----------------|-----------------|--|--|-----------------|-----------------|
| Foundations of Education (Ed. 2) | | 3 | or 3 | Child and Community (Ed. 3 or 4) | | 1 | or 1 |
| Speech 11 or 31 (81 with permission) | | 3 | or 3 | *Music Methods and Literature (Ed. 111 and Music 10) | | 3 | & 3 |
| *English (select from 1-18) | | 3 | or 3 | *Fundamental Concepts of Elementary School Mathematics (Math 125 & 126) | | 3 | & 3 |
| *Human Geography (Geog. 11) | | 3 | or 3 | *American History (Hist. 23 & 24) | | 3 | & 3 |
| Personal Component (Ed. 198) | | 1 | & 1 | *English (select from 21-198) | | 3 | or 3 |
| Physical Education | | 1 | & 1 | Personal Component (Ed. 198) | | 1 | & 1 |
| General Electives and/or approved electives in Area of Concentration | | | | General Education electives and/or approved electives in Area of Concentration | | | |
| Junior Year | | 1st SEMESTER | 2nd SEMESTER | Senior Year | | 1st SEMESTER | 2nd SEMESTER |
| Encounter with Art I (Ed. 140) | | 3 | ..... | Teaching Mathematics and Critical Thinking (Ed. 160) | | 3 | ..... |
| Learning and Human Development (Ed. 145-146) | | 3 | & 3 | Health and Physical Education for the Elementary School (P.E. 100 and 116) | | 2 | & 2 |
| Language Arts and Children's Literature (Ed. 134) | | 3 | ..... | History of Educational Thought (Ed. 190) |  | ..... | 3 |
| Teaching Science and Social Studies (Ed. 144) |  | ..... | 3 | Student Teaching (Ed. 181) | | 8 | ..... |
| Language Arts and Reading (Ed. 121) |  | ..... | 3 | Personal Component (Ed. 198) | | 1 | or 1 |
| *American Political System (Pol. Sci. 21) | | 3 | or 3 | General Education electives and/or approved electives in Area of Concentration | | | |
| Personal Component (Ed. 198) | | 1 | & 1 | | | | |
| General Education Electives and/or approved electives in Area of Concentration | | | | | | | |

A minimum of 127 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 offices.

Secondary Education

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.

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

* Recommended to meet specific state and national certification requirements.

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 advisers or from the Student Information Services Center, 311 Waterman Building. In addition, the program includes a planned sequence of professional courses, laboratory experiences, and the Personal Component (Ed. 198).

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 Student Information Services Center, 311 Waterman Building).

MAJORS: Biological Science, Chemistry, Earth Science, English, French, German, History, Latin, Mathematics, Music (36 hrs.), Physical Science, Physics, Spanish, Speech & Drama.

MINORS: Biology, Chemistry, Earth Science, Economics, English, French, Geography, German, Health Education, History, Latin, Mathematics, Physical Education, Physics, Political Science, Russian, Sociology, Spanish, Speech & Drama.

BROAD FIELD MAJORS: Natural Science, Social 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.

A grade of less than C may not be applied to the minimum required credits in majors and minors or Broad Field and professional education.

EXPERIENCES IN PUBLIC SCHOOLS Students in secondary education usually have direct experiences in public schools throughout the four-year curriculum. During the sophomore year students observe and participate as teacher assistants in local junior and senior high schools. During the senior year students devote eight 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 Coordinator of Professional Laboratory Experiences, 412 Waterman Building.

A typical program is as follows:

| | 1st SEMESTER | 2nd SEMESTER |
|--|-----------------|-----------------|
| Freshman Year | | |
| *English (select from Eng. 1-18) | 3 | or 3 |
| Speech 11 or 31 (81 with permission) | 3 | or 3 |
| Foundations of Education (Ed. 2) | 3 | or 3 |
| *Social Science—(for certification purposes 3 credits of U.S. History and 3 credits of Pol. Sci. 21 are recommended) | 3 | or 3 |
| One elective from the Science and Mathematics area | 3 | or 3 |
| One elective from the Humanities area | 3 | or 3 |
| Personal Component (Ed. 198) | 1 | & 1 |
| Physical Education | 1 | & 1 |
| General Education electives or approved electives in major and minor or Broad Field | | |

| | 1st SEMESTER | 2nd SEMESTER |
|---|-----------------|-----------------|
| Sophomore Year | | |
| *English (select from Eng. 21-198) | 3 | or 3 |
| Psychology 1 | 3 | or 3 |
| Participation (Ed. 15) | 2 | or 2 |
| Personal Component (Ed. 198) | 1 | & 1 |
| General Education electives or approved electives in major and minor or Broad Field | | |

| | 1st SEMESTER | 2nd SEMESTER |
|---|-----------------|-----------------|
| Junior Year | | |
| Learning and Human Development (Ed. 145-146) | 3 | 3 |
| Personal Component (Ed. 198) | 1 | & 1 |
| General Education electives or approved electives in major and minor or Broad Field | | |

| | 1st SEMESTER | 2nd SEMESTER |
|---|-----------------|-----------------|
| Senior Year | | |
| Personal Component (Ed. 198) | 1 | or 1 |
| Secondary Methods & Procedures (Ed. 178) | ----- | 3 |
| Special Subject Methods & Procedures (Ed. 179) | ----- | 3 |
| (Ed.—Eng. 182 for English majors and Ed.—Speech 294 for Speech majors) | | |
| History of Educational Thought (Ed. 190) | ----- | 3 |
| Student Teaching (Ed. 181) | ----- | 8 |
| General Education electives or approved electives in major and minor or Broad Field | | |

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 offices.

Music Education

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 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

* Recommended to meet specific state and national certification requirements.

in Music to meet the general education requirements. Students in the Class of 1975 have the option of electing credits in the Personal Component (Ed. 198).

The prescribed program is:

| | | 1st | 2nd | | | 1st | 2nd |
|--|--|----------|-------|--|--|----------|-------|
| | | SEMESTER | | | | SEMESTER | |
| The Freshman Year | | | | The Sophomore Year | | | |
| Theory I | | 3 | 3 | Theory II | | 3 | 3 |
| Survey of Mus. Lit. | | 3 | 3 | Performance Study: Major, Piano, ¹ Voice & Woodwind classes | | 4 | 4 |
| Performance Study: Major, Piano, ¹ & String Class | | 3 | 3 | Ensembles: Major, Secondary or Chamber Music ³ | | 2 | 2 |
| Major Ensemble | | 1 | 1 | Participation | | 2 | or 2 |
| Foundations of Ed. | | 3 | or 3 | Electives ² | | 6 | 6 |
| Speech 11 or 31 | | 3 | or 3 | | | | |
| Physical Education | | 1 | 1 | | | | |
| Electives ² | | 3 | 3 | | | | |
| | | | | | | | |
| | | 1st | 2nd | | | 1st | 2nd |
| | | SEMESTER | | | | SEMESTER | |
| The Junior Year | | | | The Senior Year | | | |
| Orchestration | | 3 | ..... | Student Teaching in Music | | 8 | ..... |
| Counterpoint | | 3 | ..... | Elem. & Secondary Music Meth. | | 5 | ..... |
| History of Music | | 3 | 3 | Performance Study: Major Recital, Percussion & Repair classes | | 1 | 4 |
| Learning & Human Development | | 3 | 3 | Ensembles: Major, Secondary, or Chamber Music ³ |  | ..... | 2 |
| Performance Study: Major, Brass Class | | 3 | 3 | Form & Analysis |  | ..... | 3 |
| Ensembles: Major, Secondary, or Chamber Music | | 2 | 2 | History of Educational Thought |  | ..... | 3 |
| Conducting |  | ..... | 3 | Elective |  | ..... | 3 |
| Elective |  | ..... | 3 | | | | |

A minimum of 128 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 offices.

Physical Education

The teaching major in physical education, open to men and women, qualifies candidates to teach physical education in grades K-12. Courses will be selected within the broad areas of: General Education, General Professional Education (including a Personal Component (Ed. 198), Specific Professional Education (including a major and minor), and unstructured electives. Graduates are awarded a degree for Bachelor of Science in Education.

Candidates earn 30 credits in physical education theory course work. In addition, students will earn a minimum of 8 credits in activity skill courses where they will be required to demonstrate competency in a variety of sports from intermediate to advanced levels.

All physical education majors will be required to purchase a special instructor's uniform.

¹ Until functional piano facility achieved (see Performance, Page 248).

² To meet General Education requirements.

³ A second performance field may be substituted for one ensemble.

A typical program is as follows:

| | | 1st | 2nd | | | 1st | 2nd |
|-------------------------------|----|----------|----------|---------------------------------------|-----|----------|----------|
| | | SEMESTER | SEMESTER | | | SEMESTER | SEMESTER |
| The Freshman Year | | | | The Sophomore Year | | | |
| Personal Component | 1 | & | 1 | Personal Component | 1 | & | 1 |
| Anatomy and Physiology | 3 | | 3 | Am. History or Pol. Sci. Elect | 3 | | 3 |
| Physical Ed. Activities | 2 | | 2 | Physical Educ. Activities | 2 | | 2 |
| Foundations of Phys. Ed. | 3 | or | 3 | Science or Social Science | | | |
| Foundations of Education | 3 | or | 3 | elective ¹ | 3-4 | | 3-4 |
| English Elect (1-18) | 3 | or | 3 | Humanities Elect | 3 | or | 3 |
| English Elect (21-198) | 3 | or | 3 | C & P Athletic Injuries ² | 2 | or | 2 |
| Public Speaking | 3 | or | 3 | Devel. of Motor Skills | 2 | or | 2 |
| General Psych | 3 | or | 3 | Participation | x | or | x |
| Health Education ² | 3 | or | 3 | Electives | 9 | | 9 |
| Elective | 3 | | 3 | | | | |
| | 17 | | 17 | | 17 | | 17 |
| | | | | | | | |
| | | 1st | 2nd | | | 1st | 2nd |
| | | SEMESTER | SEMESTER | | | SEMESTER | SEMESTER |
| The Junior Year | | | | The Senior Year | | | |
| Personal Component | 1 | & | 1 | Personal Component | 1 | or | 1 |
| Learning & Human Devel. | 3 | | 3 | Phys. Ed. for the Atypical | 3 | or | 3 |
| P.E. in the El. School | 3 | or | 3 | Org. and Adm. of P.E. ² | 3 | or | 3 |
| P.E. in Sec. School | 3 | or | 3 | Major elective | 3 | or | 3 |
| Kinesiology | 3 | or | 3 | Tests & Measure. in P.E. ³ | 3 | or | 3 |
| Physiology of Muscular Act. | 3 | or | 3 | Hist. of Educ. Thought ³ | 3 | or | 3 |
| Major Elective | 3 | or | 3 | Student Teaching | 8 | or | 8 |
| Electives | 8 | | 8 | Electives | 6 | | 6 |
| | 17 | | 17 | | 17 | | 17 |

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

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

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 Botany, Biology, Zoology, Chemistry, Physics, Sociology, Psychology, or Mathematics

² Recommended elective

³ Accelerated course

- (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.
- (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 adviser.
- (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 adviser.
- (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 Student Information Services Center, 311 Waterman Building.

International Education Field Study

The College of Education now offers comparative education programs in England, Japan, Africa, and Europe. The purpose of these programs is twofold: 1) to provide an in-depth experience in the educational system of another country; and 2) to give the 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, these programs are designed primarily to offer students something more than the usual "study abroad" experience. 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 Director, International Education Programs, University of Vermont, 2 Colchester Avenue, Burlington, Vermont 05401.

V The College of Technology

The College of Technology includes the Departments of Chemistry, Civil Engineering, Electrical Engineering, Mechanical Engineering, and Mathematics. It offers a number of specialized professional curricula in these fields, and in physics, leading to the degree of Bachelor of Science in the field of specialization. Details are given in the sections immediately following. In addition to the courses listed in the several curricula, all students must fulfill the general requirements in physical education and hygiene. Students whose curricula require them to take two years of mathematics are referred to the footnote under the offerings of the Department of Mathematics for information concerning the possible sequences of courses in freshman mathematics.

The Chemistry Curriculum

The Department of Chemistry offers a specialized curriculum leading to the professional degree of Bachelor of Science in Chemistry. This curriculum is designed to give a sound basic training in chemistry, to prepare the student for service in some branch of the chemical profession, and to qualify him adequately for advanced study in graduate school. The department is accredited by the Committee on Professional Training of the American Chemical Society, which has established minimum requirements for the training of chemists at the bachelor's level. In accepting accreditation, the department has planned a curriculum which permits the student to reach these minimum objectives and will qualify the graduate for certification.

Those who wish a less intensive training in chemistry may take the liberal arts curriculum with a concentration in chemistry and receive the Bachelor of Arts degree. These students may also qualify for accreditation by satisfactorily completing certain courses beyond the minimum required for concentration. A student can elect to concentrate in chemistry at the end of the freshman year or even as late as the end of the sophomore year and still qualify for accreditation. However, the department strongly recommends that the student choose before the start of his sophomore year. In the first year, and to some degree in the second year, prescribed courses are such that a student can transfer into the curriculum from liberal arts, or vice versa.

| | | 1st | 2nd | | | 1st | 2nd |
|---------------------------------|--|----------|----------|--|--|----------------|----------|
| The Freshman Year | | SEMESTER | SEMESTER | The Sophomore Year | | SEMESTER | SEMESTER |
| General Chemistry 11, 12 | | 5 | 5 | Organic Chemistry 131, 132 | | 3 | 3 |
| English Electives | | 3 | 3 | Organic Laboratory 134 |  | ..... | 2 |
| Mathematics 11, 12 ¹ | | 5 | 5 | Physical Chemistry 141 |  | ..... | 3 |
| Physics 17, 18 | | 3 | 3 | Mathematics 121, 124 ¹ | | 3 | 3 |
| | | — | — | Physics 27 | | 4 | ..... |
| | | 16 | 16 | German ² or Elective | | 3-4 | 3-4 |
| | | | | Humanities and/or | | | |
| | | | | Social Sciences ³ | | 3 | 3 |
| | | | | | | — | — |
| | | | | | | 16-17 | 17-18 |
| | | 1st | 2nd | | | 1st | 2nd |
| The Junior Year | | SEMESTER | SEMESTER | The Senior Year | | SEMESTER | SEMESTER |
| Physical Chemistry 142 | | 3 | ..... | Advanced Chem. Elective ⁴ | | 3 | 3 |
| Physical Chem. Lab. 144 | | 2 | ..... | Senior Seminar 184 | | A ⁵ | 1 |
| Organic Laboratory 135 | | 3 | ..... | Research 197, 198 ⁶ or Elective | | 2 | 4 |
| Adv. Inorganic Chem. 212, 213 | | 3 | 3 | Electives ⁷ | | 6 | 3 |
| Inorganic Chem. Lab 214 |  | ..... | 2 | Humanities and/or | | | |
| Instrumental Analysis 224 |  | ..... | 4 | Social Sciences ³ | | 6 | 3 |
| German ² or Elective | | 3 | 3 | | | — | — |
| Humanities and/or | | | | | | 17 | 14 |
| Social Sciences ³ | | 3 | 6 | | | | |
| | | — | — | | | | |
| | | 17 | 18 | | | | |

A minimum of 131 approved semester hours is required for the degree in this curriculum, plus required courses in physical education.

The Engineering Curricula

The engineering curricula are designed to help students learn to approach and deal in a professional manner with problems and situations they will meet as engineers, citizens and individuals. From this basic preparation they should continue to learn from experience and to grow in stature throughout their professional life.

The Departments of Engineering offer instruction in four curricula, Civil, Electrical, Management, and Mechanical Engineering, each leading to the degree of Bachelor of Science in the field of specialization. Each curriculum includes the general subjects: mathematics, chemistry, physics, graphics, elements of electrical engineering, mechanics, thermodynamics, economics and English.

The College of Technology also offers the Bachelor of Science Degree to those qualified students in the community who are unable to attend regularly scheduled courses. Consult the Evening Division Bulletin for further information.

The required courses in each curriculum are shown arranged for a four-year program. These courses may be arranged in a five-year sequence if desired. Also,

1. Mathematics 11, 12, 121, and 124 or their equivalent is required.
2. German through the intermediate level (11, 12) is required. Russian or French is advised as a second language for students proficient in German.
3. To be certified as a chemist, a student must complete 24 hours of courses in the humanities and social sciences in addition to the English and foreign language requirements.
4. Courses in biochemistry are acceptable as advanced chemistry electives.
5. An audit of Chemistry 381 (Graduate Seminar) is a prerequisite for 184 (Senior Seminar).
6. May be taken only with permission of the department.
7. Advanced courses in physics and mathematics are highly recommended.

the courses can be arranged to accommodate transfer from other curricula. One year of physical education is normally required of all students.

All junior engineering students visit Northeastern industrial centers during spring vacation. This plant inspection trip is required for graduation. 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. These include: technical papers presented by students and engineers actively engaged in their profession; attendance at conventions; and inspection trips. These provide helpful contacts with engineering practice and assist in the development of leadership qualities essential to success in the engineering profession.

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

HUMANISTIC-SOCIAL STUDIES FOR ENGINEERING STUDENTS The objective of the program in humanities and social studies is to broaden the engineering student's understanding of man and the relationships in human society. Each student should plan, in consultation with his adviser, an integrated sequence of courses to meet this objective.

A minimum of twenty-four credit hours is required in humanistic-social studies. To meet this requirement each student must satisfy the following distribution:

| Required of all students | Minimum credit hours |
|---|----------------------|
| 1. English Electives (must be taken the Freshman year) ¹ | 6 |
| 2. Courses from at least two areas listed below | 12 |
| 3. Courses from one additional area listed below | 6 |
| | <hr/> |
| Minimum total | 24 |

Elective Areas

Geography
History
Philosophy
Religion
Political Science
Psychology
Sociology
World Problems

Intermediate Classical Languages
Intermediate Romance Languages
Intermediate German
Intermediate Russian
Literature courses
Art (history courses only)¹
Music (history and Survey courses only)²
Economics (history and theory courses only)
Speech (history and literature courses only)³

1. Requirement does not apply to the Mathematics Department.
2. E. E. Department permits unlimited choice.
3. E. E. Department permits unlimited choice except for speech pathology courses.

The Freshman Year for All Curricula

| | 1st SEMESTER | 2nd SEMESTER |
|--|-----------------|-----------------|
| Mathematics, 13, ¹ 14 | 4 | 4 |
| Chemistry, 1-2 ² | 4 | 4 |
| Engineering Graphics, M.E. 1, 2 ³ | 2 | 2 |
| English Electives | 3 | 3 |
| General Physics, 17, 18 | 3 | 3 |
| | <hr/> 16 | <hr/> 16 |

Civil Engineering

| The Sophomore Year | 1st SEMESTER | 2nd SEMESTER |
|---|-----------------|-----------------|
| Engineering Mathematics, Math. 123 | 4 | ..... |
| Applied Mathematics for Engineers and Scientists, Math. 271 | ..... | 3 |
| Computer Programming, Math. 31 | ..... | 2 |
| General Physics, Phys. 127 | 4 | ..... |
| Introductory Modern Physics, Phys. 128 | ..... | 4 |
| Statics, C.E. 1 | 3 | ..... |
| Dynamics, C.E. 2 | ..... | 3 |
| Surveying, C.E. 10 | 4 | ..... |
| Geometronics, C.E. 11 | ..... | 3 |
| Humanistic-Social Studies ⁴ | 3 | 3 |
| | <hr/> 18 | <hr/> 18 |

| The Junior Year | 1st SEMESTER | 2nd SEMESTER | The Senior Year | 1st SEMESTER | 2nd SEMESTER |
|---|-----------------|-----------------|--|-----------------|-----------------|
| Mech. of Materials, C.E. 100 | 3 | ..... | Reinforced Concrete, C.E. 173 | 3 | ..... |
| Geology or Biology | 3 | ..... | Sanitary Engineering I, C.E. 150 | 3 | ..... |
| Electrical Engineering, Principles, E.E. 101 | 4 | ..... | Soil Mechanics, C.E. 180 | 4 | ..... |
| Transportation Engineering, C.E. 140 | 3 | ..... | Structural Analysis II, C.E. 171 | 3 | ..... |
| Thermodynamics and Heat Transfer, M.E. 113 | ..... | 3 | Humanistic-Social Studies ⁴ | 3 | 3 |
| Humanistic-Social Studies ⁴ | 3 | 3 | Substructure Design, C.E. 181 | ..... | 4 |
| Mech. of Materials Lab., C.E. 101 | ..... | 1 | Sanitary Engineering II, C.E. 151 | ..... | 3 |
| Engineering Contracts, C.E. 120 | ..... | 2 | Adv. Structural Design, C.E. 172 | ..... | 4 |
| Hydraulics, C.E. 160 | ..... | 4 | Professional Elective ⁵ | ..... | 3 |
| Structural Analysis I, C.E. 170 | ..... | 4 | | <hr/> 16 | <hr/> 17 |
| | <hr/> 16 | <hr/> 17 | | | |

A minimum of 134 approved semester hours is required for the degree in this curriculum plus required courses in physical education.

1. See footnote under course offerings of the Department of Mathematics.
2. Life Science course may be elected by E.E.'s with departmental approval.
3. E.E.'s take Engineering Analysis I, E.E. 2, instead of M.E. 2.
4. See distribution of Humanistic-Social Studies.
5. A course chosen from engineering, science, mathematics, or economics with the approval of the Civil Engineering Faculty.

Electrical Engineering

| | | 1st | 2nd |
|--|--|----------|-----|
| | | SEMESTER | |
| The Sophomore Year | | | |
| Humanistic-Social Studies | | 3 | 3 |
| Mathematics, 123 | | 4 | — |
| Elem. Probability, Math. 203 | | — | 3 |
| Physics, 27, 128 | | 4 | 4 |
| Laboratory, 81, 82 | | 1 | 2 |
| Engineering Analysis II, E.E. 3 | | 3 | — |
| Engineering Analysis III, E.E. 4 | | — | 3 |
| Programming and Elementary Numerical Methods, Mathematics 31 | | — | 2 |
| Engineering Computation, E.E. 32 | | 2 | — |
| | | — | — |
| | | 17 | 17 |

| | | 1st | 2nd |
|---|----|----------|-----|
| | | SEMESTER | |
| The Junior Year | | | |
| Humanistic-Social Studies | 3 | 3 | |
| Electromagnetic Field Theory, E.E. 143, 144 | 3 | 3 | |
| Thermodynamics, M.E. 115 | 3 | — | |
| Electronics I, E.E. 121 | 3 | — | |
| Laboratory, 183, 184 | 2 | 2 | |
| Signals and Systems, E.E. 171 | 3 | — | |
| Electromagnetic Properties of Materials, E.E. 162 | — | 3 | |
| Control Systems, E.E. 111 | — | 3 | |
| Electronics II, E.E. 122 | — | 3 | |
| | — | — | |
| | 17 | 17 | |

| | | 1st | 2nd |
|--|----|----------|-----|
| | | SEMESTER | |
| The Senior Year | | | |
| Humanistic-Social Studies | 3 | 3 | |
| Approved Mathematics Elective | 3 | — | |
| Solid State Physical Electronics, E.E. 163 | 3 | — | |
| Laboratory, 185 | 2 | — | |
| Energy Conversion I, E.E. 113 | 3 | — | |
| Electronics III, E.E. 123 | 3 | — | |
| Information Transmission Systems, E.E. 174 | — | 3 | |
| Laboratory, E.E. 186 | — | 1 | |
| Laboratory, E.E. 188 | — | 1 | |
| Energy Conversion II, E.E. 114 | — | 3 | |
| Wave and Diffusion Analogies, E.E. 146 | — | 3 | |
| Elective | — | 3 | |
| | — | — | |
| | 17 | 17 | |

A minimum of 134 approved semester hours is required for the degree in this curriculum, plus required courses in physical education. For students interested in Electrical Engineering as a pre-medical curriculum, special arrangements will be made.

Mechanical Engineering

| | 1st | 2nd |
|---|----------|-------|
| | SEMESTER | |
| The Sophomore Year | | |
| Engineering Math. III, Math. 123 | 4 | ..... |
| General Physics, 27 | 4 | ..... |
| Manufacturing Processes, M.E. 53 | 3 | or 3 |
| English Elective | 3 | or 3 |
| Statics, C.E. 01 | 3 | ..... |
| Creative Design, M.E. 73 | 3 | ..... |
| Programming and Numerical Methods, Math. 31 | ..... | 2 |
| Introduction to Modern Physics, Physics 128 | ..... | 4 |
| Dynamics I, M.E. 133 | ..... | 3 |
| Thermodynamics I, M.E. 92 | ..... | 2 |
| Mechanical Instrumentation, M.E. 84 | ..... | 1 |
| | 17 | 15 |

| | | 1st | 2nd | | | 1st | 2nd |
|--|-------|----------|----------|--|-------|----------|----------|
| | | SEMESTER | SEMESTER | | | SEMESTER | SEMESTER |
| The Junior Year | | | | The Senior Year | | | |
| Mech. of Materials I, C.E. 100 | 3 | ..... |  | Industrial Materials I, M.E. 171 | 3 | ..... |  |
| Thermodynamics II, M.E. 111 | 4 | ..... |  | Advanced Fluid Mechanics, | | | |
| Applied Math. for Engrs. | | | | M.E. 243 | 3 | ..... |  |
| and Scientists, Math. 271 | 3 | ..... |  | Advanced Fluid Mechanics | | | |
| Mech. Engineering Laboratory, | | | | Laboratory, M.E. 245 | 1 | ..... |  |
| M.E. 117 | 1 | ..... |  | Systems Control, M.E. 137 | 2 | ..... |  |
| Electrical Engineering Principles, | | | | M.E. Elective ² | 3 | 4 | |
| E.E. 101, 102 | 4 | 4 | | Tech. Elective ³ | 3 | ..... |  |
| Heat Transfer, M.E. 266 | ..... | 3 | | Thesis, M.E. 192, or M.E. | | | |
| Fluid Mechanics, M.E. 142 | ..... | 3 | | Elective ² | ..... | 3 | |
| Engineering Design I, | | | | Engineering Design Analysis and | | | |
| M.E. 135 | ..... | 4 | | Synthesis, M.E. 294 | ..... | 4 | |
| Humanistic-Social Studies ¹ | 3 | 3 | | Humanistic-Social Studies ¹ | 3 | 6 | |
| | 18 | 17 | | | 18 | 17 | |

A minimum of 134 approved semester hours is required for the degree in this curriculum, plus required courses in physical education.

A student who, at the end of his junior year, has a cumulative average of 3.0 or above may become an applicant for the honors program in a special area of study. If accepted the student will determine his own program under the guidance of his adviser.

Management Engineering

| | | 1st | 2nd |
|---|--|----------|----------|
| | | SEMESTER | SEMESTER |
| The Sophomore Year | | | |
| General Physics, Physics 27 | | 4 | ..... |
| Engrg. Math. III, Math. 123 | | 4 | ..... |
| Creative Design, M.E. 73 | | 3 | ..... |
| Statics, C.E. 01 | | 3 | ..... |
| Program & Num. Methods, Math. 31 |  | ..... | 2 |
| Intro. to Modern Physics, Physics 128 |  | ..... | 4 |
| Applied Math. for Engrs. and Sc., Math. 271 |  | ..... | 3 |
| Dynamics I, M.E. 133 |  | ..... | 3 |
| Thermo. & Heat Transfer, M.E. 113 |  | ..... | 3 |
| Princ. of Econ., Econ. 11, 12 | | 3 | 3 |
| | | 17 | 18 |

| | | 1st | 2nd |
|--------------------------------------|--|----------|----------|
| | | SEMESTER | SEMESTER |
| The Junior Year | | | |
| Electr. Engrg. Princ., E.E. 101, 102 | | 4 | 4 |
| Mech. of Mat'ls I, C.E. 100 | | 3 | ..... |
| Industrial Materials I, M.E. 171 | | 3 | ..... |
| Materials Processing I, M.E. 131 |  | ..... | 3 |
| Fluid Mechanics, M.E. 142 |  | ..... | 3 |
| Technical elective ⁴ | | 3 | 3 |
| Humanistic-social elective | | 3 | 3 |
| | | 16 | 16 |

1. See distribution of Humanistic-Social Studies on page 118. Econ. 11, 12 is required.
2. Any 200 level course with approval of the Mechanical Engineering Department.
3. Technical electives from departments of engineering, mathematics or physical sciences.
4. To be selected from the following: Econ. 9, 10, 121, 141, 207, 251.

| The Senior Year | 1st SEMESTER | 2nd SEMESTER |
|--|-----------------|-----------------|
| Statistical Methodology I, Math. 200 | 3 | ..... |
| Methods Engineering, M.E. 175 | 3 | ..... |
| Materials Processing, II, M.E. 231 | 3 | ..... |
| Engrg. Economy, C.E. 225 | 3 | ..... |
| Statistical Techniques in Mfg., M.E. 233 | ..... | 3 |
| Plant Organization, M.E. 176 | ..... | 4 |
| Engineering Design I, M.E. 135 | ..... | 4 |
| Technical elective ⁵ | ..... | 3 |
| Humanistic-social elective | 3 | 3 |
| | 15 | 17 |

A minimum of 131 approved semester hours is required for the degree in this curriculum, plus required courses in physical education.

A student who, at the end of his Junior year, has a cumulative average of 3.0 or above may become an applicant for the honors program in a special area of study. If accepted the student will determine his own program under the guidance of his adviser.

The Mathematics Curriculum

This curriculum is designed to provide sound basic training in mathematics, to prepare the student for a position in an area in which mathematicians are sought, and to qualify him for advanced study in graduate school. Students in the College of Arts and Sciences may also concentrate in mathematics and will receive the Bachelor of Arts degree. An adviser from the department will assist students in the determination of a program best suited to their individual needs and plans.

| The Freshman Year | 1st SEMESTER | 2nd SEMESTER | The Sophomore Year | 1st SEMESTER | 2nd SEMESTER |
|------------------------------------|-----------------|-----------------|------------------------------------|-----------------|-----------------|
| Mathematics, 11, 12 | 5 | 5 | Mathematics, 121, 124 | 3 | 3 |
| Science ² | 3-4 | 3-4 | Mathematics, 102 | ..... | 3 |
| Humanistic-Social Studies | 3 | 3 | General Physics, 17, 18 | 3 | 3 |
| Electives | 4-3 | 4-3 | Humanistic-Social Studies | 3 | 3 |
| | — | — | Electives | 6 | 3 |
| | 15 | 15 | | 15 | 15 |
| The Junior Year | 1st SEMESTER | 2nd SEMESTER | The Senior Year | 1st SEMESTER | 2nd SEMESTER |
| Mathematics Electives ³ | 6 | 6 | Mathematics Electives ³ | 9 | 9 |
| Physics 27 | 4 | ..... | Science ⁴ | 3 | 3 |
| Humanistic-Social Studies | 3 | 3 | Humanistic-Social Studies | 3 | 3 |
| Electives | 4 | 9 | | — | — |
| | 17 | 18 | | 15 | 15 |

1. See distribution of Humanistic-Social Studies on page 118.
2. Physical science, biological science, agricultural science, medical science or engineering courses.
3. Beyond Mathematics 102.
4. Physical science, biological science (including experimental psychology), agricultural science, medical science or engineering courses beyond the sophomore level, to constitute a minor specialization.
5. To be selected from departments of engineering, mathematics or physical sciences.

HUMANISTIC-SOCIAL STUDIES FOR MATHEMATICS MAJORS

A minimum of twenty-four hours is required in humanistic-social studies. To meet this requirement each student must satisfy the following distribution:

1. Six semester hours in courses from one area listed below.
2. Eighteen semester hours in courses from at least two other areas listed below.

Elective Areas

Advanced Literature Courses
 Anthropology
 Art
 Economics
 English
 Geography
 History
 Intermediate Classical Languages
 Intermediate German

Intermediate Romance Languages
 Intermediate Russian
 Music
 Philosophy
 Political Science
 Psychology
 Religion
 Sociology
 Speech
 World Problems

A minimum of 125 approved semester hours is required for the degree in this curriculum, plus required courses in physical education.

The Physics Curriculum

The Department of Physics offers a pre-professional curriculum leading to the degree of Bachelor of Science in Physics. This program is designed to give a strong background for future professional education in industry or graduate school. Students in the College of Arts and Sciences may also concentrate in physics and receive a Bachelor of Arts degree.

| The Freshman Year | | 1st SEMESTER | 2nd SEMESTER | The Sophomore Year | | 1st SEMESTER | 2nd SEMESTER |
|---|--|-----------------|-----------------|--|--|-----------------|-----------------|
| English Electives | | 3 | 3 | Liberal Arts Elective | | 3 | 3 |
| Mathematics ^{1,3} 11, 12 or 13, 14 | | 4-5 | 4-5 | Mathematics 121, 124 or 123, 124 | | 3-4 | 3 |
| Chemistry ^{2,3} 11-12 | | 5 | 5 | German, French or Russian ⁴ | | 4 | 4 |
| Physics 17, 18 | | 3 | 3 | Physics 27, 128 | | 4 | 4 |
| | | — | — | Elective ⁵ | | 3-4 | 3-4 |
| | | 15 | 15 | | | — | — |
| | | or 16 | or 16 | | | 17 | 17 |
| | | | | | | to 19 | to 18 |
| The Junior Year | | 1st SEMESTER | 2nd SEMESTER | The Senior Year | | 1st SEMESTER | 2nd SEMESTER |
| German, French or Russian ⁴ | | 3 | 3 | Physics 271, 272 | | 3 | 3 |
| Physics 213, 214 | | 3 | 3 | Physics 203, 204 ⁷ | | 3 | 3 |
| Physics 211, 216 | | 3 | 3 | Physics 265 | | 3 | ..... |
| Physics 101, 102 ⁷ | | 3 | 3 | Scientific Elective |  | ..... | 3-4 |
| Mathematics Elective ⁶ | | 3 | 3 | Mathematics Elective ⁶ | | 3 | 3 |
| Elective ⁶ | | 3 | 3 | Elective ⁵ | | 3-4 | 3-4 |
| | | — | — | | | — | — |
| | | 18 | 18 | | | 15 | 15 |
| | | | | | | or 16 | to 17 |

1. See footnote under course offerings of Department of Mathematics.
2. Chemistry 1-2 is acceptable for a student of limited background. A student wishing to continue a foreign language in the freshman year at the intermediate level may postpone chemistry until the sophomore year.
3. A student electing both mathematics 13, 14 and chemistry 1-2 would only be carrying 14 credits during each semester of the freshman year. Such a student might well consider an elective course in either or both semesters.

A minimum of 130 semester hours is required for the degree in this curriculum, plus required courses in physical education.

The Technical Information Center

The Technical Information Center was authorized in February, 1967, by the Board of Trustees and began operations on October 2nd. It is the outgrowth of the University's expanding role of service to the people of the State of Vermont. The offices of the Center are located in the Votey Engineering Building on the University campus.

The Center provides Technical Library services to the industries of the State of Vermont. These services include searching for material on any technical subject, referring incoming technical literature to those desiring it in industry, and publishing periodic lists of new technology. The Library services utilize the resources of many federal information clearinghouses as well as the University's library and its inter-library loan capability.

The Center also provides Educational Extension programs as a means of training industrial personnel in modern or new technology. These programs are given as either conferences, seminars, short courses, or workshops. The subject areas include: Management for Engineers; Environmental Pollution; Mechanical Engineering as Related to Machine Design; New Technological Thrusts in Management; Manufacturing Methods, Materials and Processes; PERT/CPM Study Workshops and Dry Kiln Operations. Other subject areas will be covered as the need arises. The Educational Extension service utilizes experts from industry, universities, and colleges.

The Technical Information Center is supported in part by state and federal funds under the authority of the State Technical Services Act of 1965. The Act is administered in this state by the Vermont Office of Technical Services, Vermont Development Department, and nationally by the Office of State Technical Services, U.S. Department of Commerce, Washington, D.C. It is anticipated that industry will make contributions to the work of the Center.

The services of the Center are available as follows: The Technical Library Services are available to individual companies. A charge is made for any copies of technical material supplied to the company. The Educational Extension programs are available only to a group of companies or a segment of Vermont industry. All educational programs administered by the Center are partly supported by registration fees.

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4. See footnote 2. In the junior year an elective may be taken if a language through the intermediate level has been passed in the freshman or sophomore years.
 5. This elective may be either in a natural science, mathematics or in the arts, humanities or social sciences. The Department recommends at least a year in the latter category. A student emphasizing biology might include physics 220 or 222.
 6. In general an undergraduate major should plan to take mathematics every semester. Various courses are possible depending on the interests of the student and the offerings of the Department of Mathematics. In some cases other courses might be substituted with the permission of the Department of Physics and of the Dean of the College of Technology.
 7. With departmental permission, a student may replace one or more of the Junior-Senior laboratory courses with equivalent laboratory experience in Physics 197, 198, in industrial employment, or in suitable course offerings of other departments. Any difference in academic credits may be included among electives.

V 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 curricula whose health, academic record or performance and behavior in the professional careers is judged unsatisfactory.

The School of Allied Health Sciences

The Program in Dental Hygiene

A School of Dental Hygiene was established in the fall of 1949 on authorization and a grant of money by the State Legislature, and became a Department in the School of Allied Health Sciences in 1968. Its purpose is to meet the increasing need for dental health services.

The Department of Dental Hygiene offers a two-year curriculum leading to an Associate in Health Science degree and a Certificate in Dental Hygiene. A program offering a Bachelor of Science is being studied.

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 individual states.

The duties of a graduate dental hygienist are educational and preventive in nature and may be carried out in private dental practice, public institutions, hospitals and industrial clinics, and public health programs. Dental hygienists practice under the supervision of a dentist. The primary concentration of her skills is in oral health education, oral prophylaxis and inspection. However, she is qualified to perform procedures for the prevention of dental caries, expose and process dental radiographs, and assist in other phases of dental practice. The dental hygienist is a vital member of the health science professions, and her opportunities are practically unlimited.

Requirements for admission to study in the Dental Hygiene Program are identical with general University requirements, with the additional requirement that applicants write the Dental Hygiene Aptitude Test. Information and application forms for this test are available from the American Dental Hygienists' Association, 304 East 45th Street, New York, N.Y. 10017.

As this program of study is scientifically oriented, high school courses in algebra, chemistry, biology and physics are important prerequisites. Personal attributes essential to success in this program include good health, emotional stability, task orientation, high moral standards and an ability to relate well with society.

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. Clinic experience is obtained in the department's fourteen chair dental 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.

Students applying for this program should be interested in and have aptitude for scientific studies.

| The Freshman Year | 1st SEMESTER | 2nd SEMESTER | The Sophomore Year | 1st SEMESTER | 2nd SEMESTER |
|---|-----------------|-----------------|--|-----------------|-----------------|
| Freshman English, Eng. 1-2 | 3 | 3 | The Cultures of Man, Soc. and Anthropol, 21 | 3 | ..... |
| Oral Tissues 11-12 | 3 | 2 | Oral Pathology, 53-54 | 2 | 2 |
| Dental Hygiene, 1 | 2 | ..... | Radiology, 61 | 1 | ..... |
| Dental Hygiene, 2 | ..... | 3 | Public Health, 74 | ..... | 2 |
| General Psychology, Psych. 1 | ..... | 3 | Clinical Dental Hygiene, 81-82 | 5 | 5 |
| Physical Education | 1 | 1 | Dental Health Education, 72 | | |
| Integrated Science | 5 | 5 | Pharmacology and | | |
| *Freshman Laboratory Science, 11, 12 | 3 | 3 | Anesthesiology, 51-52 | 1 | 1 |
| Dynamics of Health Care, 1, 2 | 1 | 1 | Dental Materials, 91-92 | 1 | 1 |
| | | | Public Speaking, Speech, 11 | ..... | 3 |
| | | | Home Economics, F & N, 87 | 3 | ..... |
| | | | Periodontics, 55 | 1 | ..... |
| | | | Dental Practice 62 | ..... | 1 |

The Program in Medical Technology

The four-year curriculum, leading to the degree, Bachelor of Science, is designed to provide the student with a background in the fundamentals essential for professional work in the field of medical technology. The curriculum is designed to meet the standards set by the Council on Medical Education of the American Medical Association.

The student will begin his specific professional training during the junior year by taking specified subjects. The senior year will concentrate on developing the professional medical technologist with didactic courses in the Division of Health Sciences and practical laboratory experience in the Medical Center Hospital of Vermont, Vermont State Health Department, and the Red Cross Blood Center.

After graduation the student may be eligible to take the examination for certification as a Medical Technologist, ASCP, on recommendation by the Director to the Registry of Medical Technologists of the American Society of Clinical Pathologists. *The proposed curriculum is as follows:*

* Taken concurrently with integrated science course.

| | | 1st SEMESTER | 2nd SEMESTER | | | 1st SEMESTER | 2nd SEMESTER |
|------------------------------|--|--------------|--------------|----------------------------|--|--------------|--------------|
| The Freshman Year | | | | The Sophomore Year | | | |
| *English | | 3 | 3 | Zoology 103 | | 4 | ..... |
| Chemistry 1-2 | | 4 | 4 | Chemistry 131 | | 4 | ..... |
| *Mathematics | | 3 | 3 | Physics 5-6 | | 4 | 4 |
| Biology 1-2 | | 4 | 4 | Approved electives | | 4 | 8 |
| Dynamics of Health Care | | 1 | ..... | Biochem. 102 |  | ..... | 4 |
| Approved Electives |  | ..... | 3 | | | — | — |
| Physical Education | | 1 | 1 | | | 16 | 16 |
| | | — | — | | | | |
| | | 16 | 18 | | | | |
| | | | | | | | |
| The Junior Year | | 1st SEMESTER | 2nd SEMESTER | The Senior Year | | 1st SEMESTER | 2nd SEMESTER |
| Introductory Microbiology 55 | | 4 | ..... | Medical Technology 102 | | 4 | ..... |
| Biochemistry 111-112 | | 4 | 4 | Medical Technology 103 |  | ..... | 1 |
| Approved Electives | | 8 | 8 | Medical Technology 120 | | 6 | ..... |
| Medical Technology 101 |  | ..... | 4 | Medical Technology 110 |  | ..... | 2 |
| | | — | — | Practicum 140, 141 | | 5 | 9 |
| | | 16 | 16 | Medical Technology 197-198 | | 1 | 2 |
| | | | | | | — | — |
| | | | | | | 16 | 14 |

Notes: Total credit hours required for graduation: 126 (excluding Physical Education).

* Course dependent upon Freshman placement. (One semester of Calculus may suffice.)

Medical Technology 201 recommended for students anticipating Graduate School.

Chemistry 16 may be substituted for Chemistry 131.

The Program for Medical Laboratory Technicians

The two-year curriculum, leading to an Associate Degree, offers a background of general education to enable the student to be an effective member of society, generally informed and socially sensitive, in addition to specialized courses to develop occupational skills. Although the majority of credits earned during the freshman year are through general courses offered in the University, the specialized courses during the second year are designed to qualify students for employment. After completion of the two-year program, the exceptional student may apply for transfer to the four-year baccalaureate program and consideration of transfer of credits will be granted on an individual basis.

Graduates of this program should be eligible for examination and certification by the Board of Registry of the American Society of Clinical Pathologists.

Clinical experience in laboratory techniques is acquired in the facilities of the Medical Center Hospital of Vermont, the Vermont State Health Department, and selected approved health facilities throughout the State. A tentative curriculum follows:

| | | 1st SEMESTER | 2nd SEMESTER | | | 1st SEMESTER | 2nd SEMESTER |
|-------------------------------|---|--------------|--------------|------------------------------|--|--------------|--------------|
| The First Year | | | | The Second Year | | | |
| Dynamics of Health Care, 1, 2 | 1 | 1 | | Medical Technology 20-21 | | 6 | 4 |
| *English | | 3 | 3 | Medical Technology 40-41 | | 2 | 9 |
| *Math | | 3 | ..... | Introductory Microbiology 55 | | 4 | ..... |
| Psychology 1 |  | ..... | 3 | Medical Orientation 3 |  | ..... | 1 |
| Integrated Science 9, 10 | | 5 | 5 | Electives | | 6 | ..... |
| Freshman Lab Science 11, 12 | | 3 | 3 | | | — | — |
| Physical Education | | 1 | 1 | | | 18 | 14 |
| | | — | — | | | | |
| | | 16 | 16 | | | | |

Notes: * Course dependent upon Freshman placement.

A minimum of 60 approved semester hours is required for the Associate Degree in this curriculum, plus 1 year of required courses in physical education.

The Program in Physical Therapy

The program in Physical Therapy is 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 sciences. In the upper-sophomore year, the student will begin the basic sciences of anatomy and physiology and an introductory course 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, the clinical education experiences will provide the student with concurrent opportunities to apply the acquired knowledge and skills. The program of study in the first two years is as follows:

| Freshman Year | 1st SEMESTER | 2nd SEMESTER | Sophomore Year | 1st SEMESTER | 2nd SEMESTER |
|------------------------------|-----------------|-----------------|--------------------------|-----------------|-----------------|
| *English | 3 | 3 | Physics 5, 6 | 4 | 4 |
| Chemistry 3, 16 | 4 | 4 | Anatomy 102 | ..... | 5 |
| Biology 1, 2 | 4 | 4 | Physiology 100 | ..... | 5 |
| Dynamics of Health Care 1, 2 | 1 | 1 | Introduction to P. T. 21 | ..... | 2 |
| *Mathematics | 3 | ..... | Psychology 1 | 3 | ..... |
| Elective | ..... | 3 | Speech 11 | 3 | ..... |
| | — | — | Elective | 6 | ..... |
| | 15 | 15 | | — | — |
| | | | | 16 | 16 |

* Course dependent upon freshman placement

The Program in Radiologic Technology

The program is designed to provide both didactic and clinical training in diagnostic radiography, nuclear medicine and radiation therapy within the framework of a two-year college program in association with the Medical Center Hospital of Vermont for the development of technical skills. The program is to be supplemented by a 12-month internship in approved hospitals.

| First Year | 1st SEMESTER | 2nd SEMESTER |
|------------------------------------|-----------------|-----------------|
| Mathematics | 3 ¹ | ..... |
| Introductory Radiologic Science 11 | 3 | ..... |
| English | 3 | 3 ² |
| Clinical Practicum 1, 2 | 1 | 1 |
| Physiology 9, 10 | 5 | 5 |
| Dynamics of Health Care 1, 2 | 1 | 1 |
| Physical Education 1, 2 | 1 | 1 |
| Radiologic Anatomy 12 | ..... | 3 |
| Elective | ..... | 3 |
| | — | — |
| | 17 | 17 |

¹ By placement

² Choice of English, History, Philosophy or Religion

| Second Year | 1st SEMESTER | 2nd SEMESTER |
|-------------------------------------|-----------------|-----------------|
| Diagnostic Radiography: | | |
| Radiographic Exposure Principles 31 | 3 | ..... |
| Radiographic Positioning 33, 34 | 3 | 3 |
| Electives | 6 | 6 |
| Clinical Practicum 3, 4 | 3 | 3 |
| Radiopathology 14 | ..... | 2 |
| | — | — |
| | 15 | 14 |
| Nuclear Medicine: | | |
| Radiation Methodology 43 | 3 | ..... |
| Imaging 41 | 3 | ..... |
| Electives | 6 | 3 |
| Instrumentation 42 | ..... | 3 |
| Laboratory Studies 44 | ..... | 3 |
| Clinical Practicum 3, 4 | 3 | 3 |
| Radiopathology 14 | ..... | 2 |
| | — | — |
| | 15 | 14 |
| Radiation Therapy: | | |
| Radiation Methodology 43 | 3 | ..... |
| Radiation Therapy Science 51 | 3 | ..... |
| Electives | 6 | 3 |
| Treatment Planning 52 | ..... | 3 |
| Therapeutic Techniques 54 | ..... | 3 |
| Clinical Practicum 3, 4 | 3 | 3 |
| Radiopathology 14 | ..... | 2 |
| | — | — |
| | 15 | 14 |

The School of Nursing

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 in Nursing. The Technical Nursing program is two years in length. Upon its completion the Associate Degree is awarded. Direct transfers from one program to the other are not possible.

Professional Nursing Program

The Department of Professional Nursing offers a curriculum leading to the Bachelor of Science in Nursing. 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 program is designed to assist the student in nursing to achieve progressively higher levels in the development of: knowledge, skills, and understandings necessary to help in meeting the physical, emotional, spiritual, and social needs of people; skill in establishing effective relationships by the understanding of behavior and its effect on interpersonal relations; understanding of the responsibil-

ities inherent in the professional practice of nursing and the profession's role in meeting the health needs of a changing society; and appreciation of the thought and achievement of man as a basis for enrichment of personal life.

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 which begin in the second year with concentration in the third and fourth years. Facilities used for clinical laboratory experience include the Medical Center Hospital of Vermont, the Burlington Visiting Nurses' Association, Inc., the Vermont State Hospital, Waterbury, Sheraton House, and other selected community agencies.

The program is approved by the Vermont Board of Nursing and is fully accredited by the National League of Nursing, Inc.

A minimum of 123 approved semester hours is required for the Bachelor of Science degree plus required courses in physical education.

A typical program of studies follows:

| The Freshman Year | | 1st SEMESTER | 2nd SEMESTER | The Sophomore Year | | 1st SEMESTER | 2nd SEMESTER |
|---|--|-----------------|-----------------|---|--|-----------------|-----------------|
| English | | 3 | 3 | Introductory Microbiology, MCBI 55 | | 4 | ..... |
| Mammalian Anatomy and Physiology, Zool. 5-6 | | 3 | 3 | Home Economics, F&N 41 | | 3 | ..... |
| Outline of Chemistry, Chem. 3-4 | | 4 | 4 | General Psychology, Psych. 1, or Principles of Sociology, Soc. 22 |  | ..... | 3 |
| Public Speaking, Speech 11 | | 3 | ..... | Nursing 21-22 | | 6 | 6 |
| Principles of Sociology, Soc. 22, or General Psychology, Psych. 1 |  | ..... | 3 | Electives | | 3 | 6 |
| Elective | | 3 | 3 | | | | |
| The Junior Year ¹ | | 1st SEMESTER | 2nd SEMESTER | The Senior Year ¹ | | 1st SEMESTER | 2nd SEMESTER |
| Nursing 121, 122 | | 9 | 9 | Nursing 156 | | 6 | ..... |
| Human Development and Per- sonality, Home Ec. 63 | | 3 | ..... | Nursing 176 | | 6 | ..... |
| Electives | | 3 | 6 | Nursing 164 |  | ..... | 6 |
| | | | | Nursing 186 |  | ..... | 3 |
| | | | | Electives | | 3 | 6 |

In addition to the general education courses found in the curriculum outlined above, 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 adviser. These are:

| | | | |
|-------------------------|---|-----------------------------|----|
| Philosophy | 3 | History, Political Science, | |
| Fine Arts | 3 | Economics or Geography | 6 |
| Psychology or Sociology | 3 | English, Foreign Language | |
| Physical Education | 2 | or Speech | 3 |
| | | Electives | 15 |

Students are encouraged to pursue the study of a foreign language if able to enter the intermediate level of instruction. Students desiring to learn a new foreign language may need to plan on summer sessions.

Students admitted in the fall of 1971 and thereafter will follow a revised curriculum. The general education courses will be similar to the present but dis-

1. The semesters may be reversed dependent on the student's program.

tributed differently. Clinical nursing courses will be scheduled in the junior and senior years.

Technical Nursing Program

The two-year program in nursing is designed to prepare qualified individuals for technical nursing practice and to promote the development of the individual as a responsible member of society. The graduates of this program receive the Associate Degree, are eligible to apply for licensure as registered nurses, and are prepared to give direct nursing care to patients of all age groups in hospitals, clinics, nursing homes, and other health agencies.

The curriculum is two academic years and one four-week summer session in length. General education courses account for approximately one-half of the total required credits, and nursing courses for the remaining one-half. General education content includes courses in the humanities, behavioral and social sciences, and the biological and physical sciences. Nursing courses are taught concurrently with general education courses throughout the two years and include classroom instruction and guided experiences in giving nursing care to patients in the Medical Center Hospital of Vermont, the Vermont State Hospital, Waterbury, the Green Mountain Nursing Home, Winooski, and other health agencies.

The Program is approved by the Vermont State Board of Nursing and is designed to meet the standards for accreditation by the National League for Nursing. (A school of nursing is not eligible for National League for Nursing accreditation until the graduation of its first class.)

The program of studies follows:

| The Freshman Year | | 1st SEMESTER | 2nd SEMESTER | The Sophomore Year | | 1st SEMESTER | 2nd SEMESTER |
|---|---|-----------------|-----------------|---|--|-----------------|-----------------|
| English Elective | | 3 | ..... | Nursing Care of Children & Adults, Nurs. 27-28 | | | 10 |
| Dynamics of Health Care, 1-2 | 1 | 1 | | Nursing Trends, Nurs. 30 | | 9 | 2 |
| Physiology, 9-10 | | 5 | 5 | Group Discussion, Spe. 14 |  | ..... | ..... |
| Principles of Sociology, Soc. 22 |  | ..... | 3 | Electives | | 3 | 3 |
| General Psychology, Psych. 1 | 3 | ..... |  |  |  |  |  |
| Fundamentals of Nursing, Nurs. 11-12 | | 4 | 4 | | | | |
| Approved Elective* |  | ..... | 3 | | | | |
| Physical Education | | 1 | 1 | | | | |
| *English | | | | | | | |
| Philosophy | | | | | | | |
| Religion | | | | | | | |
| History | | | | | | | |

Summer Session—4 weeks

| | | |
|--------------------------------------|---|-------|
| Fundamentals of Nursing, Nurs. 14 | 4 | |
|--------------------------------------|---|-------|

A minimum of 66 approved semester hours, plus credit in required physical education courses, is required for the degree.

Admission of Registered Nurses

The School of Nursing will consider for admission to the baccalaureate program qualified registered nurses currently licensed to practice. Admission to the program is essentially the same as for other applicants to the University. In ac-

cord with University policy, the registered nurse student may apply for credit by examination in general education and selected nursing courses.

Registered nurses planning to seek admission 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 other institutions.

General Information

Applicants must satisfy the general admission requirements for the University. High School courses in biology, chemistry, and physics are highly recommended.

Grades in nursing courses are based on achievement in theory and in laboratory practice, both of which must be satisfactory to receive a passing grade. The School of Nursing reserves the right to require the withdrawal from nursing of any student whose health, academic record, or performance and behavior in nursing is judged unsatisfactory.

All students in the School of Nursing are responsible for transportation to and from the agencies which are used for clinical experiences.

Financial aid is available in the form of scholarships, loans, prizes and employment (see page 332). Of special interest to students in nursing is the Nursing Student Loan Program. Anyone interested should make application for financial aid by February 1.

In addition to funds handled through the University, students in the baccalaureate program may apply for appointments in the Army Student Nurse Program or the Navy Nurse Corps Candidate Program at the beginning of their junior year. The appointments carry generous financial allowances. A student who participates twelve months or less serves on active duty in the respective service for twenty-four months. If two years of financial support have been received, thirty-six months of service are required.

Continuing Education

Continuing education is arranged to meet the demands of both employed and unemployed professional nurses. Special classes, seminars, institutes, and workshops are scheduled throughout the year, on the campus and in accessible communities of the state. These activities are designed to aid the nurse to keep abreast of new knowledge and to develop greater skill in nursing care. For more information, contact Continuing Education, School of Nursing, 538 Waterman, University of Vermont, Burlington, Vermont 05401.

PROFESSIONAL PERSONNEL IN COOPERATING AGENCIES

Robert B. Aiken, M.D., Commissioner of Health, Vermont State Department of Health

Mrs. Elizabeth Davis, R.N., Executive Director, Burlington Visiting Nurse Association, Inc.

Ann Dion, R.N., Director of Nursing, Green Mountain Nursing Home

Mrs. Vera Hanks, R.N., Chief, Patient Care Services, Vermont State Hospital

Margaret A. Landon, R.N., Associate Director of Nursing, Medical Center Hospital of Vermont

Mrs. Sandra Lang, R.N., Director of Nursing, Sheraton House
Sally Sample, R.N., Director of Nursing, Medical Center Hospital of Vermont

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.

Eligibility of an applicant for admission is determined by the Admissions Committee of the College of Medicine on the basis of the following:

The scholastic record of the applicant in his premedical work.

Aptitude and motivation for the study and practice of medicine as determined by information from the applicant's undergraduate faculty and by personal interview with the Admissions Committee.

The applicant's scores on the Medical College Admission Test. Applicants are urged to take the Test in May preceding application.

A maximum of seventy-five students is admitted to each entering class. The faculty sincerely hopes that each entering student will successfully complete the medical curriculum and graduate with the degree of Doctor of Medicine.

Preference for admission is according to the following priorities:

Qualified residents of Vermont.

Qualified residents of other New England States having contractual arrangements with the College of Medicine through the New England Board of Higher Education. Contracts are presently in effect with the States of Maine, New Hampshire, Massachusetts and Rhode Island.

Qualified residents of other areas. The number of places for residents of other areas is limited and competition for these places is especially keen.

Sons and daughters of alumni of the College of Medicine are given special consideration within the framework of the above policy.

The final closure date for receiving applications is November 1 preceding the September admission.

An application fee of \$15.00 (not refundable) is payable on request of the Office of Admissions.

When an applicant is offered admission to the College of Medicine and wishes to accept the place offered, a deposit of \$100.00 must be paid no later than two weeks following notice of acceptance in order to reserve a place in the entering class. This deposit is refundable up to March 1 preceding admission, should the applicant release his place in the class. The deposit is applied toward the applicant's tuition upon matriculation in the College of Medicine.

THE CURRICULUM

The curriculum consists of three parts: the basic science core, the clinical core, and the major program.

Basic Science Core

The forty-eight weeks of instruction in the basic science core spans the freshman year and fall semester of the sophomore 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. Comprehensive clinics, seminars in Behavioral Science and the elective faculty tutorial program provide for the first year medical student clinical contacts, an awareness of social, cultural and psychologic factors affecting health and illness, and insight into the major issues influencing the practice of medicine.

Clinical Science Core

The clinical core extends from January of the sophomore year until December of the junior 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 will be a brief summer vacation. During this year students work within the hospitals and clinics and instruction is based on the care of patients.

Major Program

The Major Program extends from January of the junior year until graduation in May of the following year. This sixteen-month period is divided into ten rotations of approximately six weeks 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 and Medicine, Surgery, Obstetrics and Gynecology, Pediatrics, and the Neurological Sciences and Psychiatry.

An integral part of each clinical major is a review and extension of basic science relevant to that discipline. Each major includes a limited number of required clinical and/or laboratory experiences as well as elective rotations. These electives are not restricted to the discipline in which the student is majoring and may include experiences in approved programs outside of Burlington. Each of these programs has sufficient flexibility to meet the interests and goals of each student. During the 1969-70 academic year, for instance, students with career goals in family practice selected major programs in Medicine, Pediatrics and Surgery, while those with future careers in Psychiatry selected major programs in Medicine and Neurological Sciences and Psychiatry, and so forth. A system of faculty advisers has been developed to counsel each student on a one-to-one basis throughout the planning and course of his major program.

Although the majority of students elect a clinical major, students so desiring may commit the full Major Program to study in the preclinical sciences. While these programs are individualized, it is expected that graduate study, research and a thesis will form the basis for each. Qualified students may enroll in the Graduate College as candidates for the Master of Science degree while fulfilling the requirements of the M.D. degree within the Major Program.

V The Graduate College

The purpose of the Graduate College is to serve the needs of college graduates who desires a broader and more thorough knowledge of scholarship and research in their chosen fields. 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 Bulletin available from the Graduate College Office, 335 Waterman Building.*

Master of Arts

Programs are offered in the following fields:

Communication
Economics
English
French
Geography
German
Greek
History

Latin
Mathematics
Music
Philosophy
Political Science
Psychology
Spanish

Master of Science

Programs are offered in the following fields:

Agricultural Economics
Anatomy
Animal Sciences
Animal Pathology
Biochemistry
Biomedical Engineering
Biostatistics
Botany
Chemistry
Civil Engineering
Economics of Natural
Resource Planning
Electrical Biophysics
Electrical Engineering

Forestry
Geology
Home Economics
Mechanical Engineering
Medical Microbiology
Medical Technology
Microbiology
Pathology
Pharmacology
Physics
Physiology and Biophysics
Plant and Soil Science
Speech Pathology
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:

Agriculture
Botany
Chemistry
English
French
Geography
Geology
German
Greek

History
Home Economics
Latin
Mathematics
Music
Physics
Spanish
Vocational and Technical
Education
Zoology

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.

Mathematics
Biology (Botany & Zoology)
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
Reading and Language
(Elementary and Secondary)
School Counseling
(Elementary and Secondary)

Special Education
Student Personnel Services in
Higher Education
Teacher Education
Vocational and Technical Education

Master of Business Administration

Study leading to the degree of Master of Business Administration is designed to provide 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
Home Economics
Youth Organizations

Family Centered Services
Business and Industry

Doctor of Philosophy

Programs are offered in the following fields:

Anatomy
Biochemistry
Botany
Chemistry
Electrical Engineering
Mathematics
Mechanical Engineering

Microbiology
Pharmacology
Physics
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.

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.

V Continuing Education

The University, through Continuing Education, aims to broaden the horizon of those who have not attended college, to afford an opportunity for those who have attended college and subsequently wish to keep in touch with academic thought in their favorite fields or to gain information about subjects which were not studied in college, and to provide undergraduate opportunities in addition to the regular classroom experience.

The Summer Session

Summer Session offers courses on both the graduate and undergraduate level in many subjects, including agriculture, art, astronomy, botany, chemistry, classics, dramatic art, economics, education, English, French, geography, German, history, home economics, journalism, library science, mathematics, music (instrumental and vocal), philosophy, physical education, physics, political science, psychology, reading, sociology, Spanish, speech and zoology.

The offerings are diversified to meet the needs of the following various groups of students: those with adequate preparation who desire courses leading to a bachelor's degree; those with adequate preparation who wish to do graduate work for the master's degree; principals and superintendents of schools who desire fundamental or specialized courses in the fields of educational administration and supervision; teachers in elementary or secondary schools who seek credit toward state teachers' certificates, or who desire to broaden their knowledge of special subjects; persons who desire college level courses for self-improvement. Students must have sufficient maturity and background to profit from the courses in which they enroll.

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. All students desiring graduate credit for courses taken in the Summer Session must secure the approval of the Dean of the Graduate College at the time of registration. Enrollment in courses for graduate credit does not imply admission to the Graduate College. Fuller details on available courses and programs will be sent on request by the Director of the Summer Session.

Evening Division

Continuing education for adults in the State of Vermont is provided under the Evening Division Program offered by the University. Members of the faculty at the University and others, working under temporary appointment, offer evening or extension courses in arts and sciences and education. A variety of courses is presented in evening sessions on campus throughout the college year. Some of these may be taken for credit while others are non-credit and are designed for the adult who is interested in continuing his education for the pleasure of self-improvement.

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, Waterman Building. 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

Through Continuing Education Non-Degree students have an opportunity to enroll in courses offered in the day program. Non-degree students are those who have presented minimum credentials and are permitted to enroll in one of the colleges of the University to undertake course work for a purpose other than the earning of a degree.

Previously earned credits for non-matriculated students who later matriculated will be evaluated and included in the particular degree program if pertinent.

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 Admissions, 344 Waterman Building.

All non-degree students who would like assistance in planning educational programs and selecting courses should contact the Division of Continuing Education at 357 Waterman Building. (telephone 656-2085)

Conferences and Institutes

Conference activity is a rapidly increasing part of University life. Both 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 service. Groups interested in arranging

for meetings or conferences at the University should contact the Conferences and Institutes Office, Waterman Building. This office also coordinates the Speakers Bureau through which University personnel are made available to organizations outside the campus.

V 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.

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 or 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.

Courses numbered from 300 through 399 are graduate courses and, with rare exceptions, are taken only by persons holding a bachelor's degree.

Courses numbered above 400 are limited to candidates for the degree of Doctor of Philosophy.

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.

V Agricultural Economics

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professors Sargent (Chairman), Sinclair and Webster; Associate Professor Tremblay; Assistant Professors Fife and Gilbert.

2 WORLD FOOD AND POPULATION Agricultural development with emphasis on adjustments to natural and economic phenomena and the effect of food supplies on population trends and policies. Three hours. Mr. Tremblay.

51 AGRICULTURAL FINANCE Capital requirements of American agriculture; analysis of the financial problems of farmers; types and sources of credit and the lending problems and practices of farm credit institutions. *Prerequisite:* sophomore standing. Three hours. Mr. Sinclair.

61 PRINCIPLES OF AGRICULTURAL AND RESOURCE ECONOMICS The application of economic principles to the analysis of problems of agricultural production and resource development. Identification of individual and societal problems of the rural sector in an expanding economy, introduction to concepts of benefit-cost analysis, and externalities. *Prerequisite:* sophomore standing. Three hours. Mr. Sinclair.

75 PARTICIPATION IN RECREATION MANAGEMENT (see page 79).

103 RURAL SOCIOLOGY Analysis of selected research data concerning all populations in rural areas—rural farm, nonfarm, and suburban—and their social interaction as it relates to the concept of urbanized social organization. *Prerequisite:* junior standing. Three hours. Staff.

121 RESOURCE ECONOMICS The analysis of natural resource development and utilization. An evaluation of the economic forces affecting resource allocation, conservation, implications of resource use, tools of economic analysis, land use controls, planning and organization, decision making, and economic implications of current resource utilization practices. *Prerequisite:* economics 11 or agricultural economics 61. Three hours. Mr. Gilbert.

166 SMALL BUSINESS MANAGEMENT (3-2) Management problems of small business firms. Theoretical and practical considerations in the organization and operation of small businesses with emphasis on financial and legal organization, accounting and budgeting procedures, and tax policies. *Prerequisite:* sophomore standing. Three hours. Mr. Fife.

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. Staff.

201 **FARM BUSINESS MANAGEMENT** Organization and operation of successful farm businesses with emphasis on resource allocation, production efficiency, and marginal analysis. Field trips are required. *Prerequisite:* economics 11, 12, or agricultural economics 61; junior standing. Three hours. Mr. Tremblay.

207 **AGRICULTURAL MARKETING AND PRICES** Market structure, prices, and economic forces involved in the movement of farm products from producers to consumers. Emphasis on the New England situation. *Prerequisite:* economics 11-12, or agricultural economics 61. Three hours. Mr. Webster.

208 **AGRICULTURAL POLICY** The role of government, farm organizations, and other institutions in the development of agricultural policy. An economic analysis of the price and income problems of American agriculture and alternatives to their solution. *Prerequisite:* economics 11-12, or agricultural economics 61. Three hours. Mr. Sinclair.

222 **ADVANCED RESOURCE ECONOMICS** A critical investigation of current research, allocation procedures, and methods of analysis in natural resource economics with emphasis on the public sector. *Prerequisite:* agricultural economics 121. Three hours. Mr. Gilbert.

223 **REGIONAL PLANNING** Delineation of regional boundaries, determination of public goals, tools of planning, and the legal and political process of planning. Study of the ecological approach to planning and current planning programs. *Prerequisite:* senior standing and economics 11, 12, or equivalent. Three hours. Mr. Sargent.

224 **ENVIRONMENTAL POLICY** The economic history, objectives, criteria, implementation, politics, and implications of natural resource policy. *Prerequisite:* junior standing and agricultural economics 121, or permission of the instructor. Three hours. Staff.

225 **ECONOMICS OF OUTDOOR RECREATION** An analysis of demand and supply of natural resources for outdoor recreation in the northeast. A study of methods of economic analysis applicable to outdoor recreation. Emphasis on current policy issues and management of recreational business firms. *Prerequisite:* economics 11, 12 or agricultural economics 61. Three hours. Mr. Gilbert and Mr. Sargent.

254 **ADVANCED AGRICULTURAL ECONOMICS** Application of microeconomic theory to the problems of agricultural production and resource use; agricultural supply and demand analysis, price determination, market structures, and income distribution in competitive and imperfectly competitive markets. *Prerequisite:* twelve hours in agricultural economics and/or economics, and senior standing. Three hours. Mr. Sinclair.

255, 256 **SPECIAL TOPICS IN AGRICULTURAL ECONOMICS** Readings and discussion of selected topics in economics at an advanced level. *Prerequisite:* departmental permission. Credit as arranged. Staff.

266 **ECONOMICS OF MANAGERIAL DECISIONS** Application of economic concepts to problems of business management. Cost concepts for financial planning, capital budgeting, and discounting cash flows. Emphasis on tax planning, pricing, and demand analysis. Cases. *Prerequisite:* economics 11, 12, or equivalent. Three hours. Mr. Fife.

324 ADVANCED REGIONAL PLANNING A discussion of concepts of ecological planning with special emphasis on economic base analysis, resource base analysis, and economic impact studies. Current literature and current problems will be discussed and each student will make a contribution to a regional planning project. Three hours. Mr. Sargent.

351 RESEARCH METHODS The scientific method, statistical methods, sampling methods, use of electronic computers, linear programming, reporting research results. *Prerequisite:* three hours of statistics. Three hours. I or II. Mr. Fife

381, 382 AGRICULTURAL ECONOMICS SEMINAR Discussion of problems and research in agricultural economics, resource economics, and regional planning. One hour. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

V Agricultural Engineering

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professor Schneider (Chairman); Associate Professor Arnold; Assistant Professor Bornstein

5 INTRODUCTORY AGRICULTURAL ENGINEERING (2-2) Introduction to principles and practices in farm machinery, internal combustion engines, light building structures, electric wiring and devices, water supply, sewage disposal, and soil and water engineering in residential, recreational and farm use. Consideration of environmental relevance in these areas. Not for credit for B.S.A.E. degree candidates. Three hours. Mr. Schneider.

102 FARM SHOP (0-6) Wood and metal working by hand and machine methods, sheet metal work, welding, rope work and tool fitting, demonstrations and methods of teaching. Problems in safety, shop care, layout, and selection of equipment. *Prerequisite:* sophomore standing. Three hours. Mr. Schneider.

121 SOIL AND WATER MANAGEMENT (2-2) Analysis of agricultural, recreational, and other rural soil and water problems; design and application of conservation practices for environmental protection. *Prerequisite:* plant and soil science 61 and civil engineering 12. Three hours. Alternate years, 1972-73. Mr. Bornstein.

131 AGRICULTURAL, RESIDENTIAL AND RECREATIONAL BUILDINGS (2-2) Site planning, building planning, material selection. Insulation, heating, and ventilation of farm service buildings, residences and recreational buildings. Consideration of environmental relevance in these areas. *Prerequisite:* physics 6 and engineering graphics 1, or departmental permission. Three hours. Alternate years, 1971-72. Mr. Arnold.

140 POWER AND MACHINERY FOR AGRICULTURE (2-2) The principles of operation and maintenance of engines, tractors and agricultural field and farmstead machinery. *Prerequisite:* physics 6. Three hours. Alternate years, 1971-72. Mr. Arnold.

160 ELECTRICITY IN AGRICULTURAL, RESIDENTIAL, AND RECREATIONAL USE (2-2) Wiring systems, lighting, motors, heating, and overload protection in the use of electricity in agriculture, residences, recreation and rural area development. *Prerequisite:* physics 6. Three hours. Alternate years, 1972-73. Staff.

164 WATER SUPPLY, SEWAGE DISPOSAL AND REFRIGERATION (2-2) Water sources and systems, sewage disposal and refrigeration in agriculture, residences, recreation and rural area development. Consideration of environmental relevance in these areas. *Prerequisite:* physics 6. Three hours. Alternate years, 1972-73. Staff.

191, 192 SPECIAL TOPICS Advanced study in areas of agricultural engineering as indicated by the interest of the student. *Prerequisite:* departmental permission. Three hours. Staff.

V Anatomy

COLLEGE OF MEDICINE

Professors Young (Chairman), Dunibue; Associate Professor Wells; Assistant Professors Freedman, Iorio, Weidman, Wennberg; Demonstrator Boushey.

102 ANATOMY FOR PHYSICAL THERAPISTS (2-9) Study of the organization of the human body, emphasizing the principles of structure, methods of analysis, and detailed attention to specific regions. The musculoskeletal, integumentary, respiratory, cardio-vascular and peripheral nervous systems will be given special emphasis. Laboratory experiences will include: detailed dissections of certain regions; study of selected microscopic preparations, models, prosecutions, cross-sections, radiographs and skeletal materials; and will direct the student's attention to salient topographic anatomy by visualization and palpation. Departmental permission. Five hours. Staff.

V Animal Pathology

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professor Bolton (Chairman); Associate Professor Murray; Assistant Professors Henry Doremus and Helen Doremus

105 ANATOMY AND PHYSIOLOGY Structure and function of the various parts of the animal body with emphasis on cattle and horses. Three hours. Dr. 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. Dr. Murray.

107-108 LABORATORY ANIMAL TECHNIQUES (2-2) Basic laboratory procedures used in the examination of blood, fecal, urine, milk, and tissue specimens. Preparation of tissue sections. *Prerequisite:* microbiology and biochemistry 55 and a course in organic chemistry. Three hours. Dr. Helen Doremus.

110 WILDLIFE DISEASES A survey of the more common disease and parasitic problems of large game animals, small fur-bearing animals, waterfowl and game birds and their relationship to domestic animals and man. Autopsy techniques and proper use of diagnostic laboratory facilities will be demonstrated. *Prerequisite:* 2 courses in biology or zoology. Three hours. Dr. Bolton. Alternate years, 1972-73.

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. Staff.

217-218 LABORATORY ANIMALS (2-2) Life cycles, feeding, housing, breeding requirements, nutrition, disease prevention, maintenance of germ-free colonies, preoperative and postoperative care, and humane methods of handling. *Prerequisite:* microbiology and biochemistry 55 or medical microbiology 201, chemistry 131, 132. Three hours. Dr. Henry Doremus.

220 LABORATORY ASSIGNMENTS Rotating assignments in the Animal Pathology Laboratory and Division of Animal Services in the College of Medicine. Students are assigned under the guidance of the professional staff. *Prerequisite:* 107, 217. Three hours. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

Animal Sciences

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professors Atherton, Smith (Chairman), and Welch; Associate Professors Balch, Carew, Duthie, Nilson, and Simmons; Assistant Professor Foss; Lecturers Gibson, Mercia, and Woelfel.

2 INTRODUCTORY ANIMAL SCIENCE (3-2) Fundamental principles of anatomy, physiology, nutrition, breeding and management of animal species important in our agricultural economy. Technical problems associated with the selection and management of livestock and product utilization will be emphasized. Four hours. Mr. Smith and staff.

33 INTRODUCTORY DAIRY TECHNOLOGY (2-2) History and development of the dairy industry, general and basic composition of milk and milk products, milk quality and the significance of flavor, dairy arithmetic, and fundamental

processes used in the manufacture of milk and milk products. Three hours. Mr. Duthie.

44 DAIRY CATTLE JUDGING (0-6) Judging, fitting, and showing of dairy cattle. Practical application of dairy cattle selection will be emphasized. Two hours. Mr. Gibson. Alternate years, 1972-73.

55 FUNDAMENTALS OF LIVESTOCK FEEDING (3-2) Principles of livestock feeding and the evaluation of livestock rations. Emphasis will be placed on economic and nutritive value of various feed ingredients and the application of these facts to proper feed formulation. Four hours. Mr. Smith.

58 INTRODUCTORY AVIAN BIOLOGY (2-2) The evolution and biology of birds. Emphasis will be placed upon physiological and morphological development, physiological and endocrinological aspects of reproduction, social behavioral patterns, and the mechanics of flight. This course has been especially designed for the student who has an interest in broadening his appreciation of biology. Three hours. Mr. Foss.

104 DAIRY TESTING AND QUALITY CONTROL (2-2) The composition and properties of milk. Standard methods of bacteriological and chemical analysis. General laboratory testing procedures for milk and milk products and their importance in quality control. Three hours. Mr. Atherton.

109 FOOD MICROBIOLOGY (2-3) A study of the microorganisms important in milk and other food products, including common methods of laboratory examination and quality control. Desirable as well as undesirable activities of food microorganisms are discussed with emphasis on the elimination of contamination, spoilage, and spread of disease in various food products. Three hours. Mr. Atherton.

114 MANUFACTURED DAIRY PRODUCTS (2-3) Methods and technical problems in manufacturing milk products such as cheese, butter, evaporated and dry milks. *Prerequisite:* 33, junior standing. Three hours. Mr. Nilson. Alternate years, 1971-72.

121 SENSORY EVALUATION OF MILK AND MILK PRODUCTS (1-4) Employment of the senses in evaluation of milk and milk products, classification, physiology, and threshold values for taste and odor; comparison of sensory tests used in evaluation; testing consumer acceptance; practical experience in examining off-flavors in milk and milk products; and methods used in flavor identification research. Three hours. Mr. Duthie. Alternate years, 1972-73.

153 MILK PROCESSING (2-2) Technical aspects of processing fluid milk and fluid milk products. *Prerequisite:* departmental permission. Three hours. Mr. Nilson. Alternate years, 1972-73.

177 ADVANCED LIVESTOCK PRODUCTION (2-3) The organization and operation of livestock enterprises. Emphasis will be on theory and application of feeding, breeding and management programs and principles. *Prerequisite:* 55; junior standing. Three hours. Mr. Welch. Alternate years, 1971-72.

187, 188 LIGHT HORSE PRODUCTION AND MANAGEMENT (2-3) The problem of light horse production. Application of the principles of selection, management and horsemanship. *Prerequisite:* 187 for 188; junior standing. Three hours. Mr. Balch. Alternate years, 1972-73.

190 **POULTRY TECHNOLOGY** The organization and operation of poultry enterprises. Emphasis will be placed on theory and application of feeding, breeding, and management programs and principles. *Prerequisite:* 55, 58; junior standing. Three hours. Staff. Alternate years, 1971-72.

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 and department permission. Three hours. Staff.

206 **ANIMAL NUTRITION** Nutrients, their function and utilization and requirements for growth, reproduction and lactation. *Prerequisite:* 55; and a course in organic chemistry. Three hours. Mr. Welch.

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, soda fountain management and sanitary control. *Prerequisite:* 104; credit or concurrent enrollment in 109; junior standing. Three hours. Mr. Nilson. Alternate years, 1971-72.

251 **ADVANCED DAIRY CATTLE MANAGEMENT (2-3)** The organization and operation of dairy cattle enterprises. Theories and methods of application of feeding, breeding, and management programs and principles will be emphasized. *Prerequisite:* 55. Three hours. Mr. Woelfel. Alternate years, 1971-72.

256 **DAIRY PLANT MANAGEMENT (2-3)** Organization and operation of milk processing and manufactured milk products plants. *Prerequisite:* 153, Ag.Ec. 62; junior standing. Three hours. Mr. Nilson. Alternate years, 1972-73.

257 **DAIRY CHEMISTRY (1-6)** An advanced study of the chemical and physical properties of milk constituents with emphasis on training and experience in dairy research methodology. Students will select, design and perform several research experiments. *Prerequisite:* 33, 104, and a course in organic chemistry. Three hours. Mr. Duthie. Alternate years, 1971-72.

260 **ANIMAL BREEDING (2-3)** Theory and application of genetic principles of breeding of livestock. *Prerequisite:* 2. Three hours. Mr. Balch. Alternate years, 1971-72.

271 **ENDOCRINOLOGY (2-2)** Anatomy, physiology, glandular interrelationships, and assay methods of the endocrine glands and their hormones. *Prerequisite:* departmental permission. Three hours. Mr. Simmons.

275 **PHYSIOLOGY OF REPRODUCTION AND LACTATION (2-2)** Fundamental principles of the physiology of reproduction and lactation with the primary emphasis on farm animals. Three hours. Mr. Simmons. Alternate years, 1972-73.

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. Staff.

291, 292 **SPECIAL PROBLEMS IN ANIMAL AND DAIRY SCIENCE** Reading, discussion, and special laboratory investigation in the field of animal and dairy science. *Prerequisite:* departmental permission. Three hours. Staff.

294 HISTORY OF NUTRITION (see home economics 294). One hour. Staff.

307 ADVANCED CONCEPTS IN NUTRITION Study of chemistry and physiology of digestion, absorption and metabolism of nutrients. Methods of estimating and meeting dietary requirements for maintenance, growth, and reproduction of several species. Genetic and nutritional interrelationships. Basic study of growth per se. *Prerequisite*: one of the following: animal and dairy science 206, home economics 243, or a 200 level course in biochemistry. Three hours. Staff. Alternate years, 1971-72.

308 EXPERIMENTAL TECHNIQUES IN NUTRITION (0-4) Methods of conducting research in nutrition with the various animal species including humans. Physical, physiological and biochemical aspects considered. Experimental design and analyses. *Prerequisite*: a 200 level course in nutrition and in biochemistry. Two hours. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

V Art

COLLEGE OF ARTS AND SCIENCES

Professor R. Janson (Chairman); Associate Professors J. Davison and Mills; Assistant Professors Aschenbach, W. Davison, Hewitt, Lipke, Owre, Roland; Instructors Fengler, Okino, Sherman, Walker, Wedell; Mr. Higgins

1, 2 BASIC DESIGN The nature and interaction of color, line, light, and space in visual design, stressing invention and discovery as a means towards creative insight and evaluation. Lectures, discussion, projects. Three hours. Staff.

5, 6 ART HISTORY A survey of painting, sculpture, and architecture in the western world. First semester: Egyptian period through the Gothic; second semester: Renaissance to the present. *Prerequisite*: 5 for 6. Three hours. Staff.

11 INTRODUCTION TO FINE METAL CRAFTS Basic creative experiences in enamels and silver jewelry to develop individual ability in design, appreciation and technical skill. *Prerequisite*: sophomore standing. Three hours. I and II. Mrs. Mills.

13 INTRODUCTION TO CERAMICS Basic design and practice in ceramics stressing technical competence and critical judgment. Hand coiled and thrown forms, firing and glazing. *Prerequisite*: sophomore standing. Three hours. I and II. Mr. Okino.

21 DRAWING An investigation of various aspects of drawing through class assignments, individual projects, and group criticisms. Three hours. I, II. Mr. Owre.

41 INTRODUCTION TO SCULPTURE A basic course in sculpture, dealing with both formal and technical problems. *Prerequisite:* sophomore standing. Three hours. I and II. Mr. Aschenbach.

51 GREEK ART History of art in Greek lands in ancient times, with principal emphasis on sculpture, architecture, and vase painting. *Prerequisite:* sophomore standing. Three hours. Miss J. Davison.

52 ROMAN ART Development of Roman art styles out of Greek forms. Special emphasis on wall painting, Augustan official sculpture, later imperial architecture, mosaic. *Prerequisite:* sophomore standing. Three hours. Staff.

54 MODERN ART Painting and sculpture from the period of French Impressionism to the present time; emphasis on European influences. *Prerequisite:* sophomore standing. Three hours. Mrs. Roland.

102 MEDIEVAL ART Architecture, sculpture, and painting in western Europe from the early Christian era to the early 15th century, with emphasis on the Romanesque and Gothic. *Prerequisite:* 6 or 51 and 52. Three hours. Mrs. Roland.

103 RENAISSANCE ART Painting, sculpture and architecture in Italy and Northern Europe 1400-1600. *Prerequisite:* 6 or 51 and 52. Three hours. Mrs. Fengler.

104 BAROQUE ART European art and architecture, 1600-1750. Studies of original works in the Museum collection. *Prerequisite:* 6 or 51 and 52. Three hours. Mrs. Roland.

105 ROCOCO AND ROMANTIC ART European architecture, sculpture, and painting, circa 1750-1850, and the origins of the modern movement. Studies of original material in the Museum collection. *Prerequisite:* 6 or 51 and 52. Three hours. Mrs. Fengler.

106 MODERN ARCHITECTURE Monuments, masters and movements since 1850. Visits with architects and to modern buildings in the area. *Prerequisite:* 2 or 6. II. Three hours. Mr. R. Janson.

107 AMERICAN PAINTING Painting in America from Colonial times to the twentieth century. Use of the Fleming and Shelburne Museum collections. *Prerequisite:* 6. Three hours. Mr. Lipke.

108 AMERICAN ARCHITECTURE The Colonial period to Frank Lloyd Wright. Research projects particularly on buildings of historical interest in the area. *Prerequisite:* 6. Three hours. Mr. R. Janson.

111, 112 FINE METAL CRAFTS Advanced techniques in enamels and silver jewelry. Independent work emphasizing design and skill. Related aspects of historical and contemporary metal crafts. *Prerequisite:* 11 and one of the following which may be taken concurrently: 1, 2, 21. Three hours. Mrs. Mills.

113, 114 CERAMICS Advanced techniques in throwing and hand building. Clay and glaze technology, kiln theory and construction. Independent work in ceramic design and execution. Related aspects of historical and contemporary ceramics. *Prerequisite:* 13 and one of the following which may be taken concurrently: 1, 2, 21. Four hours. Mr. Scatchard.

121, 122 **DRAWING AND PAINTING** Exploration of individual problems in drawing and painting. The course includes a seminar on the development of thematic material. *Prerequisite:* 1 or 2 and 21. Three hours. Mr. Davies.

131, 132 **PRINTMAKING: INTAGLIO** Methods and materials in intaglio printing, such as etching and woodcut, stressing design and technical control. *Prerequisite:* 1 or 21 and instructor's permission; 131 for 132. Four hours. Mr. W. Davison.

133, 134 **PRINTMAKING: PLANOGRAPHIC** Methods and materials in planographic printing, such as lithography and silk screen, stressing design and technical control. *Prerequisite:* 1 or 21 and instructor's permission; 133 for 134. Four hours. Mr. W. Davison.

141, 142 **SCULPTURE** Problems of form and design in relation to material and technique. Emphasis on individual exploration and invention. Related aspects of historical and contemporary sculpture. *Prerequisite:* 41 and one of the following which may be taken concurrently: 1, 2, 21. Three hours. Mr. Aschenbach.

183, 184 **SEMINAR IN ART AND EDUCATION** A workshop exploring the methods, place and purpose of art in the educational experience, organized around the museum children's program for which students will plan and conduct classes as part of their studies. *Prerequisites:* six hours of studio, to include 1 and 2 or Education 140, and permission. Three hours. Mrs. Walker and Miss Sherman.

185, 186 **ART HISTORY SEMINAR** A museum oriented course dealing with selected topics or areas in art history. First semester: problems of research and criticism; second semester: organization, presentation and documentation of an exhibition undertaken by the class. *Prerequisite:* six hours of advanced art history and permission. Three hours. Staff.

193, 194 **COLLEGE HONORS**

195, 196 **SPECIAL TOPICS**

197, 198 **READING AND RESEARCH** Independent projects in either art history or studio under the guidance of a staff member. *Prerequisite:* departmental permission. Three hours. Staff.

207 **STUDIES IN AMERICAN ART** Advanced studies in selected areas of American art and design, particularly as represented in the collections of the Fleming and Shelburne Museums. Lectures, reports and discussions. *Prerequisite:* six hours of advanced art history; or by permission to advanced students of American history or literature. Three hours. Mr. Janson and Mr. Lipke.

210 **STUDIES IN MODERN ART** Advanced studies in selected areas of 19th and 20th century art, stressing individual research and reports. *Prerequisite:* 105 or 6 and 54, and instructor's permission. Three hours. Mrs. Roland and Mr. Lipke.

281, 282 **STUDIO SEMINAR** Advanced studies, combining independent projects and group critiques with staff and visiting critics, in a particular studio area. *Prerequisite:* six hours of advanced studio and departmental permission. Three or six hours. Mr. Hewitt and staff.

ART EDUCATION The department offers a broad fields major in visual arts in education. For requirements in this program and additional courses in art and education turn to the section on the College of Education.

Biochemistry

COLLEGE OF MEDICINE

Professor Melville (Chairman); Associate Professors Lamden and Gjessing; Assistant Professor Hart.

102 ANALYTICAL BIOCHEMISTRY (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. Drs. Lamden and Gjessing.

111-112 BIOCHEMISTRY (2-4) Lectures, conferences, and laboratory exercises concerned with mammalian biochemistry, particularly as it relates to man. Topics include the chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids; enzymes, digestion, and biological oxidations; blood, hemoglobin, plasma proteins, and iron metabolism; respiration, acid-base balance, and mineral metabolism; hormones and control mechanisms. Laboratory work involves the application of quantitative biochemical principles to the analysis of body constituents. Primarily for students of medical technology but open to others with permission of the department chairman. *Prerequisite:* 102 or quantitative chemistry; organic chemistry. Four hours each semester. Dr. Hart.

Botany

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professors Dodge,¹ Gershoy,² Hyde (Chairman), Klein, Marvin, Sproston, Taylor and Vogelmann; Associate Professors Cook and Etherton; Assistant Professors Wilson and Worley.

Biology

1, 2 PRINCIPLES OF BIOLOGY (3-3) Introduction to the structure, functions, and evolution of animals and plants; illustration through lectures, discussions, and laboratory experience of the similarities and differences among organisms. Emphasis on ideas and concepts important both for advanced study in a Life Science and for understanding the biological world of which man is a part. Offered jointly by the Departments of Botany and Zoology. *Prerequisite:* 1 for

1. Visiting professor.
2. Emeritus.

2. Four hours. Mr. Klein, Mr. Davison, Botany and Zoology Staff and guest lecturers.¹

3 **BIOLOGY AND MAN** An introductory course designed for nonscience majors, it is approached through a study of selected biological processes relevant to man and his world. Emphasis is placed on problems resulting from man's interaction with his environment, examples being the topics of overpopulation and environmental pollution. Basic biological principles and concepts necessary for an understanding of these problems are presented. *No prerequisite*. Three hours. Mr. Potash and staff.¹

Botany

4 **INTRODUCTION TO PLANT BIOLOGY (3-3)** An introduction to plant science in which structure, function, and reproduction of vascular plants are examined in terms of the dynamics of plant life. Emphasis placed on a general understanding of plants as a basis for advanced study in a plant science. Practical implications of basic botanical information in the applied plant sciences. Four hours. Staff.¹

101 **GENETICS** (this course is identical with Zoology 101, which see)

104 **PHYSIOLOGY OF THE PLANT BODY (3-3)** Lecture and laboratory study of the plant as a whole, including the growth and development of the plant and its parts, the relation of plants to water and minerals, the effects of environmental factors on the plant, and regulatory processes. *Prerequisite*: Principles of Biology or Botany 4. Four hours. Mr. Etherton.

105 **DEVELOPMENTAL PLANT STRUCTURE (2-4)** The structural changes associated with plants during their developmental cycles and the use of plant material in experimental morphogenesis. Comparison of developmental patterns of major plant groups with consideration of the evolutionary and physiological implications. *Prerequisite*: Principles of Biology or Botany 4. Four hours. Mr. Cook.

109 **SYSTEMATICS AND PHYLOGENY (1-4)** Principles of classification; evolution of flowering plants; characterization and recognition of major plant families; species and generic concepts; biosystematics; use of taxonomic keys and preparation of herbarium specimens. *Prerequisite*: Principles of Biology or Botany 4, junior standing or departmental permission. Three hours. Mr. Vogelmann. Alternate years, 1971-72.

112 **FOREST PATHOLOGY (2-2)** The etiology of the principal diseases of forest trees and deterioration of forest products, with emphasis on prevention and control in relation to forest management and utilization. *Prerequisite*: junior standing in Forestry or departmental permission. Three hours. Mr. Wilson and staff.

117 **PLANT PATHOLOGY (2-4)** Diagnosis, life history, and control of plant diseases caused by fungi, viruses, bacteria and nematodes. *Prerequisite*: Principles of Biology or Botany 4. Four hours. Mr. Sproston.

151 **PLANTS AND MAN** The place of plants in man's affairs. The influence of plants on exploration, migration and the development of civilizations. The

1. Credit will not be given for both Biology 1 and Botany 4. Credit will not be given for both Biology 1, 2 and Biology 3. Botany and Zoology majors will not receive credit for Biology 3.

role of plants in the world today, with special emphasis on food, drug, fiber and other useful plants and on the botanical features which contribute to their usefulness. *Prerequisite*: Principles of Biology or Botany 4. Three hours. Mr. Taylor.

160 PLANT ECOLOGY Principles of plant ecology; analysis of the environment and effects on plants; interrelationships between plants; ecologic adaptations. *Prerequisite*: Principles of Biology or Botany 4. Three hours. Mr. Worley.

193, 194 HONORS IN BOTANY

197, 198 UNDERGRADUATE RESEARCH AND APPRENTICESHIPS Individual projects under the direction of a faculty member of the Department of Botany and/or faculty member in a related department. The project may involve original research, readings, or apprenticeships. *Prerequisite*: junior standing. A maximum of six hours in the year. Staff.

205 MINERAL NUTRITION OF PLANTS (see Plant and Soil Science 205). Three hours. Mr. Bartlett and Botany, Forestry, and Plant and Soil Science staff. Alternate years, 1971-72.

207 WATER RELATIONS OF PLANTS Absorption, translocation and transpiration of water. Soil-water relations. Effects of excesses and deficits of water. Mineral absorption. *Prerequisite*: Botany 104 or permission of instructor. Three hours. Botany, Forestry, Plant and Soil Science staffs. Alternate years, 1972-73.

213 PLANT COMMUNITIES (2-2) Principles of 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. Mr. Vogelmann. Alternate years, 1972-73.

232 BOTANY FIELD TRIP A multidisciplinary course involving field trips to selected environments outside Vermont. Led by several faculty members representing different fields of Botany. Emphasis will be on overall, integrated approach to plant ecology, plant structure, and plant function. One hour. Staff. Christmas or spring vacation or end of school year.

252 PLANT ANATOMY AND HISTOLOGY (2-4) Development of the organism and accompanying integration of cellular tissues. Ontogeny of vegetative tissues; modifications of the cell wall. *Prerequisite*: Principles of Biology or Botany 4; junior standing. Four hours. Mr. Taylor. Alternate years, 1972-73.

253 FUNGI (2-4) The reproductive processes of the common molds, yeasts, and actinomycetes and their classification. Physiological studies; antibiosis. *Prerequisite*: Chemistry 131, 132 or departmental permission. Four hours. Mr. Sproston. Alternate years, 1971-72.

254 GENETICS AND CYTOGENETICS (2-2) Fundamental principles of genetics. Analysis of mendelian inheritance, recombination in higher plants and animals as well as microorganisms, chromosome aberrations, polyploidy. Gene action and introduction to molecular genetics. *Prerequisites*: 4; Zoology 101 and at least eight additional hours of botany or zoology. Three hours. Mr. Hyde. Alternate years, 1972-73.

256 CYTOLOGY (3-2) The dynamics of the protoplast; nuclear division, gamete formation and syngamy. Ultrastructure of cell organelles, nucleocytoplasmic interaction. *Prerequisite*: 254 or Zoology 101; Chemistry 131, 132. Four hours. Mr. Hyde. Alternate years, 1972-73.

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 5, 6 and Microbiology and Biochemistry 201 or their equivalents strongly recommended. Four hours. Mr. Etherton and staff. Alternate years, 1972-73.

259 **PLANT GROWTH (2-4)** The nutrition of plant cells, growth hormones, cyclic variation of environmental factors, morphogenesis. *Prerequisite:* 104, Chemistry 131, 132. Four hours. Mr. Marvin, Mr. Klein. Alternate years, 1971-72.

260 **PHYCOLOGY (2-4)** The morphology, classification, and general biology of the algae, with special consideration of the freshwater forms. Emphasis on the use of algae as experimental material for the investigation of general biological problems. *Prerequisite:* 105, or two courses in zoology or botany above 100. Four hours. Mr. Cook. Alternate years, 1971-72.

270 **PERSPECTIVES IN BIOLOGY** Group discussion and individual participation in the examination of such topics as biological rhythms, mimicry, holism, polarity, traumatic reversion, dichotomy, the common occurrence of the helix, and others. *Prerequisite:* junior standing, 12-15 credits in zoology or botany courses. Three hours. Mr. Sproston.

281, 282 **BOTANY SEMINAR** A topical seminar consisting largely of presentations of personal research by faculty and graduate students from within and outside the University. May be jointly sponsored with Zoology, Agricultural Biochemistry, Forestry, Plant and Soil Science, etc. Required attendance of botany graduate students and seniors in botanical research programs. Without credit. Staff.

374 **CYTOGENETICS** (see Anatomy 374 in Graduate College catalogue)

381, 386 **SELECTED PROBLEMS IN MODERN BOTANY** Subject matter varies but will stress recent botanical inquiries, particularly where they border on mathematics, physics, and chemistry. *Prerequisite:* departmental permission. Credit as arranged. Staff.

391 through 393 **MASTER'S THESIS RESEARCH** Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

491 through 493 **DOCTORAL THESIS RESEARCH** Original research under the direction of an assigned staff member, culminating in an acceptable doctoral dissertation. Credit as arranged.

V Chemistry

COLLEGE OF TECHNOLOGY

Professors Crooks, Gregg, Flanagan, Kice (Chairman), Krapcho, Kuebne, and White; Associate Professors Whitcher and Wulff; Assistant Professors Allen, Brown, Strauss, and Weltin.

Note: Credit cannot be granted 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 students planning subsequently to take any 100 level course in chemistry. It should also be elected by those who, while not planning additional work in chemistry, need a more extensive course in general chemistry than is provided by Chemistry 3. *Prerequisites:* Chemistry 1 or Chemistry 11 for Chemistry 2. Four hours. Staff.

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. Designed for those needing a less extensive coverage of general chemistry than is provided by Chemistry 1, 2. Four hours. Staff.

4 OUTLINE OF ORGANIC AND BIOCHEMISTRY (3-3) A brief introduction to some of the important and interesting aspects of organic and biochemistry. Designed particularly for those in the biological and health science areas who will take no further chemistry and/or biochemistry beyond this course. Credit cannot be granted for both Chemistry 4 and 16. *Prerequisite:* Chemistry 1, 3, or 11. Four hours. Staff.

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 11 or 13 for Chemistry 11. Chemistry 11 for Chemistry 12. Five hours. Staff.

13, 14 THE CHEMICAL BOND Nature of interatomic and intermolecular forces. Stereochemistry, bond energies, and crystal structures are considered. *Prerequisite:* 1, 2 or 11, 12. One hour. Mr. Gregg.

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 Chemistry 1, 3, or 11. Four hours. Staff.

123 QUANTITATIVE ANALYSIS (3-3) Theory and practice of gravimetric and volumetric methods of analysis. Theoretical discussion of indicators, buffers, pH, etc. *Prerequisite:* 1, 2. Not open to students with credit for 11, 12. Four hours. Mr. Whitcher.

131, 132 ORGANIC CHEMISTRY (3-3) Organic chemistry for chemistry majors, premedical students, and those concentrating in the biological and physical sciences. *Prerequisite:* 1, 2 or 11, 12; 131 for 132. Four hours (may be taken without laboratory for three hours credit by chemistry majors who intend to enroll in 134 and 135). Messrs. Krapcho and Kice.

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. *Prerequisite:* 131. Two hours. Mr. Krapcho.

135 ADVANCED ORGANIC CHEMISTRY LABORATORY (1-6) Chemical and physical methods of identifying organic compounds. Advanced synthetic and separation procedures. *Prerequisite:* 132, 134. Three hours. Staff.

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. *Prerequisite:* chem. 2, physics 5-6 or the equivalent. Three hours. Mr. Flanagan.

141, 142 PHYSICAL CHEMISTRY Elementary quantum chemistry, introduction to statistical mechanics, thermodynamics, properties of solutions and chemical kinetics. *Prerequisite:* 2 or 12; physics 6 or 27; mathematics 121; *Prerequisite* for 142 is 141. Three hours. Messrs. Weltin, Flanagan and Wulff.

144 PHYSICAL CHEMISTRY LABORATORY Basic physical chemistry experiments. *Prerequisite:* 11, 12 or 123; 141; concurrent enrollment in 142. Two hours. Messrs. Flanagan, Weltin and Wulff.

Advanced Inorganic Chemistry

212 ADVANCED INORGANIC CHEMISTRY Electronic structure of atoms and molecules; valence bond and molecular orbital treatments of chemical bonding; inorganic stereochemistry; ionic crystals; inorganic thermochemistry; inorganic equilibria in solution; theories of acids and bases. *Prerequisite:* 141 or the equivalent. Three hours. Staff.

213 ADVANCED INORGANIC CHEMISTRY Descriptive chemistry of the elements and of various important classes of inorganic compounds; electron-deficient compounds; organometallic chemistry; inorganic reaction mechanisms. 213 may not be offered every year. *Prerequisite:* 212. Three hours. Staff.

214 INORGANIC CHEMISTRY LABORATORY Synthesis and characterization of inorganic compounds making use of a controlled atmosphere box, vacuum line, autoclave, photochemical reactor, X-ray diffraction equipment, infrared and ultraviolet-visible spectrophotometers, etc. *Prerequisite:* 212 or permission of instructor. Three hours. Staff.

311 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. Staff. Alternate years, 1971-72.

350, 351 SPECIAL TOPICS IN INORGANIC CHEMISTRY Advanced theoretical treatment of bonding and physical properties of transition metal complexes; de-

tailed consideration of the chemistry of various classes of inorganic compounds; detailed treatment of inorganic reaction mechanisms. Credit as arranged. Staff.

Advanced Analytical Chemistry

223 CHEMICAL INSTRUMENTATION The design and usage of modern instruments to facilitate chemical research. Topics such as temperature measurement and control, pH measurement and control, pressure measurement and control, etc., will be discussed. Three hours. Staff. Alternate years, 1971-72.

224 INSTRUMENTAL ANALYSIS (2-6) Theory and practice of optical, electromagnetic, chromatographic, and radiochemical methods of analysis. *Prerequisite:* 11, 12 or 123; 141 and credit for or concurrent enrollment in 142. Four hours. Staff.

229 SPECIAL TOPICS IN ANALYTICAL CHEMISTRY Discussion of selected topics in analytical chemistry. *Prerequisite:* departmental permission. Credit as arranged. Staff. Offered as occasion warrants.

Advanced Organic Chemistry

231 PHYSICAL ORGANIC CHEMISTRY—PRINCIPLES Structure-reactivity relationships, quantum organic chemistry, molecular properties and their interpretation, kinetics and catalysis. *Prerequisite:* 132 and 142 or 247. Three hours. Mr. Strauss or Mr. Kice. Alternate years, 1972-73.

233 PHYSICAL ORGANIC CHEMISTRY—MECHANISMS Methods and results of investigations of mechanisms of common organic reactions. *Prerequisite:* 132 and 142 or 247. Three hours. Mr. Krapcho or Mr. Kice. Alternate years, 1971-72.

251, 252 ADVANCED ORGANIC CHEMISTRY A detailed discussion of systematic organic chemistry with emphasis on important synthetic methods and stereochemistry. Kinetic and Stereochemical approaches to reaction mechanisms will be introduced. *Prerequisite:* 131, 132, credit or concurrent enrollment in 141-142, 251 for 252. Three hours. Messrs. Kuehne, Krapcho, and Strauss.

332 NATURAL PRODUCTS—THE ALKALOIDS The major classes of alkaloids will be surveyed from a biogenetic point of view. Classical and modern degradation methods, total syntheses and biosynthetic incorporation of labeled compounds will be discussed. *Prerequisite:* 252 or concurrent enrollment, or the equivalent with departmental permission. Three hours. Mr. Kuehne. Alternate years, 1972-73.

334 NATURAL PRODUCTS—THE TERPENES Chemistry of mono-sequi-di and triterpenes, including degradations, structure proofs, total syntheses, rearrangements reactions and biogenesis. *Prerequisite:* as for chemistry 332. Three hours. Mr. Kuehne. Alternate years, 1971-72.

336, 338 SPECIAL TOPICS IN ORGANIC CHEMISTRY Advanced level discussion of specific topics in organic chemistry of current interest such as photochemistry, carbenes, bio-organic chemistry, magnetic resonance, etc. *Prerequisite:* departmental permission. Credit as arranged. Staff.

Advanced Physical Chemistry

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. Mr. Weltin. Alternate years, 1971-72.

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, Mr. 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. Mr. 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. Mr. Flanagan. Alternate years, 1972-73.

342 **CHEMICAL KINETICS** Fundamentals of chemical kinetics; collision theory, absolute rate theory, applications to organic and physical chemistry. *Prerequisite:* 247 and 248 or 249. Three hours. Staff. Alternate years.

344 **QUANTUM CHEMISTRY** Applications of quantum mechanical techniques to problems of chemical interest. *Prerequisite:* 247. Three hours. Mr. Weltin. Alternate years, 1972-73.

345, 346, 347 **SPECIAL TOPICS IN PHYSICAL CHEMISTRY** Advanced level discussion of specific topics in physical chemistry and chemical physics; group theory, solid state theory, irreversible thermodynamics, solution theory. Credit as arranged. Staff. Offered as occasion warrants.

Seminars and Research

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** The student elects a field of special study in inorganic, analytical, physical, or organic chemistry and collaborates with an assigned staff member. Findings submitted in written form. *Prerequisite:* 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.

371, 372 **METHODS OF CHEMICAL INVESTIGATION** Introduction to advanced modern chemical methods. Primarily for chemistry doctoral students. *Prerequisite:* departmental permission. Two hours. Staff.

380 **RESEARCH PROBLEM CONCEPTION AND SOLUTION** Independent origination of research problems and the methods of their solution. Required of all

doctoral candidates. *Prerequisite:* two years of graduate work and departmental permission. One hour. Staff.

381 through 384 GRADUATE SEMINAR One hour. Staff.

391 through 399 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged. Staff.

491 through 499 DOCTORAL THESIS RESEARCH Original research under the direction of an assigned staff member, culminating in an acceptable doctoral dissertation. Credit as arranged. Staff.

V Classics

COLLEGE OF ARTS AND SCIENCES

Professors Gilleland (Chairman), Bliss, and Davison; Associate Professor Ambrose; Assistant Professor Schlunk.

Greek

(There are no prerequisites to any Greek course. Students who have previously studied Greek should consult the department.)

1-2 ELEMENTARY GREEK Essentials of Attic Greek. Prose compositions and selected readings from Greek authors. Four hours. Staff.

11, 12 INTERMEDIATE GREEK Review of syntax. Selections from Plato's dialogues, the speeches of Lysias, and Xenophon's *Hellenica*; Euripides' *Alcestis*. Three hours. Staff.

51 GREEK LITERATURE IN TRANSLATION Lectures on the development of various branches of Greek literature and on its chief authors, with emphasis on Homer and the drama. Readings in standard translations from the major authors. No knowledge of Greek is required. No prerequisites. Three hours. Mr. Schlunk.

111, 112 PROSE COMPOSITION Required of students who concentrate in Greek. One hour. Mr. Gilleland.

151 GREEK DRAMA IN TRANSLATION Plays of Aeschylus, Sophocles, Euripides, Aristophanes, and Menander. The historical development of dramatic techniques. Three hours. Staff. On demand.

153 GREEK HISTORIANS IN TRANSLATION Works of Herodotus, Thucydides, Xenophon, Polybius, Arrian, and others. Introduction to Greek historiography. Three hours. Staff. On demand.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH

201 GREEK ORATORS Selected speeches of Lysias and Demosthenes. Three hours. Mr. Gilleland. Alternate years, 1971-72.

202 GREEK COMEDY Two plays of Aristophanes. Three hours. Mr. Ambrose. Alternate years, 1970-71.

203 GREEK HISTORIANS Thucydides, Books I and II; selections from Herodotus and Xenophon's *Hellenica*. Three hours. Mr. Bliss. Alternate years, 1970-71.

204 GREEK TRAGEDY Sophocles' *Antigone* and Euripides' *Medea*, or two equivalent plays. Three hours. Mr. Ambrose. Alternate years, 1971-72.

205 GREEK PHILOSOPHERS Plato, Republic, Books I and II; selections from the pre-Socratics and from Aristotle. Three hours. Mr. Schlunk. Alternate years, 1970-71.

206 GREEK EPIC Readings in the *Iliad* and *Odyssey*. Problems of epic composition and language together with mythological and historical background. Three hours. Miss Davison. Alternate years, 1971-72.

381, 382 SEMINAR Graduate level study of Greek authors not read in the candidate's undergraduate program. Credit as arranged. Staff.

391, 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

For Greek Philosophy, see philosophy 107; for Greek Art, see art 51.

Latin

(There are no prerequisites to any Latin course. Students who have had two years of high school Latin normally enroll in Latin 5 or Latin 12. Those who have had more normally enroll in Latin 101.)

1, 2 ELEMENTARY LATIN Essentials of Ciceronian Latin. For students who present less than two years of high school Latin.¹ Four hours. Staff.

5 ADVANCED ELEMENTARY LATIN Extensive review of Latin syntax. Selections from prose writers. Three hours. Staff.

12 INTERMEDIATE LATIN Selections from Vergil and Ovid. Three hours. Staff.

32 ETYMOLOGY Derivation of English words from Greek and Latin bases. Training in analysis of unfamiliar words; special attention to scientific vocabulary. No previous knowledge of Greek or Latin required. Three hours. Staff.

101, 102 SURVEY OF LATIN LITERATURE Selections from the principal Roman authors, with particular attention to Livy and Horace. The development and decline of various prose styles and poetic forms. Three hours. Staff.

111, 112 LATIN PROSE COMPOSITION May be taken concurrently with Latin 101, 102. Required of students who major in Latin and of those who wish to be recommended to teach Latin. One hour. Mr. Bliss.

1. Students who have completed two years of high school Latin more than two years prior to their entrance into the University must obtain departmental permission to enroll in Latin 1, 2 for credit.

152 ROMAN EPIC IN TRANSLATION Latin epic poetry, from Ennius to Ausonius; its development, fruition, and decline. Three hours. Staff. On demand.

154 ROMAN SATIRE IN TRANSLATION Roman satire, in both prose and poetry, from Lucilius to Lucian, and its influence on medieval and modern literary forms. Three hours. Staff. On demand.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH

203 REPUBLICAN PROSE Reading in Caesar and Sallust, and in the speeches of Cicero. Three hours. Mr. Gilleland.

204 EPIC POETS Reading in Lucretius, Vergil, Ovid, and others. Three hours. Mr. Ambrose.

227 ROMAN LYRIC POETS Selections from the works of Catullus, Horace, Propertius, Tibullus. Three hours. Mr. Schlunk. Alternate years, 1970-71.

251 ROMAN LETTERS Selected letters of Cicero, Pliny, and Fronto. Three hours. Mr. Bliss. Alternate years, 1971-72.

252 COMEDY Two plays of Plautus and Terence. Development of this literary form. Three hours. Mr. Bliss. Alternate years, 1971-72.

253 ROMAN ORATORY Selections from Cicero's *De Oratore*, *Orator*, and *Brutus*, and from his speeches. Historical development of forensic and other rhetorical canons. Three hours. Mr. Gilleland. Alternate years, 1971-72.

255 HISTORIANS OF THE EMPIRE Augustus, *Res Gestae*; Tacitus, *Annals*, I-IV; selections from Suetonius and Ammianus Marcellinus. Three hours. Miss Davison. Alternate years, 1970-71.

256 SATIRE Selections from Horace, Persius, and Juvenal. Three hours. Mr. Gilleland. Alternate years, 1971-72.

271 SILVER LATIN Extensive reading of post-Augustan authors not included in other advanced courses. Three hours. Mr. Bliss. Alternate years, 1970-71.

381 through 384 SEMINAR Graduate level study of Latin authors not read in the candidate's undergraduate program. Credit as arranged. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

For The Teaching of Latin, see secondary education 179.

For Roman Art, see art 52.

Dental Hygiene

DIVISION OF HEALTH SCIENCES

Associate Professor Sawabini (Chairman); Assistant Professors Faigel, Farnham, P. L. Heininger, Lambert, Marceau; Instructors Brown, Grundler, Halebian, Ingalls, Long, MacLellan, Montgomery, Sloanaker, Wilcox.

1-2 DYNAMICS OF HEALTH CARE See Technical Nursing, page 251.

1 DENTAL HYGIENE (2) Study of the theories, of the practice of dental hygiene with emphasis on patient education and preventive procedures. Two hours. Mrs. Sloanaker.

2 DENTAL HYGIENE (0-6) Continuation of Dental Hygiene 1 including special patient care and clinical practice of dental hygiene procedures. Three hours. Mrs. Sloanaker.

11 ORAL TISSUES (2-4) The study of the morphology and physiology of oral tissues both microscopically and macroscopically. The identification of individual tooth forms. Three hours. Dr. Heininger, Miss Ingalls.

12 ORAL TISSUES The study of the related functions of the oral tissues, head and neck anatomy, occlusion, mastication, comminution and deglutition. Two hours. *Prerequisite:* 11. Dr. Heininger, Miss Ingalls.

51-52 PHARMACOLOGY AND ANESTHESIOLOGY (1-0) (1-0) The reactions and uses of drugs. Anesthesia, general and local, as used in dental practice. One hour. Dr. MacLellan.

53-54 ORAL PATHOLOGY (2-2) General pathology of the more common diseases affecting the human body. Pathology of the teeth and their supporting structures. Two hours. Dr. Farnham.

55 PERIODONTICS (1-0) Classification of periodontal disease, clinical picture, etiological factors, and types of treatment. Particular emphasis is placed on the role of the hygienist in patient education for the prevention of periodontal disease. One hour. Dr. Faigel.

61 RADIOLOGY (1-1) Study, demonstration, and practice of the fundamentals of intra-oral radiographic technic including electrophysics; angulation of machine; placing of films and complete processing of films. One hour. Miss Brown.

62 DENTAL PRACTICE (1-0) Principles of professional ethics and economics; office management and essentials of practice building. One hour. Dr. Montgomery.

72 DENTAL HEALTH EDUCATION (2-0) Demonstration and practical application of modern methods of dental health education. Teaching methods; visual aids; surveys and statistics; materials; campaigns; school dental programs. Two hours. Miss Phillips.

74 PUBLIC HEALTH (2-0) Public health as it applies to community sanitation; communicable disease control; organization, powers and function of

health departments and voluntary health agencies; relation of dentistry to public health. Two hours. Dr. Long.

81-82 CLINICAL DENTAL HYGIENE (0-15) Clinical practice on patients from simple to more difficult cases with children and adults. Field practice at local dental clinics, hospitals and in Children's Homes. Five hours. Staff.

91-92 STUDY OF MATERIALS USED IN DENTAL PRACTICE. One hour. Dr. Lampert.

Economics and Business Administration

COLLEGE OF ARTS AND SCIENCES

Professors Dellin, Greif, Nadworny (Chairman), and Nyquist; Associate Professors Alnasrawi, Campagna, Chase, Severance, and Squire; Assistant Professors Battelle, Kuklis, Laber, Michael, Salgo, Schweyer, and Wicker; Instructor Erdmann.

3 CURRENT ECONOMIC PROBLEMS Designed primarily for non-majors to deal with some of the current issues and problems which face contemporary economies. Three hours. Mr. Alnasrawi.

9, 10 BUSINESS LAW I First semester: fundamental legal concepts of the American system of law as related to business, as the law of contracts, sales, bailments, and negotiable instruments. Second semester: the legal aspects of business with reference to the law of agency, partnerships, and corporations. *Prerequisite:* 12, or concurrent enrollment. Three hours. Messrs. Erdmann and Schweyer.

11, 12 PRINCIPLES OF ECONOMICS Fundamental economic principles as an aid to the understanding of modern economic society. Three hours. Staff.

13, 14 PRINCIPLES OF ACCOUNTING (2-4) First semester: a study of basic accounting principles, concepts, conventions and standards, their application to the recording of business transactions and the reporting of the accumulated results. Second semester: an introduction to manufacturing accounting, analysis of financial data, and other specialized procedures designed to furnish accounting aids to management. *Prerequisite:* 13 for 14. Four hours. Mr. Michael.

15, 16 ECONOMIC HISTORY OF THE UNITED STATES Analysis of capitalism as first developed in Western Europe and later in the United States as a basis for understanding our modern economic systems. Primarily for freshmen and sophomores. Three hours. Messrs. Dellin and Squire.

11 and 12 are prerequisites for all courses number 100 and above with the exception of accounting courses.

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. Messrs. Alnasrawi and Severance.

103 **ECONOMICS OF TAXATION** Revenues and expenditures of federal, state, and local governments and their effects upon individuals, business institutions, and the national economy. *Prerequisite:* 12. Three hours. Mr. Campagna.

104 **ECONOMICS OF STATE AND LOCAL TAXATION** Revenues, expenditures, and debt management problems of state and local governments; analysis of state and local fiscal relationships. Problems, policies and practices in Vermont and neighboring states. *Prerequisite:* 12. Three hours. Staff.

105 **INTERNATIONAL TRADE AND FINANCE** Theory of international values, mechanism of adjustment of international balances, foreign exchange theory, international aspects of monetary and banking theory, and tariff theory. *Prerequisite:* 11, 12. Three hours. Mr. Alnasrawi.

121 **PRINCIPLES OF MARKETING** The place of marketing in our economy. Analysis of the marketing structure by functions, institutions, and commodities. *Prerequisite:* 12. Three hours. Mr. Greif.

122 **PROBLEMS IN MARKETING** Application of the case method to discover solutions to problems which challenge producers and middlemen in marketing goods and services. *Prerequisite:* 121. Three hours. Mr. Greif.

123 **PERSONAL SELLING IN THE ECONOMY** The personal selling function as a communication activity. Behavioral science areas are explored for insight into the selling process. Individual projects. *Prerequisite:* 122. Three hours. Mr. Greif.

127 **RESEARCH METHODS IN MARKETING** Introduction to the problems of methodology and design in marketing research. Topics include the basic design of proof, selection of economic designs, scaling, techniques, Bayesian applications, factor analysis, and forecasting methods. Individual research. *Prerequisite:* 122. Three hours. Mr. Kuklis.

130 **SALES MANAGEMENT AND PROMOTION** Methods of selection, testing, training, compensation, and control. Principles and practices of creative selling. Sales organization analysis and the coordination of related department functions. *Prerequisite:* 121. Three hours. Messrs. Greif and Kuklis.

132 **FUNDAMENTALS OF ADVERTISING** Advertising as an economic and social influence. Principles and techniques of copy preparation, selection of media and agency activities. Practice in preparation of advertising copy and layout. *Prerequisite:* 121 or consent of instructor. Three hours. Mr. Greif.

141 **LABOR ECONOMICS** Labor as an economic factor: the labor force, wages, productivity, and income. Wage and hour legislation, social security, and unemployment insurance. History of the American labor movement. *Prerequisite:* 12. Three hours. Messrs. Nadworny and Chase.

142 **COLLECTIVE BARGAINING** Subject matter, problems, and issues of union-management relationships. Structure and functions of collective bargaining in the economy. The grievance process and arbitration. Laws of collective bargaining. *Prerequisite:* 141. Three hours. Messrs. Nadworny and Chase.

143 **INDUSTRIAL MANAGEMENT** Principles and practices employed in the direction and operation of industrial organizations. Techniques of organization

and control of operations. Personnel function in an industrial structure. *Prerequisite*: 12. Three hours. Mr. Squire.

160 INTRODUCTION TO INTEGRATED DATA PROCESSING AND COMPUTERS A study of the nature of business data processing and a general introduction to the components and characteristics of electronic digital computers available for such processing. Included is a study of programming systems, systems analysis, system design, elementary flow charting, and processing procedures. Demonstration problems are prepared for processing at the University Computation Center. *Prerequisite*: 14. Three hours. Mr. Nyquist.

161-162 INTERMEDIATE ACCOUNTING An intensive examination of accounting theory, valuation methods, and classification procedures as they pertain to balance sheet accounts. Second semester: consideration of balance sheet accounts continued; problems of single entry systems and incomplete records; financial statement analysis covering comparative analysis, ratios and measurements; funds-flow and cash-flow reporting and effects of price changes. *Prerequisite*: 14. Three hours. Mr. Michael.

164 BASIC FEDERAL TAXES The federal income tax law; regulations covering taxable income, exclusions and inclusions, allowable deductions, exemptions, gains and losses, accounting methods, and computation of tax for all classes of taxpayers; Federal payroll taxes. Assigned research problems and a preparation of tax returns. *Prerequisite*: 14. Three hours. Messrs. Michael and Nyquist.

181 TRANSPORTATION AND PUBLIC UTILITIES Social and economic aspects of transportation problems as revealed by analysis of the nature, history, and problems of transportation public utilities agencies of the United States. *Prerequisite*: 12. Three hours. Mr. Squire.

183 GOVERNMENT AND BUSINESS Economic causes and consequences of government activities and their impact upon the private sector of the economy. *Prerequisite*: 12. Three hours. Mr. Squire.

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. Staff.

188 ELEMENTARY STATISTICS (2-2) Descriptive statistics: frequency distributions, measures of central location, measures of variation; Introduction to Probability; Theoretical Distribution: normal, binomial, and student's *t*; Tests of Hypotheses; Elements of Index Numbers; Introduction to correlation and regression; FORTRAN programming to be introduced and used to solve problems. *Prerequisites*: Economics 11 and 12. Three hours. Staff.

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*: 11, 12. Three hours. Mr. Campagna.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH

206 **PRINCIPLES OF INVESTMENTS** An analysis of the investment process, including an examination of types of financial assets, the markets in which such assets are traded, and factors affecting their values. *Prerequisite:* 12 and 14. Three hours. Mr. Battelle.

207 **CORPORATE FINANCE** A study of the sources of financing and the efficient utilization of funds by corporations. Topics include capital budgeting, capital structure, dividend policy, and problems of financing new business ventures, large and small. *Prerequisite:* 12 and 14. Three hours. Mr. Michael.

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:* 11, 12. 190 recommended. Three hours. Mr. Alnasrawi.

217 **REGIONAL ECONOMIC GROWTH** An inquiry into the processes of economic growth at the regional level; theoretical models of regional growth will be developed; the relationships among growth theory, international trade theory, and location theory will be analyzed and applied to regional growth. Empirical evidence on interregional factor movements (migration and capital flows) will be examined and related to historical patterns of income growth at the state level in the U.S. Research in areas of student interest. *Prerequisites:* 186, 190. Three hours. Mr. Laber.

228 **CURRENT MARKETING DEVELOPMENTS** Modern marketing theory and practice. Topics include: the nature of consumer changes; urban and suburban trading centers; the distribution cycle; marketing legislation; functional and institutional changes. *Prerequisite:* 122. Three hours. Mr. Grief.

229 **MARKETING MANAGEMENT** Formulation of overall policies and planning strategies for marketing programs. Product planning and development; channel selection; market and sales forecasts; advertising and sales campaigns. *Prerequisite:* 122. Three hours. Mr. Greif.

234 **MONETARY THEORY** Analysis of Classical, Keynesian, and modern macroeconomic models; micro and macro demand for and supply of money; portfolio choice; term structure of interest rates and the influence of financial intermediaries. *Prerequisite:* 190. Three hours. Staff.

238 **ECONOMIC HISTORY OF MODERN EUROPE** A comparative historical study of the process of economic growth as experienced in Britain, France, Germany, and Russia since 1760. For the economic history of pre-industrial Europe see history 237. *Prerequisite:* 12 and history 12. Three hours. Staff.

240 **WAGE AND EMPLOYMENT THEORY** Microeconomic theory dealing with the pricing of labor as an economic resource. Analysis of theoretical economic and behavioral models that attempt to explain the role and the effects of institutions on the wages, allocations, and levels of utilization of labor resources. *Prerequisites:* 186, 190; 141 highly desirable. Three hours. Mr. Chase.

241 **MANPOWER IN AN ADVANCED ECONOMY** Fundamental changes in the structure of the American labor force; income, education, occupational distribution, and unemployment factors. Implications and impacts of Manpower Development and Training Act, Economic Opportunity Act, and other pro-

grams on manpower training and allocation. Income maintenance and manpower. *Prerequisite:* 141. Three hours. Messrs. Chase and Nadworny.

251 PERSONNEL ADMINISTRATION The field and organization of the personnel function; selecting and training employees; job analysis and evaluations; evaluating employees; wages and wage administration; problems of morale; human relations in the supervision of personnel. *Prerequisite:* 141. Three hours. Mr. Nadworny.

252 EXECUTIVE DECISION-MAKING Synthesis of the management and operation of a firm in terms of production, marketing, personnel, and finance. The process of decision-making, planning and execution of policies. *Prerequisite:* 121, 143, and 207. Three hours. Messrs. Nadworny and Squire.

254 SCIENTIFIC MANAGEMENT AND LABOR Development of scientific management; reactions and relationship of organized labor to it. Long-range effects of scientific management on the structure and policies of industry and organized labor. *Prerequisite:* 143. Three hours. Mr. Nadworny.

256 AMERICAN BUSINESS AND ECONOMIC HISTORY Evolution of firms and industries from relatively small and undifferentiated establishments to large, highly complex institutions of the present day. The roles of federal and state governments and of legislation. Development in American management. *Prerequisite:* 143. Three hours. Mr. 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. Mr. Dellin.

266 ADVANCED ACCOUNTING Accounting for partnerships, ventures, consignments, installment sales, insurance, statement of affairs, receivers, realization and liquidation, estates, trusts, home offices and branches, and parent and subsidiary accounting. *Prerequisite:* 162. Three hours. Mr. Nyquist.

267 INTRODUCTION TO ECONOMETRICS Classical least-squares regression model; tests of significance; problems of the linear model—collinearity, identification, auto-correlation; introduction to FORTRAN programming and computer usage in econometric research; applied econometric research in areas of student interest, matrix algebra introduced as needed. *Prerequisite:* 186, 188, and 190. Three hours. Mr. Laber.

271 AUDITING Theory and practice of auditing applicable to the work of the internal and external auditor; auditor's responsibility, types of audits, and audit programs. Illustrative audit working papers, financial statements, and audit reports prepared and discussed. *Prerequisite:* 266. Three hours. Mr. Michael.

272, 273 COST ACCOUNTING The nature of manufacturing costs and conventional methods of accumulating, summarizing, and interpreting them. Special problems in job order, process and standard costs. Second semester, joint and by-product costs; problems of waste and spoilage; inventory planning, capital budgeting; accounting systems including EDP; statistical methods and operations research. *Prerequisite:* 14, 272 for 273. Three hours. Mr. Nyquist.

276 C.P.A. PROBLEMS Review of questions and problems from past C.P.A. examinations. Including: partnerships, corporations, financial statements, auditing, cost accounting, insolvencies, receiverships, liquidations, consolidations, estates, trusts governmental and institutional accounting methods. *Prerequisite:* 266. Three hours. Mr. Nyquist.

277 INTRODUCTION TO OPERATIONS RESEARCH Application of quantitative techniques to the formulation and solution of economic and business problems. Topics include demand and cost analysis, forecasting methods, linear programming, inventory and queuing theory. *Prerequisite:* 188. Three hours. Staff.

285 COMPARATIVE ECONOMIC SYSTEMS Major economic systems, their theoretical models, basic institutions and practical varieties, from a comparative point of view. *Prerequisite:* 11, 12 and six hours in another social science. Three hours. Mr. Dellin.

289 QUANTITATIVE METHODS IN BUSINESS (2-2) Application of statistical tools to industrial problems. Control charts, sampling plans, index numbers, and measurement of trends. *Prerequisite:* 188. Three hours. Staff.

290 THE SOVIET ECONOMY Analysis of the economic development of the USSR, its structure, performance and direction. Seminar. *Prerequisite:* 12 and six hours in another social science. Three hours. Mr. Dellin.

291 ECONOMIC PATTERNS AND POLICIES OF EASTERN EUROPE An area approach to the resources, organization, and domestic and foreign economic policies of the Communist countries of Eastern Europe, with special emphasis on recent changes. *Prerequisite:* 12 and six hours in another social science. Three hours. Mr. Dellin.

292 INTERNATIONAL ECONOMIC PROBLEMS AND POLICIES Important aspects of international cooperation and conflict in the economic sphere; quest for foreign markets, raw materials, investment opportunities, and population outlets. *Prerequisite:* 12. Three hours. Mr. Alnasrawi.

295 DEVELOPMENT OF ECONOMIC THOUGHT Development of economic ideas. The Pre-Classical, Classical, Socialist, Neo-Classical, Keynesian Schools and individual theoreticians. *Prerequisite:* 186 and 190 or concurrent enrollment. Three hours. Mr. Dellin.

297, 298 SEMINAR For students concentrating in the department. Review of recent books and periodic literature; discussions of topics of contemporary interest; student reports based upon personal investigation. *Prerequisite:* senior standing; departmental permission. Three hours. Staff.

300, 301 INDEPENDENT READING AND RESEARCH Designed to meet the special research problems of graduate students. Departmental consent required. Hours to be arranged. Staff.

303 ADVANCED PUBLIC FINANCE Economic analysis of the public sector. Emphasis is on the application of economic theory to the problems of public finance; incidence theory, optimal allocation of resources, debt management, the effect of various tax considerations upon investment theory, and fiscal policy as a component of full-employment theory. *Prerequisite:* 190 and 186, or the equivalent. Three hours. Staff.

341 **MANAGERIAL ECONOMICS** Techniques used in management decision-making and forward planning. Operations research techniques and advanced quantitative methods applied to operating problems in business. *Prerequisite:* 186 and 289. Three hours. Staff.

367 **ADVANCED ECONOMIC STATISTICS** Theories and techniques of statistical analysis; probability, sampling, design of experiments, tests of statistical hypotheses, statistical estimation, regression, correlation, statistical demand and cost functions, econometric methods and models as tools of structural analysis, economic projections. *Prerequisite:* 267 and math. 11, 12. Three hours. Mr. Campagna.

377 **ADVANCED MICROECONOMIC THEORY** Microeconomic models presented and analyzed. Advanced market structure theories; theory of games, general equilibrium, and dynamic models. *Prerequisite:* 186. Three hours. Mr. Laber.

378 **ADVANCED MACROECONOMIC THEORY** Advanced macro models presented and analyzed. Models of economic growth, general equilibrium and economic dynamics; theory and empirical results. *Prerequisite:* 186 and 190. Three hours. Mr. Campagna.

391 through 393 **MASTER'S THESIS RESEARCH** Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

Designated Economics courses: 3, 11, 12, 101, 103, 104, 105, 141, 142, 181, 183, 186, 188, 190, 193, 194, 195, 196, 197, 198, 216, 217, 234, 240, 241, 256, 258, 267, 285, 290, 291, 292, 295, 297, 298, 303.

Designated Business Administration courses: 9, 10, 11, 12, 13, 14, 101, 121, 122, 123, 127, 130, 132, 141, 142, 143, 160, 161-162, 164, 181, 183, 188, 193, 194, 195, 196, 197, 198, 206, 207, 228, 229, 251, 252, 254, 256, 266, 271, 272, 273, 276, 277, 289, 297, 298.

V Education

COLLEGE OF EDUCATION

Professors Baker, Boller, Corrigan, Hunt, Rippa; Associate Professors Gobin, McKenzie, Petrusich, Wheeler; Assistant Professors Abruscato, Agne, Case, Cheney, Conrad, Dunkley, Fox, Hanley, Lang, Larson, McEntee, Nash, Peterson, Ponzo, Rathbone, Soderberg; Instructors Bloomenthal, Corologos, Egner, Ho, Knight, Perelman, Schneider, Szabo. Affiliated Faculty: Professors Lidral, Meserve, Pappoutsakis; Associate Professors Fuller, Lorenz, Manchel, Schultz; Assistant Professors Biddle, Read, Weinrich, Wigness; Instructors Geno, Sherman, Walker.

For students who are not in teacher education, courses in education are open only by permission of the office of the Dean of the College of Education. In pre-service programs, 200-level courses in education are recommended only for graduate students.

2 FOUNDATIONS OF EDUCATION Social foundations of education; development of American education; education as a profession. Three hours. I or II. Staff.

7 EDUCATIONAL PSYCHOLOGY Principles of educational psychology as drawn from research, theory, and educational practice. A study of the learning process, its determining conditions, and its results. *Prerequisite*: junior standing; not open to students who take education 145-146. Three hours. Staff.

142 AUDIO-VISUAL MATERIALS AND METHODS Designed to increase teacher capabilities in the use of instructional media and in the integration of media into the classroom and curriculum. Emphasis will be given to technology as it relates to individualizing instruction and to meeting the needs of learners in various kinds of groups. Activities will be directed to preparation of materials and the collation of sources of media used in elementary education. Laboratory time will be provided in the course structure. Three hours. Staff.

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. *Prerequisite*: junior standing. Three hours. Staff.

190 HISTORY OF EDUCATIONAL THOUGHT Educational ideas from the seventeenth century to the present with emphasis upon the historical development of the American school. *Prerequisite*: senior standing. Three hours. Miss Boller, Mr. Conrad, Mr. Nash, Mr. Rippa.

197 READINGS AND RESEARCH Individual research problem or directed 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.

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 adviser to fulfill the terms of the contract. Each contract holds one credit. Multiple contracts and renewable contracts are possible. 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. Mr. Rathbone and Staff.

202 PHILOSOPHY OF EDUCATION Educational theory and philosophy past and present; contributions of leading educational philosophers; the interrelationships of education, society, and philosophy. *Prerequisite*: twelve semester hours in education and related areas. Three hours. Miss Boller, Mr. Nash, Mr. Rippa.

204 SEMINAR IN EDUCATIONAL HISTORY A study of selected topics in the history of education from the "Golden Age" of Greece to the present. Stresses the relationships of education to current social and political trends. Special attention to the nature of education in democratic and authoritarian social orders. *Prerequisite*: 12 hours in education and related areas, or major in history. Three hours. Mr. Rippa.

205 HISTORY OF AMERICAN EDUCATION History of principles and practices in American education as they relate to social, economic, political, and cultural developments. *Prerequisite:* twelve hours in education and related areas, or a major in history. Three hours. Mr. Rippa.

206 COMPARATIVE EDUCATION Underlying principles, general organization, and typical practices of education in leading countries of the world. Special emphasis will be placed on European education and on areas of particular interest to class members. Constant reference will be made to American education. *Prerequisite:* 12 hours in education and related areas. Three hours. Miss Boller, Mr. Rippa, and Mr. Wheeler.

211 EDUCATIONAL MEASUREMENTS Essential principles of measurement in education; test construction, application, and analysis. *Prerequisite:* twelve semester hours in education and related areas. Three hours. Staff.

212 CHILD AND ADOLESCENT DEVELOPMENT A study of the growth and development of the individual from infancy to adulthood with special emphasis upon implications for teaching and learning. *Prerequisite:* 12 hours in education and related areas. Three hours. Staff.

220 PERSONALITY DEVELOPMENT Study of personality and behavior theory as related to problems of individual adjustment and growth. The personality and problems of the teacher, problems of the pupil, and experiences in the family, school, and community are considered in planning ways of dealing with individual adjustment and in formulating programs of mental hygiene. *Prerequisite:* 12 hours in education, psychology, and/or related areas. Three hours. Mr. Peterson.

222 IMPROVEMENT OF READING INSTRUCTION IN THE ELEMENTARY SCHOOL A comparative analysis of current and emerging philosophers, progress and 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. Three hours. Mrs. Lang.

223 READING PROGRAMS IN SECONDARY SCHOOLS AND COLLEGES Relationship of reading to learning; study of organization, procedures, and materials for developing reading improvement programs for secondary schools and college students reading in content areas. *Prerequisite:* twelve hours in education and/or related areas, including an introductory course in reading or instructor's permission. Three hours. Mrs. Lang.

234 LITERATURE AND LANGUAGE FOR CHILDREN AND YOUTH A study of the characteristics, interests, and reading habits of children and young people; criteria for selection and evaluation of literature; methods of organizing units for more effective teaching of literature and using books in the content areas; techniques for using literature in the classroom and in the language arts program; an opportunity to read widely among selected books for children and youth will also be provided. *Prerequisite:* 12 hours in education and related areas or consent of the instructor. Three hours. Mrs. Lang.

242 MODERN TRENDS IN ELEMENTARY EDUCATION A study of modern educational principles and new and promising practices in today's elementary school. Emphasis on school program, materials, experiences in all areas of the

school curriculum, both separately and as they relate in an integrated program. A survey of recent research including findings regarding school programs and activities. Opportunity for individual study of problems in elementary education. *Prerequisite*: 12 hours in education and related areas. Three hours. Mr. Wheeler and Miss Petrusich.

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. Mr. Lorenz or Mr. McEntee.

254 **ANTHROPOLOGY OF EDUCATION** An introductory examination of the 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. Topics for study include the meaning of culture, culture change, personality-in-culture, value orientations, comparative enculturative patterns, and cultural dynamics. *Prerequisite*: 12 hours in education and related areas. Three hours. Mr. Nash.

255 **THE SCHOOL AS A SOCIAL INSTITUTION** An analysis of major social forces that affect both elementary and secondary schools. The professional role of the modern educator and the values underlying educational policy will focus on such contemporary issues as political pressures in the public schools, the problems of integration, the place of religion in education, and the impact of the culturally deprived child on school and community. *Prerequisite*: 12 hours in education and related areas. Three hours. Miss Boller and Mr. Conrad.

275 **ANALYSIS OF READING AND RELATED LANGUAGE DIFFICULTIES** An interdisciplinary approach to the analysis and evaluation of learning difficulties with an emphasis on reading and writing. Examination of the nature of difficulties; procedures and materials used for the assessment of reading performance. Practice with children is required. *Prerequisite*: twelve hours in education and related areas, including an introductory course in reading or permission of the Director of the Reading Center. Three hours. Mr. Hunt.

276 **LABORATORY EXPERIENCES IN READING AND RELATED LANGUAGE INSTRUCTION** A study of the various approaches and materials used for the prevention and correction of reading and written language difficulties. Supervised teaching of individuals and small groups experiencing severe difficulties in reading and related language skills. Apprenticeships in a variety of reading instructional programs. *Prerequisite*: The Analysis of Reading and Related Language Difficulties or consent of instructor. Three to six hours. Mr. Hunt.

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. Credit according to the particular offering. *Prerequisite*: 12 hours in education and related areas. Two to six hours. Staff.

295-298 **LABORATORY EXPERIENCE IN EDUCATION** Supervised field experience in such areas as reading, administration, elementary and secondary education, and special education, designed to give students experience in specialized areas for their professional development. *Prerequisite*: permission of instructor. Credit as arranged. Staff.

Elementary Education

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. Miss Boller.

111 MUSIC METHODS FOR THE ELEMENTARY CLASSROOM TEACHER A course to aid prospective elementary classroom teachers in understanding procedures and methods designed for the development of musical literacy and understanding in the elementary grades, and to develop practical applicability of these procedures and methods. *Prerequisite*: sophomore standing. Three hours. Mr. Wigness.

113 SCHOOL MUSIC Basic principles in elementary school music teaching. *Prerequisite*: Education 111 and Music 10 or Music 1, 2, and 5-6. Three hours. Staff.

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. Mrs. Lang and Mr. Wheeler.

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, 181; all others consent of Director of Reading Center. Three hours. Staff.

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. Mrs. Lang and Mr. Wheeler.

144 TEACHING SCIENCE AND SOCIAL STUDIES Curriculum, teaching methods, materials in the social studies and science in the elementary school. Observation and participation in elementary schools. Students should plan a schedule which will enable them to have blocks of time, such as a morning or afternoon, free of regular classes. Three hours. Mr. Agne and Miss Petrusich.

160 TEACHING MATHEMATICS AND CRITICAL THINKING Curriculum, teaching methods, materials in mathematics in the elementary school, development of critical thinking. Three hours. Mr. Agne and Miss Boller.

Secondary Education

15 PARTICIPATION A minimum of thirty clock hours of observation and participation in classroom work in junior and senior high schools. Weekly seminars on campus. 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 and acceptance by the Coordinator of Professional Laboratory Experiences. Two hours. Mr. Cheney and staff.

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. *Prerequisite*: satisfactory completion of Ed. 145 & 146, senior standing, and acceptance in a teacher education program. Three hours. Mr. Abruscato.

179 SECONDARY METHODS AND PROCEDURES IN SPECIAL SUBJECT AREAS (Latin, mathematics, romance languages, and social studies.) *Prerequisite*: prior or simultaneous enrollment in Ed. 178 and acceptance in a teacher education program. Variable credit, two or three hours, i.e. Latin 3 hrs., mathematics 2 hrs., romance language 3 hrs., and social studies 3 hrs. (English majors enroll in Ed.-Eng. 182 and Speech majors in Ed.-Speech 294. Speech minors are encouraged to enroll in 294.) Staff.

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, eight-week, eight-credit experience during a semester. *Prerequisite*: senior standing, acceptance in a teacher education program, and acceptance by the Coordinator of Professional Laboratory Experiences. Variable credit, three to twelve hours. Mr. Cheney and staff.

182 SEMINAR FOR PROSPECTIVE TEACHERS OF ENGLISH (see 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. Mr. Abruscato.

294 SEMINAR FOR PROSPECTIVE TEACHERS OF SPEECH (see Speech 294).

303-304 PROBLEMS AND RESEARCH IN TEACHING SECONDARY SCHOOL ENGLISH (see English 303-304).

319 INTERNSHIP FOR SPECIALIZED PERSONNEL IN EDUCATION Students will undertake an approved internship in an institution which reflects the particular area of interest and needs of the student. *Prerequisite*: permission of instructor. Credit as arranged. Staff.

382 TEACHING INTERNSHIP Supervised teaching experience in cooperating schools with related seminar in the special subject field. *Prerequisite*: undergraduate courses leading to certification; acceptable preliminary field experience; acceptance in graduate program. Three to eight hours. Mr. Cheney and staff.

Art Education

140 ENCOUNTER WITH ART I Purpose and methods in contemporary Art Education. Workshops, discussions and lectures in creative art activities. Elementary grades K to 6. Three hours. Staff.

141 ENCOUNTER WITH ART II Purpose and methods in contemporary Art Education. Workshops, discussions and lectures in creative art activities. Secondary grades 7 to 12. *Prerequisite*: Art 140 or permission of Mrs. Walker or Miss Sherman. Three hours. Staff.

177 CURRICULUM AND PRACTICE IN ELEMENTARY AND SECONDARY ART EDUCATION The study and implementation of curriculum development in elementary and secondary Art Education. Students will plan and teach children's

art classes at the Art Education Center. *Prerequisite:* 140 and 141 or permission of Mrs. Walker or Miss Sherman. Three hours. Staff.

183 SEMINAR: CURRENT ISSUES IN ART EDUCATION Research and discussion of issues relevant to contemporary art education. *Prerequisite:* 140 and 141 or permission of Mrs. Walker or Miss Sherman. Three hours. Staff.

184 SPECIAL PROBLEMS IN ART EDUCATION Individual investigation of a selected problem in Art Education under the supervision of staff. Reports and group discussions. *Prerequisite:* 177 and 178 (or concurrent enrollment in 178) or permission of Mrs. Walker or Miss Sherman. Three hours. Staff.

Music Education

For class performance study see 71, 72 under Music Department.

131 MUSIC METHODS Methods and materials in the teaching of vocal and instrumental music in elementary and secondary schools. *Prerequisite:* 145-146 and senior standing in music education. Five hours. Mr. Schultz.

Physical Education

PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL (see Physical Education 100).

HEALTH EDUCATION (see Physical Education 116).

PHYSICAL EDUCATION IN SECONDARY SCHOOLS (see Physical Education 155).

For information on the curriculum for prospective teachers of physical education and athletic coaches see page 113 and page 259.

HOME ECONOMICS, EARLY CHILDHOOD, AND KINDERGARTEN EDUCATION (see Home Economics Education programs).

VOCATIONAL AND TECHNICAL EDUCATION (see Vocational, Technical and Extension Education programs).

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.

| <i>Number</i> | <i>Title</i> | <i>Credit Hours</i> |
|---------------|---|---------------------|
| 75 | Driver Education Workshop, Basic | 2 |
| 132 | Teaching Arithmetic | 3 |
| 150 | Intensive Teacher Preparation | 4 |
| 172 | The Creative Process Through Art | 3 |
| 175 | Driver Education, Advanced | 2 |
| 201 | Administration of Athletic Programs | 3 |
| 203 | Principles of Physical Education | 3 |
| 208 | School Health Programs | 3 |
| 209 | Education of Teachers of the Mentally Retarded—I Early Years | 3-6 |

| <i>Number</i> | <i>Title</i> | <i>Credit Hours</i> |
|---------------|---|---------------------|
| 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 |
| 218 | Workshop in Curriculum | 4 |
| 219 | Workshop in Economic Education | 4 |
| 225 | Teaching Social Studies in the Secondary School | 3 |
| 227 | Teaching Science in the Secondary School | 3 |
| 228 | Literature in the Junior-Senior High School Curriculum (Literary Criticism for Teachers) | 3 |
| 229 | Communicative Arts in Secondary Schools (Teaching English in Secondary Schools) | 3 |
| 240 | Musical Creativity in the Junior High School | 3 |
| 241 | Science for the Elementary School | 3 |
| 243 | Recent Trends in Music Education | 3 |
| 244 | Social Studies in the Elementary School | 3 |
| 253 | Practicum in Music Education | 1-4 |
| 256 | Methods and Materials in Elementary School Mathematics | 3 |
| 257 | Teaching Mathematics in the Secondary Schools | 3 |
| 259 | Teaching Foreign Language | 3 |
| 260 | Improvements in Teaching Bookkeeping and Basic Busi- ness 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 |
| 270 | Kindergarten Methods and Organization | 3 |
| 271 | Laboratory Experiences in Kindergarten Education | 3 |
| 290 | Basic Concepts in Music Education | 3 |
| 291 | Psychology of Music | 3 |
| 303, 304 | Problems and Research in Teaching Secondary School English | 3 |
| 310 | Methods for Deriving and Achieving Special Education Objectives | 3 |
| 312 | Analysis of Classroom Behavior—The Handicapped Learner | 3 |
| 313 | Statistical Methods in Education | 3 |
| 316 | Seminar in Research in the Education of Handicapped Learners | 3 |
| 330 | The Courts and the Public Schools | 3 |
| 331 | The Principalship | 3 |
| 332 | School Administration | 3 |
| 335 | Instructional Assessment and Staff Development | 3 |
| 337 | Political Processes in Education | 3 |
| 350 | Guidance in Education | 3 |
| 351 | Understanding the Individual | 3 |
| 352 | Analysis of Educational Organizations | 3 |
| 353 | Inquiry Seminar in Educational Administration | 3 |

| <i>Number</i> | <i>Title</i> | <i>Credit Hours</i> |
|---------------|---|---------------------|
| 354 | Applications of Systems Theory and Techniques to Educational Administration | 3 |
| 373 | Individual Testing | 3 |
| 374 | Counseling Theory and Practice | 3 |
| 375 | Analysis of Reading and Related Language Difficulties | 3 |
| 376 | Laboratory Experiences in Reading and Related Language Instruction | 3 |
| 377 | Seminar in Educational Psychology | 3 |
| 378 | Advanced Study and Research in Reading and Related Language Arts | 3 |
| 379 | Seminar in Reading Instruction | 3 |
| 380 | Professional Problems in Education | 3 |
| 381 | Personalizing Information Processes in Guidance | 3 |
| 383 | Group Processes in Counseling and Guidance | 3 |
| 384 | Practicum in Counseling | 3 |
| 385 | Student Personnel Services in Higher Education | 3 |
| 386 | Organization and Coordination of Guidance Programs | 3 |
| 390 | Organization and Administration of Music Education | 3 |
| 391 | Master's Thesis Research | 6 |
| 397 | Problems in Education | 3-6 |
| 399 | Research Methods in Education | 3 |

(For detailed descriptions of 200 and 300 level courses see Graduate College Bulletin)

Engineering, Agricultural

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professor Schneider (Chairman); Associate Professor Arnold; Assistant Professor Borstein.

155 SOIL AND WATER ENGINEERING (2-2) Consideration of hydrologic, hydraulic, and agronomic principles as applied to design and installation of drainage and irrigation systems, erosion control facilities, farm and small watershed flood control reservoirs, and other rural environmental protection practices. Philosophy of soil and water conservation. *Prerequisite:* plant and soil science 61, civil engineering 12. Three hours. Mr. Bornstein. Alternate years, 1971-72.

Engineering, Civil

COLLEGE OF TECHNOLOGY

Professor Oppenlander (Chairman); Associate Professors Dawson, Fay and Knight; Assistant Professors Condren, Downer, Eldred and Olson; Engineer Dunham; Instructor Parker; Adjunct Professor Kiley; Adjunct Assistant Professor Stearns.

01 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:* mathematics 14. Three hours. Staff.

02 DYNAMICS (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:* 01, mathematics 14. Three hours. Staff.

10 SURVEYING (3-4) Fundamental surveying methods; propagation of errors as applied to surveying measurements; triangulation; control surveys; and traverse adjustments. *Prerequisite:* mathematics 13. Four hours. Staff.

11 GEOMETRONICS (2-4) Selected items in analytical photogrammetry; celestial observations, elements of photo-interpretation; theory of curves; and digital terrain analysis. *Prerequisite:* 10 or 12 and mathematics 14. 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. *Prerequisite:* mathematics 2 and 9. 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:* 01; mathematics 14. 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.

120 ENGINEERING CONTRACTS (2-0) Contract law; engineering specifications; and ethics and professional conduct. *Prerequisite:* junior standing. Two hours. Staff.

140 TRANSPORTATION ENGINEERING (3-0) Analysis of transportation systems; planning studies for highways, airports, rail and mass transport, pipelines, and belt systems; traffic flow phenomena; geometric design; economic analysis during planning, design, and construction phases; and critical path

scheduling techniques. *Prerequisite:* 10, mathematics 31 and junior standing. Three hours. Messrs. Dawson and Oppenlander.

150 SANITARY ENGINEERING I (3-0) The theory and design of water supplies, treatment processes, and distribution systems. *Prerequisite:* 160. Three hours. Mr. Condren.

151 SANITARY ENGINEERING II (2-3) The theory and design of waste water collection systems and primary, secondary and tertiary waste water treatment plants; and laboratory studies on waste water characteristics and treatment. *Prerequisite:* 150, 160, chemistry 1-2. Three hours. Mr. Jewell.

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:* 02. Four hours. Mr. 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. *Prerequisite:* 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 non-mathematical 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 hydrologic parameters. *Prerequisite:* junior standing and one year of college science. Three hours. Mr. 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; design of steel and timber members under combined bending and axial loads; base plates; eccentric connections; and laboratory practice in graphic statics and design computations. *Prerequisite:* 100. Four hours. Mr. Eldred.

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 virtual work, moment area, conjugate beam, and Williot-Mohr diagram; continuous structures; and an introduction to structural dynamics. *Prerequisite:* 170. Three hours. Mr. Eldred.

172 ADVANCED STRUCTURAL DESIGN (3-3) Advanced theory and design of structures with emphasis on continuous frames and trusses; consideration of wind stress analysis, space frames, moment connections, and camber diagrams; comparative studies of specifications for design in steel and aluminum; and

laboratory problems in design of steel building frames and continuous girder and truss bridges. *Prerequisite:* 171. Four hours. Mr. Knight.

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 or concurrent enrollment. Three hours. Mr. 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 particulate systems. *Prerequisite:* 100. Four hours. Mr. 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:* 173 and 180. Four hours. Mr. 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. *Prerequisite:* senior standing and departmental permission. Three hours. Staff.

200 MECHANICS OF MATERIALS II (3-0) The study of stresses and strains at a point under plane and three-dimensional loading using Mohr's circle; failure theories and energy methods; and plastic design and buckling of plates and shells. *Prerequisite:* 172 or concurrent enrollment. Three hours. Mr. Fay.

210 AIRPHOTO INTERPRETATION (2-3) The development of techniques in aerial photographic interpretation; principles of stereoscopic viewing and identification of the airphoto features related to landform, vegetation, drainage, soil color 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. Mr. Olson.

220 CONSTRUCTION ENGINEERING (3-0) Development of construction processes to obtain optimum facilities with minimum outlay of resources; relationship of techniques to design details and specification requirements; sequence studies by means of CPM and PERT techniques including crashing procedures; special problems in measurements of construction efficiency, cost estimating, and specification preparation; and case studies of local projects under construction. *Prerequisite:* senior or graduate standing. Three hours. Mr. Dunham.

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. Staff.

226 CIVIL ENGINEERING SYSTEMS ANALYSIS (3-0) Development of operations research techniques including linear and dynamic programming, inventory theory, replacement theory, queuing models, networks, and scheduling; procedures for solving complex problems; and application of systems analysis to problems in civil engineering. *Prerequisite:* senior or graduate standing. Three hours. Messrs. Dawson and Oppenlander.

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. Messrs. Dawson and Oppenlander.

231 URBAN PLANNING ANALYSIS (3-0) The history and development of urban planning in the United States and other countries; special approaches to planning with attention to city design and appearance, quantitative methods in planning, and social welfare planning; plan implementation through programs, zoning, land subdivision regulations, and urban renewal; organization and administration of planning agencies; and financial planning. *Prerequisite:* 230 or consent of instructor. Three hours. Mr. Oppenlander.

240 TRAFFIC ENGINEERING CHARACTERISTICS (3-0) Analysis of the basic components of highway travel including driver, vehicle, roadway, environmental, and pedestrian characteristics; evaluation of traffic demands imposed by road users for travel and parking; traffic flow and intersection characteristics; highway and intersection capacities; performance of traffic systems with particular attention to accidents and travel efficiency; and techniques for measuring traffic characteristics. *Prerequisite:* senior or graduate standing. Three hours. Messrs. Dawson and Oppenlander.

241 TRANSPORTATION SYSTEMS ENGINEERING (3-0) Introduction to the interdisciplinary aspects of transportation systems and their technological characteristics; mathematical analysis and synthesis of system problems including planning, design, and operation; economic consideration of transportation systems and economic analyses for decision making; transportation planning process; fiscal studies and financial planning; and administration of transportation systems. *Prerequisite:* senior or graduate standing. Three hours. Messrs. Dawson and Oppenlander.

250 DESIGN OF WATER TREATMENT FACILITIES (1-6) Design of treatment systems to provide water for domestic and industrial use; and source evaluation, demand projections, specific treatment processes, distribution systems, economics, and case studies. *Prerequisite:* 150. Three hours. Mr. Condren.

251 DESIGN OF WASTEWATER TREATMENT FACILITIES (1-6) Design of treatment systems for processing wastewaters from municipal and industrial sources to obtain desired receiving waterway protection; and population projections, site location, collection systems, lift stations, choice and sizing of unit processes, specification writing, cost estimates, and bid document preparation. *Prerequisite:* 151. Three hours. Mr. Jewell.

252 INDUSTRIAL WASTE DISPOSAL (3-0) A survey of the fundamental chemical, physical, and biological processes employed in the treatment and dis-

posal of pollutants from the following industries: mining and metal processing, refinery and petrochemical, pulp and paper, food and meat processing, textiles, and electric generation. *Prerequisite:* 151. Three hours. Mr. Condren.

253 AIR POLLUTION ABATEMENT (3-0) Identification of specific air pollutants and their effects on humans, plants, and materials; concepts, principles, and application of air pollution control processes; and electrostatic precipitation, scrubbing, cyclonic separation, filtration, absorption, catalytic oxidation, and dispersion. *Prerequisite:* Chemistry 2 and Physics 18. Three hours. Mr. Condren.

254 SOLID WASTES (3-0) The significance of solid wastes generated from municipal, industrial, agricultural, and mining sources; the optimization and design of collection, disposal, and/or recycle systems; and sanitary landfills, incineration, composting, and material recovery. *Prerequisite:* Chemistry 2 and Physics 18. Three hours. Mr. Jewell.

255 UNIT OPERATIONS OF WATER AND WASTEWATER TREATMENT (1-6) An examination of major physical, chemical, and biological processes used in treating water and wastewater; theory and methods of obtaining data from bench through full scale units; analysis of data to obtain process optimization; and application of data to design. *Prerequisite:* 150, 151. Three hours. Mr. Jewell.

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. *Prerequisite:* 160 or Mechanical Engineering 142. Three hours. Mr. Downer.

261 OPEN CHANNEL FLOW (3-0) Application of the basic laws of fluid mechanics to flow in open channels; boundary layer theory; design of channels and transition structures; non-uniform flow; and non-uniform, spatially-varied flow problems. *Prerequisite:* 160, Mathematics 271. Three hours. Mr. 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 and mathematics 31. Three hours. Mr. Downer.

270 INDETERMINATE STRUCTURES II (3-0) Analysis of trusses with redundant members; elastic weights and column analogy methods for indeterminate frames; energy methods for curved frames and closed rings; arch theory; and cable analysis. *Prerequisite:* 171. Three hours. Mr. Eldred.

271 PRESTRESSED CONCRETE STRUCTURES (3-0) Comparison of service and ultimate strength theories for concrete structures with emphasis on prestress effects; topics considered include prestressed beam analysis, load balancing methods, columns, and piles, bent analysis, yield-line theory, and circular prestressing in domes and tanks; and discussion of current design specifications. *Prerequisite:* 173. Three hours. Mr. Dunham.

280 APPLIED SOIL MECHANICS (3-0) Use of soil mechanics principles in the evaluation of building foundations, braced excavations, and earth structures; and bearing capacity, settlements in sands and clays, lateral earth pressures, pile foundations, pier and caisson foundations, slope stability, and construction problems. *Prerequisite:* 180. Three hours. Mr. Olson.

281 HIGHWAY AND AIRPORT PAVEMENT DESIGN (3-0) Structural design of flexible and rigid pavements; types of wheel and axle configurations; soil classification; compaction of soils; frost action; subsurface drainage; design of bases and subbases; soil stabilization; theory of stresses in flexible pavements; plate bearing, triaxial and CBR methods of design; Westergaard analysis for rigid pavements; design of joints and reinforcing steel; and pavement evaluation. *Prerequisite:* 140, 180. Three hours. Mr. Olson.

282 ENGINEERING PROPERTIES OF SOILS (2-3) The study of soil properties that influence the engineering behavior of soils as a construction and foundation material; subject areas include soil mineralogy, physicochemical concepts, plasticity properties, permeability, compaction, and soil stabilization; and laboratory work in the study of soil index properties, permeability, and compaction tests. *Prerequisite:* 180. Three hours. Mr. 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.

300 ADVANCED MECHANICS OF MATERIALS (3-0) The theory of elasticity with applications to curved beams, combined stresses, torsion of non-circular sections, and relaxation procedures. *Prerequisite:* 100, Mathematics 271. Three hours. Mr. Fay.

301 PHOTOELASTICITY (3-0) Development of the theories of photoelastic stress analysis; model similitude; correlation with other stress analysis techniques; and laboratory work on two-dimensional applications such as stress concentrations around holes, notches, and fillets. *Prerequisite:* 100, Mathematics 271. Three hours. Mr. Fay.

330 COMMUNITY DESIGN (2-3) The basic principles and methods of planning and designing the total community for its environment; site selection; elements of physical layout and design; and design of subdivisions, industrial parks, shopping centers, community service facilities, public utilities, recreational areas, urban renewal projects, and new towns. *Prerequisite:* 230. Three hours. Mr. Kiley.

340 TRAFFIC ENGINEERING OPERATIONS (3-0) Techniques for making traffic engineering investigations; traffic laws and ordinances; design and application of traffic control devices including signals, signs, and markings; regulation of traffic flows, speeds, and parking; safety engineering; design of off-street parking facilities; transit operations; design of street lighting; traffic engineering administration; and evaluation of traffic engineering improvements. *Prerequisite:* 240. Three hours. Mr. Dawson.

341 HIGHWAY GEOMETRIC DESIGN (3-0) Theory and practice of geometric design for rural and urban highway facilities; route location; design control criteria such as traffic volumes and characteristics, design speeds, design vehicles, capacity and level of service requirements, and design standards; design of geometric elements including sight distance, horizontal and vertical alignments, cross section, intersections, interchanges, control of access, and frontage roads; and emerging concepts of geometric design for modern highways. *Prerequisite:* 240. Three hours. Messrs. Dawson and Oppenlander.

342 URBAN TRANSPORTATION SYSTEMS (3-0) Transportation planning process for urban areas including freeway and major street systems, parking, and mass transit; inventory, use, and desire studies for urban transportation; mathematical models for the evaluation of land use and traffic interaction; techniques of travel forecasting and trip generation, distribution, and assignment; circulation systems for vehicle, pedestrian, and freight traffic in the urban center; planning, design, and operation of mass transit systems; location and design of terminal facilities; and innovation of new urban transportation technology. *Prerequisite:* 230, 241. Three hours. Mr. Oppenlander.

360 ADVANCED HYDROLOGY (3-0) Application of statistics to problems in engineering hydrology; the concept and use of the instantaneous unit hydrograph; study of run-off models; flow through porous media; and design techniques for water resources projects. *Prerequisite:* 260, Mathematics 271. Three hours. Offered as occasion warrants. Mr. Downer.

370 ULTIMATE STRENGTH DESIGN (3-3) Development of ultimate load theory, virtual work, and statical methods of analysis; design of structural steel and reinforced concrete structures by ultimate load methods; and consideration of shear, axial force, buckling, and rotation capacity. *Prerequisite:* 172, 173. Four hours. Mr. Eldred.

372 ADVANCED DYNAMICS (3-0) The study of Coriolis acceleration; gyroscopic forces; dynamic measurements; and vibrations, earthquakes, and blast shocks on structures. *Prerequisite:* 172, 173, Mathematics 271. Three hours. Mr. Stearns.

380 THEORETICAL SOIL MECHANICS (3-0) Theories of soil mechanics, failure conditions, mechanical interaction between solids and water; and problems in elasticity and plasticity pertaining to earth masses. *Prerequisite:* 180. Three hours. Mr. Olson.

382 ADVANCED ENGINEERING PROPERTIES OF SOILS (2-3) A detailed study of soil properties that affect the compressibility and shear strength of natural soil deposits. Laboratory work includes extensive studies of consolidation and compressibility and use of the latest methods of shear strength determination from triaxial and plane strain testing devices. *Prerequisite:* 282. Three hours. Mr. Olson.

390 ADVANCED TOPICS IN CIVIL ENGINEERING Special topics to intensify the programs of graduate students in civil engineering. *Prerequisite:* consent of instructor. Hours and credits to be arranged. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic for an acceptable thesis under the direction of an assigned staff member. Credit as arranged.

Engineering, Electrical

COLLEGE OF TECHNOLOGY

Professors Roth (Chairman), Essler, Handelsman, and Rush; Associate Professors Evering, Lai, Lambert, and Taylor; Assistant Professors Absber, Ellis, Mirchandani, and Williams.

2 ENGINEERING ANALYSIS I (2-0) Concepts of linearity. System elements and their models. Interconnection of system elements. Vectors and matrices. Solution of linear simultaneous equations. Kirchoff's laws and equilibrium equations. Electrical networks and their analogies. *Prerequisite:* mathematics 11 or 13. Two hours.

3 ENGINEERING ANALYSIS II (3-0) Input-output relations of systems. Ordinary linear differential equations with specific application to linear systems. Response of systems to exponential excitation and concept of complex frequencies. Impulse response. Steady-state response of linear systems. System functions. Resonance. Network theorems. Energy and power. *Prerequisite:* 2. Three hours.

4 ENGINEERING ANALYSIS III (3-0) Signal flow graphs, Simulation of systems by analog computers. Transient response of linear systems. State-space approach. Response of mechanical systems, electromechanical systems, acoustic systems, magnetic networks, etc. *Prerequisite:* 3. Three hours.

32 ENGINEERING COMPUTATION (2-0) Analog and hybrid computing devices for solving engineering problems. Stimulation of linear algebraic and dynamic systems using modern electronic techniques. Operations of addition, subtraction, differentiation and integration. Multiplication, division and arbitrary function generation developed for solving non-linear problems. Conversion between the analog and digital domains. The scaling of simulated systems. *Prerequisite:* concurrent enrollment in mathematics 123. Two hours.

101, 102 ELECTRICAL ENGINEERING PRINCIPLES (3-3) Principles of electric and magnetic circuits; application of these principles to the theory and performance of selected power, control and communication equipment. *Prerequisite:* mathematics 123 and physics 27, 101 for 102. Four hours.

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.

113 ENERGY CONVERSION I (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. *Prerequisite:* 4. Three hours.

114 ENERGY CONVERSION II (3-0) Six basic methods of Direct Energy Conversion (DEC): thermoelectric devices, thermionic devices, magnetohydrodynamic (MHD) converters, solar cells and fuel cells, electrohydrodynamic

(EHD) converters. Modern solid state theories of DEC. The past, present, and future of DEC. *Prerequisite:* 113, 163. Three hours.

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.

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.

123 ELECTRONICS III (3-0) Analysis of pulse and digital circuits. Design of transistor logic gates, multivibrators, and blocking oscillators. *Prerequisite:* 122. Three hours.

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. *Prerequisite:* 4. Three hours.

146 WAVE AND DIFFUSION ANALOGIES (3-0) Electromagnetic waves on lines and in space. Vibration of strings and membranes. Mechanical waves in fluids and solids. Electromechanical transducers. Thermal waves Diffusion process. *Prerequisite:* 144. Three hours.

162 SOLID STATE PHYSICAL ELECTRONICS I (3-0) Theories of conductivity, dielectric constant, magnetic permeability, optical properties, piezoelectricity, ferroelectricity, pyroelectricity, magnetostriction. *Prerequisite:* physics 128. Three hours.

163 SOLID STATE PHYSICAL ELECTRONICS II (3-0) Introduction to the physics of atoms and crystals through quantum and statistical mechanics. Application of these principles to semiconductor devices. *Prerequisite:* 162, physics 128. Three hours.

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. *Prerequisite:* 4, mathematics 203. Three hours.

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.

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 (0-3) Direct current measurements, non-linear resistive elements, electron ballistics, the cathode ray oscilloscope, tran-

sients in RC circuits, alternating current measurements, sinusoidal behavior of RL and RC circuits, transients and sinusoidal behavior of RLC circuits. One hour.

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.

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.

184 JUNIOR LABORATORY (1-3) Active device characteristics, Power supplies, a.m. and f.m. modulation and detection. Transformers, magnetic amplifiers, a-c and d-c machines. *Prerequisite:* 183. Two hours.

185 SENIOR LABORATORY (1-3) Electrical conductivity in solids, the Hall effect, properties of gaseous conductors and dielectric materials. Control systems. Electromechanical transducers. *Prerequisite:* 184. Two hours.

186 SENIOR LABORATORY (0-3) Design and construction of pulse and digital circuits including logic gates, astable multivibrators, bistable multivibrators, monostable multivibrators, and locking oscillators. *Prerequisite:* 185. One hour.

188 SENIOR PROJECT (0-3) Experimental or theoretical project selected by the student and conducted under staff supervision. *Prerequisite:* 185. One hour.

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. Staff.

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. *Prerequisite:* EE 171 and Math 124 or equivalent background. Three hours. Mr. 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 modelling. 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. Mr. Mirchandani.

230 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 other major mechanisms. *Prerequisite:* 123 or physics 213. Three hours. Staff.

232, 233 HYBRID COMPUTERS (3-0) Systems design concepts and use of interconnected analog and digital computers as an engineering tool are stressed. Selected problems from mathematics, biological and physical sciences are solved on a hybrid computer. The use of logic and decision as well as analog/digital and digital/analog conversion are stressed. *Prerequisite:* 123 or departmental permission. Three hours.

235 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. *Prerequisite:* College physics and calculus or permission of the instructor. Four hours. Mr. Evering.

239 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. Mr. Rush.

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. Mr. 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. Mr. Evering.

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:* EE 174. Three hours. Mr. 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, subspaces and manifolds, linear operators, change of basis, spectral representation of operators, the eigenvalue problem, matrices and functions of matrices. Application to problems of state variable analysis, field theory, mechanics, quantum mechanics and signal theory. *Prerequisite:* Graduate standing in EE or Physics or departmental permission. Three hours. Mr. 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:* mathematics 121 or 123. Three hours. Mr. 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. Equivalent circuits for high frequency operation; oscillators and pulse switching circuits. *Prerequisite:* 261. Three hours. Staff.

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:* mathematics 203. Three hours.

281 through 284 SEMINAR (1-0) Presentation and discussion of advanced electrical engineering problems and current developments. *Prerequisite:* senior or graduate engineering enrollment. One hour.

285 CREATIVE ENGINEERING (3-0) Creative techniques and applications to typical problems of commercial importance in fields of process control, biomedical engineering communications, circuit design. *Prerequisite:* graduate standing in EE or departmental permission. Three hours. Mr. 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.

311, 312 INTRODUCTION TO OPTIMUM CONTROL SYSTEMS (3-0) Review of conventional s-plane design of linear systems. Introduction to the optimal control problem, parameter optimization, Parseval's Theorem and least-square optimization in the frequency domain. Optimization using the calculus of variations, Pontryagin's maximum principle, and Hamilton Jacobi theory. Dynamic programming and functional analysis. Computational methods for solving two-point boundary-value problems, simplex technique and linear programming, search techniques and nonlinear programming. Examples of optimum systems control. Introduction to stochastic control problems. *Prerequisite:* 111, 201, 311 for 312. Three hours. Mr. Absher or Mr. Taylor.

314, 315 NONLINEAR SYSTEM THEORY (3-0) Analysis and synthesis of piecewise linear networks. Topological study of second order autonomous systems. Nonlinear conservative and Lagrangian systems. Existence of periodic solutions and associated theorems. Graphical methods of analysis. Concepts of stability. Lyapunov stability. Perturbation theory; existence and convergence of periodic solutions. Parametrically excited systems. Mathieu-Hill theory. *Prerequisite:* 201 or mathematics 230. Three hours. Staff.

317, 318 THEORY OF OPTIMUM CONTROL SYSTEMS (3-0) Optimum z-domain design of sampled-data systems. Discrete variational calculus and a discrete maximum principle. Formulation of distributed system problems and a distributed maximum principle. Optimum state estimation in linear stationary systems. Optimum filtering for nonstationary continuous systems. Least-squares curve fitting and state estimation in discrete linear systems. Sensitivity in optimal control. *Prerequisite:* 312, 370, 317 for 318. Mr. Absher or Mr. Taylor.

319, 320 SPECIAL TOPICS IN CONTROL SYSTEM THEORY (3-0) Topics selected from special interests of staff with lectures and readings from current literature. *Prerequisite:* 318. Mr. Absher or Mr. Taylor.

340, 341 SPECIAL TOPICS IN ELECTROMAGNETIC FIELD THEORY (3-0) For advanced students in the field of electromagnetism. Topics selected from special interests of staff with lectures and readings from current literature. Three hours. Staff.

342, 343 MILLIMETER WAVE OPTICS (3-0) Optical and microwave theory applicable to the millimeter and submillimeter region. Generation and detection of radiation; dispersion, scattering, and refraction; interference and interferometers; antennas, diffraction and diffraction gratings. Applications to lasers, diffraction anomalies, atmospheric transmission and millimeter wave astronomy. *Prerequisite:* 242 or departmental permission. Three hours. Mr. Evering.

EE 345 ELECTROMAGNETIC ANTENNAS AND PROPAGATION (3-0) Fundamentals of electromagnetic radiating systems and antennas. Radiation from simple sources and from apertures. Study of antenna gain, directivity and receiving area. Linear antennas, aperture antennas and phased arrays. Study of transmission line systems and propagation through the atmosphere and ionosphere. *Prerequisite:* EE 242 or equivalent. Three hours. Mr. Handelsman.

360 SOLID STATE THERMODYNAMICS (3-0) Introduction to Maxwell-Boltzmann, Fermi-Dirac, and Bose-Einstein distribution functions. Application of these functions to problems in solids. Development of the Planck radiation law and the Debye theory of lattice vibrational energies. Introduction to density matrix and negative temperatures. *Prerequisite:* graduate standing in electrical engineering or physics. Three hours. Mr. Lambert.

363, 364 INTRODUCTION TO SOLID STATE THEORY (3-0) Crystal structures in terms of the Bravais lattice and the Miller indices description. Band theory and the concept of Brillouin zone, Quantum theory of solids. Vibrational, transport, and other fundamental problems associated with ordered solids. *Prerequisite:* Atomic or Modern Physics; 363 for 364. Three hours. Equivalent to and alternates with physics 341, 342. Mr. Lambert.

365 LASERS AND MASERS (3-0) Conditions for operation and photon flux amplification. Modes of operation and measurement of power and beam characteristics. CW and pulsed lasers. Light modulation and detection. *Prerequisite:* bachelor's degree in engineering or physics and departmental permission. Three hours. Mr. Lambert.

366, 367 SOLID STATE THEORY (3-0) Quantum mechanical free electron theory of metals. Quasi-free electron theory for periodic structures. Calculation of energy bands for the most common crystal structures employing the tight binding approximation. Development of thermal and magnetic properties of crystals. Calculation and cohesive energy of crystals. Presentation of generation and recombination mechanisms in semiconductors including photon absorption and emission. Introduction to the Boltzmann transport equation and its application to semiconductor problems. *Prerequisite:* 364, 366 for 367. Three hours. Mr. Lambert.

370, 371 SIGNAL THEORY (3-0) Analysis and representation of nonrandom and random signals. Discrete signals. Signal-space concepts. Random proc-

esses. Correlation function and power density spectrum. Measurement techniques. Applications. *Prerequisite:* graduate standing in electrical engineering or concurrent enrollment in 174, 370 for 371. Three hours. Mr. Lai.

372 ADVANCED COMMUNICATION ENGINEERING (3-0) Principles of optimum receiver; design and implementation. Implementation of coded communication systems. Models of communication channels: Bandpass channels and fading channels. Modulation systems: AM, FM, PAM, PPM, PWM, and PCM. *Prerequisite:* graduate standing in electrical engineering. Three hours. Mr. Lai.

374 THEORY OF SIGNAL DETECTION (3-0) Testing of hypothesis. Detection of known and unknown signals. Detection by multiple observations. The estimation of signal parameters. Detection of signals of unknown arrival time. Signal resolution. *Prerequisite:* graduate standing in electrical engineering. Three hours. Mr. Lai.

376 CODING AND SIGNALING (3-0) The coding problem. Linear codes and nonlinear codes. Error-correction capabilities of linear codes. Important linear codes. Cyclic codes. Bose-Chaudhuri codes. Burst-error-correcting codes. Recurrent codes. Parity-check codes. Decoding methods. Efficient signaling for message sequences. *Prerequisite:* graduate standing in electrical engineering. Three hours. Staff.

378 SPECIAL TOPICS IN STATISTICAL COMMUNICATION, RELATED FIELDS (3-0) Coding for communication or computer systems, pattern recognition and learning machines, artificial intelligence, etc., selected from special interests of staff with lectures and readings from current literature. *Prerequisite:* graduate standing in electrical engineering. Three hours. Mr. Lai.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member culminating in an acceptable thesis. Credit as arranged.

491 through 493 DOCTORAL THESIS RESEARCH* Investigation of research topic under the direction of an assigned staff member culminating in an acceptable doctoral dissertation. Credit as arranged.

Engineering, Mechanical

COLLEGE OF TECHNOLOGY

Professors von Turkovich (*Chairman*), Berry, Outwater, and Tutbill; Associate Professors Carpenter, Duchacek, Hundal, Marshall, Martinek, and McLay; Assistant Professor Black; Engineer Ettlinger; Adjunct Professor Zubko.

1 ENGINEERING GRAPHICS I (0-6) Basic geometrical construction, free-hand sketching and lettering, charts and graphs, orthographic projection and applications of orthographic principles to typical engineering problems. Introduction to descriptive geometry. Two hours.

* Areas of research include control systems, instrumentation, electromagnetic fields, biomedical engineering, solid state materials and devices, information processing and communication theory.

2 ENGINEERING GRAPHICS II (0-6) A continuation of the application of orthographic principles to technical problems covering intersections and development. Axonometric projection. *Prerequisite:* 1. Two hours.

53 MANUFACTURING PROCESSES (2-3) Theory and principles of casting and molding, metal forming, welding, machining and finishing processes with emphasis on economics and design. *Prerequisite:* 2. Three hours.

73 CREATIVE DESIGN (3-0) Application of fundamental engineering principles to the solution of real engineering problems through formulation, selection, synthesis, analysis, optimization, oral and written presentation. *Prerequisite:* sophomore standing in ME. Three hours.

84 MECHANICAL INSTRUMENTATION (1-0) Engineering measurements; experimental error; test sequence; data analysis. *Prerequisite:* mathematics 14. One hour.

92 THERMODYNAMICS I (2-0) Engineering thermodynamics with particular emphasis on energy forms, the development of thermodynamics laws, equilibrium, fixed and variable mass systems, reversibility, and entropy. *Prerequisite:* mathematics 14, physics 18. Two hours.

111 THERMODYNAMICS II (3-3) 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. Laboratory on problems and analysis. *Prerequisite:* 92. Four hours.

113 THERMODYNAMICS AND HEAT TRANSFER (3-0) Fundamental principles of engineering thermodynamics; application of these principles to thermodynamic cycles; heat transfer. *Prerequisite:* physics 18; mathematics 14. Three hours.

115 THERMODYNAMICS (3-0) The first and the 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. *Prerequisite:* physics 28, mathematics 14. Three hours.

117 MECHANICAL ENGINEERING LABORATORY (0-3) Experiments using the project method to investigate thermodynamic principles, instrument capability, and the theory of experimentation. *Prerequisite:* 84 and concurrent enrollment in 111. One hour.

131 MATERIALS PROCESSING I (2-3) The fundamentals of forming and material removal in the solid state, in particular, underlying aspects of plastic deformation, energy requirement and overall economics are stressed. *Prerequisite:* CE 100. Three hours.

133 DYNAMICS I (3-0) Fundamentals of kinematics; analysis and synthesis of displacement, velocity and acceleration with respect to fixed and moving frames of reference; principles of particle and rigid body motion; conservation principles of dynamics and their application in the solution of dynamics problems;

dynamic analogies between mechanical, fluid and electrical systems. *Prerequisite:* CE 01. Three hours.

135 ENGINEERING DESIGN I (3-3) Application of the principles of kinematics, dynamics, strength of materials and design to the design of machine elements including consideration of function; production and economic factors; with special emphasis on engineering mechanics. *Prerequisite:* 133, CE 100. Four hours.

137 SYSTEMS CONTROL (2-0) Concepts of control, stability and interaction of systems with particular reference to design of mechanical, pneumatic, hydraulic and other control circuits. *Prerequisite:* mathematics 271. Two hours.

142 FLUID MECHANICS (3-0) Dynamics of an ideal fluid; energy and momentum relations; similitude flow in conduits; boundary layer mechanics; compressibility phenomena; wing theory; hydrodynamic lubrication; fluid machines and controls. *Prerequisite:* 111 or 113, 133. Three hours.

164 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. *Prerequisite:* 111, 142, 266. Three hours.

171 INDUSTRIAL MATERIALS I (3-0) Fundamentals of ferrous and non-ferrous physical metallurgy, and nonmetallic materials. The correlation of the microscopic structure and physical properties of metals, ceramics and plastics with their heat treatments and uses. *Prerequisite:* chemistry 2; physics 18. Some laboratory work required. Three hours.

174 INDUSTRIAL ENGINEERING (3-0) Principles of industrial organization, plant facilities and layout, production and quality control, motion and time study, wage incentives and job evaluation. *Prerequisite:* inspection trip. Three hours.

175 METHODS ENGINEERING (2-3) Work methods analysis and design, introduction to human engineering. Work measurement including stop watch study, work sampling and predetermined data. *Prerequisite:* junior standing. Three hours.

176 PLANT ORGANIZATION (3-3) Analysis of industrial plant requirements as to layout and materials handling; plant services and maintenance. *Prerequisite:* junior standing. Four hours.

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. *Prerequisite:* senior standing and departmental permission. Three hours.

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:* 133. Three hours. Staff.

203 MECHANICAL VIBRATIONS (3-0) Vibration phenomena in single and multi-degree of freedom systems. Response of systems to periodic and transient excitation. Isolation of shock and vibration. Impedance; matrix and numerical

methods for vibration problems. *Prerequisite:* senior standing. Three hours. Mr. Hundal.

204 ADVANCED SYSTEMS ANALYSIS (3-0) Lumped-parameter and distributed-parameter systems analysis of mechanical thermal, hydraulic, pneumatic and electromechanical systems; system response to periodic, transient and random excitation. *Prerequisite:* senior standing. Three hours. Staff.

206 APPLICATION OF COMPUTERS IN ENGINEERING (4-0) Utilization of analog, digital and hybrid computers as engineering tools for the solution of complex engineering problems. *Prerequisite:* senior standing. Four hours. Staff.

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. *Prerequisite:* senior standing. Three hours. Mr. 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:* senior standing. Three hours. Mr. McLay.

231 MATERIALS PROCESSING II (2-3) Fundamentals of forming from liquid state, plastics forming, metal joining, powder metallurgy. *Prerequisite:* 113, CE 100. Three hours. Mr. Berry.

233 STATISTICAL TECHNIQUES IN MANUFACTURING (3-0) Quality control engineering methods including correlation, variance and time series analysis. Principles of experimental design and operating research in manufacturing. *Prerequisites:* 53 or 131, Math 31, Math 200. Three hours. Mr. Black.

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:* 142. Three hours. Mr. Duchacek.

244 COMPRESSIBLE FLOW (3-0) Introduction to flow in two and three dimensions; steady irrotational flow; small perturbations; the hodograph method; the Karman-Tsien, Prandtl-Glauert, and Gothert's methods; supersonic airfoils; the method of characteristics; oblique shocks; shock waves and boundary layer interaction. *Prerequisite:* 243. Three hours. Mr. Duchacek.

245 ADVANCED FLUID MECHANICS LABORATORY (0-3) Mechanics of fluids with emphasis on compressible flow; flow-measurement; fluid machinery; aerodynamics; compressible flow in nozzles and ducts; high Mach number effects; field mapping. *Prerequisite:* 243 or concurrent enrollment therein. One hour. Mr. Duchacek.

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:* 142. Three hours. Mr. Duchacek.

252 ENGINEERING DESIGN II (3-3) Application of the principles of kinematics, dynamics, strength of material, fluid mechanics and thermodynamics to the design of mechanical systems and their components; application of computers to design; design optimization; group projects in design; construction and evaluation. *Prerequisite:* 135. Four hours. Mr. Carpenter.

262 THERMAL SYSTEMS (3-3) Application of engineering thermodynamics to the analysis of thermodynamic machines and processes; problems on gas turbine, jet propulsion, nuclear power plants, energy conversion devices and other areas of current interest. *Prerequisite:* senior students. Four hours. Mr. Tuthill.

266 HEAT TRANSFER (3-0) Fundamental principles of heat transfer; conduction, convection, radiation; steady and unsteady state; the electric analogy; applications to heat transfer equipment. *Prerequisite:* 111 or 113 and mathematics 271. Three hours. Mr. Duchacek.

267 ADVANCED THERMODYNAMICS (3-0) A rigorous detailed study of the laws of thermodynamics and of ideal and actual thermodynamic processes. *Prerequisite:* 111 or 113 and mathematics 271. Three hours. Mr. Tuthill.

271 INDUSTRIAL MATERIALS II (3-0) The composition, structure, mechanics and fabrication of polymeric materials. The mechanism of adhesion. Deformational mechanics of crystalline materials. *Prerequisite:* 171. Three hours. Mr. Outwater.

272 MECHANICAL BEHAVIOR OF MATERIALS (3-0) Elastic and plastic behavior of single crystals and polycrystals; dislocations; approximate plastic analysis; anisotropic materials; hardness; residual stress, brittle, transitional and ductile fractures; fatigue; damping; creep and surface phenomena. *Prerequisite:* senior standing. Three hours. Mr. Outwater.

281, 282 SEMINAR (1-0) Presentation and discussion of advanced mechanical engineering problems and current developments. *Prerequisite:* senior or graduate engineering enrollment. One hour. Staff.

284 ADVANCED HEAT ENGINES (3-0) Application of engineering science to specific types of heat engines according to the interest of the students. *Prerequisite:* 111, 142, 266. Three hours. Staff.

294 ENGINEERING DESIGN ANALYSIS AND SYNTHESIS (4-0) The application of the fundamental concepts and principles of mathematics, physics, mechanics, electricity, thermodynamics, fluid dynamics and heat transfer combined with economic considerations and decision-making processes to the rigorous training in the design, analysis and synthesis of engineering systems and their components. *Prerequisite:* senior standing. Four hours. Staff.

295, 296 SPECIAL TOPICS (3-0) Advanced study and discussion in areas dependent on the interest of the students. *Prerequisite:* senior or graduate standing and departmental permission. Three hours. Staff.

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. Staff.

301 ADVANCED ENGINEERING DESIGN ANALYSIS AND SYNTHESIS (4-0) Application of the fundamental concepts and principles of advanced mathematics, physics, mechanics, electricity, thermodynamics, fluid dynamics and heat transfer combined with economic considerations and decision-making processes to the rigorous training in the design, analysis and synthesis of complex engineering systems and their components. *Prerequisite:* graduate standing in ME. Four hours. Mr. Hundal.

302 ENGINEERING ELASTICITY (4-0) General analysis of stress and strain; stress-strain relationships; equations of equilibrium and compatibility using Cartesian tensors; two-dimensional stress problems. Airy's stress function solutions using Fourier series. Fourier integral, and approximate methods; simple three-dimensional problems; axisymmetric stress distribution; thermoelastic problems; energy principles of elasticity and their application; torsion of beams; theory of unsymmetrical beams; stress waves in elastic media. *Prerequisite:* graduate standing in ME. Four hours. Mr. McLay.

303 STRESS ANALYSIS (THEORY AND EXPERIMENT) (3-0) Theory and experimental method of measuring static and dynamic stress and strain including the use of piezoelectric materials; wire resistance strain gages; mechanical, optical, inductance and capacitance displacement gauges; photoelasticity; brittle coating; x-rays and associated instrumentation and recording systems; theory of plasticity; methods of elastic-plastic analysis, plastic design of structures, plates and shells. *Prerequisite:* graduate standing in ME. Three hours. Mr. McLay.

306 CONTINUUM MECHANICS (3-0) A unified treatment of those topics which are common to solid and fluid continua; general discussion of tensors; deformation, strain, rates of deformation and strain; conservation laws; mass, momentum and energy; laws of motion; constitutive equations of mechanics for fluids, elastic and hyperelastic solids including materials with memory. *Prerequisite:* graduate standing in ME. Three hours. Mr. Martinek.

307 ADVANCED FLUID DYNAMICS (4-0) Integrated development of equations of continuity, momentum and energy for fluid particles and control volumes; viscous flow theory; stress and rate of deformation tensors; Navier-Stokes equations and its applications; boundary layer theory, turbulence; flow about immersed bodies and in closed conduits; theory of fluid amplifiers and computers. *Prerequisite:* graduate standing in ME. Four hours. Mr. Martinek.

308 ADVANCED DYNAMICS (3-0) Fundamental principles of kinematics and dynamics; motion of systems with several degrees of freedom; rotating and accelerating frames of reference; energy methods; variational principles; Lagrange's and Hamilton's equations; gyroscopes and their application; vibration and stability of systems; non-linear vibration and dynamics of structures; Liapunov's method. *Prerequisite:* graduate standing in ME. Three hours. Mr. Hundal.

309 ADVANCED ENGINEERING THERMODYNAMICS (3-0) A rigorous and general treatment of the first law of thermodynamics for a system and control

volume with applications to steady and transient problems involving fluid flow and heat transfer; application of the first law to chemical reactions; the second law of thermodynamics for a system and control volume and its application; entropy production and the concept of availability; irreversible thermodynamics and its application; phase equilibrium; equation of state; transfer phenomena; relation between statistical mechanics and thermodynamics; canonical equations; Liouville's Theorem, ensembles; partition function, statistical thermodynamics, the third law of thermodynamics; equilibrium in a gas with charged particles; equilibrium of multicomponent systems; metastability. *Prerequisite:* graduate standing in ME. Three hours. Mr. Martinek.

310 ADVANCED HEAT TRANSFER (3-0) Generalized equation of heat conduction including heat generation, moving boundaries; solution of the heat conduction equation for various geometries and boundary conditions; numerical methods; thermal boundary layer phenomena in forced and natural convection; dimensional analysis; application of convective heat transfer to engineering problems; aerodynamic heating; heat transfer in rarefied gases; condensation; boiling; transpiration and ablative cooling; heat exchange by radiation; interchange factors in radiation. *Prerequisite:* graduate standing in ME. Three hours. Mr. Martinek.

311 ADVANCED GAS DYNAMICS (3-0) Analysis of compressible flow in ducts with area change, friction and heat transfer; shock waves; oblique shock; two- and three-dimensional compressible flow; small perturbation theory; similarity in high speed flow; transonic and supersonic flow; method of characteristics. *Prerequisite:* graduate standing in ME. Three hours. Mr. Martinek.

320 SPECIAL PROBLEMS IN ELASTICITY (3-0) Advanced topics in the theory of elasticity in which there is a particular student and staff interest. *Prerequisite:* graduate standing in ME. Three hours. Staff.

321 SPECIAL PROBLEMS IN FLUID MECHANICS (3-0) Advanced topics in fluid mechanics in which there is a particular student and staff interest. *Prerequisite:* graduate standing in ME. Three hours. Staff.

322 SPECIAL PROBLEMS IN DYNAMICS (3-0) Advanced topics in dynamics in which there is a particular student and staff interest. *Prerequisite:* graduate standing in ME. Three hours. Staff.

323 SPECIAL PROBLEMS IN THERMODYNAMICS (3-0) Advanced topics in thermodynamics in which there is a particular student and staff interest. *Prerequisite:* graduate standing in ME. Three hours. Staff.

324 SPECIAL PROBLEMS IN HEAT TRANSFER (3-0) Advanced topics in heat transfer in which there is a particular student and staff interest. *Prerequisite:* graduate standing in ME. Three hours. Staff.

325 SPECIAL PROBLEMS IN MATERIALS (3-0) Advanced topics in behavior of materials in which there is a particular student and staff interest. *Prerequisite:* graduate standing in ME. Three hours. Staff.

330 MATRIX METHODS IN STRUCTURAL DYNAMICS (3-0) Theory and application of matrix methods of structures and Lagrange's equation. Natural vibration from a matrix eigenvalue-eigenvector viewpoint. Theory and application of variational methods, differential equations and integral equations. Theo-

ries of damping. Frequency response and random vibration. Makes heavy use of the digital computer. *Prerequisite*: 203. Three hours. Mr. McLay.

391-393 **MASTER'S THESIS RESEARCH** Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged. Staff.

491 **DOCTORAL THESIS RESEARCH** Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged. Staff.

V English

COLLEGE OF ARTS AND SCIENCES

Professors Bandel, Bogorad, Cochran, Jones,¹ Long, Rothwell (Chairman), Orth, and Trevithick; Associate Professors Broughton, Manchel, Poger, and Shepherd¹; Assistant Professors Biddle, Clark, Dickerson, Hall, Howe,² Seid, and Stephany; Instructors Bradley, Campolucci, Eschholz, Kohler, Miller, Rosa, Simone, and Zeuch.

1 **INTRODUCTION TO LITERATURE** Study and discussion of selected literary works and writing compositions relating to them, to encourage reading with understanding and enjoyment and to develop clear and effective expression. May not be taken by students who have successfully completed any other semester of English except by special permission. Three hours. I, II, Staff.

3, 4, 5, 6, 7, 8 **GENRE COURSES** Each semester the Department chooses and announces before enrollment a genre for each number, of the nature indicated by the following list: Narrative Poetry, Lyric and Reflective Poetry, Prose Fiction, Tragedy, Comedy, Epic, Satire, Biography and Autobiography, Essay, Pastoral. Study and discussion of relevant literary works and writing compositions related to them. Three hours. Staff.

9, 10, 11, 12 **THEMATIC COURSES** Each semester the Department chooses and announces before enrollment a theme for each number, of the nature indicated by the following list: Utopia, The Hero, Politics in Literature, The City, The American Dream. Study and discussion of relevant literary works and writing compositions related to them. Three hours. Staff.

13 **INTRODUCTION TO THE ENGLISH LANGUAGE** An introductory study of the English language in America. Three of the following topics to be considered each semester: Language as a part of human behavior and American culture; historical influences upon and changes within the language; regional and social dialects of American English; functional varieties of English in speech and writing; lexicography; the new analyses of English. Lectures, discussions, compositions, tape recordings. Three hours. Staff.

16 **EXPOSITORY WRITING** Writing and analysis of expository essays. *Prerequisite*: sophomore standing. Three hours. I, II. Mr. Howe.

¹ Sabbatical leave first semester.

² Sabbatical leave second semester.

17 CREATIVE WRITING 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. *Prerequisite:* sophomore standing. Three hours. I, II. Mr. Broughton.

18 CREATIVE WRITING An intermediate writing course open to students who have completed English 17 and wish to continue their work during the second semester. *Prerequisite:* 17. Three hours. Mr. Broughton.

21, 22 BRITISH LITERATURE Selected masterpieces. Lectures, discussions, and frequent assignment of critical and analytical papers. Three hours. Staff.

23, 24 AMERICAN LITERATURE Selected masterpieces. Lectures, discussions, and frequent assignment of critical and analytical papers. Three hours. Staff.

25, 26 WORLD LITERATURE Selected masterpieces. Lectures, discussions, and frequent assignment of critical and analytical papers. Three hours. Staff.

101 CHAUCER The principal works of Chaucer, with emphasis on Chaucer's literary scope, talents, and position in medieval literature. *Prerequisite:* three hours of English and sophomore standing. Three hours. Mr. Stephany.

107-108 SHAKESPEARE Literary study and textual interpretation of most or Shakespeare's works. *Prerequisite:* three hours of English and sophomore standing. Three hours. Miss Bandel, Mr. Howe, and Mr. Rothwell.

121, 122 THE ROMANTIC PERIOD First semester: development of the Romantic Movement through Wordsworth and Coleridge; second semester: Byron, Keats, Shelley, and other Romantic poets and prose-writers. *Prerequisite:* three hours of English and sophomore standing. Three hours. Mr. Jones.

133, 134 THE DEVELOPMENT OF AMERICAN LITERATURE The emergence and growth of a national literature, including both major and minor figures. First semester: Colonial times to the Civil War; second semester: from the Civil War to the present. *Prerequisite:* three hours of English and sophomore standing. Three hours. Mr. Poger and Mr. Shepherd.

135, 136 CANADIAN LITERATURE The development of a national literature. Required of students in the Canadian Area Studies Program. *Prerequisite:* three hours of English and sophomore standing. Three hours. Mr. Miller. Alternate years, 1970-71.

137 MODERN AMERICAN NOVEL Representative American novelists since 1915. *Prerequisite:* three hours of English and sophomore standing. Three hours. Mr. Poger and Mr. Shepherd.

138 MODERN BRITISH NOVEL Representative British and continental novelists. *Prerequisite:* three hours of English and sophomore standing. Three hours. Staff.

140 MODERN SHORT FICTION Critical study of short stories and novellas of outstanding modern writers; recent techniques and trends. *Prerequisite:* three hours of English and sophomore standing. Three hours. Mr. Cochran and Mr. Shepherd.

143 LITERATURE OF BLACK AMERICA Significant works of poetry, fiction, and drama by black writers since the turn of the century, including Langs-

ton Hughes, Richard Wright, Ralph Ellison, James Baldwin and others. *Prerequisite*: three hours of English and sophomore standing. Three hours. Mr. Orth.

151 PHILOSOPHY AND LITERATURE See Philosophy.

177-178 ADVANCED CREATIVE WRITING A writing workshop in which students are encouraged to follow their own interest in poetry, prose, fiction, and drama. Permission of instructor required. *Prerequisite*: 17. Three hours. Mr. Broughton.

182 SEMINAR FOR PROSPECTIVE TEACHERS OF ENGLISH GRAMMAR AND LANGUAGE Literary interpretation and criticism; allied problems useful to teachers of English. *Prerequisite*: 16, 261. Three hours. Mr. Manchel and Mr. Biddle.

192 MAJOR DEVELOPMENTS IN ENGLISH LITERATURE Twelve to fifteen broad studies of literary periods, movements, and ideas. For seniors concentrating in English. Designed to assist, but not limited to, candidates for departmental honors. *Prerequisite*: senior standing and English major. Three hours. Staff.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READING AND RESEARCH

200 OLD ENGLISH The sounds, words, and structure of Old English; simple prose texts and selections from *Beowulf*. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Dickerson. Alternate years, 1971-72.

202 MEDIEVAL LITERATURE The forms (in translation) of medieval literature, with emphasis on Arthurian materials. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Stephany.

204 MIDDLE ENGLISH Literary, historical, and linguistic considerations of Middle English texts, excluding Chaucer. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Dickerson. Alternate years, 1970-71.

206 ELIZABETHAN DRAMA Drama in England from its beginning to 1642, exclusive of Shakespeare. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Rothwell, Mr. Howe. Alternate years, 1970-71.

209, 210 ELIZABETHAN PROSE AND POETRY The major writers of the Tudor and Stuart periods: English prose from the early humanists to the Restoration; English poetry from Wyatt and Surrey to Donne and his followers, including the development of Elizabethan lyric poetry. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Long. Alternate years, 1971-72.

212 MILTON The works of Milton including *Paradise Lost*, *Paradise Regained*, *Samson Agonistes*, some of the minor poems, and selections from the prose works. Lectures, discussions, and reports. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Bogorad.

217 RESTORATION AND EIGHTEENTH-CENTURY DRAMA Development of English drama from Dryden to Sheridan. The lectures, discussions, and reports consider the literary and theatrical qualities of representative plays. *Prerequisite*:

site: three hours of English and junior standing. Three hours. Mr. Howe. Alternate years, 1970-71.

218 RESTORATION AND EIGHTEENTH-CENTURY PROSE AND POETRY The works of significant writers from Dryden to Johnson. Particular emphasis on the development of the essay, the satires of Pope and Swift, and the works of the Johnson-Boswell circle. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Jones. Alternate years, 1970-71.

227, 228 ENGLISH NOVEL English fiction from its origin through the nineteenth century. Masterpieces are stressed and read critically. *Prerequisite*: three hours of English and junior standing. Three hours. Mrs. Hall.

231, 232 VICTORIAN LITERATURE A study of the lives and the works, except the novels, of the significant writers from 1832 to 1900. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Long. Alternate years, 1970-71.

235 MODERN BRITISH DRAMA British and continental plays representing the principal trends in the dramatic renaissance of the late 19th and 20th centuries. *Prerequisite*: three hours of English and junior standing. Three hours. Staff.

236 MODERN AMERICAN DRAMA American plays representing the principal trends culminating in contemporary drama. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Orth.

239 MODERN BRITISH POETRY A study of selected British poets since World War I. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Poger.

242 LITERATURE OF THE SOUTHERN RENAISSANCE Study of selected short stories, novels, and poetry by Glasgow, Faulkner, Warren, Tate, Styron, and others. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Shepherd. Alternate years, 1971-72.

244 MODERN IRISH LITERATURE A study of Irish literature from 1890 to the present with emphasis on Yeats and Joyce. *Prerequisite*: three hours of English and junior standing. Three hours. Alternate years, 1971-72.

251, 252 AMERICAN NOVEL OF THE NINETEENTH CENTURY Masterpieces of nineteenth-century American fiction selected on the basis of literary merit. Lectures, class discussions, oral and written reports. First semester: Hawthorne, Melville, and others; second semester: Mark Twain, Howells, James and others. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Shepherd and Mr. Biddle.

254 EMERSON, THOREAU AND THEIR CIRCLE The essays, journals, and poetry of Emerson, and Thoreau's *Walden*. Minor writers in the group will receive briefer treatment. Lectures, discussions, oral and written reports. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Orth. Alternate years, 1969-70.

256 REGIONAL WRITING IN AMERICA Selected works by Cooper, Harte, Garland, Twain, Faulkner, and others, including units on local color and South-west humor. Lectures, discussion, and reports. *Prerequisite*: three hours of English and junior standing. Three hours. Mr. Cochran. Alternate years, 1971-72.

257 AMERICAN POETRY TO WORLD WAR I Major American poets from the eighteenth century to the First World War, including Poe, Whitman, Emily Dickinson, and others. *Prerequisite:* three hours of English and junior standing. Three hours. Mr. Orth.

258 MODERN AMERICAN POETRY Major American poets since World War I. *Prerequisite:* three hours of English and junior standing. Three hours. Mr. Poger.

261 STRUCTURE OF THE ENGLISH LANGUAGE Descriptive study of the structure of Modern American English. *Prerequisite:* three hours of English and junior standing. Three hours. Mrs. Clark.

262 HISTORY OF THE ENGLISH LANGUAGE The principles of historical linguistics and their application to English. *Prerequisite:* three hours of English and junior standing. Three hours. Mrs. Clark. Alternate years, 1970-71.

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. *Prerequisite:* three hours of English and junior standing. Three hours. Mrs. Clark. Alternate years, 1971-72.

273 TECHNIQUE AND CRITICISM OF POETRY Poetic theory with close analysis of selected poems, past and present, designed to show their organic structure, the relation between poetic effect and sense, mood, tone, imagery, stanzaic form, figurative language, and meter. Lectures, discussions, reports. *Prerequisite:* three hours of English and junior standing. Three hours. Mr. Bogorad.

275 HISTORY OF CRITICISM Principles and theories of criticism from Aristotle to the twentieth century. *Prerequisite:* three hours of English and junior standing. Three hours. Mrs. Hall. Alternate years, 1971-72.

276 CONTEMPORARY CRITICISM A seminar in selected contemporary critical methods and interests; discussion and criticism of selected major works, both contemporary and traditional, with emphasis on criticism of a major modern work. *Prerequisite:* three hours of English and junior standing. Three hours. Mr. Poger.

301 CHAUCER Principal works. Three hours. Mr. Dickerson.

302 GRADUATE SEMINAR Discussion topics vary from year to year. Recommended for all first-year graduate students in English. Three hours.

303-304 PROBLEMS AND RESEARCH IN TEACHING SECONDARY SCHOOL ENGLISH Consideration of problems, curricular materials, teaching procedures and research methods in secondary school language, literature, and composition. *Prerequisite:* 12 hours of education; acceptance as qualified to earn graduate credit in English. Three hours. Mr. Manchel.

371 BIBLIOGRAPHY Methods of literary study, research, and scholarship. Recommended for all first-year graduate students in English. Three hours.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

Extra-Departmental Courses

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Environmental Studies Program

99 ENVIRONMENTAL QUALITY An introduction to the problems associated with an expanding population faced with pollution, restoration, and preservation of the environment. *Prerequisite:* Sophomore standing. Three hours. Mr. Parker and Staff. See page 268 under Plant and Soil Science.

110 ENVIRONMENTAL POLLUTION Introduction to theoretical and practical considerations of physical and biological pollution in the hydrologic cycle; land use and water quality relationships; transfer of atmospheric pollutants to streams; the significance of pollution economically, politically and culturally. *Prerequisite:* departmental permission. Three hours. Mr. Kunkle. See page 268 under Plant and Soil Science.

Recreation Resource Management Program

75 PARTICIPATION IN RECREATION MANAGEMENT Supervised field experience in national, state, urban or private park and recreation operations. *Prerequisites:* Sophomore standing and permission of recreation management committee. Three hours. I, II. Miss Atwood, Mr. Fuller, Mr. Gilbert, and Mr. Lindsay. See page 143 under Agricultural Economics.

COLLEGE OF ARTS AND SCIENCES

General Literature

51 GREEK LITERATURE IN TRANSLATION Lectures on the development of various branches of Greek literature and on its chief authors, with emphasis on Homer and the drama. Readings in standard translations from the major authors. No knowledge of Greek required. No prerequisites. Three hours. Mr. Schlunk.

62 GERMAN LITERATURE IN TRANSLATION Lectures on the development of German literature; reading and discussion of representative works in English translations. No knowledge of German required. *Prerequisite:* junior standing and one year course in any literature. Three hours. Mr. Kahn.

72 ROMANCE LITERATURE IN TRANSLATION Comparative study of contemporary literature in French, Spanish, and Italian in English translations. The novel and theatre are studied in alternate years. *Prerequisite:* junior standing and one year course in any literature. Three hours. Mr. Parker.

81, 82 RUSSIAN LITERATURE IN TRANSLATION First semester: Russian masters of the nineteenth century. Second semester: twentieth century writers from the symbolists to the present. *Prerequisite:* junior standing and one year course in any literature. Three hours. Mr. Nalibow.

101, 102 LINGUISTICS 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.

151, 152 DEVELOPMENT OF PROSE FICTION First semester: Latin, Spanish, French; second semester: French, Russian, English, and Italian. Three hours.

Meteorology

161 INTRODUCTORY METEOROLOGY An introductory study of weather elements and the dynamic process under which they combine and act. Special consideration of the interaction of earth and atmosphere. *Prerequisite*: mathematics 11; a year of college chemistry (1-2), geology, or physics. Three hours. Mr. Vollkommer.

Pharmacology

290 PHARMACOLOGY (4-3) The physiological consequences of introducing foreign chemicals, either as contaminants, drugs, food additives or poisons, into man's internal and external environment. A broad range of systemic pharmacology will be considered with emphasis on neuropharmacology (including behavioral pharmacology), endocrine and metabolic pharmacology, chemotherapy and environmental toxicology. *Prerequisites*: At least one advanced course in Zoology, or Psychology 221, 222. A knowledge of organic chemistry is desirable.

Forestry

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professor Christensen (Chairman); Associate Professors McCormack and Whitmore; Assistant Professors Armstrong, Donnelly, Fuller, Hannah, Hoekstra, Lindsay, Myers; Lecturer Harold.

1 INTRODUCTION TO FORESTRY Introduction to forestry and conservation sciences. Two hours. Mr. Donnelly.

2 FRESHMAN SEMINAR Guest lecturers and student seminars on selected topics in forest resources management. One hour. Mr. Donnelly.

5 DENDROLOGY (3-4) Classification and silvical characteristics of native and exotic forest trees. Twig identification. *Prerequisite*: biology 1 or botany 4. Four hours. Mr. Hannah.

100 FOREST BIOECOLOGY Field study of structure, dynamics, and manipulation of selected forest communities. *Prerequisite*: forestry 5. Four weeks in summer camp. Four hours. Mr. Donnelly, Mr. Fuller, and Mr. McCormack.

103 WOODLAND MANAGEMENT (3-4) Silviculture practice and multiple use concepts in the management of small woodland areas. *Prerequisite*: junior standing. Four hours. Mr. Hannah. Alternate years, 1970-71.

105 MAN AND THE FOREST ENVIRONMENT (3-0) Forest resources of North America, their uses and their influences on the environment. Three hours. Mr. McCormack.

107 FOREST ENTOMOLOGY (See P & SS 107.) Three hours. Mr. Parker.

112 FOREST PATHOLOGY (See Botany 112.) Three hours. Mr. Wilson.

122 SILVICS Environmental factors and their influence upon the development, distribution, and succession of forest trees. Basic for the practice of silviculture. *Prerequisite*: 5. Three hours Mr. Donnelly.

123 SILVICULTURE (2-3) The principles and practices for governing growth and reproduction of forest stands. *Prerequisite*: 122. Three hours. Mr. McCormack.

132 FOREST FIRE CONTROL Forest fire behavior as influenced by fuels, weather, topography; causes and effects of fire; fire danger measurements; methods of prevention and controlling fires; use of fire in forest management. *Prerequisite*: junior standing. Two hours. Mr. Whitmore.

133 FOREST RECREATION MANAGEMENT The philosophies, values, economics, land use planning, design, and development of forest and wildland areas in public and private ownership for outdoor recreation. The impact upon the natural resources and the community. Coordination of timber, wildlife and water resources with forest recreation management. Two hours. Mr. Lindsay.

136 FOREST MANAGEMENT (2-2) Organization of forests for continued production, regulation of cut, rotation and cutting cycles for sustained yields. *Prerequisite*: 123 and 144. Three hours. Mr. Armstrong.

140 FOREST BIOMETRY II Boundary and topographic survey methods as applied to the management of timberlands; Planning for the construction of forest roads. The application of principles of forest biometry to forest-data collection. *Prerequisite*: civil engineering 12, forestry 5, and forestry 144. Four weeks in summer camp. Four hours. Mr. Armstrong and Mr. Myers.

142 FOREST PHOTOGRAMMETRY (2-3) Preparation of planimetric and topographic maps from aerial photographs; vegetation and forest type mapping. Forest inventory through the use of aerial photographs. *Prerequisite*: 144. Three hours. Mr. Lindsay.

144 FOREST BIOMETRY I (2-3) Electronic data processing in forestry; forest sampling procedures; regression and correlation analysis; analytical methods for determining forest volume, growth, and productivity. *Prerequisite*: mathematics 110 or concurrent enrollment. Three hours. Mr. Myers.

151 FOREST ECONOMICS The economic principles and problems in the management and utilization of forest resources; the use of computer analytical methods to guide economic decision making; taxation of forest lands; marketing of forest products. *Prerequisite*: economics 12. Three hours. Mr. Armstrong.

152 FOREST POLICY AND ADMINISTRATION The development and present status of forest policies, public and private, including philosophies of natural resource management as applied to public and private enterprises. *Prerequisite*: junior standing in forestry. Three hours. Mr. Myers.

162 WOOD TECHNOLOGY (2-3) Identification of commercial woods of the United States; basic properties and variations in relation to their uses. *Prerequisite*: biology 1. Three hours. Mr. Whitmore.

163 **TIMBER HARVESTING (2-3)** Methods and costs of harvesting timber under different forest conditions and silvicultural treatments; organization and costs of logging operations. *Prerequisite:* 5 or 103. Three hours. Mr. Harold.

165 **FOREST PRODUCTS (2-3)** Wood products manufacture including lumber, veneer and plywood, pulp and paper. Wood preservation; naval stores; maple products. Forest products marketing practices. *Prerequisite:* 162. Three hours. Mr. Whitmore.

170 **WILDLIFE BIOMETRICS** Field and laboratory methods for management and research; instrumentation, specimen collection-preservation, sexing, aging, food habit analysis, capturing and marking wildlife; habitat analysis and evaluation; wildlife census and population estimation methods. Combined lecture and laboratory, five and one-half full days per week. Required of wildlife management majors in the summer term of the junior year. *Prerequisite:* Forestry 174 and 144. Mr. Hoekstra.

174 **PRINCIPLES OF WILDLIFE MANAGEMENT (2-2)** Properties of game populations and their habitat in relation to the mechanisms and practices of game management. *Prerequisite:* biology 2. Three hours. Mr. Fuller.

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 and permission. Three hours. Staff.

205 **MINERAL NUTRITION OF PLANTS** (See plant and soil science 205.) Three hours. Mr. Bartlett and botany and forestry staff. Alternate years, 1969-70.

207 **WATER RELATIONS OF PLANTS** Absorption, translocation, and transpiration of water. Soil-water relations. Effects of excesses and deficits of water. Mineral absorption. *Prerequisite:* botany 103. Three hours. Mr. Donnelly and botany and plant and soil science staff. Alternate years, 1970-71.

208 **BIOLOGICAL STATISTICS** Application of statistics to the analysis of biological data; interpretation of statistical analysis. *Prerequisite:* mathematics 9; senior standing. Three hours. Mr. Bee.

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; and dynamics of dry matter production. *Prerequisite:* permission. Three hours. Mr. Hannah.

222 **ADVANCED SILVICULTURE** Scientific bases for silvicultural practices for specific forest types. *Prerequisite:* permission. Three hours. Mr. McCormack.

242 **ADVANCED FOREST BIOMETRY** Advanced principles of electronic data processing and biometry for forest land management. Current developments in the science of forest biometry. *Prerequisite:* 144 or permission. Three hours. Mr. Myers.

252 **FOREST VALUATION** Principles of valuation of forest growing stock, land and other forest resources. *Prerequisite:* 151 and 136 or concurrent enrollment. Two hours. Mr. Armstrong.

271 **WILDLIFE MANAGEMENT I (3-3)** Integration of principles and techniques of wildlife management with contemporary land use; emphasis on de-

velopment and maintenance of habitat requirements; population regulation. Field trips. *Prerequisites:* Forestry 123, 170. Four hours. Mr. Fuller and Mr. Hoekstra.

282, 284 FORESTRY SEMINAR Review and discussion of current forestry problems. Required of forestry seniors and graduate students. One hour. Mr. Christensen.

381, 382 SELECTED PROBLEMS IN FORESTRY OR WILDLIFE SCIENCES Advanced readings, or a special investigation dealing with a topic beyond the scope of existing formal courses. *Prerequisite:* Undergraduate major in forestry or wildlife. Credit arranged. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credits as arranged.

V Geography

COLLEGE OF ARTS AND SCIENCES

Professor Miles (Chairman); Associate Professors Barnum, Gade, Meeks; Assistant Professors Lind, Wilvert; Instructor Grant.

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 HUMAN GEOGRAPHY Basic geographic concepts. The cultural diversity among people as it affects the organization and use of the environment. Three hours. Staff.

12 INTRODUCTION TO PHYSICAL GEOGRAPHY An analysis of the natural patterns of man's environment with particular attention to land-forms, climate, soil, vegetation and water resources. Three hours. Staff.

14 INTRODUCTION TO ECONOMIC GEOGRAPHY The types and distribution of economic activity with focus on agricultural and industrial resources and regions. Three hours. Staff.

33 WORLD GEOGRAPHY Survey of the major regions and nations of the world. Required of elementary education students. Not open to students who have taken Geography 11, 12. Three hours. I, II. Staff.

51 CLIMATE Temperature, precipitation, wind and pressure as elements of weather and climate, and the interaction of these elements with one another to produce world climate patterns. Weather instrument use and daily weather analysis to facilitate understanding of various climatic systems. *Prerequisite:* sophomore standing. Three hours. I, II. Mr. Lind.

71 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. Three hours. I, II. Mr. Barnum, Sister Grant.

101-109 REGIONAL COURSES The character and development of the contemporary cultural, economic, and political patterns of the area against the background of its physical and resource base. *Prerequisite:* six hours in the social sciences and sophomore standing.

101 GEOGRAPHY OF AFRICA Mr. Miles.

102 GEOGRAPHY OF CANADA Mr. Miles.

103 GEOGRAPHY OF USSR Mr. Meeks.

105 GEOGRAPHY OF EUROPE Mr. Barnum.

106 GEOGRAPHY OF LATIN AMERICA Mr. Gade.

107 GEOGRAPHY OF THE UNITED STATES Mr. Meeks.

108 GEOGRAPHY OF EAST ASIA Staff.

109 GEOGRAPHY OF SOUTH ASIA Staff.

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. *Prerequisite:* history 23 plus six additional hours in geography, history, or other social sciences. Three hours. Mr. 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:* history 12 plus six additional hours in geography or history. Three hours. Mr. Barnum.

211 GEOGRAPHIC ANALYSIS OF VERMONT A course emphasizing field studies, using the state and local area as an outdoor laboratory to indicate lines of geographic inquiry and to demonstrate methods and techniques of investigation into the human use of the earth. *Prerequisite:* junior standing and six hours in geography. Three hours. Staff.

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. Mr. Gade.

221 through 223 SPECIAL TOPICS IN REGIONAL GEOGRAPHY Specialized study of a particular region or parts thereof. *Prerequisite:* twelve hours in the social sciences including three in geography, senior standing and departmental permission. Three hours. Staff.

231 PHYSICAL AND RESOURCE GEOGRAPHY OF THE UNITED STATES The physical environmental patterns of the United States. Identification and analysis

of natural regions 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. Mr. Meeks.

244 ADVANCED ECONOMIC GEOGRAPHY The geographical aspects of the localization of economic activity, patterns of circulation, regional specialization and development. *Prerequisite*: Geography 14 and six additional hours in geography, economics or other social sciences. Three hours. Staff.

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. *Prerequisite*: Geography 11 and six additional hours in the social sciences. Three hours. Mr. Barnum.

257 POLITICAL GEOGRAPHY (Same as political science 257) Characteristics of the political unit as a geographic area. Consideration of location, resources, and the distributional relationships of the variety of cultural and human factors as they have a bearing on the structure and functioning of the modern political unit. Relationship between geopolitics and political geography. *Prerequisite*: twelve hours in geography and political science. Three hours. Mr. Miles.

258 SELECTED TOPICS IN POLITICAL GEOGRAPHY Advanced studies in political geography focusing primarily on contemporary world politics from a geographical and geopolitical viewpoint. *Prerequisite*: Geography/Political Science 257 and permission. Three hours. II. Mr. Miles.

262 CULTURAL GEOGRAPHY (Same as anthropology 262) The elements of the cultural landscape, their evolution and distribution, including settlement, technology, domesticated plants and animals; as well as the spatial implications of language, religion, and cultural attitudes. *Prerequisite*: Geography 11 and six additional hours in geography, anthropology, or other social sciences. Three hours. I. Mr. 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 and senior standing. Three hours. II. Mr. Gade.

271 ADVANCED CARTOGRAPHY The history and importance of cartography; contemporary developments; special laboratory projects. *Prerequisite*: Geography 71 and permission. Three hours. I, II. Mr. Barnum.

281 THE NATURE OF GEOGRAPHY The history, philosophy and structure of modern geography. *Prerequisite*: twelve hours in geography. Three hours. I. Staff.

285 SEMINAR IN HISTORICAL GEOGRAPHY Advanced studies and research in historical geography. *Prerequisite*: Geography/History 201, 202 or Geography 203, and permission. Staff.

381 through 383 ADVANCED READINGS AND RESEARCH Readings on research topics, with conferences and reports, to provide graduate students with background and specialized knowledge in an area not appropriately covered by an existing course. Credit as arranged. Staff.

391 through 393 **MASTER'S THESIS RESEARCH** Investigation of a research topic under the direction of an assigned staff member culminating in an acceptable thesis. Staff.

V Geology

COLLEGE OF ARTS AND SCIENCES

Associate Professors Hunt and Stanley (Chairman); Assistant Professors Bucke, Doolan, Drake and Wagner; Instructor Vollkommer; Adjunct Professor Johnson.

1 INTRODUCTORY GEOLOGY (3-2) Geological processes and agents and their effects on the materials, structure, and morphology of the Earth's crust. The origin and evolution of the Earth, continents, oceans, atmosphere and life. The interaction of man with his geologic environment will be stressed. Laboratory includes field trips, study of rocks and minerals, and interpretation of topographic and geologic maps. Three lectures, one laboratory per week. Four hours. Mr. Bucke.

11 INTRODUCTORY MINERALOGY (2-6) Study of the chemical and physical properties of minerals with special regard to their mode of origin. Laboratory stresses identification of minerals in hand specimen. Other techniques will be introduced. *Prerequisite:* 1, 42, or introductory courses in physics, or chemistry. Four hours. Mr. Drake.

25 ELEMENTARY FIELD GEOLOGY (1-9) Introduction to geologic mapping of bedrock terrains and glacial deposits with special emphasis on such environmental problems as water storage, mineral resources, land usage, and geologic hazards. Mapping will be problem oriented with sufficient flexibility to meet the needs of the student. *Prerequisite:* None. Four hours. Staff.

42 GEOLOGICAL OCEANOGRAPHY (3-0) An introduction to the geology of the ocean basins and shorelines, incorporating a study of processes which have controlled their evolution. The concepts of continental drift and sea floor spreading will be included. *Prerequisite:* 1 or an introductory course in science or engineering. Three hours. Staff.

101 ENVIRONMENTAL GEOLOGY (3-0) Evaluation of surface and sub-surface processes with emphasis on the nature of each process and the effect on earth materials and landforms. Consideration of geological information relevant to such environmental problems as natural resources, waste disposal, pollution, hazards and land development. *Prerequisite:* 1 or introductory courses in science, engineering, or permission of the instructor. Three hours. Mr. Wagner.

121 GEOLOGIC HISTORY OF LIFE (3-0) Survey of the origin, preservation, and diversification of ancient life as revealed through the geological record. The interaction of organisms with their environment and the effect that organisms have had on the evolution of the earth. *Prerequisite:* 1 or Biology 1, or equivalent. Three hours. Mr. Hunt.

130 GEOLOGY OF MINERAL RESOURCES (2-3) The origins, forms, and classifications of mineral deposits. The world location, occurrence and production of major mineral products. *Prerequisite*: 1. Three hours. Staff.

145 OPTICAL MINERALOGY (1-6) The study of the optical properties of minerals by means of the polarizing microscope with emphasis on determinative techniques and problem oriented studies. *Prerequisite*: 11 (may be taken concurrently). Three hours. Mr. Doolan.

155 SEDIMENTARY PETROLOGY (1-6) Origin, identification, and basis for classification of sedimentary rocks, with emphasis on interpretation of depositional and post-depositional environments. Laboratories present various methods utilized in rock analysis. *Prerequisite*: 11. Three hours. Mr. Hunt, Mr. Bucke.

156 IGNEOUS AND METAMORPHIC PETROLOGY (2-3) The origin and analysis of igneous and metamorphic rocks. Laboratory work is problem oriented and stresses modern approaches to petrologic problems. *Prerequisite*: 145. Four hours. Mr. Doolan.

161 INTRODUCTORY METEOROLOGY (see p. 206).

166 STRUCTURAL GEOLOGY (2-3) Behavior of rocks in different tectonic environments of the earth's crust. Laboratory studies of rock deformation, description and geometry of structural types, and the kinematic and dynamic interpretation of structural features of all sizes. *Prerequisite*: 1, 42, or 101. Three hours. Mr. Stanley.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 RESEARCH IN GEOLOGY (0-2) Individual research supervised by a member of the staff. Discussions and readings are designed to deepen a student's knowledge in a selected field of geology. Students from the allied sciences, mathematics, and engineering who have taken several of the required courses of the geology major may elect a research problem that combines their major field of study and geology. Written and oral research reports required. *Prerequisite*: consultation with the staff. Three hours.

212 ADVANCED MINERALOGY (2-3) A discussion of the crystallographic, chemical, and physical properties of the common rock forming minerals. Laboratory is problem oriented and stresses techniques involved in mineral identification and the analysis of mineral assemblages. *Prerequisite*: 11. Three hours. Mr. Drake.

216 GLACIAL GEOLOGY (2-3) The Quaternary history of North America with emphasis on the origin, mechanics, and effects of past and present glaciations. *Prerequisite*: junior standing or above. Three hours. Mr. Wagner. Alternate years, 1970-71.

218 HYDROGEOLOGY (3-0) The origin, occurrence, movement, and character of ground water in various geologic environments, principles and practices of development, utilization, and management of ground water supplies. *Prerequisite*: junior standing or above. Three hours. Mr. Wagner. Alternate years, 1970-71.

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. Discussion will be complemented by field trips and guest speakers. *Prerequisite:* 101, or by permission of the instructor. Three hours. Mr. Wagner.

222 INVERTEBRATE PALEONTOLOGY (2-3) Classification, geological distribution, evolution, and morphology of major invertebrate fossil groups. Consideration given to correlation and environmental interpretation. Laboratory includes methods of collecting, preparing, and identifying fossils. *Prerequisite:* 121, or equivalent. Three hours. Mr. Hunt.

224 STRATIGRAPHY (2-2) Sequential development and distribution of the sedimentary rocks. *Prerequisite:* 155. Three hours. Mr. Bucke. Alternate years, 1971-72.

238 FIELD GEOLOGY (1-6) Geologic mapping of nearby areas. Methods of analysis of field data, structural features in sedimentary, metamorphic, and igneous rocks, and stratigraphic principles. Held in late May and early June. *Prerequisite:* 166 or departmental permission. Four hours. Mr. Stanley.

242 REGIONAL GEOLOGY (3-0) Comprehensive study of the geology and sequential development of selected regions of the earth's crust. *Prerequisite:* 156 (or concurrent enrollment), 166, 238. Three hours. Mr. Stanley.

245 GEOLOGY OF NEW ENGLAND (3-0) Comprehensive study of the geology of New England with emphasis on the spatial and temporal relationships to the eastern part of the North American continent. *Prerequisite:* 166, or 156, or 224. Three hours. Mr. Stanley.

253 PHASE EQUILIBRIUM IN MINERAL ASSEMBLAGES (2-3) The application of the thermodynamics and graphical methods to the analysis of multicomponent, polyphase systems of mineralogical interest. *Prerequisite:* 212, or 156 desirable, or by permission of the instructor. Three hours. Mr. 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:* 212, or 155, or 156, or by permission of the instructor. Three hours. Mr. Drake.

256 CRYSTAL CHEMISTRY (2-3) A discussion of crystal symmetry, polymorphism, order-disorder, cation distribution and chemical variation in mineral systems and the genetic significance thereof. *Prerequisite:* 11 and Chemistry 1-2 or permission of the instructor. Three hours. Mr. Drake.

271, 272, 273, 274 TOPICS IN GEOLOGY (1-0) Selected topics of current interest. *Prerequisite:* 156, 166. One hour. Staff.

310 CLAY MINERALOGY 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 the instructor. Three hours. Mr. Bucke.

321 IGNEOUS GEOLOGY (2-3) Paragenesis of igneous rocks investigated through chemical and petrographic approaches; laboratory work on selected

suites of specimens. *Prerequisite*: 156 or equivalent. Three hours. Mr. Doolan. Alternate years, 1970-71.

324 METAMORPHIC GEOLOGY (2-3) The origin of metamorphic rocks with emphasis on the concepts of metamorphic facies, analysis and interpretation of mineral assemblages and the relationship of metamorphism to tectogenesis. *Prerequisite*: 156 or equivalent. Three hours. Mr. Doolan and Mr. Drake. Alternate years, 1970-71.

326 SEDIMENTARY PETROLOGY (2-3) Origin and interpretation of sedimentary rocks. Topics include mechanics of transportation and deposition, recent depositional environments, interpretation of surface textures, methods of statistical analysis, theoretical aspects of rock classification, and sedimentary tectonics. Thin section study and individual projects. *Prerequisite*: 105, 106 Three hours. Mr. Hunt.

330 ADVANCED GEOMORPHOLOGY (2-3) Examination of stream, wind, glacier, and wave mechanics and the resultant land forms. Emphasis is given to recent field and laboratory studies. Three hours. Mr. Wagner.

335 ADVANCED STRUCTURAL GEOLOGY (2-3) The geometric relationship and origin of various structural features in the different tectonic environments of the earth's crust. Emphasis is placed on field investigations, laboratory results, and theoretical models that provide insight into the deformation behavior of rocks in different parts of the earth's crust and the relationship between geologic structure and the dynamic configuration in which they have formed. *Prerequisite*: 116. Three hours. Mr. Stanley.

337 STRUCTURAL PETROLOGY (3-0) Origin of strain features in common rock forming minerals with emphasis on their dynamic and kinematic interpretation as based on laboratory and field studies since World War II. Laboratory will be problem oriented with emphasis on techniques of analyses including orientation and universal stage procedures, use of computers in the rotation of data, and methods of interpretation. *Prerequisite*: Geology 116 and Optical Mineralogy. Will alternate with Advanced Structural Geology 335. Mr. Stanley.

342 ADVANCED PALEONTOLOGY (2-3) Problems in biogeology, paleoecology, and biostratigraphy. The use of fossils in determining the origin, depositional environment, and age of rocks. Consideration is given to biogenic sedimentation, to taxonomic, adaptive, and biogeographic methods of paleoecological interpretation, and to geochronologic measures. *Prerequisite*: 121. Three hours. Mr. Hunt.

371, 372 ADVANCED READINGS IN GEOLOGY Readings and research problems intended to contribute to the program of graduate students in phases of geology for which formal courses are not available. *Prerequisite*: graduate standing in geology. One to three hours. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

V German

COLLEGE OF ARTS AND SCIENCES

Professors Webster (Chairman) and White; Associate Professor Kahn; Assistant Professors Paucker, Richel and Wurthmann; Instructor Ganz.

1-2 **ELEMENTARY GERMAN** Emphasis on the spoken language of everyday use. Oral and written practice in speaking, reading, and comprehension, based on memorization of texts in the form of dialogues. Tape recordings are used in the language laboratory as aids to speaking and comprehension. Four hours. Staff.

11, 12 **INTERMEDIATE GERMAN** Reading and discussion, as far as possible in German, of selected prose with review of grammar. Emphasis on development of facility in reading; knowledge of idioms; auditory comprehension. *Prerequisite:* 1-2 or equivalent for 11; 11 for 12. Three hours. Staff.

13, 14 **INTERMEDIATE GERMAN** Composition and Conversation. Guided conversation, discussion and written work leading to free composition and oral presentations. Subject matter based on readings in texts, current events and other subjects. Grammar review to support work in oral and written expression. *Prerequisite:* 13 or 11 for 14. Three hours. Mr. Kahn.

15, 16 **INTERMEDIATE GERMAN** Introduction to Technical German. Reading technical expository prose of moderate difficulty. Emphasis on developing fluency in reading types of prose useful for graduate work and research in the humanities and sciences. Some opportunity is provided for students to read in the fields of their own interest. *Prerequisite:* 1-2 or equivalent; 15 for 16. Three hours. Messrs. White and Wurthmann.

81, 82 **SCIENTIFIC GERMAN** Development of ability to read accurately and efficiently original German in the field of each student's scientific interest. *Prerequisite:* 16 or equivalent. Three hours. Mr. Wurthmann.

101, 102 **INTRODUCTION TO GERMAN LITERATURE** Selected works of Lessing, Goethe, and Schiller. Survey of the development of German literature from the beginnings to the twentieth century. *Prerequisite:* 12 or 14 or equivalent. Three hours. Mr. Webster.

121, 122 **COMPOSITION AND CONVERSATION** Guided conversation, discussion, and oral and written drill in German with emphasis on increasing oral and written command of the language. Free composition, oral reports, and translation into German are required. *Prerequisite:* 12 or 14 or equivalent and departmental permission. Three hours. Mr. Wurthmann.

193, 194 COLLEGE HONORS

195, 196 **SPECIAL TOPICS** Advanced study in accordance with students' needs and interests. *Prerequisite:* 101, 102 or the equivalent and departmental permission. Three hours. Staff.

197, 198 READINGS AND RESEARCH.

205, 206 **GOETHE** Life and works of the poet through the Italian journey (205). Goethe in the years of his maturity: 1790-1832 (206). *Prerequisite:* 101, 102 or the equivalent. Three hours. Messrs. Webster and White. 1971-72.

207 **NINETEENTH-CENTURY PROSE** Masterpieces of narrative prose by representative authors such as Mörike, Keller, O. Ludwig, C. F. Meyer, Stifter, Raabe, and the early Thomas Mann. *Prerequisite:* 101, 102 or the equivalent. Three hours. Staff.

208 **NINETEENTH-CENTURY DRAMA** Works by Kleist, Büchner, Grillparzer, Hebbel, O. Ludwig, Wagner, and the early Hauptmann. *Prerequisite:* 101, 102 or the equivalent. Three hours. Staff.

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 the equivalent. Three hours. Staff. Alternate years, 1971-72.

221, 222 **ADVANCED COMPOSITION AND CONVERSATION** Guided conversation, discussion and advanced oral and written drill in German. Study of modes of expression and stylistic devices of modern German based on analysis of selected texts. Problems in translating literary and technical English prose into German. *Prerequisite:* 121, 122 or equivalent. Three hours. Mr. Kahn.

232 **HISTORY OF THE GERMAN LANGUAGE** Introduction to Germanic linguistics, the comparative method, and linguistic reconstruction. The development of German from Indo-European to the present. No knowledge of the older stages of the language is presupposed or required. *Prerequisite:* 121, 122 or the equivalent. Three hours. Mr. White.

235 **THE STRUCTURE OF GERMAN** Linguistic analysis of the phonological, morphological, and syntactic structure of modern German with special attention to problems useful for teachers. *Prerequisite:* 121, 122 or the equivalent. Three hours. Mr. White.

281, 282 **SENIOR SEMINAR** Readings and research. Required of all senior concentrators. One hour.

305 **SCHILLER** Life and major works of the poet, including drama, poetry, aesthetic and philosophical writings. Three hours. Mr. Paucker.

322 **BRECHT AND THE MODERN DRAMA** Brecht's major dramas, as well as selected theoretical writings. Analysis of his concept of modern theater and its influence on contemporary German playwrights. Readings to include Dürrenmatt, Weiss and others. Three hours. Miss Richel.

381, 382 **GRADUATE SEMINAR** Readings, conferences, and reports in connection with the work of candidates for the M.A. degree. Three hours.

391 through 393 **MASTER'S THESIS RESEARCH** Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

V Hebrew

COLLEGE OF ARTS AND SCIENCES

Associate Professor Kahn

1-2 **ELEMENTARY HEBREW** The spoken language of everyday use with oral, aural and written practice in speaking, reading, and comprehension based on memorization of texts in the form of dialogues. Four hours. Mr. Kahn. Alternate years, 1971-72.

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. Mr. Kahn. Alternate years. 1972-73.

V History

COLLEGE OF ARTS AND SCIENCES

Professors Bliss, Daniels, Davison, Evans (Emeritus), Felt (Chairman), Hand, Rollins, and Schultz; Associate Professors Metcalf,¹ Spinner, and Stout²; Assistant Professors Andrea, Fackler, Gard, Hutton, Muller, Overfield, Seybolt, Steffens, and True; Adjunct Professor Morrissey; Instructors Carlson, Stoler, and Young.

All advanced courses numbered 100 or above have the prerequisite of a specific survey course. CEEB and Advanced Placement tests may in some cases be accepted instead, with the permission of the instructor concerned. Courses numbered 200 or above have the further prerequisite of six additional hours of history or other social science, together with junior standing or permission of the instructor. The first semester of any two-semester course is prerequisite for the second semester, except by permission of the instructor.

11, 12 **EUROPEAN CIVILIZATION** History of Europe, 1500 to the present. Three hours. Messrs. Andrea, Gard, Hutton, Metcalfe, Overfield, Schmokel, Seybolt, Spinner, Steffens, and Young.

17 **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 or 107 may not take History 17.) Three hours. Mr. Bliss.

18 **MEDIEVAL EUROPEAN CIVILIZATION** A survey of European civilization from the dissolution of the Roman Empire in the West to the rise of Renaissance humanism. Three hours. Mr. Andrea.

23, 24 **HISTORY OF THE UNITED STATES** American history since 1783. *Prerequisite:* sophomore standing. Three hours. Messrs. Carlton, Felt, Hand, Morrissey, Muller, Schultz, Stoler, Stout, and True.

1. On leave, 1970-1971.

51, 52 CONTEMPORARY HISTORY Survey of recent world events: first semester, 1918-1945; second semester, 1945 to the present. *Prerequisite*: sophomore standing. Three hours. Messrs. Gard and Seybolt.

61, 62 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. *Prerequisite*: sophomore standing. One year of science is desirable. Three hours. Mr. Steffens.

71, 72 ASIAN CIVILIZATION Survey of the history of the principal civilizations of Asia, from ancient times to the twentieth century. First semester: the Moslem world and India; second semester: the Far East and Southeast Asia. *Prerequisite*: sophomore standing. Three hours. Messrs. Gard and Seybolt.

91 HISTORIOGRAPHY An introduction to the mechanics of historical research and to the writings of great historians. Strongly recommended for students concentrating in history. *Prerequisite*: six hours of history. Three hours. I, II. Staff.

105 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 particular emphasis on the archaeological evidence. *Prerequisite*: six hours of history. Three hours. Miss 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. (Students who have already taken History 31 may not take History 106.) *Prerequisite*: six hours of history, or concurrent enrollment in Latin or Greek. Three hours. Miss 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. (Students who have already taken History 32 may not take History 107.) *Prerequisite*: six hours of history, or concurrent enrollment in Latin or Greek. Three hours. Miss Davison.

115, 116 AFRICAN HISTORY Survey of the history of Africa south of the Sahara, from earliest times to independence. First semester: to 1880; second semester: 1880 to the present. *Prerequisite*: 11 and 12; geography 101 recommended. Three hours. Mr. Schmokel.

123 AMERICAN HISTORY SINCE 1945 Survey of recent developments in the United States not covered in detail in 24, with emphasis on the nature of contemporary source materials. *Prerequisite*: 23 and 24. Three hours. Mr. Hand.

125 HISTORY OF THE NEGRO IN THE UNITED STATES 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. *Prerequisite*: 23 and 24, or appropriate work in social science. Three hours. Mr. Felt.

140 BIOGRAPHY Especially designed as an accelerated course of benefit to seniors in disparate fields of specialization (English, foreign languages, the sciences, mathematics, as well as the social sciences), readings in the history

and criticism of biography, the role of the individual in history, and biographies of individuals. *Prerequisite*: senior standing. Three hours. Mr. Schultz.

191 READINGS FOR DEPARTMENTAL HONORS For seniors concentrating in history only. (Candidates should consult the chairman of the Department at the time of spring enrollment. Students accepted will do their readings between November and March; official enrollment will be in the spring semester.) *Prerequisite*: an 80 average through the junior year and an 85 average in at least eighteen hours of history; completion of at least six hours of history numbered above 200. Three hours. Staff.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH

201 HISTORICAL GEOGRAPHY OF THE U.S. Three hours. See geography 201.

202 HISTORICAL GEOGRAPHY OF EUROPE Three hours. See geography 202.

203 LATIN AMERICAN HISTORY The Spanish Empire in America including the Indian heritage, the conquest, economic, social and political trends within the empire, and the struggles for independence. *Prerequisite*: 204 or permission of the instructor. Reading knowledge of Spanish strongly recommended. Three hours. Mr. True. (To be given in alternate years, spring semester.)

204 LATIN AMERICAN HISTORY An introduction to the history of modern Latin America. The political, social and economic development of selected countries since 1826. *Prerequisite*: sophomore standing. Three hours. Mr. True.

205 HISTORY OF MEXICO Concentrates on the political, social, and economic development of Mexico since 1810. *Prerequisite*: 204, or the permission of the instructor. Reading knowledge of Spanish strongly recommended. Three hours. Mr. True. (To be given in alternate years, spring semester.)

207 THE EARLY MIDDLE AGES Western Europe from the late Roman Empire to the death of Otto III (A.D. 1002). Emphasis on political, social, and ecclesiastical developments. *Prerequisite*: sophomore standing. History 18 suggested, but not required. Three hours. Mr. Andrea.

208 THE HIGH MIDDLE AGES Western Europe, 1000-1300. Emphasis on religious, intellectual, and artistic developments. *Prerequisite*: sophomore standing. History 18 suggested, but not required. Three hours. Mr. Andrea.

211 THE RENAISSANCE Political, economic, and cultural developments in Europe, c. 1250 to c. 1517, with emphasis on the developments in Italy. *Prerequisite*: 11, or 34. Three hours. Mr. Overfield.

212 THE REFORMATION Political, economic, and cultural developments in Europe in the sixteenth century, with particular attention to the religious movements, and to the evolution of Northern European humanism. *Prerequisite*: 11. Three hours. Mr. Overfield.

213, 214 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.

turalism. *Prerequisite:* sophomore standing. Three hours. Messrs. Metcalfe, Muller, and Young.

221 THE AMERICAN COLONIES The colonial period of American history from the earliest explorations to 1763. *Prerequisite:* 11. Three hours. Messrs. Carlson and Stout.

222 THE AMERICAN REVOLUTION History of the War for Independence, the confederation, and the making of the U.S. Constitution, 1763-1789. *Prerequisite:* 221. Three hours. Messrs. Carlson and Stout.

226 THE MIDDLE PERIOD OF U. S. HISTORY History of the U. S., 1815-1856, with emphasis on political and social development. *Prerequisite:* 23 and 24. Three hours. Mr. Fackler.

231, 232 FRENCH HISTORY France in modern times. Emphasis on the French Revolution and the French Revolutionary Tradition. First semester: seventeenth century to 1815; second semester: 1815 to the present. *Prerequisite:* 11 and 12. Three hours. Mr. Hutton.

233, 234 GERMAN HISTORY History of Germany in modern times; first semester: seventeenth century to 1850; second semester: 1850 to the present. *Prerequisite:* 11 and 12. Three hours. Messrs. Overfield and Schmokel.

235, 236 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 Nineteenth Century (1800-1914). *Prerequisite:* 11 and 12. Three hours. Messrs. Hutton and Overfield.

237 ECONOMIC HISTORY OF PRE-INDUSTRIAL EUROPE Development of economic institutions and technology from the late Roman Empire to the eighteenth century. For the economic history of Modern Europe see economics 238. *Prerequisite:* 11 and 12, and economics 12 (one of the prerequisites may be taken concurrently). Three hours. Mr. Hunt. (For ECONOMIC HISTORY OF EUROPE SINCE THE INDUSTRIAL REVOLUTION, see economics 238.)

240 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. *Prerequisite:* 23 and 24, and junior standing. Three hours. Mr. Schultz.

243 SOVIET RUSSIA The USSR from the Revolution of 1917 to the present. A general introduction to the study of Russia and Communism, including historical and ideological background, Soviet political, economic, and cultural institutions. *Prerequisite:* 11 and 12, or 52. Three hours. Mr. Daniels.

244 TSARIST RUSSIA History of Russia from the Middle Ages to the revolutionary period, with emphasis on the period since Peter the Great. *Prerequisite:* 11 and 12. Three hours. Mr. Gard.

253, 254 ENGLISH HISTORY Political and social history of England. First semester: Middle Ages and Tudor-Stuart; second semester: 1715 to the present. *Prerequisite:* 11 and 12. Three hours. Messrs. Metcalfe and Spinner.

257, 258 AMERICAN STATESMEN Thought and practical politics of American statesmen. First semester: 1783-1850; second semester: since 1850. *Prerequisite*: 23 and 24. Three hours. Mr. Schultz.

259 THE LINCOLN ERA A history of the United States, 1830-1865, with emphasis on the sectional conflict of the 1850's, the Civil War, and the life of Lincoln. *Prerequisite*: twelve hours of history, including 23 or its equivalent. Three hours. Mr. Schultz.

261 VERMONT HISTORY A survey of Vermont History from early times to the present, with special emphasis on local history as a means to examine national trends and as a vehicle for research. *Prerequisite*: 23 and 24. Three hours. Mr. Muller.

263, 264 SOCIAL HISTORY OF THE U.S. Selected topics in the history of American society, including social movements, rural history, or urban history. *Prerequisite*: 23 and 24, or appropriate work in social science. Three hours. Mr. Fackler.

265, 266 INTELLECTUAL HISTORY OF THE UNITED STATES Selected topics in the intellectual history of the United States since 1783. *Prerequisite*: 23 and 24, or appropriate work in another discipline. Three hours. Mr. Felt.

267, 268 HISTORY OF U.S. FOREIGN RELATIONS International relations from the eighteenth century to the present, with major emphasis on the foreign policies of the United States. First semester: 1763-1893; second semester: 1893-present. *Prerequisite*: 11 and 12, or 23 and 24. Three hours. Mr. Stoler.

271, 272 HISTORY OF MODERN CHINA History of China in modern times, including the Empire, the Western impact, the Revolutions of the 20th century, and the Communist regime. *Prerequisite*: 72 or equivalent preparation. Three hours. Mr. Seybolt.

277 SOVIET POLITICS (Same as Political Science 277) An intensive historical and institutional study of the Soviet government and Communist Party, mainly treating the period since 1953. Application of sociological and biographical analysis and data-processing techniques. Comparative treatment of other Communist systems. *Prerequisite*: History 243, or Political Science 172, or Economics/Political Science 258. Three hours. Mr. Daniels.

278 FOREIGN POLICY OF THE USSR (Same as political science 278). Theoretical background; history of Soviet foreign relations; development of the international Communist movement and the Communist bloc; factors and instruments of policy; current problems of relations between Russia and the West among the Communist countries. *Prerequisite*: 243 or six hours of political science including 51, and one other year course in social science. Three hours. Mr. Daniels.

289 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. *Prerequisite*: Math 110 or equivalent work in statistics, and six hours of advanced work in history or social science. Three hours. Mr. Fackler.

301 HISTORIOGRAPHY Techniques of historical research and the development of the various philosophies of history. (Designed to provide a professional orientation for graduate students.) Required for all beginning graduate students. Three hours. Mr. Felt.

Seminar Courses: Ordinarily each seminar will be given for one semester in alternate years. All seminars will count for three credit hours per semester. The prerequisites for each seminar are appropriate work in the given field, foreign language where necessary, and permission of the instructor. Exceptionally qualified senior undergraduates will be admitted to seminars when space permits.

303, 304 LATIN AMERICAN HISTORY Mr. True.

305, 306 ANCIENT HISTORY Miss Davison.

307, 308 MEDIEVAL HISTORY Mr. Andrea.

311, 312 THE HISTORY OF EARLY MODERN EUROPE Mr. Overfield.

313, 314 THE HISTORY OF CANADA Mr. Metcalfe, Mr. Muller.

321, 322 AMERICAN COLONIAL HISTORY Mr. Stout.

326 MIDDLE PERIOD OF U.S. HISTORY Mr. Fackler.

331, 332 THE HISTORY OF FRANCE Mr. Hutton.

333, 334 THE HISTORY OF GERMANY Mr. Overfield, Mr. Schmokel.

335, 336 INTELLECTUAL HISTORY OF MODERN EUROPE Mr. Hutton, Mr. Overfield.

343, 344 THE HISTORY OF RUSSIA Mr. Daniels, Mr. Gard.

353, 354 THE HISTORY OF ENGLAND Mr. Metcalfe, Mr. Spinner.

355, 356 RECENT EUROPEAN HISTORY Mr. Schmokel and staff.

357, 358 U.S. POLITICAL HISTORY Mr. Hand, Mr. Schultz.

361, 362 STATE AND LOCAL HISTORY Mr. Morrissey, Mr. Muller.

363, 364 SOCIAL HISTORY OF THE U.S. Mr. Fackler.

365, 366 AMERICAN INTELLECTUAL HISTORY Mr. Felt.

367, 368 THE HISTORY OF U.S. FOREIGN RELATIONS

377, 378 SPECIAL TOPICS Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of an individual research topic. Required of all candidates for the M.A. Normally arranged for two semesters at three hours each. Staff.

397, 398 SPECIAL READINGS AND RESEARCH Readings or research topics with conferences and reports, to provide graduate students with background and specialized knowledge in an area not appropriately covered by an existing course. Three hours. Staff.

Home Economics

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professors Grams, Morse; Associate Professors Brown, Caldwell, Knowles, Powell, Webster, Williams (Chairman); Assistant Professors Atwood, J. Emanuel, Hand,¹ Jameson, Lepeschkin, Livak, Prior, and Whittlesey; Instructors Howard,¹ McKay, Osborn, Pooley, Soule, and F. Emanuel; Visiting Professor Groves²; Lecturers Keyser and Spaven.

1 HOME ECONOMICS IN THE LAND-GRANT COLLEGE Teaching, research, and extension. The historical development of the field, its common core of family and individual, and the professional opportunities which are available. 1 hour. Staff.

Related Art

15 DESIGN (1-4) Color and design in theory and practice. Work with various media as a means of creative expression and understanding of art principles. Three hours. I, II. Miss Caldwell.

16 SKETCHING FOR FASHION AND HOUSING DESIGN (1-4) Sketching the human figure in poses and in action. Orthographic and perspective drawing. Rendering in various media. *Prerequisite:* 15. Three hours. Miss Atwood.

17 COSTUME DESIGN (1-4) Application of design fundamentals and principles to fashion planning. Techniques of fashion illustration. *Prerequisite:* 15. Three hours. Miss Caldwell.

115 TEXTILE DESIGN (1-4) Application of design elements and principles to processes of textile design. The Shelburne Museum collection will provide resources for research. *Prerequisite:* 15, 20; or art 10 and departmental permission. Three hours. Miss Atwood.

116 WEAVING (1-4) Practical application of design fundamentals in the creation of woven textiles. Opportunity will be provided to use the Shelburne Museum textile collection. *Prerequisite:* 15, 20; or art 10 and departmental permission. Three hours. Miss Atwood.

117 HISTORY OF COSTUME (2-2) History of costume stressing the background, philosophy and events of each period as reflected in dress. Adaptation of historic design to modern fashion. *Prerequisite:* history 12. Three hours. Miss Caldwell.

119 INTERIOR DESIGN I (1-4) Application of design fundamentals to the problems involved in furnishing the home. *Prerequisite:* 15. Three hours. Miss Caldwell.

S217 AMERICAN TEXTILES AND FASHION: TWO CENTURIES—18th Century to 1910. The collections of textiles and needle art in the Shelburne Museum will provide source material for lectures, demonstrations and laboratory experience in the study of home production, design and use of early fabrics. The

1. Part time, first semester, 1970-71.
2. First Semester, 1970-71.

Museum's extensive collection of Couturier gowns will be used for the study of late Victorian and Edwardian fashion. *Prerequisite:* six hours in design and/or textiles, or permission of instructors. Three hours. Misses Atwood and Caldwell.

219 INTERIOR DESIGN II (1-4) Interior design; period furnishing, its present use and influence upon modern furnishing. *Prerequisite:* 119. Three hours. Miss Caldwell.

Clothing and Textiles

20 INTRODUCTION TO TEXTILES AND CLOTHING (3-1) Fibers, their properties and manufacturing processes. Selection of clothing to meet consumer needs in relation to material, design and appropriateness. Three hours. I, II. Mrs. Emanuel.

22 CLOTHING SELECTION AND CONSTRUCTION (1-4) Selection of clothing to meet individual needs in relation to design and appropriateness of dress. Development of clothing construction techniques. Three hours. Staff.

120 ADVANCED TEXTILES (2-3) Physical and chemical properties of fibers in relation to fabric characteristics. Technological developments in fabric formation, dyes and finishes. Testing techniques. *Prerequisites:* H.E. 20, chemistry 16. Three hours. Mrs. Emanuel.

122 PATTERN DESIGN AND ADVANCED CONSTRUCTION (2-4) Techniques of designing and altering flat patterns. Advanced construction techniques and original design. *Prerequisite:* 22. Three hours. I, II. Mrs. Webster.

123 TAILORING (2-4) Construction techniques with emphasis on tailoring problems. *Prerequisite:* 122. Three hours. Mrs. Webster.

221 COSTUME DESIGN AND DRAPING (1-4) Draping techniques used in creative fashion design. Handling of fabrics in relation to line in dress. Original projects developed according to individual interests. *Prerequisite:* 15, 122. Three hours. Mrs. Webster.

229 CLOTHING, TEXTILES AND RELATED ART SEMINAR Theory and research in the field of Clothing, Textiles and Related Art, analysis of current problems; review and discussion of recent research, books and publications; individual studies. *Prerequisite:* 117, 219, 221, or equivalent. Three hours. Staff.

Human Nutrition and Food

35 BASIC CONCEPTS OF NUTRITION (3-0) Principles of nutrition for the individual related to growth and health. Three hours. I, II. Mrs. Livak.

41 FUNDAMENTALS OF NUTRITION Basic principles of nutrition. Nutrient content of foods. Practice in recording and evaluating dietary intake of individuals. *Prerequisite:* chemistry 4, zoology 6. Three hours. Miss Powell.

135 ADVANCED FOOD PREPARATION (2-4) Scientific principles and fundamental processes underlying food preparation and preservation with practical application. *Prerequisite:* 35, chemistry 16 or 131. Four hours. I, II. Mrs. Livak.

137 MEAL MANAGEMENT (1-5) Principles and practice in planning, preparing and serving family meals at different cost levels. *Prerequisite:* 35. Three hours. I, II. Mrs. Soule, Mrs. Hand.

144 APPLIED NORMAL NUTRITION (2-2) Emphasizing nutritional needs of individuals in all stages of the life cycle. Attention is given to the social, economic and cultural factors which affect nutrient intake. Selected field experience. *Prerequisite:* 35, junior standing. Three hours. I, II. Miss Powell.

S235 RECENT ADVANCES IN FOOD AND NUTRITION Interpretation, application and communication of the recent trends in Foods and Nutrition as evidenced through current literature and research. *Prerequisite:* 35, 135, 137, or equivalent; chemistry 1 and 2, or 3 and 4. Three hours. Staff. (Summer Session or Evening Division only.)

236 INTRODUCTION TO FOOD RESEARCH (1-4) Methods and techniques in experimental work in foods. Independent laboratory study of problems in food preparation. *Prerequisite:* 135. Three hours. Mrs. Livak.

237 READINGS IN FOODS Critical survey of the literature on the recent developments in food research. *Prerequisite:* senior standing; 135. Two or three hours. Staff.

238 WORLD DIETARY PROBLEMS (3-0) The complex interrelationships which are responsible for the nutritional status of persons living in selected countries. A background for the understanding of the causes of malnutrition in various areas of the world and the study of the techniques used, and agencies working to alleviate the problems. *Prerequisite:* 135, 144; sociology 21, or departmental permission. 3 hours. Miss Williams.

240 METHODS IN NUTRITION EDUCATION (3-0) Problems common to nutrition educators in schools, hospitals, and the community. Individual investigation of a problem selected to meet the special needs of students. *Prerequisite:* college course in nutrition or departmental permission. Three hours. Staff. (Graduate credit pending.)

243 ADVANCED NUTRITION (3-0) Review of relevant biochemical and physiological material as applied to human nutrition and metabolism. Individual projects. *Prerequisites:* general biochemistry 201, zoology 6. Three hours. Miss Morse and Mr. Keyser.

244 DIET THERAPY (4-0) Adaptations of the normal diet in conditions affected by or affecting the utilization of food. *Prerequisite:* 243. Four hours. Miss Powell.

248 READINGS IN NUTRITION Critical survey of the literature on recent developments in nutrition. *Prerequisite:* 243, or departmental permission. Two or three hours. Staff.

249 NUTRITION SEMINAR A review of the recent developments in human nutrition in reference to the individual and to the nutritional problems on a world-wide basis. *Prerequisite:* a college course in principles of nutrition. Two or three hours. Staff.

294 HISTORY OF NUTRITION Foremost investigators and methods involved in the development of present day nutritional knowledge. *Prerequisite:* three hours of nutrition. One hour. Staff.

307 ADVANCED CONCEPTS IN NUTRITION See animal science 307. Three hours. Staff.

308 EXPERIMENTAL TECHNIQUES IN NUTRITION See animal science 308. Two hours. Staff.

Institutional Food Service

138 QUANTITY FOOD PRODUCTION AND SERVICE (3-4) Equipment; sanitation; time and motion; practical applications of principles, methods, and techniques used in quantity food production and service in different types of food service establishments. *Prerequisite:* 135. Five hours. Mr. Emanuel.

139 INSTITUTIONAL PURCHASING AND FOOD COST CONTROL (3-0) Principles of institutional purchasing, accounting, food cost control, and menu planning. *Prerequisite:* 135. Three hours. Mr. Emanuel.

239 INSTITUTIONAL ORGANIZATION AND MANAGEMENT (3-0) Institutional organization and management; personnel policies; laws and regulations; promotion and advertising. *Prerequisite:* 138, 139, or equivalent. Three hours. Mr. Emanuel.

Housing

51 FAMILY HOUSING SELECTION A study of the problems involved in selecting an adequate and suitable living environment for families including site location, financing, structure and space design. Three hours. Miss Knowles.

52 SOCIO-ECONOMIC ASPECTS OF HOUSING The housing needs of families including low income, elderly, physically handicapped and minority groups; how the needs are being met by the current housing supply; programs devised to aid housing problems. Three hours. Miss Knowles.

54 HOUSEHOLD EQUIPMENT (2-2) Application of scientific principles to the selection, operation and care of household equipment. Three hours. Miss Knowles.

151 HOUSE PLANNING (1-4) An advanced study of housing design to meet family requirements, application of home management principles. *Prerequisite:* 51, 56. Three hours. Miss Knowles.

155 EXPERIMENTAL EQUIPMENT (1-4) Performance measurement and rating of household equipment. *Prerequisite:* 54. Three hours. Miss Knowles.

251 ADVANCED HOUSING Investigation of housing data and current problems including studies of environmental factors, technological developments and governmental programs. *Prerequisite:* 51; economics 12 and sociology 21. Three hours. Miss Knowles.

Family Resource Management

56 PRINCIPLES OF HOME MANAGEMENT Family and individual management techniques. Application to use of time, energy and money. Introduction to consumer economics. Three hours. Mrs. Soule, Mrs. Howard.

156 HOME MANAGEMENT RESIDENCE Practical application of home management and group living in the Home Management Residence. Students are charged for room rent and board proportional to that paid by students in University residence halls. *Prerequisite:* 56, 137. Three hours. I, II. Mrs. Soule, Mrs. Howard.

158 CONSUMER PROBLEMS Role of the consumer in the economy, problems in modern buyer/seller relationships; institutions and agencies providing information and protection to the consumer. Lecture, readings, demonstration problems. *Prerequisite:* junior or senior standing. Three hours. Mrs. Prior.

256 HOME MANAGEMENT PROBLEMS Application of economic and sociological principles to some problems of the home and family. *Prerequisite:* 56; economics 12; psychology 1. Three hours. Staff.

258 FAMILY ECONOMICS The American family as a socio-economic unit: acquiring resources, managing current consumption, planning for future consumption. *Prerequisite:* 56; economics 3 or 12. Three hours. Staff.

301 READINGS IN FAMILY ECONOMICS Critical survey of the literature and of recent research in Family Economics. *Prerequisite:* 258. Statistical Methods and one other advanced economics course (may be taken concurrently). Three or four hours. Staff.

Family Living-Human Development

61 THE FAMILY, COMMUNITY AND PRESCHOOL The family as a basic social unit and its interrelationships with the community and school. Three hours. Mrs. Jameson.

63 HUMAN DEVELOPMENT AND PERSONALITY (I) The biological, psychological, and social growth and development of the child and his relationships with his family, peers and institutions. Observation in the preschool laboratory. *Prerequisite:* sophomore standing. Three hours. I, II. Mrs. Jameson.

161 HUMAN RELATIONSHIPS AND SEXUALITY A study of sexual responsibility and the biological, social, and psychological growth and development of the human being in terms of his sex role identity. *Prerequisite:* junior standing. Three hours. Mr. Grams.

163 DYNAMICS OF FAMILY DEVELOPMENT Development growth of parents and children in the various stages of the family life cycle. *Prerequisite:* junior standing. Three hours. I, II. Mrs. Jameson.

164 PARENT-CHILD RELATIONS A study of the interpersonal relations of adults and children in a family and the application of underlying principles in programs of parent education and family consulting. *Prerequisite:* 63, a psychology course, or permission of instructor. Three hours. Mrs. Jameson.

165 AGING IN THE FAMILY AND COMMUNITY Orientation to the place of the older person in contemporary American life and in modern western European cultures. *Prerequisite:* junior standing or departmental permission. Three hours. Miss Whittlesey.

261 INTERNATIONAL EARLY CHILDHOOD EDUCATION An examination in depth of the practices and interrelated services in the field of early childhood

education in ten countries. The student will design a complete early childhood plan for a selected community. *Prerequisite:* 184, or equivalent. Three hours. Mrs. Lepeschkin.

263 SEMINAR IN FAMILY RELATIONS AND HUMAN DEVELOPMENT Theory and research on the family. *Prerequisite:* 163 and/or sociology 151 or equivalent. Three hours. Mr. Grams.

264 THE AMERICAN WOMAN Recent literature regarding the role of women and the unique tasks they face in maintaining stability in a dynamic twentieth century world. *Prerequisite:* 163 and/or sociology 151 or equivalent. Three hours. Staff.

265 FAMILY LIFE EDUCATION IN SCHOOL AND COMMUNITY Practical and theoretical approach to the family as an interacting unit and as an institution. Teachers, social workers, nurses, guidance and extension specialists and others, are offered an opportunity to develop a philosophy basic to family life education. *Prerequisite:* 63, 163, or equivalent. Three hours. Mr. Grams.

266 PERSONALITY AND DEVELOPMENT IN EARLY CHILDHOOD An intensive study and application of the principles of child development in relationship to preschool education, nursing and other areas. *Prerequisite:* 63 and 163, or equivalent. Three hours. Mr. Grams.

Early Childhood Education

82 CREATIVE CURRICULUM ACTIVITIES FOR PRESCHOOL AND KINDERGARTEN I (2-2) The theory and practice of developing a creative curriculum program for preschool and kindergarten children; experimenting with graphic and plastic art media, photographs, rhythmic arts and language arts. Staff and practicum students in direct interaction with preschool children of two distinct income levels. *Prerequisite:* 63, or equivalent. Three hours. Mrs. Lepeschkin.

182 CREATIVE CURRICULUM ACTIVITIES FOR PRESCHOOL AND KINDERGARTEN II (2-3) Investigation of cognitive learning in the early childhood years and practices in introducing numbers, natural and physical sciences, and family life. Staff and practicum students in direct interaction with preschool children of two income levels. *Prerequisite:* 63, 164, or permission of instructor. Three hours. I, II. Mrs. Lepeschkin.

184 EARLY CHILDHOOD EDUCATION An examination of educational theories from early civilizations to modern times with emphasis on the early childhood years. The present approach to the total structuring of facilities and curriculum for the preschool child. Three hours. Mrs. Lepeschkin.

185 EXPERIENCE WITH PRESCHOOL FAMILIES (3-3) Investigation of the preschool children of two income levels in school and at home through interview and interaction with the family. *Prerequisites:* 63, 164, or permission of instructor. Four hours. I, II. Mrs. Lepeschkin.

187 FIELD PRACTICUM Supervised teaching in accredited early childhood facilities licensed or approved by responsible boards. *Prerequisite:* Permission of instructor. 7 hours. Mrs. Lepeschkin.

189 PRESCHOOL PRACTICUM (1-5) Supervised planning and conducting the preschool laboratory program. *Prerequisite:* 63, 82, 164 and 185. Six hours. Staff.

Social Welfare Program

SW-2 ORIENTATION TO SOCIAL WORK Introduction to the field of social work and its relation to social services. One hour. Staff.

SW-51 HUMAN NEEDS AND SOCIAL SERVICES Study of problems in social functioning and social services to meet such problems. *Prerequisite:* Sophomore standing. Three hours. Mrs. McKay.

SW-166, 167 SOCIAL WELFARE AS A SOCIAL INSTITUTION Philosophy, purpose, history of social welfare; review of fields and processes of social work. *Prerequisites:* sociology 21, psychology 1. Three hours. Miss Whittlesey.

SW-168 SOCIAL WORK AS A PROFESSION Major components of professional social work services; structure and functions of social agencies in the United States; basic methods of social work practice. *Prerequisites:* sociology 22, SW 167. Three hours. Miss Whittlesey.

SW-169 SOCIAL WORK IN THE COMMUNITY Study and discussion of social work services in the community; field experience in community social agencies. *Prerequisites:* SW 168 and permission of instructor. Four hours. Mrs. McKay.

SW-170 FIELD EXPERIENCE Field experience under supervision will be given in social agencies four and one-half days each week. Weekly seminar. *Prerequisites:* Senior standing; SW 51, 166, 167, 168. Fifteen hours. Mrs. McKay and Miss Whittlesey.

SW-290, 292 SPECIAL PROBLEM Supervised study in the field of social welfare. Not for graduate credit. Three hours. Miss Whittlesey.

Education

15 PARTICIPATION (See education 15) Credit to be arranged. Staff.

71 INTRODUCTION TO HOME ECONOMICS EDUCATION Homemaking education in relation to philosophy, professional contacts, and growth toward teacher competencies. Observation of secondary school problems, place of homemaking in general education. *Prerequisite:* sophomore standing. Three hours. Miss Osborn.

102 EXTENSION METHODS (See agricultural education 102) Credit to be arranged. Staff.

104 LEADERSHIP TRAINING AND ORGANIZATION METHODS (See agricultural education 104) Credit to be arranged. Staff.

171 METHODS OF TEACHING Methods of teaching home economics in junior and senior high schools, and of general administration of home economics departments in secondary schools. *Prerequisite:* 71; psychology 1. Three hours. Miss Brown.

172 STUDENT TEACHING Supervised observation and teaching in approved secondary schools in Vermont. *Prerequisite:* 171. Seven hours. Miss Brown and Miss Osborn.

173 COMMUNICATION METHODS (2-2) Presentation of information through the media of press, radio and television, and lecture-demonstration. *Prerequisite:* junior standing. Three hours. I. Miss Osborn and Mr. Spaven.

175, 176 SPECIAL PROBLEMS IN HOME ECONOMICS EDUCATION Individual investigation of a problem selected to meet special needs of students. *Prerequisite:* 171 or permission of instructor. Two or three hours. Miss Brown and Miss Osborn.

272 TEACHING ADULTS Problems of organization and of teaching classes in home economics to meet the needs of adults; supervised experience in techniques of teaching adults. *Prerequisite:* 171 or education 145-146; agricultural education 104, or equivalent. Two hours. Miss Brown.

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. Miss Osborn.

274 HOME ECONOMICS IN ELEMENTARY AND MIDDLE SCHOOLS Home Economics as an integral part of the school curriculum through the 8th grade. Observations and study of the child through age 12. Participation in local schools. *Prerequisites:* 63, 71. Three hours. (Graduate credit pending.) Miss Osborn.

397 PROBLEMS IN EDUCATION (see education 397) Credit to be arranged. Staff.

370 ADVANCED HOME ECONOMICS EDUCATION

Seminars and Research

290 INTRODUCTION TO RESEARCH Research procedures with lectures and discussions of problem selection, objectives, bibliographical techniques, and analysis of data. Each student will prepare a project outline for a simple experiment or study in a chosen field. A suggested prerequisite for special problems or theses. One hour. Miss Morse.

291, 292 SPECIAL PROBLEMS Supervised study in a field of home economics. Findings submitted in a form prescribed by the department. One to three hours. Not for graduate credit. Staff.

386, 387 GRADUATE SEMINAR Advanced study in a special field; opportunities for independent work are provided. Two to three hours. Staff.

391 through 399 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged. Staff.

Mathematics

COLLEGE OF TECHNOLOGY

Professors Schoonmaker (Chairman), Brock, Izzo, Meserve, Moser and Riggs; Associate Professors Bee, Chamberlain, Dwork, Hill, Lightball, Nicholson, Prather, Sylvester and Wright; Assistant Professors Burgmeier, Cooke, Lam-born and Whorton; Instructors Brown, Cobb, Dimmock, Earnshaw, Johansson, Knox, Morrow, Roney and Vincent.

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 Summer Session. 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. *Prerequisite:* 1 or 9. Three hours. Staff.

4 MATHEMATICS OF FINANCE Mathematical theory of finance applied to interest and investments, annuities, and life insurance. *Prerequisite:* 1 or 9. Three hours. Staff.

7, 8 FUNDAMENTALS OF MATHEMATICS To provide an understanding of basic logical and mathematical ideas (both ancient and modern) and some of their applications to other fields of knowledge. Emphasis is on fundamental concepts and logical methods of reasoning rather than on the development of techniques. Many topics of algebra, trigonometry and analytic geometry are considered in their relation to certain basic concepts pervading all mathematics. A course for students in the arts, social sciences and others whose programs do not require further study of mathematics. Credit will not be given for both mathematics 7 and 9. *Prerequisite:* 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. Students who have earned credit for any higher numbered course in mathematics may not enroll in this course for credit. Credit will not be given for both mathematics 7 and 9. *Prerequisite:* two years of secondary school algebra and one year of secondary school geometry. Three hours. Staff.

11¹ PLANE ANALYTIC GEOMETRY AND CALCULUS A few topics from College Algebra and an introduction to plane analytic geometry and calculus. This course prepares students for mathematics 12. *Prerequisite:* 9 and 2 or sufficiently

1. 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.

strong background in secondary school algebra and trigonometry. Five hours. Staff.

12 ANALYTIC GEOMETRY AND CALCULUS A continuation of the study of plane analytic geometry, differential and integral calculus and their applications, vectors, and solid analytic geometry. *Prerequisite:* 11. Five hours. Staff.

13¹ ENGINEERING MATHEMATICS I Some plane analytic geometry and calculus of algebraic functions with applications. This course is intended primarily for engineering students. *Prerequisite:* 9 and 2 or sufficiently strong background in secondary school algebra and trigonometry. Four hours. Staff.

14 ENGINEERING MATHEMATICS II A continuation of mathematics 13 including transcendental functions, techniques of integration, applications of the calculus and solid analytic geometry. *Prerequisite:* 13. Four hours. Staff.

25, 26 FUNDAMENTALS OF CALCULUS I, II Differential and integral calculus with analytic geometry, and an introduction to linear algebra are presented with applications from both social and physical sciences. Not accepted as prerequisite to advanced mathematics courses. A student who completes Mathematics 26 may be admitted to Mathematics 12 upon the recommendation of his Mathematics 26 instructor. Students interested in intensive use of mathematics should take Mathematics 11 and 12. *Prerequisite:* 9 and 2 or sufficiently strong background in secondary school algebra and trigonometry; 25 for 26. Three hours. Staff.

31 INTRODUCTION TO COMPUTER SCIENCE Structure of a digital computer. Introduction to flow charting and machine oriented languages. Programming and coding in a commonly used language. Practical experience with the solution of various types of problems on a university computer (presently system 360/44). *Prerequisite:* 9 or the equivalent. Two hours. Staff. ✓

102 FUNDAMENTAL CONCEPTS OF MATHEMATICAL 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.

110 ELEMENTARY STATISTICS Frequency distributions, measures of central tendency, measures of variation, probability, expectation, binomial and normal distributions, sampling, estimation, tests of hypotheses, regression and correlation. Not open to mathematics majors. *Prerequisite:* 9 or the equivalent. Three hours. Staff.

115 INTRODUCTION TO COMPUTING I Algorithms, programs and computers. Basic programming and program structure. Computer solution of numerical and non-numerical problems using one or more programming languages. *Prerequisite:* 9 or the equivalent. Three hours. Staff.

116 INTRODUCTION TO COMPUTING II Computer structure, machine language, instruction execution, addressing techniques and digital representation

1. 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.

of data. Symbolic coding and assembling systems, macros, linkage. Systems and utility programs. *Prerequisite:* 115. Three hours. Staff.

121 SOPHOMORE MATHEMATICS Partial differentiation, multiple integrals, infinite series, and elementary differential equations. *Prerequisite:* 12. Three hours. Staff.

123 ENGINEERING MATHEMATICS III A continuation of mathematics 14 including vectors, partial derivatives, multiple integrals, infinite series, complex numbers and elementary differential equations. *Prerequisite:* 14. Four hours. Staff.

124 LINEAR ALGEBRA A study of matrices, linear dependence, vector spaces, linear transformations and characteristic equations. *Prerequisite:* 12. 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. *Prerequisite:* sophomore standing; 125 for 126. Three hours. Staff.

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 in teacher education, or permission of instructor. Three hours. Mr. Meserve.

181, 182 SENIOR PROBLEM Investigation of some area or problem, under the direction of an assigned staff member, culminating in a report. This course is available only to candidates for the Bachelor of Science degree in Mathematics. *Prerequisite:* departmental permission. Three hours. Staff.

200 STATISTICAL METHODOLOGY I Fundamental ideas and techniques of statistics, including randomization, confidence intervals, hypothesis testing, and estimation. Emphasis on applications to current problems of interest to the student requires acquaintance with another discipline to serve as source of data for problems (e.g., education, biology, economics, psychology, agricultural engineering). No graduate credit for mathematics majors. This course is much more demanding than 110. *Prerequisite:* 9. Three hours. Staff.

201 STATISTICAL METHODOLOGY II Techniques of regression, analysis of variance and covariance, multiple comparisons. Heavy emphasis on application requires knowledge of another discipline to serve as source of current problems and data. *Prerequisites:* 200 or 204. Three hours. Staff.

202 SAMPLING METHODS Constructing and analyzing designs for investigations involving sampling techniques. Descriptive surveys including simple random, stratified, and multistage designs. Estimation in finite populations in-

cluding ratio and regression estimators. *Prerequisite:* 200. Three hours. Mr. Whorton.

203 **ELEMENTS OF PROBABILITY** Basic concepts, techniques and applications of probability, random variables, moment generating functions, laws of large numbers and central limit theorems. Techniques and applications include permutations and combinations, binomial and normal distributions, the Poisson process, reliability theory and quality control. No graduate credit for mathematics or electrical engineering majors. *Prerequisite:* 12. Three hours. Staff.

204 **MATHEMATICAL STATISTICS I** Theory and application of classical statistical methods. Sampling distributions, estimation procedures, tests of hypothesis and confidence intervals. *Prerequisite:* 207. Three hours. Miss Lamborn.

205 **MATHEMATICAL STATISTICS II** Theory and application of modern statistical procedures. Non-parametric methods, multivariate techniques, decision theory, sequential procedures. *Prerequisite:* 204. Three hours. Miss Lamborn.

206 **EXPERIMENTAL DESIGNS** Analysis of variance including subsamples and disproportionate subclass numbers, estimation of variance components, incomplete block designs, compounding of factorial effects, fractional replication, multiple comparison techniques, principles of split plots, and pooling of experiments. *Prerequisite:* 201. Three hours. Mr. Bee and Mr. Whorton.

207 **PROBABILITY THEORY** Basic non-measure-theoretic course in probability theory with some applications. Axioms of probability, random variables, moment generating functions, laws of large numbers and central limit theorems, introduction to stochastic processes. Students will need a strong working knowledge of calculus including infinite series, partial differentiation and multiple integration. *Prerequisites:* 102, 124. Three hours. Mr. Sylwester.

210 **APPLIED STOCHASTIC PROCESSES** Random walk models, Markov chains, Poisson process, Brownian motion, probability generating functions, discrete branching processes, homogeneous birth and death processes, and diffusion processes. *Prerequisites:* 207. Three hours. Mr. Sylwester.

211 **MULTIVARIATE METHODS** Multivariate normal theory, tests of hypotheses. Multivariate analysis of variance and covariance, principle components and factor analysis. *Prerequisites:* 201 and 205, or permission of instructor. Three hours. Mr. Whorton.

216 **SYSTEMS PROGRAMMING** Review of assembly language coding. Batch processing systems programs. IOCS buffer pool management, supervisors, loaders, utilities. Parallel processors, Interrupt handling, spooling. Introduction to multi-programming and time sharing. *Prerequisite:* 116 or equivalent. Three hours. Staff.

217 **SWITCHING THEORY** Lattices and Boolean algebras, Boolean functions, minimization theory, Quine's algorithm, combinational and sequential logic nets, state assignment problems, Hartmanis' theorems, closure operators, Paull-Unger problems. *Prerequisite:* 251 or permission of instructor. Three hours. Mr. Hill.

218 **AUTOMATA THEORY** Finite state automata, nondeterministic and two-way automata, theorems of Rabin-Scott, Myhill and Kleene. Regular expressions,

homomorphisms, the lattice of automata, free automata, isomorphism theorems. *Prerequisite*: 251. Three hours. Mr. Prather.

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 consent of instructor; 219 for 220. Three hours. Mr. Prather.

229 **COMPUTER FACILITY MANAGEMENT** Non-mathematical content, problems of technical administration, budget considerations, open-closed shop, equipment proliferation, interorganizational relationships. *Prerequisites*: 116 or permission of instructor. Two hours. Mr. Brock and Mr. Hill.

230 **ORDINARY DIFFERENTIAL EQUATIONS** Solutions of linear ordinary differential equations, the Laplace transformation, and series solutions of differential equations. *Prerequisite*: 121; 124 desirable. Three hours. Staff.

231, 232 **FUNCTION 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; 231 for 232. Three hours. Staff.

233, 234 **THEORY OF FUNCTIONS OF REAL VARIABLES** Functions of real variables, including: point sets and measure, transfinite numbers, Riemann and Lebesgue integrals, and sequences of functions. Considerable outside reading is assigned. *Prerequisite*: 242; 233 for 234. Three hours. Staff.

235 **PARTIAL DIFFERENTIAL EQUATIONS** First order equations, classification of second order equations, standard problems of Laplace and Cauchy. *Prerequisites*: 230, 242. Three hours. Staff.

236 **CALCULUS OF VARIATIONS** Necessary conditions of Euler, Legendre, Weierstrass and Jacoby for minimizing integrals. Sufficiency proofs. Variation and eigenvalue problems. Hamilton-Jacoby 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 and 124. Three hours. Staff.

238 **NUMERICAL METHODS II** Finite differences, differentiation and integration, ordinary and partial differential equations, linear programming. *Prerequisite*: 237. Three hours. Staff.

239 **INTEGRAL TRANSFORMS** The theory of Fourier, Laplace, Hankel and Mellin transforms with applications to fluid dynamics, elasticity, physics. *Prerequisite*: 231. Three hours. Mr. Burgmeier.

241, 242 **ADVANCED CALCULUS** The calculus beginning with limits, continuity, differentiation, and Riemann integrals; treatment of those topics not included in the earlier course as a foundation for more advanced courses in anal-

ysis and applied mathematics. *Prerequisites*: 102 recommended; 241 for 242. Three hours. Staff.

251 MODERN HIGHER ALGEBRA Fundamental concepts of Abstract Algebra. Sets, mappings, groups, rings, integral domains, fields, homomorphisms and isomorphisms. *Prerequisite*: 12; 102 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. *Prerequisite*: 124; 251 desirable. Three hours. Staff.

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 or 242; 253 for 254. Three hours. Mr. Cooke.

255 ELEMENTARY NUMBER THEORY Divisibility, prime numbers, Diophantine equations, congruence of numbers, and methods of solving congruences. *Prerequisite*: 121. Three hours. Staff.

256 ANALYTIC NUMBER THEORY Prime numbers, prime number theorem, interchange of summations, Euler phi function, Mobius function, Riemann zeta function. *Prerequisite*: 232. Three hours. Mr. Brock.

257 THEORY OF GROUPS The study of the various kinds and structures of groups. *Prerequisite*: 251. Three hours. Staff.

258 GALOIS THEORY The study of Galois theory leading to the insolubility of general quintic equations by radicals and theorems on constructions with straightedge and compass. *Prerequisite*: 257. Three hours. Staff.

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*: 12. Three hours. Messrs. Izzo, Meserve and Riggs.

261 THE DEVELOPMENT OF MATHEMATICS Besides considering important contributions of outstanding mathematicians of the past, and classical problems of mathematics, the historical development of the concepts of modern mathematics is presented. Three hours. Staff.

262 GEOMETRY FOR ELEMENTARY SCHOOL TEACHERS Informal Euclidean geometry, classical constructions, coordinate geometry, inductive and deductive reasoning, convexity, and an introduction to topology. Not open to mathematics majors. *Prerequisite*: 126. Three hours. Mr. Izzo and Mr. Meserve.

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. Staff.

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.

265 DIFFERENTIAL GEOMETRY Analytic metric differential geometry of curves and surfaces in ordinary three dimensional space; curvature, torsion, Fre-

net formulas, involutes, evolutes, developable and ruled surfaces, geodesic curves. *Prerequisite:* 121. Three hours. Staff.

266 **MATHEMATICS OF DIGITAL COMPUTATION FOR TEACHERS** Mathematical theory underlying digital computing machines including assigned problems on the IBM 360 or 1130, 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 MATH FOR ENGINEERS AND SCIENTISTS I** Matrix Theory, Vector Analysis, Linear Ordinary Differential Equations. Emphasis on methods of solution, including numerical methods. For a mathematics concentration, a sequence beginning with 230 is advised. *Prerequisites:* 123 and knowledge of computer system programming. Three hours. Staff.

272 **APPLIED MATH 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.

281 **SPECIAL TOPICS IN APPLIED MATHEMATICS** For advanced students in the field of applied mathematics. Lectures, reports and directed readings on advanced topics in applied mathematics. *Prerequisite:* 232. Credit as arranged. Offered as occasion warrants. Staff.

283 **SPECIAL TOPICS IN COMPUTER SCIENCE** For advanced students in the field of computer science. Directed reading and research on topics in the area of computers. *Prerequisite:* 216. Credit as arranged. Offered as occasion warrants. Staff.

285 **SPECIAL TOPICS IN STATISTICS** For advanced students in the field of statistics. Lectures, reports and directed readings on advanced topics in statistics. *Prerequisite:* permission of department. Credit as arranged. Offered as occasion warrants. Staff.

287 **SPECIAL TOPICS IN ALGEBRA** For advanced students in the field of algebra. Lectures, reports and directed readings on advanced topics in algebra. *Prerequisites:* 251 and consent of instructor. Credit as arranged. Offered as occasion warrants. Staff.

289 **SPECIAL TOPICS IN TOPOLOGY** For advanced students in the field of topology. Lectures, reports and directed readings on advanced topics in topology. *Prerequisites:* 254 and consent of instructor. Credit as arranged. Offered as occasion warrants. Staff.

291 **SPECIAL TOPICS IN GEOMETRY** For advanced students in the field of geometry. Lectures, reports and directed readings on advanced topics in geometry. *Prerequisites:* 263 or 265 and consent of instructor. Credit as arranged. Offered as occasion warrants. Staff.

293 **SPECIAL TOPICS IN ANALYSIS** For advanced students in the field of analysis. Lectures, reports and directed readings on advanced topics in analysis. *Prerequisites:* 232 or 234 and consent of instructor. Credit as arranged. Offered as occasion warrants. Staff.

301 **THEORY OF HYPOTHESIS TESTING AND ESTIMATION** Confidence intervals, point estimation, Neyman-Pearson Theory of testing hypotheses, sufficient statistics, decision theory. *Prerequisites:* 205, 308. Three hours. Mr. Sylwester.

303 **ADVANCED DESIGN I** Theory of factorial arrangements of treatments, general two-way classification, confounding of factorial effects, fractional replication, confounding in mixed series of factorials, randomization tests, transformations of data, split-plot techniques, and analysis of covariance. *Prerequisite:* 313. Three hours. Mr. Bee.

305 **MULTIVARIATE ANALYSIS** Theory of multivariate normal distribution, simple, partial, and multiple correlation, multivariate sampling distributions. Wishart distribution, T^2 distribution, estimation of parameters, and tests of hypotheses on vector means and covariance matrix. Classification problems, discriminate analysis and applications. *Prerequisites:* 211, 308. Three hours. Mr. Whorton.

306 **REGRESSION ANALYSIS** Linear, non-linear, and multiple regression. Statistical model building, examination of residuals, application to analysis of variance, and computing algorithms. *Prerequisite:* 201, 205. Three hours. Mr. Hill and Miss Lamborn.

308 **DISTRIBUTION THEORY** Continuous, discrete and mixed random variables, Beta, Gamma, and waiting-time distributions, moments, cumulants, characteristic and generating functions. Theory of runs and order statistics, quadratic forms and distribution free statistics. *Prerequisite:* 205. Three hours. Mr. Bee.

309 **NON-PARAMETRIC STATISTICAL ANALYSIS** Non-parametric procedures including tests based on ranks, permutation tests, asymptotic relative efficiency, and locally most powerful tests. *Prerequisite:* 205. Three hours. Mr. Sylwester.

313 **THEORY OF LINEAR STATISTICAL MODELS** Non-central chi-square and F distributions, Markoff theorem, general linear hypothesis of full rank and less than full rank, experimental design models, and variance components. *Prerequisites:* 205, 206. Three hours. Mr. Bee.

314 **MEASURE THEORY** Sets and classes, inner and outer measure, Lebesgue-Stieltjes measure, measurable functions, absolute continuity, Radon-Nikodym theorem, and applications in theoretical probability. *Prerequisite:* 242. Three hours. Miss Lamborn.

315 **ADVANCED SYSTEMS PROGRAMMING I** Multiprogramming operating systems. Addressing techniques, paging, core management, file system design and management system accounting. Design of system modules and interfaces. System updating and documentation. *Prerequisite:* 216. Three hours. Mr. Hill.

316 **ADVANCED SYSTEMS PROGRAMMING II** Teleprocessing based systems. Time sharing. Roll in roll out systems. Multiprogramming time sliced systems. Communications methods. Multi-computer systems vs. single machine techniques. Virtual memory concept and virtual machine operating systems. *Prerequisite:* 315. Three hours. Mr. Hill.

321 **RECURSIVE FUNCTION THEORY** Recursive functions and effective computability, Turing machines, Church's thesis, unsolvability, Godel number-

ing, recursive and recursively enumerable sets, Post's correspondence theorem; universality, enumeration, and iteration theorems. *Prerequisite:* 218 or 219. Three hours. Mr. Prather.

325 ADVANCED AUTOMATA THEORY Algebraic structure theory of automata, monoids and automata; homomorphisms, simulation and realization. The semigroup of an automata, decomposition theory of Hartmanis-Stearns, Krohn-Rhodes theorem, categories of automata, abstract automata. *Prerequisite:* 218. Three hours. Mr. Prather.

326, 327 COMBINATORIAL THEORY Permutations and combinations, Mobius inversion theorem, inclusion-exclusion principle, generating functions, Polya's counting theorem, graphs, Latin square configurations, finite geometries, block designs. *Prerequisites:* 256, 326 for 327. Three hours. Mr. Brock.

331 FOURIER ANALYSIS Trigonometric series, orthogonal polynomials, convergence properties, boundary value problems, applications. *Prerequisite:* 234. Three hours. Mr. Cooke.

332 APPROXIMATION THEORY Interpolation and approximation by interpolation, uniform approximation, approximation in normed linear spaces, spline functions, orthogonal polynomials. Least squares, Chebychev approximations, rational functions. *Prerequisites:* 124, 238. Three hours. Staff.

335, 336 FUNCTIONAL ANALYSIS L^2 spaces and L^p spaces, Hilbert and Banach spaces, linear functionals and linear operators, completely continuous operators, Fredholm alternative, completely continuous symmetric operators, Hilbert Schmidt theory, unitary operators, Bochner's Theorem, Fourier-Plancherel and Watson transforms. *Prerequisites:* 234, 335 for 336. Three hours. Mr. Dwork.

351, 352 ABSTRACT ALGEBRA Groups, rings, integral domains, extensions of rings and fields, factorization theory, groups with operators (Jordan-Hölder theorem, Krull-Schmidt theorem), modules, chain conditions, Hilbert basis theorem, Noetherian rings, linear spaces, tensor products of modules. *Prerequisites:* 252, 351 for 352. Three hours. Mr. Wright.

391 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

431, 432 INTEGRAL EQUATIONS Resolvent kernels for Volterra and Fredholm integral equations, elements of Hilbert spaces, the Fredholm alternative, symmetric kernels, eigenvalues and eigenfunctions, Hilbert-Schmidt theory, Mercer's theorem, numerical techniques. *Prerequisites:* 242, 232 and 234 desirable, 431 for 432 or consent of instructor. Three hours. Mr. Burgmeier.

435, 436 NUMERICAL ANALYSIS Initial value and boundary value problems for systems of non-linear ordinary differential equations, convergence and stability of computational procedures. Analysis of partial differential equations, boundary value problems, iterative methods. Analysis of methods for obtaining eigenvalues and matrix inverses, pseudo inverses. *Prerequisite:* 238; 332 desirable, 435 for 436 or consent of instructor. Three hours. Mr. Brock and Mr. Riggs.

437, 438 ADVANCED ORDINARY DIFFERENTIAL EQUATIONS Existence theorems, uniqueness and continuation of solutions, dependence of solutions on a parameter. Linear systems, regular and irregular singular points, Sturm-Liouville systems, asymptotic behavior, Lyapunov stability, periodic solutions, multi-dimensional systems. *Prerequisite:* 230; 437 for 438, or consent of instructor. Three hours. Mr. Chamberlain and Mr. Wright.

445, 446 MATHEMATICAL PHYSICS Investigation of basic equations of mathematical physics, Schrodinger, Maxwell, Poisson. General orthogonal coordinate systems, dyads, mathematical structure of Quantum theory. *Prerequisites:* 232, 235. Three hours. Mr. Dwork.

447, 448 GENERALIZED FUNCTIONS Modern extensions to theory of distributions, delta functionals, countably Hilbert spaces, applications to transform theory and ordinary and partial differential equations. *Prerequisite:* 234, 336 desirable; 447 for 448, or consent of instructor. Three hours. Mr. Dwork.

491 DOCTORAL THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable doctoral dissertation. Credit as arranged.

Other Courses in Mathematics

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 |
|--------|---------------------------------------|--------------|
| A15 | Plane Analytic Geometry | 3 |
| A16 | Differential Calculus | 3 |
| A17 | Integral Calculus | 3 |
| A18 | Intermediate Calculus | 3 |
| A19 | Differential Equations | 3 |
| S45 | Coordinate Geometry and Vectors | 3 |
| S46 | Elementary Functions | 3 |
| S47 | Calculus I | 3 |
| S48 | Calculus II | 3 |
| S142 | Fundamental Concepts of Algebra | 3 |
| S144 | Statistics and Probability | 3 |

Extension courses:

A360 LINEAR ANALYSIS WITH NUMERICAL METHODS An accelerated presentation of the ideas and tools of linear algebra including vector spaces, linear transformations, linear functionals, the representation theorem and spectral theory. In addition, numerical techniques which are of importance in the application of linear algebraic methods, e.g. matrix inversion, polynomial curve fitting and numerical solutions of differential equations are introduced. *Prerequisite:* 31, 123. Three hours. Staff.

Medical Microbiology

COLLEGE OF MEDICINE

Professors Stinebring (Chairman), Merchant; Associate Professors Phillips, Smith; Assistant Professors Absber, Boraker, Gallagher, Moehring, Novotny, Schaeffer.

120 CLINICAL MICROBIOLOGY (3-6) Lectures and laboratory experiments in clinical aspects of microbiology. Fall semester. *Prerequisite:* Microbiology 55. Six hours. Dr. Smith and 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. Four hours. Dr. Merchant, Dr. Moehring, Dr. Schaeffer, and Dr. Stinebring.

211 GENETICS OF MICROORGANISMS Studies of mutation, genetic information transfer, fine structure of the gene, cytoplasmic inheritance, and lysogeny in fungi, bacteria, and viruses. *Prerequisite:* permission of the instructor. Three hours. Dr. Novotny.

Medical Technology

SCHOOL OF ALLIED HEALTH SCIENCES

Professor Coon (Chairman, Department of Pathology); Assistant Professor Jones; Instructors Barron, Breen, Kleiler, Wise.

Note: All courses limited to students of Medical Technology except by permission of the Departmental Chairman.

1-2 DYNAMICS OF HEALTH CARE See Technical Nursing, Page 251.

3 MEDICAL ORIENTATION Terminology related to medical science and hospital services. Limited to students in the Medical Laboratory Technician program except by permission of departmental chairman. Spring semester. One hour. Miss Breen.

11-12 FRESHMAN LABORATORY SCIENCE Specialized instruction for Medical Laboratory Technicians concurrent with Integrated Science. In-depth needs as they relate to (a) Structure (anatomy and physiology), (b) Dynamics (function), (c) Control (regulation), (d) Dysfunction and (e) Adaptation will be provided the student by self-pacing methods and small-group discussions. Three hours each semester. Dr. Jones and staff.

20-21 INTRODUCTION TO MEDICAL TECHNOLOGY Techniques of basic laboratory procedures in hematology, serology, blood banking, chemistry and

urinalysis. Limited to students in the Medical Laboratory Technician program except by permission of departmental chairman. Total—Ten hours. Miss Breen, and staff.

40, 41 PRACTICUM Rotating assignments in the clinical laboratories of the Medical Center and other approved facilities. Fall and spring semesters. Limited to students in the second year of the Associate Degree program. Total of eleven hours. Dr. Coon, Miss Barron and staff.

101 MEDICAL TECHNOLOGY (5-20) Principles, procedures, and special techniques in medical technology. Includes hematology, immunohematology, serology, and urinalysis. Spring semester. Four hours. Dr. Coon, Miss Kleiler, and staff.

102 MEDICAL TECHNOLOGY (2-6) Continuation of 101; includes histologic technique, introduction to cytopathology, parasitology. *Prerequisite:* 101. Fall semester. Four hours. Dr. Coon, Miss Barron, and staff.

103 MEDICAL TECHNOLOGY Lectures on special problems in medical technology and individual research, Spring semester. One hour. Dr. Coon, Miss Barron, and staff.

110 MEDICAL TECHNOLOGY Clinical Conferences. Participation in clinical conferences in all "divisions" of the laboratory. Two hours. Miss Wise.

140 CLINICAL PRACTICUM Rotating assignments in the laboratories of the Medical Center and other approved facilities. Fall and spring semesters. Total of twelve hours. Dr. Coon, Miss Breen, and staff.

197-198 MEDICAL TECHNOLOGY Assigned reading and special problems. Designed to develop independent capabilities of medical technologists in solving laboratory problems. One credit, fall semester. Two credits, spring semester. Miss Barron and staff.

201 MEDICAL TECHNOLOGY, ADVANCED Individual research in the field of medical technology. *Prerequisite:* departmental permission. Credit as arranged. Fall and spring semesters. Dr. Coon.

302 MEDICAL MICROBIOLOGY Fundamentals of pathogenic microbiology with emphasis on mechanisms of disease production and mechanisms of resistance to infection. The ecologic rather than taxonomic approach is stressed. *Prerequisite:* permission of the department. Four hours. Staff.

303 SPECIAL PROBLEMS IN MEDICAL MICROBIOLOGY Supervised investigations in pathogenic microbiology. Credit as arranged. Staff.

323 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. *Prerequisites:* consent of the instructor. Three hours. Dr. Boraker. Alternate years, 1970-71.

324 MEDICAL MYCOLOGY Lectures concerned with the etiology, epidemiology, pathogenesis, immunology, therapy and prognosis of the medical mycoses. Laboratory exercises devoted to the isolation, cultivation, and identification of

actinomycetes, yeasts and molds. *Prerequisites:* consent of the instructor. Four hours. Dr. A. Smith. Alternate years, 1970-71.

325 **VIROLOGY** Introduction to the nature of viruses, their physical, chemical, and biological characteristics with special reference to cell-virus interaction, viral replication, pathogenesis, viral inhibitors, and oncogenic viruses. *Prerequisites:* consent of instructor. Four hours. Mr. Gallagher. Alternate years, 1970-71.

381 **SEMINAR** Current problems in medical microbiology. One hour. Staff.

Microbiology and Biochemistry

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professors Johnstone and Racusen (Chairman); Associate Professor Foote; Assistant Professors Sjogren and Weller; Instructor Nirady.

55 **INTRODUCTORY MICROBIOLOGY (2-4)** Study of microorganisms, especially bacteria, their structure, development and activities. Emphasis is placed on the basic principles and laboratory techniques. The role of microorganisms in nature and their various interrelationships with man are discussed. *Prerequisite:* eight hours of chemistry. Four hours. Mr. Sjogren.

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. Staff.

201 **GENERAL BIOCHEMISTRY (3-3)** Broad coverage of fundamentals of biochemistry including the chemistry of carbohydrates, proteins, lipids, vitamins, enzymes, and hormones and their relation to processes of biological significance. Basic principles of analytical procedures in biochemical methods. *Prerequisite:* Chemistry 16 or 131. Four hours. Mr. Foote.

202 **ADVANCED BIOCHEMISTRY (3-3)** An advanced study of biochemical systems with emphasis on research methods and plant biochemistry. Laboratory sessions include the use of radioisotopes and chromatographic techniques. This course augments 201 (general biochemistry), the combined sequence providing a base for graduate research in biochemistry and related fields. *Prerequisite:* 201 or equivalent. Four hours. Mr. Racusen.

203 **MOLECULAR BIOLOGY (3-3)** The structure and biological function of nucleic acids and proteins. Emphasis is on basic principles of instrumentation, physical methods, and analytical procedures. *Prerequisite:* Chemistry 142 or permission of instructor. Four hours. Mr. Weller.

220 **ENVIRONMENTAL MICROBIOLOGY (2-3)** An advanced course dealing with the activities and role of microorganisms, primarily bacteria, in the specialized habitats of air, soil, and water. The influence of the cells upon their environment and the effect of the environmental conditions on metabolism will be emphasized. *Prerequisite:* a previous course in microbiology or bacteriology

and senior standing. Three hours. Offered alternate years, 1971-72. Mr. Johnstone.

254 MICROBIAL BIOCHEMISTRY (2-4) The chemical composition, energy utilization and metabolism of microbial cells. *Prerequisite:* 201 or medical biochemistry 301, botany 55; and permission of instructor. Four hours. Mr. Sjogren. Alternate years, 1970-71.

301 SPECIAL PROBLEMS IN BIOCHEMISTRY Reading, discussion, and laboratory research on a special problem. *Prerequisite:* 201 and departmental permission. Credit as arranged. Staff.

381, 382 GRADUATE SEMINAR Topical seminar with discussion of assigned and collateral reading. Required of departmental graduate students. One hour. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member culminating in an acceptable thesis. Credit as arranged.

491 through 493 DOCTOR'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

Military Science

Lieutenant Colonel Oehler (Chairman); Majors Carter and Dubov; Captains Bryan and Riederer; MSG Sheetz; SFC Piner.

1-2 U. S. DEFENSE ESTABLISHMENT (2-1) Orientation on the ROTC program; causes of war; history and mission of the U. S. Army; factors of National Power; national objectives, policy and strategy; organization of the defense establishment for national security; marksmanship training; leadership laboratory and field training.

11-12 INTRODUCTION TO TACTICS: AMERICAN MILITARY HISTORY (2-1) Military topographic and aerial photographic map study; small unit operations, communications and logistics; a survey of military history from the Colonial era to the present; leadership laboratory and field training. Note: American Military is taught by the History Department.

101-102 LEADERSHIP AND MANAGEMENT I: FUNDAMENTALS AND DYNAMICS OF THE MILITARY TEAM I (3-1) Methods of oral presentation; leadership seminar in study and discussion of psychological, physiological and sociological factors which affect human behavior; branches of the Army; principles and fundamentals of small unit tactics; leadership laboratory and field training.

111-112 LEADERSHIP AND MANAGEMENT II: FUNDAMENTALS AND DYNAMICS OF MILITARY TEAM II (3-1) Leadership and management skills; Army administration; military law; maintenance management; orientation on service life; customs and courtesies of the service; obligations and responsibilities of an

officer; military intelligence; logistics; world change and military implications; tactics; leadership laboratory and field training.

Music

COLLEGE OF ARTS AND SCIENCES

Professors Lidral (Chairman) and Pappoutsakis; Associate Professors Chapman, D. Kinsey, and Schultz; Assistant Professors T. Read, Weinrich, and Wigness; Instructors J. Ambrose, Anand, Auchter, Dahl, Fleming, F. Kinsey, E. Metcalfe, Peterson, Powell, and E. Read.

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

5-6 THEORY I (2-3) Melodic and rhythmic dictation, sight singing, and elementary harmony. Three hours. Mr. Lidral and Miss Fleming.

9 INTRODUCTORY MUSIC—THEORY Fundamentals of music: major and minor scales, intervals, transposition, rudiments of harmony, rhythm, terminology, the conventions of musical notation. Three hours.¹ Messrs. Pappoutsakis, Chapman, and Weinrich; Mrs. Auchter.

105-106 THEORY II (2-3) Contrapuntal and harmonic dictation, advanced harmony, and elementary counterpoint. *Prerequisite:* 5-6. Three hours. Mr. Read.

203, 204 ORCHESTRATION First semester: characteristics of instruments, arranging for orchestra; second semester: advanced exercises in orchestral scoring. *Prerequisite:* 105-106; 203 for 204. Three hours. Mr. Pappoutsakis. 204 in alternate years, 1971-72.

205, 206 COUNTERPOINT First semester: tonal counterpoint; second semester: canon and fugue. *Prerequisite:* 105-106; 205 for 206. Three hours. Mr. Kinsey. 206 in alternate years, 1971-72.

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. Mr. Lidral.

208 FORM AND ANALYSIS Creative approach to aural and sight analysis of musical construction. *Prerequisite:* 105-106; 205 recommended. Three hours. Mr. Kinsey.

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. Mr. Read.

1. Enrollment in 5 will cancel credit for 9.

History and Literature

1, 2 SURVEY OF MUSICAL LITERATURE First semester: the Classical and Romantic eras in songs and piano pieces, program music, and the symphony and the concerto. Second semester: Gregorian chant to Handel and Bach, opera, postromanticism, modern music, and American music. Three hours. Mr. Kinsey, Mrs. Ambrose and Mrs. Anand.

10 INTRODUCTORY MUSIC—LISTENING A study, from the listener's point of view, of music from the Baroque through the Classical and Romantic to the twentieth century contemporary periods. Stylistic, structural, and orchestral developments. Three hours.² Messrs. Pappoutsakis, Weinrich, and Wigness; Mrs. Auchter.

13 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. Mr. Schultz.

14 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:* Music 1, 2, or 10. Three hours. Mr. Bemis.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READING AND RESEARCH

221, 222 HISTORY OF MUSIC Changes in musical structure and style in relation to contemporaneous artistic, literary, religious, and social movements. First semester: Gregorian chant to the Baroque era. Second semester: Baroque to Modern. *Prerequisite:* 1, 2 and 5-6. Three hours. Mr. Chapman.

223 through 228 MUSIC LITERATURE Advanced studies in the literature of music. *Prerequisite:* 105-106 and 221, 222. Three hours. Mr. Chapman.

245, 246 CHAMBER MUSIC LITERATURE Study through analysis and performance of masterworks for small groups leading to public performance. *Prerequisite:* twelve hours or the equivalent in performance field and departmental permission. One hour. Staff.

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. Credit as arranged.

301 PROSEMINAR IN MUSICOLOGY A study of the tools and methods of musical bibliography, including the critical and effective use of such materials. *Prerequisites:* 205, 208, 221, 222. Three hours. Mr. Chapman.

302 SEMINAR IN MUSICOLOGY Discussion of the bibliographic tools and methods covered in 301 in relation to the major areas of historical musicology; problems in musical research; introduction to musical paleography. *Prerequisite:* 301. Three hours. Mr. Chapman.

2. Enrollment in 1 and 2 will cancel credit for 10.

381, 382 SEMINAR Study of special topics appropriate to student needs. One hour. Mr. Kinsey.

391 through 394 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged. Staff.

For Music Education, see page 112.

Performance

For the fees for instruction, see page 59.

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 on any curriculum are required to pass a FUNCTIONAL PIANO FACILITY examination before certification for graduation. 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 simple piano accompaniment for songs requiring the use of 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.¹ Messrs. Chapman, Lidral, Schultz, and Weinrich.

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.¹ Mr. Weinrich and staff.

51, 52 PERFORMANCE STUDY Individual instruction in piano, organ, harpsichord, voice, strings, woodwinds, brass, percussion, and harp. One or two hours.¹ Staff.

Letter code for performance study and advanced performance study:

| | | |
|------------------------|-------------------------|----------------|
| A. Piano (harpsichord) | G. Clarinet (saxophone) | M. Percussion |
| B. Voice | H. Bassoon | N. Violin |
| C. Organ | I. Horn | O. Viola |
| D. Harp (guitar) | J. Trumpet | P. Violoncello |
| E. Flute | K. Trombone (euphonium) | Q. Bass |
| F. Oboe | L. Tuba | R. Recital |

1. See footnote 1 on page 249.

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, and percussion. One hour.¹ Staff.

74 INSTRUMENT REPAIR CLASS (0-2) A laboratory for music education students in minor repair and adjustment of string, woodwind, brass, and percussion instruments. *Prerequisite:* string, woodwind, brass, and percussion classes or concurrent enrollment and departmental permission. One hour. Mr. Schultz.

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. *Prerequisite:* 5-6; 211 for 212. Three hours. Mr. Pappoutsakis. 212 in alternate years, 1970-71.

271, 272 PERFORMANCE PEDAGOGY Methods of teaching voice, strings, woodwinds, brass or keyboard instruments and advanced class instruction in them. Research paper required. *Prerequisite:* performing ability, teaching experience, and consent of instructor. Two hours.¹ Staff.

351, 352 ADVANCED PERFORMANCE STUDY Individual instruction in keyboard instruments, voice, strings, woodwinds, brass, percussion, and harp leading to public recital performance. *Prerequisite:* graduate standing in performance field. One or two hours.¹ Staff.

Nursing

DIVISION OF HEALTH SCIENCES

Professor Woodruff (Director).

Professional Nursing: Professor Woodruff (Chairman); Associate Professors Cronin, Demers, Emerson, Folta, Milligan, Palmer, Powell, Sawyer, and Whitaker; Assistant Professors Barrett, Deck, Forgione, Magee, Marsland, Rodgers, Schwalb, and Ure; Instructors Burroughs, Joslyn, Murray, Quinn, Scranton, and Suess.

Technical Nursing: Associate Professors Allen (Chairman) and Phillips; Instructors Clark, Fink, Foreman, Foster, Gray, Rule, and Spurlock.

Professional Nursing

21-22 INTRODUCTORY NURSING (2-16) First semester: Development of understandings, attitudes, and skills necessary to performance of basic activities

1. Indicated courses in performance may be repeated for credit, but no B.A. candidate may receive credit toward graduation totalling more than six semester hours in ensembles and six semester hours for individual study. One hour of credit per semester will be given for one private lesson (one-half hour) per week under a member of the department, and six hours practice per week, on condition that the instruction be accompanied or preceded by music 1, 2 or 5-6 or 9, 10 and participation in ensemble; two hours credit will be given for two private lessons per week (one hour) and twelve hours practice per week, on the same condition.

involved in the nursing care of adults. Laboratory experience in classroom, hospital, and rehabilitation center. Second Semester: Development of understandings, attitudes, and skills necessary in giving nursing care to adults who face illnesses which have a favorable or controllable outcome. Laboratory experiences in classroom, hospital, and rehabilitation center with emphasis on the ability to assume increased responsibility for patient care. Six hours. Mrs. Joslyn, Murray, Rodgers, Palmer, and Quinn; Misses Sawyer, Scranton and Suess.

121 INTERMEDIATE NURSING: MATERNAL-CHILD NURSING (4-20) Development of knowledge and skills in maternal and child care with focus on the nurse-child-family relationships. Laboratory experiences include observation and participation in the hospital and out-patient environments. Nine hours. Misses Forgiore and Schwalb; Mrs. Marsland and Burroughs.

122 INTERMEDIATE NURSING (4-20) Development of understandings, attitudes, and skills necessary in giving nursing care to adults who face illnesses which require considerable adjustments in behavioral and living patterns. Laboratory experience in classroom, hospital, rehabilitation center, clinics, and selected community settings. Nine hours. Mrs. Joslyn, Murray, Rodgers, Palmer, and Quinn; Misses Sawyer, Scranton, and Suess.

156 PSYCHIATRIC NURSING (4-8) Principles of nursing care of patients with psychiatric problems in hospitals and other settings. The emphasis will be on the development of therapeutic relationships with selected patients and upon the nurses's role with patients in various treatment situations. Six hours. Miss Magee and Mrs. Ure.

164 ADVANCED NURSING (3-12) Opportunity is provided to develop understanding of the concepts and skills necessary to provide direct nursing care to the critically ill patient and the patient in the emergency situation and to develop leadership competencies through experience in directing care for groups of patients. Six hours. Sister Barrett, r.h.s.j. and Miss Demers.

165 ADVANCED NURSING (1-8) The development of understandings, concepts, and skills necessary to provide nursing care to the critically ill patient. An emphasis will be placed on the patho-physiological basis of nursing care. Three hours. Sister Barrett, r.h.s.j.

167 NURSING LEADERSHIP (1-8) Study and discussion of nursing service and nursing team from the perspective of the staff nurse. Laboratory experience provided with emphasis on indirect nursing care and participation in a leadership capacity in assessing the nursing needs of patients and the planning and coordination necessary to meet them. Three hours. Miss Demers.

176 COMMUNITY HEALTH NURSING (4-8) Study and discussion of the development, functions and trends in official and voluntary health organizations with emphasis on the role of the nurse at the local, state, national and international level. Laboratory study provided in the community. Six hours. Miss Emerson and Mrs. Cronin.

186 SURVEY OF CONTEMPORARY NURSING Influence of contemporary social, educational, political and economic developments on nursing; problems and issues in the profession today; professional organizations in nursing and responsibilities of the professional nurse. Three hours. Miss Milligan.

Technical Nursing

1-2 DYNAMICS OF HEALTH CARE Introduction to the whole pattern of comprehensive health care: a core course for students in the programs in Technical Nursing, Dental Hygiene, Medical Technology, Physical Therapy, Radiologic Technology, and the Program for Medical Laboratory Technicians. One hour per semester. Nursing and Allied Health Staff.

11-12 FUNDAMENTALS OF NURSING (2-6) A basic course in the principles of nursing care. The entire sequence focuses on nursing interventions to meet the physiological, safety, and individuality 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. Concurrent experiences are planned in hospitals and community agencies. Four hours. Miss Foreman, Mrs. Rule, and Mrs. Spurlock.

14 FUNDAMENTALS OF NURSING (four weeks summer session) Continuation of Nursing 11-12. *Prerequisite:* 11-12. Four hours. Miss Foreman, Mrs. Rule, and Mrs. Spurlock.

27-28 NURSING CARE OF CHILDREN AND ADULTS (4-15), (5-15) These two continuous 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 care situations, including maternal and infant care and care of children and adults with varying alterations in physiological and/or psychological functioning. *Prerequisite:* 14. 27, nine hours; 28, ten hours. Mrs. Clarke, Mrs. Fink, Miss Foster, Miss Gray.

30 NURSING TRENDS This course is designed to increase the student's understanding of the role of the technical nurse within the profession. Past and current trends in nursing are reviewed in relation to future goals. *Prerequisite:* 27. Two hours. Miss Allen.

Pathology

COLLEGE OF MEDICINE

Professors Coon (Chairman), Craighead, Korson, Kusserow; Associate Professors Clemmons, Duffell, Picoff, Rice, Stark, Taylor, Trainer; Assistant Professors Harris, Howard, Kanich, Kaye.

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. *Prerequisite:* 1 year college level general biology or equivalent and permission of departmental chairman. Three hours. Dr. Taylor and Staff.

201 HISTOCHEMISTRY A survey of techniques used for chemical identification of cellular and tissue components, including discussion of underlying theories. *Prerequisite:* an acceptable course in cell structure (e.g., Anatomy 311, Botany 256); Chemistry 131-132; permission of the department. A course in biochemistry is strongly recommended. Credit as arranged. Not offered each year. Dr. Korson.

Pharmacology

COLLEGE OF MEDICINE

Professors Gans, Jaffe, and Smith (Chairman); Associate Professors Gray, McCormack, Reit, Robinson; Assistant Professor Doremus; Visiting Professor Maxwell.

290 PHARMACOLOGY (4-3) The Physiological consequences of introducing foreign chemicals, either as contaminants, drugs, food additives or poisons, into man's internal and external environment. A broad range of systemic pharmacology will be considered with emphasis on neuropharmacology (including behavioral pharmacology), endocrine and metabolic pharmacology, chemotherapy and environmental toxicology. *Prerequisites:* Chemistry 131, 132; at least one advanced course in Zoology, or Psychology 221, 222. Five hours. Dr. Gans and Staff.

Philosophy and Religion

COLLEGE OF ARTS AND SCIENCES

Professors Dykhuizen (emeritus), Hall (Chairman), and Sadler; Associate Professor Kahn; Assistant Professors Andrews, Beckett, Miller, Paden, Rice, Sobers, and Yarian; Instructors Bailey, Brenneman, Corcoran, Ford, Gussner, Martin and Paskow.

Philosophy

3 LOGIC Principles and conditions of correct thinking with emphasis on the detection of fallacies of thought. Three hours. Mr. Beckett.

4 ETHICS Examinations of the ideas underlying man's moral behaviour to develop an acceptable and coherent theory of conduct. Three hours. Staff.

5 INTRODUCTION TO PHILOSOPHICAL PROBLEMS An introduction to philosophy and its methods through certain general problems: knowledge and experience, God, religion, the self, moral and aesthetic values, freedom and determinism. Three hours. Staff.

21, 22 INTRODUCTION TO PHILOSOPHY A systematic analysis of the thought of such leading philosophers as Plato, Aristotle, Descartes, Spinoza, Hume and

Kant on such topics as Theory of Knowledge, Ethics, Political Philosophy, and Theory of Art. Three hours. Staff.

101, 102 HISTORY OF PHILOSOPHY First semester: ancient philosophy; second semester: modern philosophy through Kant. *Prerequisite*: one introductory course in philosophy. Three hours. Mr. Miller.

105 CONTEMPORARY PHILOSOPHIC THOUGHT The philosophic ideas of such men as Russell, Dewey and Whitehead, and of such movements as pragmatism, logical empiricism and existentialism. *Prerequisite*: one introductory course in philosophy. Three hours. Mr. Beckett.

151 PHILOSOPHY AND LITERATURE Selected philosophical works and the literary works they have influenced. *Prerequisite*: one course in philosophy. Three hours. Mr. Hall. Alternate years, 1969-70.

152 PHILOSOPHY OF THE ARTS An analysis of some principal theories of art as exemplified in music, literature and painting. *Prerequisite*: one introductory course in philosophy. Three hours. Mr. Hall.

153 PHILOSOPHY OF SCIENCE Some philosophical problems closely associated with the scientific enterprise: scientific explanation, interpretations of the concept of probability, the justification of induction, causality, space and time. Emphasis on current attempts at their solution. *Prerequisite*: a course in philosophy or science. Three hours. Mr. Beckett.

154 PHILOSOPHY OF RELIGION A critical analysis of the basic concepts and values which have emerged from man's religious experience. *Prerequisite*: one introductory course in philosophy, or religion 1, 2. Three hours. Mr. Hall.

175 CHINESE RELIGION AND THOUGHT Three hours. Mr. Andrews. See Religion 175.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH

202 ANALYTIC PHILOSOPHY The significant problems of philosophy from the standpoint of the predominant contemporary philosophic movement in England and the United States. *Prerequisite*: two advanced courses in philosophy. Three hours. Mr. Beckett. Alternate years, 1968-69.

203 CONTEMPORARY ETHICAL THEORY An intensive study of the contributions of leading ethical philosophers since G. E. Moore in ethical theory and metaethics. *Prerequisite*: two advanced courses in philosophy. Three hours. Mr. Beckett. Alternate years, 1968-69.

204 THEORY OF KNOWLEDGE A study of basic concepts and problems involved in explaining the possibility of human knowledge. Topics such as sense perception, memory, truth, necessity, knowledge and belief, and the possibility and limit of human knowledge will be considered. Three hours. Mr. Sobers. Alternate years, 1970-71.

206 SOCIAL PHILOSOPHY The meaning and values inherent in social life. *Prerequisite*: two advanced courses in philosophy. Three hours. Mr. Hall. Alternate years, 1968-69.

207 **METAPHYSICS** Current and traditional metaphysical problems such as the concept of change, the existence and nature of God, the self, and the world. *Prerequisite:* two advanced courses in philosophy. Three hours. Mr. Sobers. Alternate years, 1970-71.

208 **THEORY OF VALUE** An analysis of the nature of value and the nature of experience of the various realms of value. *Prerequisite:* two advanced courses in philosophy. Three hours. Mr. Sobers. Alternate years, 1968-69.

209 **AMERICAN PHILOSOPHY** The thought of such leading American philosophers as Peirce, James, Royce, Santayana, Dewey and Whitehead. *Prerequisite:* two advanced courses in philosophy. Three hours. Mr. Miller. Alternate years, 1969-70.

211 **NINETEENTH-CENTURY PHILOSOPHY** A systematic analysis of the contributions to philosophical thought of such thinkers as Fichte, Schelling, Hegel, Marx, Schopenhaur, Nietzsche, Mill, Kierkegaard, and Dilthey. *Prerequisite:* two advanced courses in philosophy. Three hours. Mr. Hall. Alternate years, 1968-69.

212 **EXISTENTIALISM** Existentialism, its sources and its relation to literature and to the arts; Heidegger, Sartre, Marcel, Jaspers and others. *Prerequisite:* two advanced courses in philosophy. Three hours. Mr. Hall.

214 **INTELLECTUAL BACKGROUNDS OF MODERN LIFE** Intellectual movements which have influenced the thought and life of today. *Prerequisite:* two advanced courses in philosophy. Three hours. Staff.

281, 282 **SEMINAR** Selected topics in philosophy, determined according to the interest of students and instructor. *Prerequisite:* two advanced courses in philosophy. Three hours. Staff.

For economic philosophy, see economics 295; and for political philosophy, see political science 211, 212; and for mathematical logic, see mathematics 259, 260.

391 through 393 **MASTER'S THESIS RESEARCH** Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

Religion

21, 22 **INTRODUCTION TO THE STUDY OF RELIGION** First semester: focus on basic writings and developments in Asian religious traditions, especially Hindu, Buddhist, Confucian and Taoist. Second semester: basic motifs and developments in the religious heritage of the West. Three hours. Staff.

101 **RELIGIOUS INSTITUTIONS AND COMMUNITIES** A comparative study of the basic types of religious community and religious institution, within various cultural settings. *Prerequisite:* three hours in religion or sociology 22; sophomore standing. Three hours. Mr. Sadler.

112 **MYSTICISM, SHAMANISM, AND POSSESSION** A comparative study of the ways in which the inward dimension of the religious life finds expression. *Prerequisite:* three hours in religion or anthropology 21; sophomore standing. Three hours. Messrs. Sadler and Paden.

122 MYTH, SYMBOL, AND RITUAL Study of the meaning and varieties of myth and ritual in cross-cultural perspective, with reference to contemporary theories of symbol and language. *Prerequisite*: three hours in religion or anthropology 21; sophomore standing. Three hours. Mr. Paden.

129 PHILOSOPHY OF RELIGION Three hours. Mr. Hall. See Philosophy 154.

131 'PRIMITIVE' RELIGIONS An introduction to the anthropological study of religion, including a critical examination of the classic theories of religious origins and essences, with a variety of references to field reports on religious phenomena in small-scale societies. *Prerequisite*: three hours in religion or three hours in anthropology; sophomore standing. Three hours. Messrs. Sadler and Lux (to be cross-listed as Anthropology 131.)

141 HEBREW SCRIPTURES Study of the history and writings of the Hebraic-Judaic religion to the first century B.C. *Prerequisite*: six hours in religion; sophomore standing. Three hours. Mr. Martin and Kahn.

142 POST-BIBLICAL JUDAISM A study of the formation of post-biblical Judaism with special attention to the Rabbinic period, 70-500 A.D. *Prerequisite*: six hours in religion; sophomore standing. Three hours. Mr. Kahn.

145 PRIMITIVE CHRISTIANITY The origin and nature of early Christianity with emphasis on the New Testament writings. *Prerequisite*: six hours in religion; sophomore standing. Three hours. Mr. Martin.

148 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. with emphasis given to a particular religion or religious movement such as Gnosticism, Greek Mystery Cults, or Hellenistic Judaism. *Prerequisite*: six hours in religion; sophomore standing. Three hours. Mr. Martin.

151 MODES OF CHRISTIAN EXPRESSION A study of the teaching, liturgy, art and piety of the Christian religion during its history up to the 16th century. *Prerequisite*: six hours in religion. Three hours. Mr. Yarian.

156 RELIGION IN AMERICA A study of the relationship between religion, the cultural ethos, and individual self-understanding in America. Consideration will be given not only to the dominant Protestant tradition and to the Catholic and Jewish immigration, but also to indigenous movements such as the religion of the American Indian, Black religion, Mormonism, etc. *Prerequisite*: six hours in religion, including Religion 22. Three hours. Mr. Martin.

161 STUDIES IN THE HINDU TRADITION Selected texts, practices, and developments in the Hindu tradition. *Prerequisite*: six hours in religion, including Rel. 21; sophomore standing. Three hours. Mr. Gussner.

166 STUDIES IN THE BUDDHIST TRADITION Selected texts, disciplines, and doctrinal developments in Indian, Tibetan, and Chinese Buddhism. *Prerequisite*: six hours in religion, including Religion 21; sophomore standing. Three hours. Messrs. Gussner and Andrews.

171, 172 JAPANESE RELIGION The religion of shrine and temple, of Shinto and Buddhism, and their interaction with the rich folk traditions of Japan, as revealed in historical patterns and contemporary practices, with reference to the ancient mythology as well as the popular lore of today, and to the post-war

situation. *Prerequisite*: six hours in religion, including Rel. 21; sophomore standing. Three hours. Mr. Sadler.

175 CHINESE RELIGION AND THOUGHT A survey of the religious and philosophical traditions and movements of premodern China with special attention to their relations to social structure and political history. *Prerequisite*: six hours in religion or philosophy, including Rel. 21 or Phil. 21; sophomore standing. Three hours. Mr. Andrews.

182 STUDIES IN FOLK RELIGION A study of folk tales, folk cults and festivals, folk deities, ogres, demons and "little people," in various cultures, and their relationship to the great traditions. *Prerequisite*: six hours in religion; junior standing. Three hours. Mr. Sadler.

187 RELIGION AND SECULAR CULTURE Study of the relation between religion and secularization, and of new forms of religious expression and interpretation. *Prerequisite*: six hours in religion; junior standing. Three hours. Mr. Paden.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH

201 THEORY AND METHOD Critical examination of some of the major theories and methods used in studying and interpreting religion. *Prerequisite*: nine hours in religion; junior standing. Three hours. Messrs. Paden and Sadler.

281, 282 PROBLEMS IN THE HISTORY AND PHENOMENOLOGY OF RELIGION Topics of current concern to historians of religions. *Prerequisite*: nine hours in religion; junior standing. Three hours. Staff.

297, 298 INTERDISCIPLINARY SEMINAR Student-faculty workshop on a topic of current interest, employing resources from various disciplines. *Prerequisite*: nine hours in religion; junior standing, and permission of the instructor. Three hours. Staff.

Physical Education

COLLEGE OF EDUCATION

Associate Professors Evans, Gobin, Leggett, Zimmerli (Chairman for Women); Assistant Professors Chase, Christensen (Chairman for Men), Dunkley, Greig, Farrell, Hayes, Soderberg, Strassburg; Instructors Carroll, Condon, Guerette, Kusiak, LaCasse, Lange, Nedde, Reinhardt, Szabo; Part-time Instructors Bove, Cross, Holmquist, Isley Jobanningmeier, Loch, Smith; Part-time Assistant Professors Bryant, Slack.

PHYSICAL EDUCATION Two hours weekly. One credit. Staff.

One year of physical education is required of undergraduate students (see page 68). The program is centered around the physical activity needs, abilities,

and interests of young adults. The aims are to help all to improve physical fitness; to provide opportunity to establish skills in basic movement; 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.

Activities

| <i>Men</i> P.E.M. | <i>Co-Ed. P.E.</i> | <i>Women</i> P.E.W. |
|----------------------|----------------------------|------------------------|
| Badminton | Children's Play Activities | Archery |
| Basketball | Folk-Social-Square Dance | Badminton |
| Body Building | Games and Rhythms | Basketball |
| Bowling | Gymnastics-Tumbling Dance | Billiards |
| Cross-Country Skiing | Judo | Bowling |
| Freshman P.E. | Life Saving | Fencing |
| Golf | Modern Dance—Ballet | Field Hockey |
| Handball | Outdoor Education | Figure Skating |
| Ice Skating | Skin and Scuba | Golf |
| Karate | Swimming | Karate |
| Paddleball | Synchronized Swim | Lacrosse |
| Remedial Exercise | | Officiating |
| Skiing | | Rhythmic Gymnastics |
| Soccer | | Riding |
| Squash | | Riflery |
| Swimming | | Skiing |
| Tennis | | Soccer-Speedball |
| Touch Football | | Softball |
| Track and Field | | Squash |
| Volleyball | | Tennis |
| Wrestling | | Track |
| | | Volleyball |

Students who elect skiing, riding, bowling, or karate will have additional fees for transportation and instruction. Those in skiing, skating, and judo usually provide their own equipment and gear.

The required physical education uniforms must be regulation in style and color and *must* be obtained at the University Bookstore:

Men: T shirts, shorts and sweat clothes (supporter, white socks, white tennis shoes).

Women: Shorts and shirt (white ankle socks, white tennis shoes), leotard and dance tights.

Every man enrolled in physical education must pay a four dollar locker-towel fee.

21 FOUNDATIONS OF PHYSICAL EDUCATION Review of Historical, Philosophical and Scientific Foundations as a basis for physical education and an introduction to the scope and rule of school physical education and to the opportunities and obligations associated with physical education as a profession. Three hours. Mr. Christensen or Mr. Soderberg.

22 FIRST AID AND SAFETY EDUCATION (1-2) First aid knowledge and skill required to respond to common emergency situations. Content includes treatment for wounds, burns, shock, broken bones, internal poisoning, as well as

techniques for bandaging, artificial respiration, and transportation. Red Cross certification as First Aid Instructor for successful performance. Two hours. Mr. Bryant.

26 WATER SAFETY (1-2) 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. Miss Farrell.

50 INTRODUCTION TO DANCE (2-2) A survey of various aspects of dance. Background in the historical and educational basis of dance. Opportunity to explore ethnic forms, performance, technique, choreography and/or other areas of interest. *Prerequisite:* skill competency and permission of instructor. Three hours. Miss Hayes.

52 DEVELOPMENT OF MOTOR SKILLS (1-2) Orientation to an understanding of the basic motor skills which form the foundation for all activity planning in the physical education program. Two hours. Mr. Dunkley.

100 TEACHING PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL (2-2) Planning, organization and practice in skills appropriate for teaching movement patterns to children aged 4-12. Three hours. (Two hours, elementary education majors only) Mr. Dunkley and Staff.

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. (Two hours for elementary education majors only.) Mr. Gobin and Staff.

123 COACHING BASEBALL AND FOOTBALL (2-2) Theory and technique of coaching interscholastic baseball and football. Includes practice, game and schedule organizations. *Prerequisite:* skill competency in baseball and football, and junior standing. Three hours. Mr. Holmquist and Mr. Scannella.

124 COACHING TRACK AND WRESTLING (2-2) Analysis and practice of the skills, technique and knowledge involved in coaching interscholastic track and wrestling. *Prerequisite:* skill competency in track and wrestling, and junior standing. Three hours. Mr. Nedde. Alternate years 1971-72, 1973-74.

125 COACHING SOCCER AND BASKETBALL (2-2) Theory and technique of coaching interscholastic soccer and basketball. Includes practice game and schedule organization. *Prerequisite:* skill competency in soccer and basketball, and junior standing. Three hours. Mr. Soderberg and Mr. Loche.

126 COACHING GYMNASTICS AND AQUATICS (2-2) Analysis and practice of skills, techniques and knowledge involved in teaching and coaching gymnastics and aquatics. *Prerequisite:* skill competency in gymnastics and aquatics, and junior standing. Three hours. Mr. Dunkley and staff. Alternate years 1972-73, 1974-75.

127 COACHING WOMEN'S TEAM SPORTS (2-2) Classroom and laboratory experiences designed to acquaint students with skill progressions, teaching techniques, selection and care of equipment, source materials, and coaching tech-

niques of the following activities: soccer, speedball, field hockey, volleyball, softball, lacrosse, and basketball. *Prerequisite*: skill competency and junior standing. Three hours. Miss Lange and Staff.

128 COACHING WOMEN'S INDIVIDUAL AND DUAL SPORTS (2-2) Classroom and laboratory experiences designed to acquaint students with skill progressions, teaching techniques, selection and care of equipment, source materials, and coaching techniques in a variety of individual and dual sports including golf, tennis, skiing, skating, and others. *Prerequisite*: skill competency and junior standing. Three hours. Miss Lange and Staff.

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. Staff.

145 SEMINAR IN ATHLETICS Contemporary issues, strategy, analysis and problem areas related to selected competitive sports. Variable credit. One-three credits. Staff.

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. Mr. Gobin.

154 INTRODUCTION TO RECREATION Development of the recreation movement, its cultural, social and economic background in American society. Techniques of leadership, community resources, supervision and evaluation methods in community recreation programs. The organization and objectives of recreational programs in various types of communities with emphasis upon the tax supported programs. (Accelerated.) Mr. Greig.

155 PHYSICAL EDUCATION IN THE SECONDARY SCHOOL (2-2) 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 experiences in teaching activity skills to youths from age of 12-18 years. *Prerequisite*: junior standing. Three credits. Mr. Gobin and Staff.

156 THE PHYSICAL EDUCATION CURRICULUM (Note title change.) The role of 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*: PE 100 or 155. Three hours. Mr. Gobin.

157 CARE AND PREVENTION OF ATHLETIC INJURIES (1-2) Prevention, recognition and care of injuries related to school physical education and athletic programs. Mr. Bryant.

158 ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION Organization and administration of instructional programs, intramurals, inter-scholastic athletics, school recreational programs, schedules, personnel, budgets, equipment, records, tests, and public relations. Three hours. Mr. Christensen.

166 PHYSIOLOGY OF MUSCULAR ACTIVITY (2-2) 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 Bio. Sci. Three hours. Mr. Leggett or Miss Lange.

167 KINESIOLOGY (2-2) 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. Mr. Leggett or Mr. Kusiak.

168 TESTS AND MEASUREMENTS IN PHYSICAL EDUCATION (2-2) 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. Mr. Greig or Mr. Kusiak.

169 HISTORY AND PRINCIPLES OF PHYSICAL EDUCATION The development of physical education; functions of physical education in society; underlying principles and concepts. Three hours. Accelerated. Mr. Gobin or Mr. Greig.

170 PHYSICAL EDUCATION FOR THE ATYPICAL (2-2) 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*: P.E. 100 or 155. Three hours. Mr. Gobin.

197 READINGS AND RESEARCH For course description see the College of Education 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. *Prerequisite*: 12 hours of education and psychology. Three hours. Mr. Leggett.

203 PRINCIPLES OF PHYSICAL EDUCATION Principles basic to sound philosophy of physical education for the space age; appraisal of historical development; relationship to health education, recreation and other areas; foundation and functions of physical education in contemporary society. *Prerequisite*: junior standing. Three hours. Mr. Gobin or Mr. Greig.

208 SCHOOL HEALTH PROGRAMS Organization of the total school health program. Problems and administration in the areas of school environment, health services, health education, and school-community relationship. Special emphasis on health appraisal of children in grades 1 through 12. *Prerequisite*: P.E. 116 (Health Education) or equivalent. Three hours. Mr. Gobin.

Physical Therapy

SCHOOL OF ALLIED HEALTH SCIENCES

Associate Professor Feitelberg (Director, Physical Therapy Program)

1-2 DYNAMICS OF HEALTH CARE See Technical Nursing, Page 251.

21 INTRODUCTION TO PHYSICAL THERAPY AND PATIENT CARE 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. Demonstration and instruction in basic procedures essential to patient care. Supervised observation at the clinical centers. (2 hours) Mr. Feitelberg and Staff.

Physics

COLLEGE OF ARTS AND SCIENCES

Professors Crowell (Chairman), Detenbeck, Juenker,¹ Nyborg and Scarfone; Associate Professor Krizan; Assistant Professors Brown, Depatie, Huang, Nagy, Sachs, and Thurnauer.

Physics 1 THE SOLAR SYSTEM (3-2) An introduction to Solar System astronomy with emphasis on recent discoveries, and including discussion of astronomical instrumentation, life on other planets, and origins. Laboratory work will include opportunity for telescopic observations. *Prerequisite:* secondary school algebra and trigonometry. Four hours.

Physics 2 STELLAR ASTRONOMY (3-2) A study of the stars including their classification and structure, nebulae, and galaxies. Discussion of the life and death of stars, and the origin and destiny of the universe in the light of current theories. Laboratory work will include opportunity for telescopic observations. *Prerequisite:* secondary school algebra and trigonometry. Four hours.

5, 6 ELEMENTARY PHYSICS (3-2) An introduction to the principles of physics for students not concentrating in physical science or engineering. Mechanics, heat, waves, optics, electricity, magnetism, atomic and nuclear physics. Demonstration lectures coordinated with laboratory work. *Prerequisite:* 5 for 6; secondary school algebra and trigonometry. Four hours. Staff.

17, 18, 27 GENERAL PHYSICS (3, 3, 3-2) For students concentrating in engineering or a physical science. Mechanics, thermal physics, electricity and magnetism, wave motion, and optics. *Prerequisite:* for 17, concurrent enrollment or credit in mathematics 11, or 13; for 18, 17 and concurrent enrollment or credit in mathematics 12 or 14; for 27, 18 or departmental permission, and credit or concurrent enrollment in mathematics 121 or 123. Three, three, and four hours. Staff.

1. Sabbatical leave January 1971 to July 1971.

101, 102 INTERMEDIATE PHYSICS LABORATORY (1-3) Selected experiments from the fields of mechanics, heat, electricity and magnetism, and optics. Students required to formulate details of objectives and procedure and to evaluate results. Intended to be taken concurrently with Physics 211 and 213 in the first semester and 214 in the second, but may be taken independently with departmental permission. *Prerequisite:* 27¹ mathematics 121. Three hours. Mr. Depatie and Mr. Nagy.

128 INTRODUCTORY MODERN PHYSICS (3-2) An introduction to the theory of relativity and to modern descriptions of radiation, the electron, the atom and combinations of atoms, the atomic nucleus, and elementary particles. *Prerequisite:* 27¹ and credit or concurrent enrollment in mathematics 121 or 123. Four hours. Staff.

193, 194 COLLEGE HONORS:

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH (0-4, 0-8) The student works on a theoretical or experimental project under direction. Written and oral reports are submitted. 197, two hours; 198, four hours. Staff.

203, 204 ADVANCED PHYSICS LABORATORY (1-3) Selected experiments from the fields of modern physics: atomic nuclear and solid state physics, physics of radiation and plasmas. Students required to formulate details of objectives and procedure and to evaluate results. Intended to be taken concurrently with physics 271, 272 but may be taken independently with departmental permission. *Prerequisite:* 28,¹ mathematics 121. Three hours. Mr. Nagy and Mr. Detenbeck.

211 MECHANICS (3-0) 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. Extensive use is made of descriptive, analytical, and approximations techniques, including energy diagrams, vector differential operations, moving and non-cartesian coordinate systems. *Prerequisite:* 27,¹ mathematics 121 or 123. Three hours. Mr. Juenker.

213 ELECTRICITY AND MAGNETISM (3-0) Fundamental principles of electricity and magnetism; charge, currents, circuits, theory of electrostatic fields, and magnetic fields of steady currents. Electrical and magnetic properties of matter and electromagnetic energy relationships. Vector analysis developed as necessary. *Prerequisite:* 27,¹ mathematics 121 or 123. Three hours. Mr. Nagy.

214 ELECTROMAGNETISM AND RELATIVITY An introduction to time dependent electromagnetic fields. Maxwell's equations in space and matter. Electromagnetism as a relativistic phenomenon. Special relativity including an introduction to four-vectors. *Prerequisite:* 213. Three hours. Mr. Nyborg.

216 INTRODUCTION TO MATHEMATICAL PHYSICS Introduction to basic mathematical methods of theoretical physics. Particular emphasis on partial differential equations, especially the wave equation. Special functions and complex variables. Other topics as time and interest permit. *Prerequisite:* 211 or 213. Three hours. Mr. Depatie.

1. May be replaced by physics 5, 6 with departmental permission.

220 **BIOLOGICAL PHYSICS (3-2)** Physical laws, concepts and methods discussed with respect to their reference to biology. Mechanics of solids, liquids and non-ideal media. Electric and magnetic fields, transport of dissolved gases and ions. Properties of macromolecules, radiation biophysics. *Prerequisite:* 6, chemistry 2, mathematics 12. Four hours. Mr. Nyborg. Alternate years.

222 **ADVANCED BIOLOGICAL PHYSICS (3-2)** Sound and electromagnetic waves, the latter including light, micro-waves and x-rays; ionizing particles and radiation. Interaction of these physical agents with biological systems. Physical properties of macromolecules and their aggregates. *Prerequisite:* chemistry 2; mathematics 121; and experience in applying differential equations. Departmental permission required. Four hours. Mr. Nyborg. Alternate years.

225, 226, 227 **SPECIAL TOPICS IN BIOLOGICAL PHYSICS** For research students in the field of biological physics. Lectures, reports and directed readings related to the research of the department. *Prerequisite:* 122 or 222, mathematics 121 and departmental permission. Credit as arranged. Mr. Nyborg. Offered as occasion warrants.

231, 232, 233 **SPECIAL TOPICS IN ACOUSTICS** For research students in the field of acoustics. Lectures, reports and directed readings on problems of particular interest to the current research of the department. *Prerequisite:* 212 and departmental permission. Credit as arranged. Messrs. Nyborg and Sachs. Offered as occasion warrants.

251, 252, 253 **SPECIAL TOPICS IN THE PHYSICS OF SURFACES** For research students in the field of surface chemistry and physics. Background of particular interest to the current research of the department is presented and discussed. *Prerequisite:* 265, or chemistry 142, mathematics 121 and departmental permission. Credit as arranged. Messrs. Crowell and Juenker. Offered as occasion warrants.

265 **THERMAL PHYSICS (3-0)** Basic concepts of thermodynamics including the characteristic functions and their application to determination of equilibrium conditions in homogeneous and heterogeneous systems. Introduction to kinetic theory and statistical mechanics. *Prerequisite:* 128 and mathematics 121. Three hours. Mr. Depatie.

271 **ATOMIC AND NUCLEAR PHYSICS** Phenomenological study of electronic structure of atoms, including vector model and various coupling modes. Development of quantum theory. Structure of the nucleus and properties of elementary particles. *Prerequisites:* 211. Three hours. Mr. Huang.

272 **INTRODUCTORY QUANTUM MECHANICS** Introduction to non-relativistic quantum mechanics. Schroedinger equation and applications to simple systems. Angular momentum and spin. Approximation techniques. *Prerequisites:* 271 and 216. Three hours. Mr. Huang.

301, 302 **MATHEMATICAL PHYSICS** Required of all graduate students in physics. Introduction to basic mathematical methods of theoretical physics; vector and tensor analysis, partial differential equations, orthogonal functions, complex variables and variational techniques presented with appropriate physical illustrations. *Prerequisite:* 211, 214 and 216, 301 for 302. Three hours. Mr. Huang.

311, 312 **ADVANCED DYNAMICS** Classical mechanics presented as the basis of the concepts and methods of modern physics. Variational, Lagrangian and Hamiltonian formulations, canonical transformations, continuous systems. Selected topics such as small oscillations, perturbation theory and special relativity. *Prerequisite:* 211 and 216, mathematics 211; 311 for 312. Three hours. Mr. Thurnauer.

313 **ELECTROMAGNETIC THEORY** Development of Maxwell's theory of electromagnetism with emphasis on the unity of electric and magnetic phenomena, both in their physical basis and in the mode of mathematical description. Boundary value problems in electrostatics, multipoles, electrostatics of macroscopic media, dielectrics, magnetostatics, time varying fields, Maxwell's equations, conservation laws, gauge transformations, wave equations, Green's functions are employed throughout. *Prerequisite:* 214 and 216, mathematics 211. Three hours. Mr. Scarfone.

314 **CLASSICAL ELECTRODYNAMICS** A continuation of electromagnetic theory. Plane electromagnetic waves, wave guides and resonant cavities, simple radiating systems and diffraction, magnetohydrodynamics and plasma physics, special theory of relativity, relativistic particle kinematics and dynamics, multipole fields. *Prerequisite:* 313. Three hours. Mr. Krizan.

321, 322, 323 **SPECIAL TOPICS IN THEORETICAL PHYSICS** For research students interested in pursuing topics of general and departmental research interest in theoretical physics such as classical and quantum field theory, relativity, group theory, plasma physics, many-body problem and scattering theory; material involved would not be presently covered in other courses. *Prerequisite:* departmental permission. Credit as arranged. Theoretical Physics staff. Offered as occasion warrants.

341, 342 **SOLID STATE PHYSICS** Introduction to crystal symmetry and the reciprocal lattice. Crystal binding and lattice vibrations. Thermal, electrical, and magnetic properties of solids, including Debye theory of heat capacities, free electron theory of metals, and band theory. Introduction to cooperative phenomena; ferromagnetism and superconductivity. *Prerequisite:* 214, 265, and 272 or their equivalents; consent of instructor. Offered alternate years, 1969-70. Equivalent to and alternates with E.E. 363, 364. Three hours. Mr. Juenker.

343, 344 **ADVANCED SOLID STATE PHYSICS** Introduction to group theory and its use in crystal physics and energy band theory. Introduction to quasiparticles, including phonons, plasmons, and ferromagnetic magnons, and their application to physical systems. Systematic discussion of the theoretical and experimental analysis of the Fermi surface in metals. Green function analysis and neutron scattering. *Prerequisites:* 342 (or E.E. 363), 362 and 375. Three hours. Offered as occasion warrants. Mr. Brown.

361, 362 **QUANTUM MECHANICS** Mathematical and physical foundations of non-relativistic quantum mechanics are presented from the unifying point of view of Dirac which includes the matrix and wave formulations. Applications include the theory of angular momentum, perturbation theory, the theory of radiative transitions and scattering theory. The role of symmetry operations and the essential algebraic structure of quantum mechanics are emphasized. *Prerequisite:* 272, 361 for 362. Three hours. Mr. Thurnauer.

363 **ADVANCED QUANTUM MECHANICS** Introduction to the mathematical and physical concepts of relativistic quantum mechanics. Topics include the Klein-Gordon equation, Dirac's theory of the electron, the relativistic hydrogen atom, Feynman's propagator theory and its applications. *Prerequisite:* 362. Three hours. Mr. Scarfone.

364 **ADVANCED QUANTUM THEORY** Quantization of free and interacting fields. Symmetry properties of fields and particles. The S-matrix and Feynman graphs. Soluble models and renormalization. The elements of Dispersion Theory. Applications in relativistic particle scattering. *Prerequisite:* 363. Three hours. Mr. Scarfone.

372 **NUCLEAR AND PARTICLE PHYSICS** Discussion of the conservation principles following from space-time symmetries and their consequences for nuclear and particle physics. The nucleon-nucleon interaction, iso-spin, light nuclei, nuclear models, analysis of scattering experiments at low and high energies. Selected additional topics such as the interaction between nucleons and radiation, weak interactions, dynamical theories of fundamental particle interactions. *Prerequisite:* 311, 314, 362. Three hours. Mr. Thurnauer. Offered alternate years 1969-70.

375 **KINETIC THEORY AND STATISTICAL MECHANICS** Review of thermodynamics. Elements of kinetic theory including the Boltzmann equation, H theorem and transport phenomena. Introduction to equilibrium statistical mechanics, both quantum and classical. *Prerequisite:* 173, 272. Three hours. Mr. Krizan.

376 **STATISTICAL MECHANICS** Applications of fundamentals of statistical mechanics to quantum and classical ideal and imperfect gases. Investigations of special topics such as the Ising model, relativistic statistical mechanics, physical adsorption and phase transitions. *Prerequisite:* 375 and 361. Three hours. Mr. Krizan.

391 through 393 **MASTER'S THESIS RESEARCH** Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

491 through 493 **DOCTORAL THESIS RESEARCH** Original research under the direction of an assigned staff member, culminating in an acceptable doctoral dissertation. Credit as arranged.

Physiology and Biophysics

COLLEGE OF MEDICINE

Professors Alpert (Chairman), Chambers; Associate Professors McCrorey, Parsons, Webb; Assistant Professors Farber, Halpern, Hamrell, MacDonald, Whiteborn.

9-10 **INTEGRATED SCIENCE (4-2)** A Systems Approach to Biology. This course will provide a physical-chemical basis for an understanding of modern

biology. Specific emphasis will be placed on the functioning of the various biological 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. Five hours per semester. Staff.

100 PHYSIOLOGY AND BIOPHYSICS (4-2) This course is taught as a science to physical therapy students in the first and second semesters, with emphasis placed on the broad physical, chemical and biological principles underlying the function of the main organ, tissue and subcellular systems. Special stress is placed on those phases which are the scientific basis of clinical physical therapy. The course consisting of 140 hours is made up of lectures, demonstrations and conferences. Five hours. Staff.

301 PHYSIOLOGY AND BIOPHYSICS Function in the whole human organism, and at the cellular, tissue, and organ levels, considered biologically and physically. *Prerequisite:* permission of the department chairman. Eight hours. Staff.

302 NEUROSCIENCE A correlated presentation of the neuroanatomy and neurophysiology of mammalian CNS. The course will consist of lectures, demonstrations and laboratory. The lab consists of both microscopic examination of the nervous system and gross dissection of the human brain. Clinical presentation of patients with neurological deficits are demonstrated when appropriate. Same course as Anatomy 302. *Prerequisite:* Permission of the instructor. Four hours. Anatomy and Physiology Staff.

303 SPECIAL PROBLEMS IN PHYSIOLOGY Various problems are covered by means of lectures, reports and directed reading. *Prerequisite:* 301; permission of the department chairman. Credit as arranged. Staff.

308 BIOMETRICS AND APPLIED STATISTICS This course is designed as an introduction to the rational use and evaluation of statistical methods in the planning of experiments and the interpretation of biological data. Topics include measures of central tendency and dispersion; "t"-test and analysis of variance; correlation and regression; chi-square; non-parametric methods; experimental design. The course includes a biometrics laboratory. Course limited to ten students. *Prerequisite:* Math 110 or equivalent, and permission of instructor. Five hours. Dr. McCrorey.

309 SYNAPTIC AND CONDUCTING MEMBRANES The mechanisms of synaptic transmission and nerve and muscle condition will be explored, with particular emphasis on molecular structure and function. *Prerequisite:* Physiology 301, Biochemistry 301, 302, permission of the instructor. Three hours. Alternate years, 1971-72. Dr. Webb.

310 MOLECULAR BASIS OF BIOLOGICAL MOTILITY This is an advanced course dealing with the molecular basis of muscle contraction and biological movement. The problems of energetics, mechanics and chemistry of biological motility will be considered in detail. Special emphasis will be given to the contraction of skeletal muscle. There will be some discussion of pathology, pharma-

cology and the comparative physiology of muscle related to the areas designated above. Lectures and conferences. *Prerequisites:* Physiology 301, Biochemistry 301, 302, permission of the instructor. Three hours. Alternate years, 1970-71. Dr. Alpert.

311 SPECIAL SENSE RECEPTORS Function of receptor cells from the standpoint of stimulation and response. Specific sense receptors will be considered. Assigned reading in the research literature with seminar discussions. *Prerequisite:* Physiology 301, permission of the instructor. Three hours. Alternate years, 1971-72. Dr. A. Chambers.

314 PHYSIOLOGY AND BIOPHYSICS OF THE CIRCULATION This course deals with the principles underlying the regulation of circulation. Special emphasis will be given to a consideration of the physiological adjustments to exercise.

The course will consist of reading and discussing articles, monographs and reviews. It will be a seminar type course limited to ten students. *Prerequisite:* Physiology 301, permission of the instructors. Three hours. Alternate years, 1970-71. Drs. Tabakin, Hanson and Levy.

315 PHYSIOLOGY AND PHARMACOLOGY OF SYNAPSES A comparative study of synaptic connections in invertebrate and vertebrate species will be undertaken, with emphasis on their ultrastructure, pharmacology, and physiology. *Prerequisites:* Physiology 301, Biochemistry 301, 302, permission of the instructor. Three hours. Alternate years, 1970-71. Dr. Parsons.

317 PHYSIOLOGY OF THE CENTRAL NERVOUS SYSTEM The course will cover electrophysiological studies of the central nervous system of mammals with particular emphasis on concepts dealing with information processing. Supplemental material drawing upon behavioral, neurochemical and clinical observations will also be used. *Prerequisites:* Physiology 301 or permission of instructor. Three hours. Dr. Whitehorn.

321, 322 CELLULAR PHYSIOLOGY AND BIOPHYSICS Fundamental physical and physiochemical properties of living cells. The reading of original scientific papers in the area covered will be stressed. *Prerequisite:* permission of the department chairman. Hours and credit as arranged. Staff.

323 PRINCIPLES AND ELEMENTS OF BIOMEDICAL INSTRUMENTATION This course is designed for the biologically trained researcher to provide a firm understanding of instrument methodology which is inseparable from intelligent planning and execution of experimental investigations. Topics include basic electrophysics; input and output transducers; the concepts and manipulation of bioelectric and other signals; fundamentals of computers, electrochemical and gas measurements; physiological instrument systems. A laboratory using biological material will support these theoretical ideas. Course limited to 12 students. *Prerequisites:* permission of the instructor. Five hours. Dr. Halpern and staff.

381 SEMINAR Presentation and discussion by advanced students and staff of current developments and research in the field. *Prerequisite:* permission of the department chairman. One hour per semester.

Plant and Soil Science

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professors Wiggans (Chairman), Bartlett, Hopp (Emeritus), and MacCollom; Associate Professors Boyce, McIntosh, and Wood; Assistant Professors Flanagan, and Pellett; Lecturers Calahan, Benoit, Kunkle, and Parker.

10 HOME AND GARDEN HORTICULTURE Enrichment of everyday home living through horticulture. Planning of the home grounds for maximum enjoyment. Selection and maintenance of plants for the home grounds, including shrub, tree and flower plantings, the home lawn, home fruit and vegetable gardens, and house plants. Designed primarily for non-agricultural students. Three hours. Mr. Wiggans and staff.

11 INTRODUCTORY PLANT SCIENCE Principles and practices involved in the culture, management, and utilization of plants and plant products with emphasis on economically important horticultural and agronomic crops. Three hours. Mr. Boyce.

61 INTRODUCTORY SOIL SCIENCE (2-3) An introductory study of the nature and properties of soils and how they serve as media for plant growth. *Prerequisite:* sophomore standing. Three hours. Mr. McIntosh.

99 ENVIRONMENTAL QUALITY . . . (see p. 205)

102 NATURAL RESOURCE CONSERVATION A systematic appraisal of the extent and character of the nation's resources; including soil, water, atmosphere, forest, wildlife, mineral, and other utilitarian and recreational aspects; their past use and misuse, present conservation status, and adequacy for the future. *Prerequisite:* junior standing. Three hours. Mr. Flanagan.

104 PRINCIPLES OF PEST CONTROL (2-3) Practices and principles involved in modern pest control including biological, cultural, and chemical methods for weeds, insects, and plant diseases. *Prerequisite:* eight hours of biological sciences or chemistry. Three hours. Staff. Alternate years, 1971-72.

106 ECONOMIC ENTOMOLOGY (3-2) Survey of the major insect orders, and the relationship of structure, physiology and life history to control; material and methods for control of injurious species. *Prerequisite:* 11 and animal science 2. Four hours. Mr. MacCollom. Alternate years, 1972-73.

107 FOREST ENTOMOLOGY (2-2) The ecology and population dynamics of insects affecting trees, forests and forest products, the types of injury and their recognition, and methods of insect control by silvicultural, biotic and chemical means. *Prerequisite:* junior standing in forestry or departmental permission. Three hours. Mr. Parker.

110 ENVIRONMENTAL POLLUTION (see page 205).

122 SMALL FRUIT CROPS (2-3) Principles of small fruit production, including propagation, culture, management, and harvesting. *Prerequisite:* 11. Three hours. Mr. Boyce. Alternate years, 1971-72.

125 ORNAMENTAL HORTICULTURE (2-3) The identification, climatic requirements, cultural management, and use of ornamental plant materials in landscape plantings. *Prerequisite*: 11. Three hours. Mr. Pellett. Alternate years, 1971-72.

138 PLANT PROPAGATION (2-3) The principles and practices involved in the propagation of herbaceous and woody plants by seeds, division, layering, cutting, budding, and grafting. *Prerequisite*: 11 or equivalent. Three hours. Mr. Evert. Alternate years, 1972-73.

141 FORAGE CROPS (2-3) Producing, improving, and managing forage and pasture crops, including a study of silage and hay making. *Prerequisite*: 11. Three hours. Mr. Wood. Alternate years, 1972-73.

144 FIELD CROPS (2-3) Theory and practice of producing, improving and managing field crops other than those for forage. *Prerequisite*: 11. Three hours. Mr. Wood. Alternate years, 1971-72.

145 TURFGRASSES (2-3) Principles of establishment, maintenance and utilization of turf for lawns, parks, athletic fields, airports, cemeteries, roadsides, golf courses, ski slopes and other special uses. *Prerequisite*: 11. Three hours. Mr. Wood. Alternate years, 1971-72.

162 SOIL FERTILITY AND MANAGEMENT The essential principles of soil management as they relate to soil fertility. A study of soil testing methods and interpretations, fertilizer manufacture and usage, and management practices which will maintain or improve soils. *Prerequisite*: 61. Three hours. Mr. McIntosh. Alternate years, 1972-73.

197, 198, S197 UNDERGRADUATE SPECIAL TOPICS Lectures, laboratories, readings, field projects, surveys or research to provide students with the opportunity for specialized experience in particular areas of agronomy, horticulture, soils, or plant environment. *Prerequisite*: permission of the department. One to three hours. Staff.

201 MICROMETEOROLOGY A theoretical and practical consideration of the micrometeorological factors that affect plant growth and response. The relationship of these factors to crop selection and agricultural practices. *Prerequisite*: 11 or equivalent. Three hours. Mr. Benoit. Alternate years, 1971-72.

204 PLANT RESEARCH TECHNIQUES (2-3) Methods of conducting research with plants. Organizing and planning of experiments. The use of field and laboratory equipment. *Prerequisite*: 11, 61, and botany 103 or equivalent. Three hours. Mr. Wiggins. Alternate years, 1971-72.

205 MINERAL NUTRITION OF PLANTS Roles of essential elements and deficiency effects. Classical and modern approach to study of ion availability and mechanisms of entry and transport. Colloid chemistry of roots and the rhizosphere. *Prerequisite*: botany 103 or equivalent. Three hours. Mr. Bartlett and botany, forestry, and plant and soil science staff. Alternate years, 1971-72.

207 WATER RELATIONS OF PLANTS (See forestry 207) Three hours. Mr. Donnelly and botany and plant and soil science staff. Alternate years, 1972-73.

222 ADVANCED TREE FRUIT CULTURE (2-3) Theory and practice of modern commercial fruit science. Basic principles involved in nutrition and

responses to cultural and management practices. *Prerequisite:* 11. Three hours. Mr. Calahan. Alternate years, 1970-71.

S223 ADVANCED ORNAMENTAL HORTICULTURE (2-3) Developmental landscape drafting, design and composition. Taxonomy, ecology, and physiological considerations in adaptation of plants in the landscape environment. Physiological principles related to modern methods of greenhouse and landscape environmental control. *Prerequisite:* 125 or departmental permission. Three hours. Mr. Pellett.

261 SOIL FORMATION AND CLASSIFICATION A discussion of the development of soils throughout the world as influenced by soil forming factors. Detailed study of soils occurring in Vermont. Classification of soils, including the Comprehensive System, 7th Approximation. Saturday field trips will be arranged. *Prerequisite:* 61 or a total of six hours in ecology, geology, or geography. Three hours. Mr. Bartlett. Alternate years, 1970-71.

264 SOIL CHEMISTRY (2-3) The chemistry and biology of soils as they affect plant growth. Colloidal properties of clays and organic matter in relation to soil acidity and availability of essential elements. Modern laboratory analysis of soils, fertilizer and plant tissue. *Prerequisite:* 61, chemistry 1-2 or 11-12. Three hours. Mr. Bartlett. Alternate years, 1971-72.

266 SOIL PHYSICS (2-3) The physical properties of soils. The mathematical and physical principles necessary to understand the soil-water-plant interaction and its relationship to production and management. *Prerequisite:* 61, physics 5-6 or chemistry 1-2. Three hours. Mr. Benoit. Alternate years, 1970-71.

281 through 283 SEMINAR Presentation and discussion of papers on selected topics of current interest by students and staff. *Prerequisite:* senior standing. One hour. Staff.

381, 382 GRADUATE SPECIAL TOPICS Advanced readings and discussion of plant or soils research literature. Three hours. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged. Staff.

491 through 493 DOCTOR'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged. Staff.

Political Science

COLLEGE OF ARTS AND SCIENCES

Professors Dellin, Gould (Chairman), Haugen, Hilberg, Little¹ and Nuquist; Associate Professors Parenti, Simon, and Staron; Assistant Professors Brubaker, Flanders, Pacy, Warner and Wertheimer; Adjunct Assistant Professor Eastman; Instructors Flannery and Nelson.

11, 12 INTRODUCTION TO POLITICAL SCIENCE First semester: elements of political science. Second semester: comparative governmental institutions. Three hours. Staff.

13 INTRODUCTION TO POLITICAL THEORY An introduction to empirical theories of politics, the purpose of normative theory, and the analysis of basic political concepts. Three hours. Mr. Wertheimer.

21 AMERICAN POLITICAL SYSTEMS Institutions, processes, and problems of American government. Three hours. Mr. Warner and staff.

51 INTERNATIONAL RELATIONS The state as actor in international relations. Global divisions and problems. Three hours. Messrs. Flannery, Hilberg, Little and Pacy.

71 COMPARATIVE POLITICAL SYSTEMS Introduction to the method and theories of Comparative Politics focusing upon selected contrasting political systems. Three hours. Mr. Flanders.

81 POLITICAL BEHAVIOR An analysis of how people react to political situations and the ways in which their behavior may be understood. Five areas of political activity will be examined (e.g., elections, administration, legislatures, courts, and communities) on three separate levels of concern; individual, group, and institution. Three hours. Mr. Nelson.

96 SEMINAR Selected topics in Political Science. *Prerequisite:* a related basic course in political science, permission of the instructor. Three hours. Staff.

161, 162 LOCAL GOVERNMENT First semester: governments of counties, towns, and other rural units. Second semester: municipal government. *Prerequisite:* six hours in political science; junior standing. Three hours. Mr. Nuquist.

171 WESTERN EUROPEAN POLITICAL SYSTEMS An examination of the British, German, and French political systems. Three hours. Mr. Staron.

172 RUSSIAN AND EASTERN EUROPEAN POLITICAL SYSTEMS An examination of the Russian and some other Eastern European Communist political systems. Three hours. Mr. Staron.

173 GOVERNMENTS OF CANADA AND THE COMMONWEALTH Governmental systems in the British Commonwealth and overseas territories, with particular emphasis on Canada and Commonwealth cooperation. Three hours. Mr. Haugen.

1. On leave second semester 1970-1971.

174 **LATIN AMERICAN POLITICAL SYSTEMS** Analysis of the formal and informal political structure of Latin American states with emphasis upon contemporary developments. Three hours. Mr. Gould.

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. Messrs. Little and Flanders.

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: recent political ideologies. *Prerequisite*: six hours in political science. Three hours. Mr. 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. Mr. Wertheimer.

214 **THEORIES OF DEMOCRACY** An examination of both empirical and normative theories of democracy, including the ideas of "democrats" and their opponents. Social, economic, and psychological aspects of democracy will be considered. *Prerequisite*: six hours in political science. Three hours. Mr. Wertheimer.

216 **AMERICAN POLITICAL THOUGHT** American political thought from the colonial period to recent times. *Prerequisite*: six hours in political science. Three hours. Mr. Simon.

221, 222 **CONSTITUTIONAL LAW** First semester: judicial review, federalism, citizenship and suffrage, taxing power, commerce power. Second semester: Bill of Rights, Due Process, Equal Protection. *Prerequisite*: six hours in political science. Three hours. Mr. Gould.

224 **LAW AND THE JUDICIAL PROCESS** The development of law in western civilization. The role of law in contemporary societies. Varying conceptions of the organization and procedure of the courts in contemporary societies. Courts as a political process. Approaches to the study of judicial behavior. *Prerequisites*: six hours of political science. Three hours. Mr. Brubaker.

226 **ADMINISTRATIVE LAW** A study of judicial decisions affecting the actions of public officials as they relate to the functions and policies of government. *Prerequisite*: six hours in political science. Three hours. Mr. Nuquist.

227, 228 **INTERNATIONAL LAW** Principles and applications of public international law. *Prerequisite*: six hours in political science. Three hours. Mr. Little.

231 **THE LEGISLATIVE PROCESS** Congressional and parliamentary organization and procedure. *Prerequisite*: six hours in political science. Three hours. Mr. Haugen.

232 **LAWMAKING AND PUBLIC POLICY** Influence of the executive and problems of congressional and parliamentary control. *Prerequisite*: six hours in political science. Three hours. Mr. Haugen.

233 THE NATIONAL EXECUTIVE Analysis of the functions and organization of the Presidency and the bureaucracy in American national government. *Prerequisite*: six hours in political science. Three hours. Mr. Warner.

235 DEFENSE POLICY Constitutional and historical framework; intelligence, R and D, procurement, manpower and deployment; U.S.-Soviet discrepancies, developments, and dilemmas. *Prerequisite*: six hours in political science. Three hours. Mr. Pacy.

239 AMERICAN POLITICS An examination of the politics of decision-making in the American political system. *Prerequisite*: six hours in political science. Three hours. Mr. Simon.

241 PUBLIC ADMINISTRATION Introduction to the role of administration in government, theories of administrative organization and their application, the basic functions of administrative management, and problems of democratic control. *Prerequisite*: twelve hours in political science, or six hours in political science and one sophomore course in social science; junior standing. Three hours. Mr. Nuquist.

242 PROBLEMS OF PUBLIC MANAGEMENT Analysis of policy and administrative issues of current domestic programs. *Prerequisite*: six hours in political science. Three hours. Mr. Warner.

250 THE CRAFT OF DIPLOMACY The craft of diplomacy in its totality. Emphasis on experiences and reflections of diplomatic personalities, supplemented by studies of specialists. History and analysis of diplomacy, foreign office organization, foreign service organization, etc. *Prerequisite*: six hours in political science. Three hours. Mr. 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 of political science. Three hours. Mr. Hilberg.

256 INTERNATIONAL ORGANIZATION Theory and practice in supranational institutions. The United Nations, regional international organizations, and functional agencies as instruments of national diplomacy and as independent factors in international politics. *Prerequisite*: six hours in political science. Three hours. Mr. Pacy.

257 POLITICAL GEOGRAPHY See Geography 257. Three hours. Mr. Miles.

258 PROBLEMS OF COMMUNISM See Economics 258. Three hours. Mr. Dellin.

261 URBAN GOVERNMENT AND POLITICS The development of cities and urban life. The analysis of metropolitan areas and governments. Metropolitan problems and proposed solutions; the role of the city; the suburbs; the state; and the nation. *Prerequisite*: six hours of political science. Three hours. Mr. Brubaker.

263 STATE GOVERNMENT Processes of basic formulation and popular control, the nation-wide effort to improve governmental systems, the theoretical basis of reform movements, and trends in the treatment of governmental problems. *Prerequisite*: six hours in political science. Three hours. Mr. Brubaker.

264 STATE ADMINISTRATION The effect of expansion in state activity problems in policy determination, the responsibility and accountability of officers and agencies, the organization and maintenance of central services and controls, and the impact of study and investigation by legislative committees, interim commissions, councils, and citizens groups. *Prerequisite*: six hours in political science. Three hours. Mr. Haugen.

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. Mr. Haugen.

273 COMPARATIVE POLITICAL ANALYSIS An intensive examination of selected topics in comparative politics. *Prerequisite*: a semester course in Comparative Government. Three hours. Mr. Flanders.

277 SOVIET POLITICS See History 277. Three hours. Mr. Daniels.

278 FOREIGN POLICY OF THE USSR Theoretical background; history of Soviet foreign relations; development of the international Communist movement and the Communist bloc; factors and instruments of policy; current problems of relations between Russia and the West among the Communist countries. *Prerequisite*: Six hours of political science or history 243. Three hours. Mr. Flannery.

281 POLITICAL PARTIES Analysis of the electoral, administrative, legislative, and organizational activities of political parties from historical, behavioral, and comparative perspectives. Special emphasis will be placed upon voting behavior and campaign techniques. *Prerequisite*: six hours in political science. Three hours. Mr. Nelson.

282 POLITICAL COMMUNICATION Analysis of the development and mobilization of political attitudes as they relate to political socialization, public opinion formation, mass communication, and interest group activity in government. *Prerequisite*: six hours in political science. Three hours. Mr. Nelson.

283 SCOPE AND METHODS OF POLITICAL SCIENCE Approaches, sources of information, research methods and systematization in the study of political phenomena. Open to senior majors and graduate students only. Three hours. Mr. Wertheimer.

291 through 293 READING AND RESEARCH For advanced undergraduates and graduate students. Three hours. Staff.

295, 296 SEMINAR Selected topics in Political Science. *Prerequisite*: six hours in political science. Three hours. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

Psychology

COLLEGE OF ARTS AND SCIENCES

Professors Ansbacher and Forgas (Chairman), Chaplin; Associate Professors Burchard, Goldstein, Joffe, Lawson, Leitenberg, Patterson and Perrine; Assistant Professors Conquest, Does, Ferguson, Jeanne Goldstein, Gordon, Hasazi, Howell, Huntley, Kessler, Leff, McKenzie, McGrath, Musty, Rolf, and Stone.

1 GENERAL PSYCHOLOGY Introduction to the entire field, emphasizing the normal adult human being. Three hours. Miss McGrath and Messrs. Huntley and Rolf.

5 PSYCHOLOGICAL STATISTICS Statistical technique and research design pertinent to the behavioral scientist. Topics covered include certain descriptive statistics and certain parametric and non-parametric hypothesis-testing statistics. A calculation laboratory is provided. *Prerequisite:* 1. Three hours. Messrs. Howell and Gordon.

105 CHILD PSYCHOLOGY Development of the individual from birth to adolescence. *Prerequisite:* 1. Three hours. Mr. Hasazi.

106 PERSONALITY Individual and life problems from the field-theoretical and phenomenological approach with emphasis on Alfred Adler's viewpoint. *Prerequisite:* 1. Three hours. Mr. Ansbacher.

108 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. Mr. Kessler.

109 EXPERIMENTAL PSYCHOLOGY I (2-4) Problems of experimental design and methodology, including such areas as threshold measurement, scaling, classical conditioning, perception, motivation, and verbal learning; laboratory exercises involving data collection and analysis; development and completion of an original experiment. *Prerequisite:* 5. Four hours. Mr. Lawson.

110 EXPERIMENTAL PSYCHOLOGY II (2-4) Research using animals as subjects; experiments in such areas as operant conditioning, discrimination learning, secondary reinforcement, chaining, schedules of positive reinforcement, and negative reinforcement. *Prerequisite:* 109. Four hours. Mr. Joffe.

121 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. Topics include: the nature, formation, and change of attitudes and norms; group dynamics; leadership; conformity; group conflict and social change; social movements; and language, symbols, and communication. *Prerequisite:* 1. Three hours. Mr. Leff.

123 SYSTEMATIC PSYCHOLOGY A comparative study of the leading contemporary schools of psychological thought. *Prerequisite:* 1. sophomore standing. Three hours. Miss McGrath.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 **RESEARCH** Individual research under staff direction. *Prerequisite:* departmental permission. Three or six hours. Staff.

200 **BEHAVIOR MODIFICATION** A survey of techniques for the manipulation and control of human behavior, and evaluation of their effectiveness. Such topics as conditioning, brainwashing, and hypnosis will be discussed. *Prerequisite:* 1. Three hours. Messrs. Leitenberg and Burchard.

205 **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 with emphasis on the psychological factors responsible for their occurrence and remission. *Prerequisite:* 1 and 105 or 108. Three hours. Mr. Rolf.

210 **COMPARATIVE PSYCHOLOGY** 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 from lower forms to man. *Prerequisite:* 110, 123. Three hours. Staff.

221 **PHYSIOLOGICAL PSYCHOLOGY I** The structure and function of the mammalian nervous system, with emphasis upon neurological correlates of behavior and receptor mechanisms. Individual laboratory experience in electrophysiological techniques and the recording of receptor potentials. *Prerequisite:* 110, 123. Mr. Patterson.

222 **PHYSIOLOGICAL PSYCHOLOGY II** The study of the role of central nervous system mechanisms in the determination of innate behavior, arousal, internal inhibition and learning. Individual laboratory experiences in assessing the effects of brain stimulation, hormones, and psychoactive drugs upon behavior. *Prerequisite:* 110, 123, 221. Mr. Musty.

225-226 **PSYCHOLOGICAL TESTS** Survey of important clinical tests of ability and personality; training in the administration of individual intelligence tests. *Prerequisite:* 110, 123, and permission of the instructor, who may waive the prerequisites in special cases. Three hours. Staff.

228 **INTRODUCTION TO CLINICAL PSYCHOLOGY** Initially this course will be a study of the basic principles of interviewing, testing, assessment from life situations, and report writing. Later there will be 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. Three hours. Mr. Kessler.

230 **LEARNING** Basic laws of the learning process as revealed by controlled experiments; with emphasis upon specific phenomena and the variables which govern them. Laboratory experiences are provided and students may undertake original experiments. *Prerequisite:* 110, 123. Three hours. Mr. Howell.

232 **EXPERIMENTAL SOCIAL PSYCHOLOGY** Advanced survey covering current research in various fields of social psychology. *Prerequisite:* 110, 123. Three hours. Mr. Ferguson.

234 **MOTIVATION AND EMOTION** Nature and development of motives, emotions and their relation to other psychological processes. *Prerequisite:* 110, 123. Three hours. Mr. Joffe.

236 **THINKING** A critical review of the experimental investigation of thought processes. Such topics as concept formation, rule learning, plans and strategies, language and thought, and creative thinking will be discussed. *Prerequisite:* 110 and 123. Three hours. Messrs. Gordon and Howell.

237 **SENSORY PERCEPTION** An introduction to the sensory basis of perception. Emphasis is on methodology and research literature; development of an original experiment. *Prerequisite:* 110, 123. Three hours. Mr. Lawson.

238 **SOCIAL PERCEPTION** Experimental and theoretical study of the phenomena of the human perceptual process; with emphasis on the role of social, motivational, and learning factors. The major perceptual theories are examined critically in the light of recent research. Students may undertake original experiments. *Prerequisite:* 110, 123. Three hours. Mr. Perrine.

281-282 **SEMINAR** Review and discussion of current psychological research. *Prerequisite:* 110, 123. One hour. Staff.

295, 296 **CONTEMPORARY TOPICS** *Prerequisite:* 110 or permission of the instructor. Three hours. Staff.

301, 302¹ **ADVANCED GENERAL PSYCHOLOGY** This course serves as an overview of the field. It will emphasize empirical findings from the frontiers of the field and relate them to the body of psychology as it is developing today. Experiments will be undertaken by each student. Three hours. Mr. Chaplin.

303¹ **RESEARCH APPARATUS AND DESIGN** A study of the methods and techniques used in executing behavioral science research, with special emphasis given to the basic principles of electricity and behavioral apparatus design. Individual laboratory experience and demonstrations give the student exposure to the contemporary methodology used by the experimental psychologist. Three hours. Staff.

305¹ **SEMINAR IN LEARNING THEORY** An examination of selected contemporary theoretical approaches to learning and a study of recent research contributions to such problem areas as social learning, emotional learning, the physiology of learning, etc. Three hours. Mr. Howell.

306¹ **SEMINAR IN VERBAL LEARNING** Selected problems in verbal learning and memory will be studied by means of a detailed critical examination of the relevant literature. Current topics such as short and long term memory, organizational structure of free recall, and pre-experimental associations will be examined. Three hours. Mr. Howell.

308¹ **SEMINAR IN OPERANT CONDITIONING** A review of current developments in this area of research. Negative and positive reinforcement; discrimination training and generalization. Three hours. Mr. Leitenberg.

310 **SEMINAR IN PERCEPTION** A review of the history and contemporary problems of perceptual processes. Emphasis will be on perceptual mechanisms responsible for organization of sensory information. Three hours. Mr. Lawson.

1. The prerequisite for this course is acceptance to the graduate psychology program which involves the satisfactory completion of undergraduate courses in experimental psychology, systematic psychology, and statistics. In special cases, these prerequisites may be waived by permission of the instructor. In addition, acceptance to Master's degree candidacy is a prerequisite.

320 **COMPARATIVE PSYCHOLOGY OF BEHAVIORAL DEVELOPMENT** An examination of the general principles underlying the development of behavior from prenatal to adult responding. Focus will be on the pertinent research literature, particularly as it concerns the influence of various kinds of experience in early life upon later functioning. Three hours. Mr. Joffe.

321 **SENSORY PROCESSES: VISION** A study of the psychological and physiological parameters of the visual receptor system. Emphasis will be placed upon the integration of recent advances in the areas of visual perception, neurophysiology, and photochemistry. Three hours. Messrs. Lawson and Musty.

322 **SENSORY PROCESSES: MECHANICAL AND CHEMICAL SENSES** A study of selected topics from the mechanical senses (somesthesia and kinesthesia) and the chemical senses (olfaction and gustation). Emphasis will be placed upon recent advances in perceptual theory, neurophysiology and ultrastructure, as they are related to these senses. Three hours. Mr. Patterson.

323 **SENSORY PROCESSES: AUDITION** A study of the psychological and physiological parameters of the auditory system. Emphasis will be placed upon the integration of recent advances in the areas of auditory perception, physiological acoustics, and sensory coding. Three hours. Mr. Patterson.

324 **CENTRAL PROCESSES: BRAIN STEM MECHANISMS** Advanced studies of spinal, rhombencephalic, and mesencephalic mechanisms of the nervous system, in the control of elementary anamative activity, including reviews of historical and current literature. Three hours. Mr. Musty.

325 **CENTRAL PROCESSES: PALEOCORTICAL MECHANISMS** Advanced studies of paleocephalic mechanisms of the nervous system with special emphasis on central integrative function of the thalamus, hypothalamus, and rhinencephalon, in the control of vegetative and affective activity, including reviews of historical and current literature. Three hours. Mr. Musty.

326 **CENTRAL PROCESSES: CORTICAL MECHANISMS** Advanced studies of the prosencephalic systems in cognitive behavior, with reference to cortical function and its relationship to input and output systems, including reviews of historical and current literature. Three hours. Mr. Musty.

330 **ADVANCED SOCIAL PSYCHOLOGY** A critical evaluation of such major concepts and methods as: attitude formation, change, and measurement; prejudice; social perception; group dynamics. Three hours. Staff.

331 **INTERPERSONAL PROCESSES: MODES OF INTERACTING** Examination of interpersonal conflict, cooperation, power relations, information transfer, and persuasion. Two major goals of the seminar will be to increase our understanding of the interpersonal behavior and to seek meaningful applications to problems of personal and social significance. *Prerequisite:* permission of the instructor. Mr. Leff.

332 **INTERPERSONAL PROCESSES: COGNITION IN SOCIAL BEHAVIOR** Examination of social attribution, interpersonal set, problems of reciprocal perspectives in social encounter, and the formulation of interpersonal strategies. Combined emphasis on theoretical understanding, empirical research, and social applications. *Prerequisite:* permission of the instructor. Mr. Leff.

333 INTERPERSONAL PROCESSES: MOTIVATION IN HUMAN INTERACTION

Examination of current and historical theories of social motivation, the interrelations of cognition and affect as determinants of motivation in social contexts, and the operation of selected motives of social significance (such as aggression, altruism, and achievement). Combined emphasis on theory, research, and applications. *Prerequisite:* permission of the instructor. Mr. Leff.

334 SEMINAR IN EXCHANGE THEORY

This course will survey the various approaches to exchange theory in human interaction. Theories will be set in the context of historical philosophical backgrounds of Mill and Bentham. Current positions of Homans, Blau and Scott, Adams, and Thibaut and Kelley will be surveyed. Research and survey material will be discussed with a particular emphasis on methodological problems of scaling associated with this area. Experimentation will be encouraged in the course of the seminar. *Prerequisite:* Psychology 232. Mr. Ferguson.

335 SEMINAR IN SOCIAL JUDGMENT

Traditional areas suggested by the work of Allport and Bruner will be examined with an eye toward a consideration of target and perceiver variables. Much attention will be given to recent work by Kelley, Jones, de Charms and others in attribution theory with particular emphasis on the process of individual causal inference based on socially mediated events. The work of Asch and others will be examined as a basis for assessing conformity behavior. The field of persuasion in communication will be considered, with special consideration of communicator and source variables. A section will be devoted to experimental work in stimulus judgment with applications to aesthetics. *Prerequisite:* Psychology 232. Mr. Ferguson.

336 SEMINAR IN ATTITUDE CHANGE

This course will cover many of the historical as well as contemporary attitude change theorists. Particular attention will be paid to an attempt to reconcile various points of view. Much of the literature will be examined in the light of more recent conceptualization of attitudinal dimensions and structural models. Methodological problems of assessing attitudes and attitude change will be discussed. Experimentation will be undertaken in the course of the seminar. *Prerequisite:* Psychology 232. Mr. Ferguson.

337 SEMINAR IN SOCIAL PERCEPTION

Examination of the process through which impressions and judgments of man and other social objects are reached. Three hours. Mr. Perrine.

340 ADVANCED STATISTICAL METHODS I

Study of Statistical methods as aids for understanding and evaluating psychological data. Critical study of such topics as sampling theory, statistical estimation, analysis of variance, and correlational techniques. Three hours. Mr. Howell.

341 ADVANCED STATISTICAL METHODS II

A continuation of 340 with in depth study of nonparametric theory and method. Further study of problems in the analysis and interpretation of data from the behavioral sciences. *Prerequisite:* 340. Three hours. Mr. Howell.

342 CORRELATION AND REGRESSION

In depth treatment of correlational techniques commonly used with data found in the behavioral sciences. Special emphasis will be given to continuous and discrete data and their distributions, covering special methods for measuring degree of association. Least square

methods for the solution of linear regression problems and associated topics such as matrix algebra. *Prerequisite:* 340. Three hours. Messrs. Goldstein and Howell.

344 **EXPERIMENTAL DESIGN** Extended coverage of problems in the design and analysis of behavioral experiments to include repeated and non-repeated measures, interactions, confounding, individual comparisons, missing data, model building, Latin and higher order squares, lattice and block designs. Problems of covariate designs and their interpretations will be considered. *Prerequisite:* 340. Three hours. Messrs. Goldstein and Howell.

345 **MATHEMATICAL MODELS IN PSYCHOLOGY** The use of probabilistic models in contemporary psychology stressing basic probability theory. Markov chains, information theory, signal detection theory and Bayesian statistics. Three hours. Mr. Gordon.

347 **MEASUREMENT AND SCALING** Treatment of the philosophy of measurement and scaling including traditional psychophysical techniques. Thurstonian judgmental methods and recent topics in unidimensional scaling. Survey of techniques and applications in metric and non-metric multidimensional scaling. Examination of the relation of these techniques to related areas such as mental test theory, including concepts of reliability and validity, factor analysis, and cluster analysis. *Prerequisite:* 340 and 342. Three hours. Mr. Gordon.

349 **SPECIAL TOPICS IN APPLIED STATISTICS** A course for advanced graduate students. Topics might include factor analysis, discriminate function analysis, multivariate analysis of variance, advanced experimental design, introduction to Bayesian statistics, computer application in data collection and analysis. *Prerequisite:* consent of the instructor. Three hours. Messrs. Goldstein, Gordon, and Howell.

351 **SEMINAR IN BEHAVIOR THERAPY** A review of the literature relating to theory, practice, and research. Emphasis will be placed on the applications of conditioning theory and the experimental analysis of behavior to psychotherapy. Three hours. Mr. Leitenberg (Department of Psychology).

352 **INTRODUCTION TO CLINICAL HUMAN NEUROPSYCHOLOGY** A clinical seminar dealing with the effects on human behavior of neocortical dysfunction. Review of the early theoretical and clinical approaches to brain function with major emphasis on recent developments in diagnostic techniques and the changes in theory that have occurred subsequently. Introduction to the interpretation of results obtained through the utilization of these techniques. *Prerequisite:* 221, 222 or equivalent. Three hours. Mr. Goldstein.

353 **SEMINAR IN RESEARCH IN THE EDUCATION OF HANDICAPPED LEARNERS** A broad survey of research undertaken to evaluate teaching/learning procedures, methodology, and materials employed in the education of the handicapped learner. *Prerequisite:* Education 312. Three hours. Mr. McKenzie.

356 **MENTAL RETARDATION** Study of abnormal behavioral development in the intellectual area. Emphasis will be placed on current psychological theory and research in the etiology, assessment, and modification of mental retardation. *Prerequisite:* Graduate standing in psychology or permission of instructor. Three hours. Mr. Hasazi.

357 RESEARCH IN SCHIZOPHRENIA An advanced seminar intended to investigate the adequacies of past and current research methodologies with respect to environmental, genetic, and biochemical theories of the etiology of schizophrenia. *Prerequisite:* Graduate standing in psychology or permission of the instructor. Three hours. Mr. Rolf.

358 SEMINAR IN ANTISOCIAL BEHAVIOR A review of the literature related to the development and modification of anti-social behavior. Special emphasis will be placed on the evaluation of previous research and the preparation of practical research proposals which will extend existing knowledge in the field. *Prerequisite:* Graduate standing in psychology or permission of instructor. Three hours. Mr. Burchard.

360 METHODS AND MODELS OF CLINICAL PREDICTION An in depth study of the clinical vs. actuarial problems in applied psychology. Consideration is given to historical precedents to the problem followed by treatment of models of intelligence and personality as classic examples of problems in prediction and description including reliability, validity and utility. Following a discussion of quantitative solutions, modern day positions in this controversy are covered. *Prerequisite:* 340 or permission of instructor. Three hours. Mr. Goldstein.

361 ADVANCED PERSONALITY THEORY A survey of present-day personality theories according to issues involved and explanatory demands made on a theory, rather than taking up one theory after another. With emphasis on usefulness to psychotherapy, an organism-operational-Adlerian type theory is favored. *Prerequisite:* Graduate standing in psychology or permission of instructor. Three hours. Mr. Ansbacher.

362 COMMUNITY CLINICAL PSYCHOLOGY A seminar in a current philosophy and approach to mental health problems. Topics will include: 1. History and development of community mental health and of community clinical psychology. 2. Consultation methodology in community clinical psychology and community mental health. 3. Research problems in community psychology. *Prerequisite:* Graduate standing in psychology or permission of instructor. Three hours. Mr. Kessler.

370, 371 INTRODUCTORY PRACTICUM: ASSESSMENT AND THERAPY I & II Introductory overview of clinical evaluation and therapy. Psychology 370 emphasizes psychodiagnostic testing, interviewing, and psychotherapy for the young adult, whereas Psychology 371 focuses on children's disorders, family psychodiagnosis and therapy. The facilities of the University of Vermont Counseling and Testing Center and the Howard Family Clinic will be utilized as part of the training. *Prerequisite:* graduate standing and permission of the instructors. Three hours. Mr. Does and Miss Stone.

372 through 377 ADVANCED CLINICAL PRACTICUM Supervised experience in a variety of clinical settings including the Medical Center Hospital; the State Hospital; a Community Mental Health Facility; a correctional facility; and Brandon Training School. *Prerequisite:* Graduate standing in Psychology and permission of the instructor. Six hours. Mr. Leitenberg and Staff.

380,¹ 381,¹ 382¹ CONTEMPORARY TOPICS Designed to cover selected topics in depth. The major emphasis will be on intensive and critical analysis of

1. See footnote 1 on page 277.

original literature in a given area. Suitable topics include: Visual Perception, Accident Research, Memory, Fear and Frustration, Adlerian Theory, Behavior Therapy, Behavioral Pharmacology, Information Theory, Instinct, Propaganda and Attitude Formation, Psycholinguistics. Three hours. Staff.

385 through 389 ADVANCED READINGS AND RESEARCH¹ Readings, with conferences, to provide graduate students with backgrounds and specialized knowledge relating to an area in which an appropriate course is not offered. One to three hours. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of a staff member. Credit as arranged. Staff.

491 through 493 DOCTORAL THESIS RESEARCH Acceptance as doctoral candidate is a prerequisite. Credit as arranged. Staff.

Radiologic Technology

SCHOOL OF ALLIED HEALTH SCIENCES

Professor VanBuskirk, Instructor Izzo, Lecturer Kasenter.

1-2 DYNAMICS OF HEALTH CARE See Technical Nursing, Page 251.

1, 2, 3, 4 CLINICAL PRACTICUM Observation and participation in clinical situations in the departments of nuclear medicine, radiation therapy and diagnostic radiography of the Medical Center Hospital of Vermont. *Prerequisite:* enrollment in radiologic technology. Variable credit. Both semesters. Staff.

11 INTRODUCTORY RADIOLOGIC SCIENCE Introduction to basic principles of ionizing radiation, including detection methods, interaction of radiation with matter and protection methods for personnel and patients. Fall semester. Three hours. Mr. Izzo.

12 RADIOLOGIC ANATOMY A study of the systems of the human body as they relate to the diagnostic and therapeutic applications of radiation including common medical terminology. *Prerequisite:* concurrent enrollment in Physiology 10. Three hours. Spring semester. Staff.

14 RADIOPATHOLOGY Survey of medical and surgical diseases which are diagnosed and treated by ionizing radiation. *Prerequisite:* Physiology 10 or Biology 2. Two hours. Spring semester. Dr. VanBuskirk.

31 RADIOGRAPHIC EXPOSURE PRINCIPLES A study of the principles and methods of obtaining optimum radiographs, including topics of x-ray film and processing, intensifying screens, image formation, and the factors which influence the latent image. *Prerequisite:* Introductory Radiologic Science 11. Three hours. Fall semester. Mr. Izzo.

33, 34 RADIOGRAPHIC POSITIONING (1-4) A study of the techniques for proper positioning of the body part to obtain optimum radiographic visualiza-

1. See footnote 1 on page 277.

tion. *Prerequisite:* Radiologic Anatomy 12. Three hours. Fall, Spring semesters. Staff.

41 IMAGING (2-2) A study of radio-nuclides, instrumentation and laboratory techniques for visualization of various organs, including the brain, thyroid gland, lungs, heart, liver, kidneys, spleen, pancreas, bones and placenta. *Prerequisite:* sophomore standing in nuclear medicine program. Three hours. Fall semester. Dr. VanBuskirk, Mr. Izzo.

42 INSTRUMENTATION (2-2) A study of the principles and applications of various instruments in nuclear medicine, including scintillation detectors, scanners, pulse height analyzers, well counters, gamma cameras, thermoluminescent dosimetry and geiger-miller counters. *Prerequisite:* sophomore standing in radiologic technology program. Three hours. Spring semester. Mr. Izzo.

43 RADIATION METHODOLOGY (2-2) Lectures and laboratory sessions on various radiation phenomena, including the statistical nature of radiation emission and detection, physical properties of ionizing radiation and utilization of radiation detection equipment. *Prerequisite:* Introductory Radiologic Science 11. Three hours. Fall semester. Mr. Izzo.

44 LABORATORY STUDIES (2-2) A study of the principles and methods of various IN VIVO and IN VITRO diagnostic studies, including thyroid uptake studies, hematological exams and procedures involving the gastro-intestinal and excretory systems. *Prerequisite:* Radiation Methodology 43. Three hours. Spring semester. Staff.

51 RADIATION THERAPY SCIENCE An introduction to physical principles involved in therapeutic uses of ionizing radiation, including backscatter, percent depth dose, tissue-air ratios, isodose curves, dosimetry techniques for orthovoltage and supervoltage radiation. *Prerequisite:* Introductory Radiologic Science 11. Three hours. Spring semester. Mr. Izzo, Mr. Kasenter.

52 TREATMENT PLANNING (2-2) A study of the methods and techniques used to deliver lethal tumor doses including opposed pairs of field, three-field techniques, rotation therapy and implant therapy. *Prerequisite:* Radiation Therapy Science 51. Three hours. Spring semester. Dr. VanBuskirk, Mr. Kasenter.

54 THERAPEUTIC TECHNIQUES A study of current methods of treating malignant and benign diseases. *Prerequisite:* sophomore standing in radiation therapy program. Three hours. Spring semester. Dr. VanBuskirk, Mr. Kasenter.

Romance Languages

COLLEGE OF ARTS AND SCIENCES

Professors Daggett and Johnston; Associate Professors Julow (Chairman), Parker, Ugalde and Weiger; Assistant Professors Kobler, Wesseling, Whitebook, Willis, and Zárate; Instructors Branden, Crichfield, Geno M., Geno T., Lascoumes, Lehovich, Núñez-de-Cela, Serra, and Wiley.

French

1-2 ELEMENTARY FRENCH The fundamentals of French, with emphasis on the spoken form through pattern drills, use of tapes, and study of the basic grammatical structure of the language. For those who present less than two years of high school French. Four hours. Miss Lehovich and Staff.

19 INTERMEDIATE GRAMMAR Review of basic grammar, audio-lingual practice, reading for comprehension. *Prerequisite:* French 1-2, or not more than two years of high school French, or by recommendation of department. Four hours. Staff.

51, 52 INTERMEDIATE READING Selected reading in French, organized around specific themes, discussion in French, limited amount of free composition. *Prerequisite:* three or more years of high school French, or French 1-2 and 19, or by recommendation of department. Three hours. Mr. Lascoumes and Staff.

119 ADVANCED GRAMMAR Intensive review and further study of the more sophisticated grammatical concepts, with emphasis on specific divergences between French and English expression. Conducted in French. *Prerequisite:* Three or more years of high school French, or French 1-2 and 19, or by recommendation of department. Three hours. Staff.

121, 122 COMPOSITION AND CONVERSATION Development of skills in conversation and comprehension through systematic review of phonology and grammatical structure. Explications de textes littéraires, exposés, and discussion. Written compositions required regularly. Required of those who wish to be recommended to teach French. *Prerequisite:* Intermediate French or equivalent, or permission of department, 121 for 122. Three hours. Miss Wiley and Staff.

151, 152 MASTERWORKS A thematic study of outstanding works of French literature of various periods. *Prerequisite:* Intermediate French or equivalent. Three hours. Mr. Daggett and Staff.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH

223, 224 ADVANCED COMPOSITION AND CONVERSATION Translation into French of difficult English prose, free composition, and discussion of questions of style. Advanced conversation. Required of those who wish to be recom-

mended to teach French. *Prerequisite*: 122 or equivalent. Three hours. Mr. Geno and Staff.

227, 228 LINGUISTIC STRUCTURE OF FRENCH An analysis of present-day French, with emphasis on phonetics, phonemics, morphology and syntax of the language. Required of those who wish to be recommended to teach French. *Prerequisite*: 122. Three hours. Mr. Willis.

233 EXPLICATION DE TEXTES Written and oral analyses in French by the instructor and by the student of a variety of literary passages. Constructive criticism of students' explanations. *Prerequisite*: 224 or equivalent. Three hours. Mr. Lascoumes.

234 STYLISTICS Study and comparison of various literary styles. Imitative compositions based on passages studied, development of individual styles. *Prerequisite*: 223. Three hours. Mr. Lascoumes.

251 FRENCH MEDIEVAL LITERATURE A study of important works of the medieval period: Chansons de geste, romans courtois, Roman de Renart, Roman de la Rose, religious and comic theater. Works studied in original text and in modern French versions. *Prerequisite*: any French literature course numbered 100 or above, or permission of department. Three hours. Mr. Daggett, Alternate years, 1972-73.

256 FRENCH LITERATURE 16th Century Selected works of the period with emphasis on Rabelais, Montaigne and the Pléiade. *Prerequisite*: Any French literature course numbered 100 or above, or permission of department. Three hours. Mr. Daggett. Alternate years, 1972-73.

261 FRENCH LITERATURE OF THE BAROQUE AGE Selected works of the period from Montaigne to Pascal with emphasis on d'Aubigné, Jean de Sponde, Malherbe, Hardy, Mairé, Rotrou, Corneille, Tristan, Saint-Amant, d'Urfé, Scudéry and Scarron. *Prerequisite*: Any French literature course numbered 100 or above, or permission of department. Three hours. Mr. Parker. Alternate years, 1972-73.

262 FRENCH LITERATURE: 17TH CENTURY Selected works of the century with emphasis on Corneille, Racine, and Molière. *Prerequisite*: Any French literature course numbered 100 or above, or permission of department. Three hours. Mr. Julow. Alternate years, 1971-72.

267, 268 FRENCH LITERATURE: 18TH CENTURY 267: Study of the principal *philosophes* and *encyclopédistes*, Montesquieu, Voltaire, Rousseau, Diderot. 268: Evolution of the novel, theater and *belles-lettres*. *Prerequisite*: Any French literature course numbered 100 or above, or permission of department. Three hours. (each course). Mr. Johnston and Staff. Alternate years, 1971-72.

271, 272 19TH CENTURY POETRY 271: Study of the Romantic movement and its antecedents. 272: Parnassian and pre-symbolist movements of second half of century, including Baudelaire, Leconte de Lisle, Verlaine, Rimbaud. *Prerequisite*: Any French literature course numbered 100 or above or permission of department. Three hours (each course). Mr. Crichfield and Staff. Alternate years, 1971-72.

273, 274 19TH CENTURY NOVEL 273: 1800 to 1850, development of novel in Constant, Senancour, Madame de Staël, the Romantic novelists, Stendhal and Balzac. 274: 1850 to 1900: Theory and practice of realistic-naturalistic novel, emphasis on Flaubert, Zola. *Prerequisite:* Any French literature course numbered 100 or above, or permission of department. Three hours (each course). Mr. Julow and Staff. Alternate years, 1971-72.

275 19TH CENTURY THEATER Romantic drama of first half of century, transition at mid-century and the realistic-naturalistic theater of second-half of century, including Théâtre Libre. *Prerequisite:* Any French literature course numbered 100 or above or permission of instructor. Three hours. Staff. Alternate years, 1971-72.

281 20TH CENTURY POETRY Study in depth of principal poetic movements. Symbolism, the New Spirit, Surrealism, the Modern Epic, and the Poetry of Everyday Life. *Prerequisite:* Any French literature course numbered 100 or above or permission of instructor. Three hours. Mr. Parker. Alternate years, 1972-73.

283, 284 20TH CENTURY NOVEL 283: Gide, Proust, et al. 284: Malraux, Sartre, Camus; the New Novelists. *Prerequisite:* Any French literature course numbered 100 or above or permission of instructor. Three hours (each course). Mr. Johnston.

285, 286 20TH CENTURY THEATER 285: 1900 to 1939. Synthesis of the preoccupations of 20th century man as seen in Jarry, Surréalisme, the Cartel, théâtre psychologique, théâtre du boulevard. 286: Artaud, le théâtre engagé théâtre de l'absurde, théâtre poétique, théâtre expérimental. *Prerequisite:* Any French literature course numbered 100 or above or by permission of instructor. Three hours (each course). Mr. Geno and Staff. Alternate years, 1972-73.

291 SENIOR SEMINAR Special readings and research. Required of all senior majors. Two hours. Staff.

301 MARCEL PROUST, *A la Recherche du Temps Perdu* A study in depth of Proust's novel and of the various waves of criticism devoted to Proust and his work. Lectures, discussions, reports. Three hours. Mr. Parker. Alternate years, 1971-72.

302 EMILE ZOLA, *Rougon-Macquart* A thorough study of Emile Zola's *Rougon-Macquart* series, his theories of naturalism and critical estimate of his work. Lectures, discussions, reports. Three hours. Mr. Julow. Alternate years, 1972-73.

381, 382 GRADUATE SEMINAR Offered for resident candidates for the Master of Arts degree; opportunities for independent work are provided. Three hours. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

Italian

1-2 ELEMENTARY ITALIAN Study of basic grammar through learning of dialogues, pattern drills in class and in electronic laboratory; reading. Four hours. Mr. Serra.

11, 12 Intermediate Italian Conversation grammar reviews, and readings in modern Italian. The spoken language is stressed. *Prerequisite:* 2 or its equivalent. Three hours. Mr. Serra.

151, 152 INTRODUCTION TO ITALIAN LITERATURE 151: Survey of period from Dante to end of 16th century. 152: 19th and 20th Centuries. Three hours. Mr. Serra.

Spanish

1-2 ELEMENTARY SPANISH The fundamentals of Spanish, with emphasis on the spoken form through pattern drills, use of tapes, and study of the basic grammatical structure of the language. For those who present less than two years of high school Spanish. Four hours. Mr. Ugalde and Staff.

19 INTERMEDIATE GRAMMAR Review of basic grammar, audio-lingual practice, reading for comprehension. *Prerequisite:* Spanish 1-2, or not more than two years of high school Spanish, or by recommendation of the department. Four hours. Staff.

51, 52 INTERMEDIATE READING Selected reading in Spanish, organized around specific themes, discussion in Spanish, limited amount of free composition. *Prerequisite:* Three or more years of high school Spanish, or Spanish 1-2 and 19, or by recommendation of department. Three hours. Mr. Wesseling and Staff.

119 ADVANCED GRAMMAR Intensive review and further study of the more sophisticated grammatical concepts, with emphasis on specific divergences between Spanish and English expression. Conducted in Spanish. *Prerequisite:* Three or more years of high school Spanish, or Spanish 1-2 and 19, or by recommendation of department. Three hours. Staff.

121, 122 CONVERSATION AND COMPOSITION Phonetics and oral correction. Drills on rhythm and intonation. Written compositions and practice in conversation. Development of vocabulary. Required of those who wish to be recommended to teach Spanish. *Prerequisite:* Intermediate Spanish or equivalent, 121 for 122, or departmental permission. Three hours. Mr. Wesseling.

153 SPANISH LITERATURE: 19TH CENTURY Principal literary currents of the 19th Century, from Romanticism to the "Generation of 1898." Representative readings from the poetry, drama, and novel of the period. *Prerequisite:* Intermediate Spanish or departmental permission. Three hours. Mr. Ugalde.

154 SPANISH LITERATURE: 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. *Prerequisite:* Intermediate Spanish or departmental permission. Three hours. Mr. Ugalde.

161 READINGS IN SPANISH AMERICAN LITERATURE: 19TH CENTURY Outstanding works from the Colonial Period to modernismo. *Prerequisite:* Intermediate Spanish or departmental permission. Three hours. Mr. Zárate.

162 READINGS IN SPANISH AMERICAN LITERATURE: CONTEMPORARY PERIOD Outstanding works of the 20th Century with emphasis on the novel. *Prerequisite:* Intermediate Spanish or departmental permission. Three hours. Mr. Zárate.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH

223, 224 ADVANCED COMPOSITION AND CONVERSATION Composition, conversation, stylistics, panel discussions, translation into Spanish of difficult English prose. Required of those who wish to be recommended to teach Spanish. *Prerequisite:* 122. Three hours. Mr. Zárate.

261, 262 SPANISH LITERATURE: GOLDEN AGE The picaresque novel, the drama and poetry of the 16th and 17th centuries, with emphasis on Lope de Vega, Calderón, Quevedo, Tirso de Molina. *Prerequisite:* any Spanish literature course numbered 100 or above or departmental permission. Three hours. Mr. Núñez-de-Cela. Alternate years, 1972-73.

263, 264 SPANISH LITERATURE: CERVANTES *Don Quijote*, the *Novelas Ejemplares*, and the theater of Cervantes. *Prerequisite:* any Spanish literature course numbered 100 or above, or departmental permission. Mr. Núñez-de-Cela. Alternate years, 1971-72.

271, 272 SPANISH-AMERICAN LITERATURE OF SOCIAL PROTEST The literature of the Spanish-American peoples as a reflection of and contribution to the social problems of the area. The second half of the course will stress the contemporary scene. *Prerequisite:* Spanish 162, or Political Science 174, or History 203, 204, or 205. (For those who do not present Spanish 162, a knowledge of Spanish is assumed.) Three hours. Mr. Chinchón. Alternate years, 1972-73.

291 SENIOR SEMINAR Special readings and research. Required of all senior majors. Two hours. Staff.

301, 302 GENERATION OF 1898 The essays, novels, poetry and drama of Unamuno, Azorín, Valle-Inclán, Baroja, Benavente, et al. Study of such thinkers as Ortega y Gasset, Américo Castro and Julián Marías and critics such as Menéndez y Pelayo and Menéndez Pidal. Three hours. Mr. Ugalde.

305 THE REGIONAL NOVEL OF SPANISH AMERICA The criollista and indigenista trends in the fictional literature of Spanish America. Study of works by Alegria, Gallegos, Guiraldes, Latorre, López y Fuentes, Rivera and others. *Prerequisite:* 272. Three hours. Mr. Zárate.

306 THE PSYCHOLOGICAL NOVEL OF SPANISH AMERICA The more sophisticated trends of the novel dealing with the development of urban and suburban society in Spanish America. Study of works by Barrios, Borges, Carlos Guentes, Godoy, Mallea, Yañez and others. *Prerequisite:* 272. Three hours. Mr. Zárate.

313 THE SPANISH COMEDIA Extensive readings in the baroque theater. Investigation of the genre in the light of research published in the twentieth century. *Prerequisite:* 261. Three hours. Mr. Núñez-de-Cela.

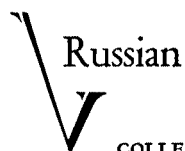
314 THE SPANISH THEATER Evolution of the Spanish drama from the twelfth-century *Auto de los Reyes Magos* to the contemporary theater of García Lorca, Casona and Buero Vallejo. Three hours. Mr. Núñez-de-Cela.

381, 382 GRADUATE SEMINAR Offered for resident candidates for the Master of Arts degree; opportunities for independent work are provided. Three hours. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

The following extra-departmental course may be taken for credit toward a major in the Department of Romance Languages:

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.



COLLEGE OF ARTS AND SCIENCES

Professor Paganuzzi; Instructor Nalibow.

1-2 ELEMENTARY RUSSIAN Spoken and written Russian. Training in modern Russian, designed to help the student gain assurance in self-expression in the language. Practice in pronunciation and aural comprehension in class and through tape recordings. Four hours.

11, 12 INTERMEDIATE RUSSIAN Rapid and systematic review of basic Russian. Increased stress on pronunciation, conversation, and reading. Readings in works by Pushkin, Lermontov, Tolstoi, Chekov, and others. *Prerequisite:* 1-2. Three hours.

101, 102 INTRODUCTION TO RUSSIAN LITERATURE Outstanding authors of the nineteenth and twentieth centuries, from Pushkin to Pasternak and Solzenitzin. Oral discussion of readings; written practice. *Prerequisite:* 11, 12. Three hours.

103, 104 ADVANCED RUSSIAN Advanced oral and written drill. Grammar review, lexical problems, roots of Russian language. Lectures and discussions of Russian language, literature and culture. *Prerequisite:* 101, 102. Three hours.

281, 282 SEMINAR IN SLAVIC LINGUISTICS Discussion of the linguistic relationships of the slavic languages to one another and particularly to Russian. The structured development in history of contemporary standard Russian will be examined on the basis of historical and comparative linguistics. Three hours. (each course). Mr. Nalibow.

Sociology and Anthropology

COLLEGE OF ARTS AND SCIENCES

Anthropologists: Associate Professor Haviland (Chairman); Assistant Professor Woolfson; Instructors Basa, Pastner.

Sociologists: Professor Lewis; Associate Professors Folta, Larson, Mabry, Stanfield, Steffenbagen; Assistant Professors Deck, Schmidt; Instructors Godfrey, Nixon; Adjunct Assistant Professor Berkman.

Anthropology

21 THE CULTURES OF MAN The culture concept; its use in perceiving and understanding behavioral regularity and the diversity of social systems. The life-ways of non-Western societies of varying social complexity. Three hours. Staff.

24 WORLD PRE-HISTORY The origins and antiquity of culture; the development of increasing cultural complexity and diversity; the beginnings of civilizations. The nature of archaeological data and interpretation. Significance of similar development in the Old and New Worlds. Three hours. Miss Basa.

26 PHYSICAL ANTHROPOLOGY An introduction to the study of the evolution and racial differentiation of man. Three hours. Mr. Haviland.

ANTHROPOLOGY 131 PRIMITIVE RELIGION (See Religion 131).

ANTHROPOLOGY 150 LANGUAGE IN CULTURE This course is designed to introduce students to the role of language in culture and society, and to provide background in linguistic anthropology. *Prerequisite:* Anthropology 21. Three hours. Mr. Woolfson.

161 PEOPLES OF THE AMERICAS An ethnographic survey of representative Amerindian cultures. Attention will be paid to the standard culture areas and culture history, modern fusions of Amerindian and European peoples, and to the theoretical implications of American research data. *Prerequisite:* 21. Three hours. Mr. Haviland.

162 PEOPLES OF AFRICA A survey of representative African cultures. Emphasis is placed on the trends and schools of African anthropological research, and on socio-cultural understanding of emerging African societies. *Prerequisite:* 21. Three hours. Miss Basa.

163 PEOPLES OF SOUTHEAST ASIA AND OCEANIA A general ethnographic survey of contemporary culture types in Southeast Asia, Polynesia, Micronesia, Melanesia and Australia. Consideration is given to the traditional cultures of these areas and their place in the modern world. *Prerequisite:* 21. Three hours. Staff.

165 PEOPLES OF JAPAN, CHINA AND INDIA A survey of these three major civilizations of east and south Asia. Consideration of their culture history, social structure, and cultural contributions to the world. Contrasts with the experience of the North Atlantic world emphasized. *Prerequisite:* 21. Three hours. Mr. Woolfson.

170 PASTORAL PEOPLES This course will examine representative peoples such as the Arab Bedouin, The Mongols and the Lapps—whose main livelihood is the migratory herding of animals. Their social and economic organization will be treated against a backdrop of environmental pressures as well as their participation in larger social systems. A major goal of the course will be to place the study of pastoral nomads into a framework of modern anthropological theory. *Prerequisite:* 21. Three hours. Mr. Pastner.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 READINGS AND RESEARCH

221 CULTURE AND PERSONALITY Relationship of socialization to the socio-cultural milieu; the cross-cultural comparison of personality development; the problem of delineating modal personality types; variations in child-rearing situations according to "social class" in contemporary Western Civilization. *Prerequisite:* 21, Sociology 22, and one 100 level course in sociology or anthropology. Three hours. Mr. Steffenhagen.

225 CURRENT ANTHROPOLOGICAL THEORY Survey and analysis of 20th century theories of cultural evolution, diffusionism, functionalism, and the American historical school. *Prerequisite:* 21 plus one of following: 161, 162, 163, 165 or 170. Mr. Pastner.

228 SOCIAL ORGANIZATION Evaluation of the comparative method in anthropology; its use in the formation of generalizations concerning the nature of society. *Prerequisite:* 21, and 161, 162, 163, 165 or 170. Three hours. Staff.

229 POLITICAL AND ECONOMIC ANTHROPOLOGY Using ethnographic materials as a background this course will focus on issues in the analysis of traditional exchange and subsistence systems and the ways these relate to interest-based, or political behaviors. *Prerequisite:* 21 and one of the following: 161, 162, 163, 165 or 170. Three hours. Mr. Pastner.

262 CULTURAL GEOGRAPHY (Same as geography 262)

283 CULTURE CHANGE The data and theories of cultural dynamics; invention, diffusion, acculturation; theories of progress, cycles, cultural evolution, and revitalization. *Prerequisite:* 21 and one of the following: 161, 162, 163, 165, or 170. Three hours. Mr. Woolfson.

290 SEMINAR *Prerequisite:* twelve hours of anthropology and senior standing. Three hours. Staff.

Sociology

21 CULTURES OF MAN (See anthropology 21)

22 PRINCIPLES OF SOCIOLOGY The structure and dynamics of human groups. Socialization, social norms, and processes, groups, stratification, institutions, and social change, with examples drawn mainly from American society. Three hours. Staff.

141 **SOCIAL PROBLEMS** A study of social problems peculiar to "pre-industrial" and developing societies as a basis for understanding their counterparts in societies, such as the United States, which have already made the industrial transformation. Select problems causally associated with urban-industrialization. *Prerequisite:* 22. Three hours. I, II. Mr. Stanfield.

151 **THE FAMILY** A cross-cultural approach to the study of the family as a social institution: the American family institution; nature of the changes it is undergoing, problems generated by these changes. *Prerequisite:* 22. Three hours. Mr. Lewis.

154 **MINORITY GROUPS** Case histories of selected New World minority groups, treated comparatively, and with attention to their origins as minorities here, their patterns of relations with the dominant American society, changes now going on, and their distinctive contributions to the common culture. Some inclusion of African and Eurasian cases will be made too, for further comparative insight. *Prerequisite:* 22. Three hours. Mr. Stanfield.

193, 194 **COLLEGE HONORS**

195, 196 **SPECIAL TOPICS**

197, 198 **READINGS AND RESEARCH**

205 **SMALL GROUP DYNAMICS** An analysis of the problems and the functioning of small groups and their relationship to large organizations. Attention will be given to the effect of the group on the individual, the consequences of democratic and non-democratic arrangements, factors making for group efficiency and morale, and the effects of groups on the large organization in which they are located. Case studies include factory groups, gangs, military groups and various experimental situations. *Prerequisite:* six hours of sociology. Three hours. Mr. Steffenhagen.

210 **POPULATION ANALYSIS** Analysis of factors affecting population growth and distribution; migration patterns, and the relationship between economic activity and population trends. Particular attention will be given to the population problems of underdeveloped areas. *Prerequisite:* six hours of sociology. Three hours. Mr. Godfrey.

212 **THE COMMUNITY** Analysis of the structure and function of communities as social systems with emphasis on American communities. Ecology, social class and power structure, and social change within the community context; procedures for sociological study of communities. *Prerequisite:* six hours of sociology. Three hours. Mr. Larson.

213 **URBAN SOCIOLOGY** The place of the city in social organization. The emergence, nature and problems of modern urbanism. *Prerequisite:* six hours in sociology. Three hours. Mr. Larson.

214 **PUBLIC OPINION** Analysis of opinion and attitude formation with the primary emphasis on the political sphere. Attention will be given to the relationship between opinions and religious, racial, class and partisan affiliations. The sources of democratic and non-democratic political tendencies will be examined. *Prerequisite:* six hours of sociology. Three hours.

221 **CULTURE AND PERSONALITY** (see Anthropology 221).

242 **SOCIAL MOVEMENTS:** A study of social movements with special emphasis given to revolutions. Selected cases, to clarify the relation of social movements to social problems, social institutions, and social class structure. *Prerequisite:* 22 and 141. Three hours. Mr. Stanfield.

243 **SOCIAL STRATIFICATION** A comprehensive study or analysis of the various ways in which societies became stratified into social class and caste, or open and closed social systems; the relationship of stratification systems to other aspects of social structure and to societal change. *Prerequisite:* six hours in sociology. Three hours. Mr. Nixon.

250 **METHODOLOGY OF SOCIAL RESEARCH** Methodological foundations of the social sciences; the nature of social facts and phenomena; formation of concepts and the application of logic in the social sciences. *Prerequisite:* six hours in sociology. Three hours. Mr. Godfrey.

251 **SOCIAL RESEARCH METHODS** The logic and techniques of sociological inquiry. *Prerequisite:* 250, psychology 5. Three hours. Mr. Godfrey.

255 **THE DEVELOPMENT OF SOCIOLOGICAL THEORY** A critical analysis of the development of sociological thought with special attention to the works of such 19th and 20th century writers as Durkheim, Marx, Weber, Simmel, Park, Sorokin, and C. Wright Mills. *Prerequisite:* 22 and history 11 or 13. Three hours. Mr. Larson.

257 **CONTEMPORARY SOCIOLOGICAL THEORY** A survey and analysis of modern schools of sociological theory with particular reference to present day issues or fundamental problems around which sociological theory is developing. *Prerequisite:* 255. Three hours. Mr. Larson.

258 **CRIME AND DELINQUENCY** Definitions of crime and delinquency; the sociological bases of criminal and delinquent behavior; analyses of delinquent subcultures such as the gang, the underworld, and white-collar crimes. *Prerequisite:* 22 plus six additional hours in sociology. Three hours. Mr. Stanfield.

259 **PENOLOGY** A sociological approach to the history, current conditions and trends regarding the apprehension, adjudication and disposition of juvenile and adult offenders. *Prerequisite:* 258. Three hours. Mr. Stanfield.

270 **HEALTH AND MEDICINE** The social and cultural environment of illness and its influence on definition and treatment. Role definitions and behavior of patients, physicians, and others. The use of community resources. The methods and status of research in medical sociology. *Prerequisite:* nine hours of sociology. Three hours. Mr. Steffenhagen and Mr. Mabry.

271 **SOCIOLOGY OF MENTAL HEALTH** The influence of a socio-cultural environment upon the perception and definition of mental health and illness. Social responses to inappropriate behavior, including the roles of the patient, physician and family. Relationships between socialization processes and mental health. Etiology and epidemiology of mental illness. *Prerequisite:* Nine hours in sociology or departmental permission. Three hours. Mr. Steffenhagen.

281, 282 **SEMINAR** Readings in current sociological literature to acquaint advanced students with contemporary issues in sociology. *Prerequisite:* twelve

hours of sociology, senior standing, and departmental permission. Three hours. Staff.

300 ADVANCED SEMINAR IN MEDICAL SOCIOLOGY Analysis of current problems relating to sociological aspects of medicine and the medical profession with emphasis on an interdisciplinary approach. Course will be taught jointly by the departments of Community Medicine, Psychiatry, and Sociology. *Prerequisite:* permission of staff. Three hours. Staff.

305, 306 INDIVIDUAL STUDY IN MEDICAL SOCIOLOGY Independent work in the study of socio-cultural factors influencing medicine and the medical profession. Topics for study and research are to be chosen by the student with the approval of the professor concerned from one of the following: epidemiology, community medicine, and social psychiatry. Offered as a result of the joint efforts of the departments of Community Medicine, Psychiatry, and Sociology. *Prerequisite:* permission of staff. Credit as arranged: 1-3 hours. Staff.

The following courses in Social Work are available in the Department of Home Economics:

SW 166, 167 SOCIAL WELFARE AS A SOCIAL INSTITUTION

SW 168 SOCIAL WORK AS A PROFESSION and

SW 169 SOCIAL WORK IN THE COMMUNITY

Speech

COLLEGE OF ARTS AND SCIENCES

Professors Huber, Lewis, London (Chairman), and Luse; Associate Professors Feidner, Lane, Manchel, and Woolf; Assistant Professors Ellenwood, Schenk, Wilson, and Yadav; Instructors Cooper, Cronin, Dilley, Jarvis, Lardy, Losee, Neal, Schmider, Waite, Wilkes, and Worden; Lecturers Houghton, Podhajski, and Smith.

Communication and Public Address

1 FOUNDATIONS OF ORAL COMMUNICATION A lecture-discussion course concerned with human communication. Interpersonal communication, group communication, aesthetic communication, mass communication, and disorders of communication are studied in an attempt to discover their elements, and how the elements affect each other. Three hours. I, II. Mr. Lewis and Staff.

3 PARLIAMENTARY PROCEDURE Study and practice in the fundamentals of conducting a meeting. The class meets twice a week with one hour of outside preparation. *Prerequisite:* sophomore standing. One hour. Mr. Huber.

11 PUBLIC SPEAKING Preliminary analysis, gathering material, organization and delivery of speeches; use of visual aids and speech to inform. Two-thirds of the time devoted to student performance. Three hours. I, II. Staff.

14 **GROUP DISCUSSION** Basic theory and practice in group communication and conference leadership. Emphasis is given to the process of small group decision making including the function of preparation, language and perception, analysis and organization, and interpersonal relations. Three hours. I, II. Staff.

31 **ORAL INTERPRETATION OF LITERATURE** Principles and techniques of oral interpretation of literature; analysis and appreciation of poetry, prose and drama through the development of ability in communicating the logical emotional and aesthetic values of literature to an audience. Three hours. I, II. Mr. Schmider and staff.

81 **VOICE AND ARTICULATION** Elements of speech and phonetics for the improvement of voice and articulation in communication. Class exercises and performance. *Prerequisite:* sophomore standing. Three hours. I, II. Miss Luse and staff.

101 **PHONETICS** Acoustic and physiologic phonetics. Analysis of English speech sounds used in the International Phonetic Alphabet. Application to standards of English pronunciation in the United States and to foreign dialects. *Prerequisites:* sophomore standing. Three hours. Miss Luse and Mr. Woolf.

111 **ADVANCED PUBLIC SPEAKING:** Emotive means of persuasion Human motivation, attitudes and how to change them; emotion, stereotypes, attention, and audience psychology; training in their use through student performance. *Prerequisite:* six hours, including 11. Three hours. Mr. Huber and Staff.

112 **ADVANCED PUBLIC SPEAKING:** Logical means of persuasion Inductive, deductive, causal, and analogical reasoning as applied to the speaking situation; designed to develop through performance skill in logical expression of thought. *Prerequisite:* 11. Three hours. I, II. Mr. Huber and Staff.

113 **ADVANCED PUBLIC SPEAKING:** Stylistic elements Study of speech style and rhetorical criticism by analysis of great speeches and by writing longer speeches. *Prerequisite:* six hours, including 11. Three hours. Mr. Huber. Alternate years, 1971-72.

121 **GENERAL SEMANTICS** An examination of the basic relationships between language and those who create, use, and respond to it. Special attention is given to critical concepts and devices such as generalization, inference, indexing, abstraction levels, multi-valued orientations, etc. *Prerequisite:* 1. Three hours. Mr. Lewis.

193, 194 **COLLEGE HONORS**

195, 196 **SPECIAL TOPICS**

197, 198 **READINGS AND RESEARCH**

201 **THEORIES OF HUMAN COMMUNICATION** Speech communication as a uniquely human capacity. The relationship of language, perception, thinking, and social context to human communication. *Prerequisite:* Nine hours of related courses, including 1. Three hours. Mr. Yadav.

210 **CLASSICAL ORIGINS OF COMMUNICATION THEORY** A study of selected works in order to provide understanding of the points of view of outstanding

writers of the classical period who have influenced human communication theory. *Prerequisite:* nine hours of related courses. Three hours. Mr. Wilkes.

212 PERSUASIVE COMMUNICATION An examination of selected contemporary approaches to persuasion and the study of recent research contributions to such areas as theories of persuasion, source credibility, and argument and controversy. *Prerequisite:* 111, nine hours of related courses including 111 or 112 or 113. Three hours. Mr. Cronin.

213 THEORIES OF SPEECH ANALYSIS Principles and theories of rhetorical criticism applied to speakers and speech movements. *Prerequisite:* Nine hours of related courses. Three hours. Messrs. Wilkes and Waite.

214 ISSUES IN AMERICAN PUBLIC ADDRESS Selected American speakers and speeches studied against the background of their lives and the issues of their times. *Prerequisite:* 213. Three hours. Mr. Wilkes.

215 GROUP COMMUNICATION An examination of selected areas of study related to the problems of group communication. Each semester, one of the following three topics will be studied in depth: (1) Group Communication Theory, (2) Leadership in Groups, and (3) Communication in Organizations. *Prerequisite:* Nine hours of related courses including 14. Three hours. May be repeated up to nine credit hours. Mr. London.

223 INTERPERSONAL COMMUNICATION A study of human communication on the interpersonal level. The subject matter is approached through an examination of the research in the area, through experimental projects and through an examination of the communication process used by the class itself. *Prerequisite:* Nine hours of related courses. Three hours. Mr. Lewis.

225 CROSS-CULTURAL COMMUNICATION A study of the conceptual perspective and the basic fund of knowledge necessary for viewing those variables which are central to the study of cross-cultural communication. *Prerequisite:* Nine hours of related courses. Three hours. Mr. Yadav.

283, 284 Seminar Discussion and research in the selected areas of communication and theatre. *Prerequisite:* Departmental permission. Three hours. Staff.

294 SEMINAR FOR PROSPECTIVE TEACHERS OF SPEECH The resources, procedures and methods utilized in teaching the different areas of speech at the various instructional levels. *Prerequisite:* twelve hours, including 1 and 11. Three hours. Mr. London.

300 RESEARCH METHOD AND DESIGN Research method and design, bibliographical resources, and professional writing in the field of speech and drama. A professional orientation for beginning graduate students. Three hours. Mr. London.

381, 382 ADVANCED READINGS Readings, with conferences, intended to contribute to the programs of graduate students in phases of speech for which formal courses are not available. Credit to be arranged up to three hours each semester. Staff.

391 through 393 MASTER'S THESIS RESEARCH Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged. Staff.

Mass Communication

63 SURVEY OF MASS COMMUNICATION The origins, evolution, and impact of Press-Radio-Television-Film; development of their respective industries; social and cultural influences as commercial and educational enterprises. Three hours. I, II. Mr. Jarvis and Mr. Yadav.

161 AUDIO PRODUCTION An analysis of the theories of producing sound for radio, television, motion pictures, recordings, etc. A study of the problems of planning, directing and editing various kinds of audio productions. Laboratory at WRUV-FM. *Prerequisite:* 63. Three hours. Mr. Cooper.

162 WRITING FOR MASS COMMUNICATION A comparative study of the principles of writing for the mass communications media. Writing projects will be adapted to the interests and talents of the students. *Prerequisite:* 63. Three hours. Mr. Worden.

165, 166 DEVELOPMENT OF THE MOTION PICTURE Development of the motion picture medium from its beginnings to the present. American and foreign films representative of major advances in the medium will be shown and discussed. *Prerequisite:* junior standing, 165 for 166. Three hours. Mr. Manchel.

263 ISSUES IN CONTEMPORARY MASS COMMUNICATION An analysis of current issues related to the mass media such as: the effects of mass media on society, governmental regulation of the mass media, censorship of the mass media, special legal problems, etc. *Prerequisite:* 9 hours of related courses, including 63. Three hours. Mr. Yadav.

264 TELEVISION PRODUCTION An analysis of the principles involved in the production of programs for television broadcast. Emphasis on the following types of programs: educational, news, documentary, dramatic and variety. Laboratory use of the ETV studio. *Prerequisite:* 161. Three hours. Mr. Dilley.

265 PRINCIPLES OF CINEMATOGRAPHY A study of the principles of the communications of meaning through moving visual images. *Prerequisite:* 165 and consent of the instructor. Three hours. Mr. Worden.

266 SEMINAR IN FILM A study of various topics including the influence of film on our culture, the responsibility of film makers to society and to themselves, the scope and limitations of film as an art, craft and business; film criticism and research. *Prerequisite:* Nine hours of related courses, including 165 or 166. Three hours. Mr. Manchel.

365 ADVANCED CINEMATOGRAPHY An exploration of the limitations and possibilities of the motion picture medium through familiarization with equipment and production techniques. *Prerequisite:* 265. Three hours. Mr. Worden and Staff.

367, 368 SEMINAR IN MASS MEDIA An examination of selected areas of study related to mass media. Each semester, one of the following topics will be studied in depth: (1) Printed Media, (2) Telecommunication. *Prerequisite:* Nine hours of related courses, including 63. Three hours. Mr. Lewis and Staff.

Speech Pathology-Audiology

74 INTRODUCTION TO DISORDERS OF ORAL COMMUNICATION Introduction to speech pathology, audiology, and speech science. Survey of disorders of speech, hearing, and language. *Prerequisite*: sophomore standing. Three hours. Mr. Ellenwood and Staff.

270 LEARNING AND DEVELOPMENT OF SPEECH AND LANGUAGE Speech and language acquisition in relation to current learning theory and methods of linguistic analysis. *Prerequisite*: nine hours of speech and psychology, including Speech 74. Three hours. Mrs. Wilson.

271 SPEECH PATHOLOGY I Etiology, symptomatology, and principles of habilitation for voice disorders (including the laryngectomized) and cleft palate. Observation required. *Prerequisite*: Twelve hours of speech and psychology, including Speech 74. Three hours. Miss Luse.

272 SPEECH PATHOLOGY II The nature of articulation and the etiology, diagnosis, and treatment of disorders of articulation. *Prerequisite*: Twelve hours of speech and psychology, including Speech 74, 101. Three hours. Mr. Woolf.

273 PRINCIPLES OF AUDIOLOGY An introduction to clinical audiology including a consideration of hearing disorders, tests of the hearing function, and hearing conservation programs. Opportunities for observation and clinical practice. *Prerequisite*: Twelve hours of speech and psychology, including Speech 74. Three hours. Mrs. Houghton.

275, 276 CLINICAL STUDY Supervised practicum experiences with children and adults presenting disorders of speech, hearing, and language. May be taken at the University of Vermont Speech and Hearing Center, at the Center for Disorders of Communication, and at various cooperating facilities. *Prerequisite*: Twelve hours in speech and hearing science courses, including Speech 271 or 272; departmental permission. Credit as arranged. Mr. Ellenwood, Miss Podhajski, and Staff.

281 ANATOMY-PHYSIOLOGY OF SPEECH Anatomy and physiology of speech and language processes. *Prerequisite*: nine hours of speech and psychology. Lectures and laboratory. Four hours. Miss Luse.

282 ANATOMY-PHYSIOLOGY OF AUDITION Anatomy and physiology of the normal auditory system. Basic acoustics and subjective correlates of the auditory stimulus. *Prerequisite*: nine hours of speech and psychology. Lectures and laboratory. Four hours. Mrs. Wilson.

377 REHABILITATIVE AUDIOLOGY I: AMPLIFICATION; SELECTION AND USE Principles and rationale underlying clinical procedures in hearing aid selection. *Prerequisite*: Speech 273. Two hours. Mrs. Houghton.

378 REHABILITATIVE AUDIOLOGY II: SPEECH-READING AUDITORY TRAINING Theories and methods for the development of speech-reading skills and the effective use of residual hearing. *Prerequisite*: Speech 273. Two hours. Mrs. Houghton.

379 REHABILITATIVE AUDIOLOGY III: PSYCHO-SOCIAL ASPECTS OF HEARING Loss Perceptual, personal, and social problems of the hard-of-hearing; theories, research, and management. *Prerequisite*: Speech 273. Two hours. Mrs. Houghton.

385 SEMINAR IN VOICE Study of the research in voice production and speech. Application to pathological and non-pathological problems. *Prerequisite:* 271, 272. Three hours. Miss Luse.

386 SEMINAR IN CEREBRAL PALSY Etiology, pathology, diagnosis, and principles of habilitation of cerebral palsy and related conditions. Emphasis on disorders of oral communication and associated disturbances. *Prerequisite:* Speech 271, 272. Three hours. Mr. Woolf.

387 SEMINAR IN LANGUAGE DISORDERS Identification, evaluation, and rehabilitation procedures for the preschool and school-age child with language-learning difficulties. Some participation in diagnostic and therapeutic sessions may be arranged. *Prerequisite:* Twelve hours in speech, psychology, or education. Three hours. Mrs. Wilson.

388 SEMINAR IN STUTTERING Study of the research in stuttering relative to etiology and rehabilitation. *Prerequisite:* 271, 272. Three hours. Mr. Woolf.

Theatre

39 INTRODUCTION TO THEATRE A critical appraisal of the theatrical event; its form, functions, materials and essential personnel in various societies and historical periods. Three hours. Messrs. Feidner and Schenk.

41 ACTING Fundamentals of acting, including improvisation, character analysis, and styles of acting. Performance in short classroom acting projects required. *Prerequisite:* 39; sophomore standing. Three hours. I, II. Messrs. Feidner and Lane.

141 ADVANCED ACTING Acting for those who have demonstrated some ability in speech 41. Periods and styles of acting, intensive character analysis, frequent acting projects, including at least one public performance. *Prerequisite:* 41 and departmental permission. Three hours. Messrs. Feidner and Lane.

142 PLAY DIRECTING Lecture-laboratory in the problems and techniques of directing plays: staging, script analysis, production techniques, and rehearsal techniques. *Prerequisite:* six hours, including 39. Three hours. Mr. Feidner.

145, 146 DEVELOPMENT OF WESTERN THEATRE History of the theatre and drama in western civilization from the earliest rituals to the contemporary theatre. Plays from all major periods are read and discussed. *Prerequisite:* junior standing; English 27, 28. Three hours. Mr. Lane.

151 STAGECRAFT Lecture and laboratory in the scenic elements of play production; analysis of theatre forms, study and application of basic elements of scenery construction. *Prerequisite:* 39. Three hours. Mr. Schenk.

252 LIGHTING Theory and practice in the illumination of stage productions and the creation of aesthetic effects. *Prerequisite:* 151. Three hours. Mr. Schenk.

254 SCENE DESIGN Lecture and laboratory. Analysis of the drama from the standpoint of its visual creation upon the stage; audience-stage relationships, styles of production. *Prerequisite:* 252; art 1. Three hours. Mr. Schenk.

Technology

COLLEGE OF TECHNOLOGY

The College of Technology offers the following courses on a non-departmental basis.

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.

52 TECHNOLOGY AND THE ENVIRONMENT (3-0) Practical information on solving environmental problems with emphasis on pollution. Inter-relationships 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.

Vocational, Technical and Extension Education

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Associate Professors Fuller (Chairman), Ross; Assistant Professor Kelly; Mr. Spaven; Mrs. Malone; Mr. Kisko, Adjunct.

102 EXTENSION METHODS (1-2) Methods and techniques of extension teaching. *Prerequisite:* junior standing. Two hours. Mr. Kelly. Alternate years, 1972-73.

104 LEADERSHIP PREPARATION (2-2) Study and practice of methods and techniques by which officers of organizations, administrators and group members may increase their leadership ability. *Prerequisite:* junior standing or departmental permission. Three hours. Mr. Fuller.

150 TECHNICAL INTERNSHIP A 104 week directed, structured and supervised educational internship completed in a selected industry during summers and the junior year. This course is designed to provide prospective high school teachers of trade and industrial subjects with technical knowledge and ability plus practical experience in a selected industry. A student may enroll more than one time and accumulate up to 30 hours. Credit will be awarded only to degree students in the industrial education option. *Prerequisites:* Departmental permission. Credit as arranged. Staff. I, II.

152 INTRODUCTION TO VOCATIONAL AND TECHNICAL EDUCATION (2-2) General orientation to the job of the high school and junior college teacher of vocational and technical subjects. Examination of principles and philosophy of occupationally oriented education; including field trips to nearby schools. *Prerequisites:* sophomore standing. Three hours. Mr. Fuller.

154 **TEACHING INTERNSHIP** Two consecutive semesters of supervised teaching and seminars for newly employed teachers of trade and industrial subjects in secondary school vocational programs. *Prerequisites:* A teaching methods course, or concurrent enrollment during first semester of internship, or departmental permission. Eight hours. Staff.

155 **TEACHING PRACTICUM** Eight full weeks of supervised teaching in a high school vocational program or post high school technical program. The practicum includes experiences prior to and during the first week of school. *Prerequisites:* 152, senior standing, concurrent enrollment in 251; acceptance into the teacher education program. Eight hours. Staff.

156 **MATERIALS AND METHODS FOR TEACHING (2-2)** Selected teaching techniques appropriate for vocational and technical training programs in extension education, businesses, high schools and junior colleges will be analyzed. Selection, preparation and use of auto-instructional devices, audio-visual aids, educational television and other appropriate techniques will be emphasized. *Prerequisite:* junior standing. Three hours. Mr. Kelly.

157 **LABORATORY ORGANIZATION AND MANAGEMENT** Study of the vocational-technical laboratory setting as a teaching and learning environment. Topics included are: purchase of equipment and supplies, inventory control, equipment placement, preventive maintenance and laboratory safety. Three hours. Mr. Ross.

158 **EVALUATING ACHIEVEMENT IN VOCATIONAL AND TECHNICAL EDUCATION** An introductory course on evaluation techniques as applied to vocational and technical education subjects. Includes principles of test construction, designing teacher-made tests, and statistical analysis of scores. *Prerequisites:* A teaching methods course or concurrent enrollment. Three hours. Mr. Ross.

159 **COURSE DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION** Systematic development of course materials used in teaching an occupational subject. Topics included are techniques in occupational analysis, establishing course objectives, selection of course content and developing supplementary instructional materials. *Prerequisites:* A teaching methods course or concurrent enrollment, or permission of the department. Three hours. Mr. Kisko.

173 **COMMUNICATION METHODS** (see Home Economics 173). *Prerequisite:* junior standing. Three hours. Miss Osborn and Mr. Spaven.

197 **SPECIAL PROBLEMS** Individual investigation of a problem selected to meet special needs of students. A student may enroll more than one time and accumulate up to six hours. *Prerequisite:* permission of an instructor. Credit as arranged. Staff. I, II.

251 **METHODS OF TEACHING VOCATIONAL AND TECHNICAL EDUCATION (2-2)** Study of advanced teaching techniques combined with micro-teaching experiences. Emphasis is placed upon teaching methodology and program management in vocational and technical education at the high school and junior college levels. *Prerequisite:* concurrent enrollment in 154 or 155, or departmental permission. Three hours. Mr. Fuller, Mr. Ross and Mr. Kisko.

253 **TEACHING ADULTS (2-2)** Study of needs, problems and objectives for the education of adults. Problems related to organizing and planning adult

education programs will be discussed. Techniques appropriate for teaching adults will be analyzed. *Prerequisites:* senior standing. Three hours. Mr. Kelly.

274 **TECHNICAL REPORTING (2-2)** Study and practice in the communication of information through research and technical operations reports and articles in professional journals. This course is designed for future and present scientists, engineers, and economists who are not professional writers but must learn to prepare written reports. Three hours. Mrs. Malone, Mr. Spaven.

282 **SEMINAR** Follow-up of teaching practicum. Required for all students completing 155. *Prerequisite:* 155. One hour. Staff.

295 **SPECIAL TOPICS IN VOCATIONAL, TECHNICAL AND EXTENSION EDUCATION** For advanced students in vocational, technical and extension education. Lectures, laboratories and/or readings and reports, to provide students with background and specialized knowledge relating to a contemporary area of study. A student may enroll more than one time and accumulate up to nine hours. *Prerequisites:* senior standing, permission of an instructor. Credit as arranged. Staff. I, II.

301 **RESEARCH IN VOCATIONAL, TECHNICAL AND EXTENSION EDUCATION** Investigation of a research topic under the direction of an assigned staff member. A student may enroll more than one time and accumulate up to nine hours. *Prerequisite:* permission of an instructor. Credit as arranged. Staff. I, II.

Zoology

COLLEGE OF ARTS AND SCIENCES

Professors Glade (Chairman), Bell, Henson, Lockhead, Moody, Potash and Rothstein; Associate Professors Davison and Stevens; Assistant Professors Brammer and Landesman.

Biology

1, 2 **PRINCIPLES OF BIOLOGY (3-3)** Introduction to the structure, functions, and evolution of animals and plants; illustration through lectures, discussions, and laboratory experience of the similarities and differences among organisms. Emphasis on ideas and concepts important for both advanced study in a Life Science and for understanding the biological world of which man is a part. Offered jointly by the Departments of Botany and Zoology. *Prerequisite:* 1 for 2. Four hours. Botany and Zoology staffs.

3 **BIOLOGY AND MAN** An introductory course designed for nonscience majors, it is approached through a study of selected biological processes relevant to man and his world. Emphasis is placed on problems resulting from man's interaction with his environment, examples being the topics of overpopulation and environmental pollution. Basic biological principles and concepts necessary for an understanding of these problems are presented. *No prerequisite:* Three hours. Mr. Potash and Staff.¹

¹ Credit will not be given for both Biology 1 and Botany 4. 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 MAMMALIAN ANATOMY AND PHYSIOLOGY (2-2) Structure and function of the mammalian body, with special reference to man. Dissection, primarily of the cat; physiological experiments; microscopic study of tissues. Required of students in the Nursing and Dental Hygiene curricula, elective to others.¹ Three hours. Mr. Brammer.

101 GENETICS Principles of inheritance and their structural basis; gene mutations; chromosomal aberrations; genes and enzymes; gene action in differentiation; genetics of populations; nonchromosomal inheritance. *Prerequisite:* Biology 1, 2. Three hours. Mr. Moody and staff.

102 ENVIRONMENTAL ZOOLOGY (3-3) Relationship between animals and their environments; dynamics of animal populations; aspects of animal behavior; conservation of environmental and animal resources; principles of systematics. *Prerequisite:* Biology 1, 2. Four hours. Mr. Potash and staff.

103 GENERAL STRUCTURE AND FUNCTIONS (3-3) A discussion of the structure and physiology of cells and organisms, with emphasis on basic features common to all forms of life. *Prerequisite:* Biology 1, 2. Four hours. Mr. Landesman and staff.

104 COMPARATIVE STRUCTURE AND FUNCTION (3-3) A discussion of the ways in which diverse animal types deal with such fundamental processes as reproduction, locomotion, and metabolism. *Prerequisite:* 103. Four hours. Mr. Stevens and staff.

105 GENETICS LABORATORY (0-3) Experiments to illustrate concepts presented in Zoology 101. *Prerequisites:* concurrent enrollment in Zoology 101 and permission of the instructor. One hour. Mr. Glade.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

197, 198 UNDERGRADUATE RESEARCH Individual laboratory research topics under the guidance of a faculty member. Undergraduates who meet the academic requirements may enroll concurrently in the College Honors or Departmental Honors program. Students must turn in a completed application form for 197, 198 at least two weeks prior to preregistration. *Prerequisite:* junior or senior standing and departmental permission. Three hours or six hours.

201 CONTROL OF GROWTH AND DIFFERENTIATION Factors controlling the processes of growth and differentiation in selected animal forms. Lectures and discussion. Three hours. *Prerequisites:* 101, 211, and Chemistry 131, 132. Mr. Davison. Alternate years, 1971-72.

203 POPULATION ECOLOGY Dynamics, composition, and density regulation of animal populations. *Prerequisite:* 102. Four hours. Mr. Potash. Alternate years, 1972-73.

1. May be taken for credit in the College of Arts and Sciences but does not satisfy the requirement of a course in biology for premedical and predental students. Students will not receive credit for both this course and zoology 103 and 104.

207 VERTEBRATES (3-3) Classification, ecology, behavior, evolution, and distribution of vertebrates other than birds. *Prerequisite:* 104. Four hours. Mr. Bell. Alternate years, 1972-73.

208 GENERAL ENTOMOLOGY (2-4) Study of insects; morphology, physiology, and evolution. *Prerequisite:* 102 or 103 or departmental permission. Four hours. Mr. Bell. Alternate years, 1971-72.

209 FIELD ZOOLOGY (2-4) Collection and identification of animals; study of local habitats, their nature, and the adaptations of animals to them; factors governing distribution of animals; methods of collecting and preparing study specimens. *Prerequisite:* 102 or 103 or departmental permission. Four hours. Mr. Bell.

211 EMBRYOLOGY (2-4) General principles of development exemplified by typical invertebrate and vertebrate embryos. *Prerequisite:* 104, junior standing. Four hours. Mr. Glade.

212 COMPARATIVE HISTOLOGY (2-4) Microscopic anatomy of tissues, chiefly vertebrate. Basic tissue similarities and specializations of organs among the various groups of animals in relation to function. *Prerequisite:* 104. Four hours. Mr. Glade. Alternate years, 1971-72.

216 HUMAN GENETICS Principles of human inheritance; population genetics; interaction of heredity and environment; application of principles of heredity to human problems. *Prerequisite:* 101 or Botany 254. Three hours. Mr. Moody.

220 MECHANISMS OF CELL DIVISION A study of the fine structure and physiology of normal and abnormal cell division with special emphasis upon mechanisms. *Prerequisite:* 103, a course in biochemistry, and the consent of the instructor. Three hours. Mr. Stevens. Alternate years, 1971-72.

222 EXPERIMENTAL EMBRYOLOGY (2-6) Theoretical approach to major problems of development based on modern research in embryology, genetics, physiology, bacteriology, and related fields. *Prerequisite:* 211 and departmental permission. Four hours. Mr. Glade. Alternate years, 1971-72.

223 BIOCHEMICAL EMBRYOLOGY Examination of the inter- and intracellular processes occurring during oogenesis and embryogenesis of selected invertebrate and vertebrate organisms. Emphasis will be on the biochemical and structural differentiation of cells and tissues. *Prerequisite:* 101, 211, and consent of the instructor. A course in biochemistry is recommended. Three hours. Mr. Landesman. Alternate years, 1972-73.

231 CELL PHYSIOLOGY (2-4) Study of cell function, with emphasis upon experimental techniques used to elucidate chemical and physical mechanisms within living cells. *Prerequisite:* 103, chemistry 131, 132, and departmental permission. Four hours. Mr. Rothstein.

236 FRESH-WATER BIOLOGY (2-4) Organisms of lakes, ponds and streams; their aquatic environment and their adaptations to varying physical, chemical and biotic conditions. *Prerequisite:* 102 and inorganic chemistry. Four hours. Mr. Henson.

250 **INVERTEBRATE ZOOLOGY (2-4)** Anatomy, physiology, and life histories of representatives of the more important invertebrate phyla. *Prerequisite:* 104. Four hours. Mr. Lochhead.

251 **INSECT PHYSIOLOGY** Examination of some of the mechanisms developed by insects which enable them to function in a variety of environments. *Prerequisite:* 104 or consent of instructor; 208 or 209 recommended. Three hours. Mr. Brammer. Alternate years, 1972-73.

255 **COMPARATIVE ANIMAL PHYSIOLOGY (2-6)** General principles of function in invertebrates and vertebrates. *Prerequisite:* 104, departmental permission and Chemistry 131, 132. Four hours. II. Mr. Rothstein. Not offered 1971-72.

267 **GENETICS OF DEVELOPMENT (2-4)** Problems of differentiation and morphogenesis approached from the viewpoint of gene action and biosynthesis; influence of hereditary material during ontogeny. *Prerequisite:* 101, 104, and departmental permission. Four hours. Staff. Alternate years, 1972-73.

270 **MODERN EVOLUTIONARY THEORY** Contributions of modern research in genetics, systematics, distribution, experimental embryology, serology, and related fields to problems of the means and methods of evolutionary change. *Prerequisite:* 101, (102 recommended). Three hours. Mr. Moody.

271 **ADVANCED LIMNOLOGY** Analyses of current limnological concepts and problems. *Prerequisite:* 236. Four hours. Mr. Henson.

281 through 283 **SEMINAR** Review and discussion of current zoological research. Graduate students and seniors in zoological research programs are expected to enroll each semester. Without credit. Staff.

381 through 383 **SPECIAL TOPICS IN ZOOLOGY** Readings with conferences, small seminar groups, or laboratories intended to contribute to the programs of graduate students in phases of zoology for which formal courses are not available. *Prerequisite:* an undergraduate major in zoology. Credit as arranged.

391 through 393 **MASTER'S THESIS RESEARCH** Investigation of a research topic under the direction of an assigned staff member, culminating in an acceptable thesis. Credit as arranged.

491 through 493 **DOCTORAL THESIS RESEARCH** Original research under the direction of an assigned staff member, culminating in an acceptable doctoral dissertation. Credit as arranged.

V Enrollment Statistics

Enrollment Comparisons by Undergraduate Class

Fall 1969 and Fall 1970

| <i>Class</i> | <i>Fall 1969</i> | <i>Fall 1970</i> | <i>Change</i> | <i>Percent Change</i> |
|------------------------|----------------------|----------------------|---------------|---------------------------|
| Freshman (1974) | 1750 | 1716 | -34 | -1.94 |
| Sophomore (1973) | 1331 | 1704 | 373 | 28.02 |
| Junior (1972) | 1113 | 1299 | 186 | 16.71 |
| Senior (1971) | 1175 | 1142 | -33 | -2.81 |
| TOTAL | | | | |
| UNDERGRAD DEGREE CAND. | 5369 | 5861 | 492 | 9.16 |

COLLEGE OF ARTS AND SCIENCES Summary by Class, Sex, and Residence

| | <i>In-State</i> | | | <i>Out-of-State</i> | | | <i>Total</i> | | |
|---------------|-----------------|----------|----------|---------------------|----------|----------|--------------|----------|----------|
| | <i>M</i> | <i>F</i> | <i>T</i> | <i>M</i> | <i>F</i> | <i>T</i> | <i>M</i> | <i>F</i> | <i>T</i> |
| Class of 1971 | 227 | 147 | 374 | 193 | 79 | 272 | 420 | 226 | 646 |
| Class of 1972 | 261 | 160 | 421 | 219 | 95 | 314 | 480 | 255 | 735 |
| Class of 1973 | 268 | 218 | 486 | 244 | 135 | 379 | 512 | 353 | 865 |
| Class of 1974 | 323 | 242 | 565 | 156 | 107 | 263 | 479 | 349 | 828 |
| TOTAL | 1079 | 767 | 1846 | 812 | 416 | 1228 | 1891 | 1183 | 3074 |

COLLEGE OF TECHNOLOGY Summary by Class, Sex, and Residence

| | <i>In-State</i> | | | <i>Out-of-State</i> | | | <i>Total</i> | | |
|---------------|-----------------|----------|----------|---------------------|----------|----------|--------------|----------|----------|
| | <i>M</i> | <i>F</i> | <i>T</i> | <i>M</i> | <i>F</i> | <i>T</i> | <i>M</i> | <i>F</i> | <i>T</i> |
| Class of 1971 | 98 | 2 | 100 | 38 | 2 | 40 | 136 | 4 | 140 |
| Class of 1972 | 106 | 6 | 112 | 45 | 5 | 50 | 151 | 11 | 162 |
| Class of 1973 | 90 | 2 | 92 | 81 | 25 | 106 | 171 | 27 | 198 |
| Class of 1974 | 129 | 3 | 132 | 48 | 7 | 55 | 177 | 10 | 187 |
| TOTAL | 423 | 13 | 436 | 212 | 39 | 251 | 635 | 52 | 687 |

COLLEGE OF EDUCATION Summary by Class, Sex, and Residence

| | <i>In-State</i> | | | <i>Out-of-State</i> | | | <i>Total</i> | | |
|---------------|-----------------|----------|----------|---------------------|----------|----------|--------------|----------|----------|
| | <i>M</i> | <i>F</i> | <i>T</i> | <i>M</i> | <i>F</i> | <i>T</i> | <i>M</i> | <i>F</i> | <i>T</i> |
| Class of 1971 | 29 | 119 | 148 | 4 | 34 | 38 | 33 | 153 | 186 |
| Class of 1972 | 26 | 102 | 128 | 11 | 55 | 66 | 37 | 157 | 194 |
| Class of 1973 | 21 | 125 | 146 | 22 | 94 | 116 | 43 | 219 | 262 |
| Class of 1974 | 66 | 137 | 203 | 15 | 71 | 86 | 81 | 208 | 289 |
| TOTAL | 142 | 483 | 625 | 52 | 254 | 306 | 194 | 737 | 931 |

ENROLLMENT STATISTICS

307

COLLEGE OF AGRICULTURE & HOME ECONOMICS

Summary by Class, Sex, and Residence

| | <i>In-State</i> | | | <i>Out-of-State</i> | | | <i>Total</i> | | |
|---------------|-----------------|-----|-----|---------------------|-----|-----|--------------|-----|-----|
| | M | F | T | M | F | T | M | F | T |
| Class of 1971 | 33 | 46 | 79 | 13 | 16 | 29 | 46 | 62 | 108 |
| Class of 1972 | 49 | 41 | 90 | 25 | 21 | 46 | 74 | 62 | 136 |
| Class of 1973 | 52 | 46 | 98 | 69 | 59 | 128 | 121 | 105 | 226 |
| Class of 1974 | 87 | 53 | 140 | 45 | 33 | 78 | 132 | 86 | 218 |
| TOTAL | 221 | 186 | 407 | 152 | 129 | 281 | 373 | 315 | 688 |

SCHOOL OF NURSING

Summary by Class, Sex, and Residence

| | <i>In-State*</i> | | | <i>Out-of-State</i> | | | <i>Total</i> | | |
|---------------|------------------|-----|-----|---------------------|-------|-------|--------------|-----|-----|
| | M | F | T | M | F | T | M | F | T |
| 4-Year | | | | | | | | | |
| Class of 1971 | ----- | 36 | 36 | ----- | 9 | 9 | ----- | 45 | 45 |
| Class of 1972 | ----- | 34 | 34 | ----- | 17 | 17 | ----- | 51 | 51 |
| Class of 1973 | ----- | 39 | 39 | ----- | 30 | 30 | ----- | 69 | 69 |
| Class of 1974 | ----- | 53 | 53 | ----- | 19 | 19 | ----- | 72 | 72 |
| 2-Year | | | | | | | | | |
| Second Year | 1 | 27 | 28 | ----- | ----- | ----- | 1 | 27 | 28 |
| First Year | ----- | 30 | 30 | ----- | 2 | 2 | ----- | 32 | 32 |
| TOTAL | 1 | 219 | 220 | ----- | 77 | 77 | 1 | 296 | 297 |

SCHOOL OF ALLIED HEALTH SCIENCES

Summary by Class, Sex, and Residence

| | <i>In-State*</i> | | | <i>Out-of-State</i> | | | <i>Total</i> | | |
|---------------|------------------|-----|-----|---------------------|----|----|--------------|-----|-----|
| | M | F | T | M | F | T | M | F | T |
| 4-Year | | | | | | | | | |
| Class of 1971 | ----- | 10 | 10 | ----- | 7 | 7 | ----- | 17 | 17 |
| Class of 1972 | 1 | 9 | 10 | ----- | 11 | 11 | 1 | 20 | 21 |
| Class of 1973 | ----- | 11 | 11 | ----- | 18 | 18 | ----- | 29 | 29 |
| Class of 1974 | 2 | 29 | 31 | ----- | 7 | 7 | 2 | 36 | 38 |
| 2-Year | | | | | | | | | |
| Second Year | ----- | 20 | 20 | ----- | 7 | 7 | ----- | 27 | 27 |
| First Year | 6 | 41 | 47 | ----- | 5 | 5 | 6 | 46 | 52 |
| TOTAL | 9 | 120 | 129 | ----- | 55 | 55 | 9 | 175 | 184 |

COLLEGE OF MEDICINE

Summary by Class, Sex, and Residence

| | <i>In-State*</i> | | | <i>Out-of-State</i> | | | <i>Total</i> | | |
|---------------|------------------|----|-----|---------------------|-------|----|--------------|----|-----|
| | M | F | T | M | F | T | M | F | T |
| Class of 1971 | 38 | 1 | 39 | 6 | 1 | 7 | 44 | 2 | 46 |
| Class of 1972 | 47 | 3 | 50 | 16 | 1 | 17 | 63 | 4 | 67 |
| Class of 1973 | 59 | 3 | 62 | 13 | ----- | 13 | 72 | 3 | 75 |
| Class of 1974 | 58 | 14 | 72 | 2 | 1 | 3 | 60 | 15 | 75 |
| TOTAL | 202 | 21 | 223 | 37 | 3 | 40 | 239 | 24 | 263 |

* Includes Regional Program Students

ENROLLMENT STATISTICS

GRADUATE COLLEGE
Summary by Class, Sex, and Residence

| | <i>In-State</i> | | | <i>Out-of-State</i> | | | <i>Total</i> | | |
|------------|-----------------|-----|-----|---------------------|----|-----|--------------|-----|-----|
| | M | F | T | M | F | T | M | F | T |
| Beginning | 169 | 90 | 259 | 137 | 73 | 210 | 306 | 163 | 469 |
| Advanced | 49 | 21 | 70 | 85 | 22 | 107 | 134 | 43 | 177 |
| Non-Degree | 137 | 75 | 212 | 9 | 4 | 13 | 146 | 79 | 225 |
| TOTAL* | 355 | 186 | 541 | 231 | 99 | 330 | 586 | 285 | 871 |

* Excludes Evening Division

UNDERGRADUATE NON-DEGREE
Summary by Sex, and Residence

| | <i>In-State</i> | | | <i>Out-of-State</i> | | | <i>Total</i> | | |
|---------------|-----------------|-----|-----|---------------------|---|----|--------------|-----|-----|
| | M | F | T | M | F | T | M | F | T |
| Undergraduate | 135 | 144 | 279 | 12 | 9 | 21 | 147 | 153 | 300 |
| Non-Degree | | | | | | | | | |
| TOTAL | 135 | 144 | 279 | 12 | 9 | 21 | 147 | 153 | 300 |

Enrollment by In-State/Out-of-State, by Sex, by College

| | <i>In/State</i> | | | <i>Out/State</i> | | | <i>Total</i> | | |
|---|-----------------|--------------|--------------|------------------|--------------|--------------|--------------|--------------|--------------|
| | <i>Men</i> | <i>Women</i> | <i>Total</i> | <i>Men</i> | <i>Women</i> | <i>Total</i> | <i>Men</i> | <i>Women</i> | <i>Total</i> |
| Undergraduate Colleges & Schools (4 Yr.) | | | | | | | | | |
| Arts and Sciences | 1079 | 767 | 1846 | 812 | 416 | 1228 | 1891 | 1183 | 3074 |
| Technology | 423 | 13 | 436 | 212 | 39 | 251 | 635 | 52 | 687 |
| Education | 142 | 483 | 625 | 52 | 254 | 306 | 194 | 737 | 931 |
| Agriculture & Home Economics | 221 | 186 | 407 | 152 | 129 | 281 | 373 | 315 | 688 |
| Nursing | ..... | 162 | 162 | ..... | 75 | 75 | ..... | 237 | 237 |
| Allied Health Sciences | 3 | 59 | 62 | ..... | 43 | 43 | 3 | 102 | 105 |
| SUBTOTAL | 1868 | 1670 | 3538 | 1228 | 956 | 2184 | 3096 | 2626 | 5722 |
| Undergraduate Colleges & Schools (2 Yr.) | | | | | | | | | |
| Nursing | 1 | 57 | 58 | ..... | 2 | 2 | 1 | 59 | 60 |
| Allied Health | 6 | 61 | 67 | ..... | 12 | 12 | 6 | 73 | 79 |
| SUBTOTAL | 7 | 118 | 125 | ..... | 14 | 14 | 7 | 132 | 139 |
| College of Medicine | 202* | 21* | 223* | 37 | 3 | 40 | 239 | 24 | 263 |
| Graduate College (Includes Graduate Non-Degree, 225, but excludes Evening Division) | 355 | 186 | 541 | 231 | 99 | 330 | 586 | 285 | 871 |
| SUBTOTAL | 557 | 207 | 764 | 268 | 102 | 370 | 825 | 309 | 1134 |
| Non-Degree Students | 135 | 144 | 279 | 12 | 9 | 21 | 147 | 153 | 300 |
| Undergraduate | | | | | | | | | |
| SUBTOTAL | 135 | 144 | 279 | 12 | 9 | 21 | 147 | 153 | 300 |
| GRAND TOTAL | 2567 | 2139 | 4706 | 1508 | 1081 | 2589 | 4075 | 3220 | 7295 |

* Includes Regional Program Students

V Degrees Granted

Division of Health Sciences
ROBERT W. COON, *Associate Dean*
School of Allied Health Sciences

Associate in Health Sciences

Daleen Elin Anderson, Bethany, Conn.
Susan Frances Bernier, St. Albans
Victoria Jean Coffin, Waterbury
Muriel Jane Collette, Orleans
Jean Carol Durciansky, Bergenfield, N.J.
Cheryl Ann Eastman, Rochester, N.Y.
Joan Althea Gray, Belmar, N.J.
Frances Mumford Hall, St. Johnsbury
Janet Lynn Jarvis, Berwyn, Pa.
Rae Marie Joslyn, Lake Elmore
Susan Elaine Joy, Burlington
Patricia Carol Latta, Fairfax, Va.

Andrea Elizabeth Martin, Hartford
Margaret Frances McDace, London, Ont.,
Canada
Paula Ann Moreau, Burlington
Donna Marie Mori, Barre
Lee Ann Murphy, Brockton, Mass.
Linda Gail Reagan, Moretown
Regina Gail Taylor, West Glover
Martha Jane Wilder, Rutland
Meredith Lynn Wilson, Barre
Trudene Lee Wright, South Ryegate
Carol Ann Yandow, Burlington

Bachelor of Science in Medical Technology

Judith Elizabeth Allan, Sharon, Mass.
Ilene Allyn Axelrod, East Brunswick, N.J.
Joan Elizabeth Bennett, Atlanta, Ga.
Muriel May Blomfield, North Salem, N.Y.
Paul Jean D'Amore, Lackawanna, N.Y.
Marianne Filiciotto Darling, Thornwood,
N.Y., *magna cum laude*
Carol Lee Durett, Colchester
Janet Marie Formaniak, Holland, N.Y.,
summa cum laude
Claire Marie Jarry, Montpelier

Karen Lee Kendall, West Springfield, Mass.
Helen Louise Kinsey, West Glover, *magna
cum laude*
Pamela Kay LaCroix, Barre
Sherlyn Ann Manley, Burlington
Janice Mary Mitchell, Kittery, Me.
Cynthia Ruth Moses, Pennington, N.J.
Sandra Jeanne O'Brien, Kensington, Conn.
Joan Helen Traill, Deerfield, Ill., *summa cum
laude*
Paula Jean Vigneault, Southington, Conn.

School of Nursing

Bachelor of Science in Nursing

Cynthia Lynne Allan, Kenogami, Que.,
Canada
Janis Paula Austin, Westminster
Martha Dutton Battles, Rutland
Jane Sinclair Beardsley, Windsor
Elizabeth Ackerson Bennett, Berrin Springs,
Mich.
Betha Ann Black, Chester, Va.
Patricia Lou Bourgea, South Burlington
Lorraine Lula Brown, East Burke
†Toby Swartz Bulotsky, Newton Centre, Mass.

Catherine Chapman Bush, South Freeport,
Me.
Margaret Mary Cibulskis, Scotch Plains, N.J.
Jane Ellen Clark, Winooski
Carol Jean Corbett, Newark, Del.
*Leslie Fern Cross, Chester
Patricia Weightman Daise, Eden Mills
Brenda Shepard Douglas, Middlebury
Loretta Ann Dow, Burlington
Sharon Marie Eielson, North Haven, Conn.
Toni Dene Girelli, Barre

* As of October 1969.

† As of February 1970.

Ruth Marie Gonsalves, Swansea, Mass.
 Sharon Ellen Goodell, Springfield
 Mary Margaret Graham, Williamstown
 Brenda Pauline Hamel, Orleans
 †Carol Jean Hanau, Essex Junction
 Pamela Jean Howe, Essex Junction, *cum laude*
 Nancy Rosemary Ingalls, Lyndonville
 Joy Carol Johnson, North Plainfield, N.J.
 Rebecca Barbara Johnson, South Dartmouth, Mass.
 Donna Elizabeth Kelleway, Rutland
 Barbara Jean LaPorte, Jeffersonville
 Heidi Lee Libercent, Westerville
 †Linda McMeekin, Orwell
 Patricia Jean Moulton, Montpelier
 †Hazel Stannard Moxhay, Fair Haven

Carolyn Anne Munton, Essex Junction, *cum laude*
 †Martha Louise O'Shea, Enosburg Falls
 Judith Ann Paulus, Burlington
 Carole Jean Pixley, Springfield
 Linda Spence Randall, Burlington
 Marion F. Richardson, Paxton, Mass.
 Elizabeth Torrey Searles, Essex Junction
 Judith Dale Simpson, Randolph
 Sandra Joyce Smith, South Burlington, *cum laude*
 Donna Morgan Stephens, Colchester
 Hendrika Mary Tabah, Northfield Falls
 Suzanne Claire Thabault, Burlington
 Judith Anne Walker, Dover, Mass.
 Gail Maclean Wilson, Crosswicks, N.J.
 Marcia Cassel Wool, Burlington
 Winona Orvis Yashko, Bristol

College of Education

DEAN C. CORRIGAN, *Dean*

Bachelor of Science in Music Education

Nancy Louise Armstrong, Saratoga Springs, N.Y.
 Deanna Lynn Cristelli, Morrisville, *magna cum laude*

†Martin Donald McRae, Burlington
 †Rufus Charles Patrick, Richmond
 Gary Delvin Welcome, Burlington

Bachelor of Science in Education

Judith Ann Abair, South Burlington
 Carol Ann Adams, Waterbury
 Joyce Elizabeth Anderson, Montpelier
 Judith Nelson Aplington, Washington, D.C.
 Susan Theresa Bain, St. Johnsbury
 Richard D. Baker, Jr., Burlington
 Ayn Baldwin, Morris Plains, N.J.
 Grayce Dorothea Balian, Worcester, Mass.
 Thelma Evelyn Barton, Kent, Conn., *magna cum laude*
 Caroline Jane Belock, Salem, Mass.
 Christine Lee Berkhoult, Hawthorn, N.J.
 John Joseph Bernardini, Burlington
 Jean Denson Betts, Burlington, *summa cum laude*
 †Maria Lucia Bliss, Montpelier
 †Margaret Higgins Brooks, Newfane
 Elizabeth Baynes Brown, Buffalo, N.Y.
 Judith Winsor Bruce, Woodbridge, Conn., *cum laude*
 Nancy Carman Bryant, Manchester Center
 Claire Yvonne Burke, Winoski
 Ann Marie Calvi, Fair Haven, *cum laude*
 Elsa Andrea Carlson, Proctor, *magna cum laude*
 *Madeline Spaulding Chase, Waterbury
 Lora Durett Christensen, Burlington

Kathleen Plumley Coleman, South Londonderry
 Susan Muriel Cottler, Newton Center, Mass.
 Judy Ann Coulman, Arlington
 Catherine Vere Cronin, Schenectady, N.Y.
 Patricia May Cummings, Chester Depot, *cum laude*
 Linda Kay Dewey, St. Albans
 Thelma Morgan Dodson, Waterbury
 Marguerite Ann Donnelly, Troy
 Linda Ann Dougan, Fayetteville, N.Y.
 Randall William Draper, St. Albans
 Diane Ellen Drinkwater, St. Albans
 Jacqueline Bernice Duggan, Burlington
 †Joan Warren Ellars, Burlington
 Ruth Leach Ellsworth, Cambridge
 Jacqueline Ann Emmons, Stamford
 †Richard Allan Farnham, Brattleboro
 †Gina Cassandra Ferrarini, Palo Alto, Calif.
 Nancy Marilyn Feyereisen, McLean, Va.
 Barbara Kay Fifield, Wells
 Janice Ann Fournier, St. Johnsbury
 Diane Marie Frame, Newington, Conn.
 Margaret Rose French, Hinesburg
 *Michael Francis Fullerton, Brattleboro
 Cheryl Ann Gadoci, South Norwalk, Conn.
 Elizabeth Merchant Garrity, Essex Junction

* As of October 1969.

† As of February 1970.

- Alice Marie Giroux, Burlington, *magna cum laude*
 *JoAnn Ratelle Grube, Reading, Pa.
 Linda Marie Guyette, Burlington
 Sharon Lee Hall, Randolph, *summa cum laude*
 Beverly Belway Hamblett, Burlington
 Loretta Fabrisi Hartigan, Winooski
 Eleanor Frances Harvey, Bennington
 Kathleen Dever Hazelton, Barre
 Kathy Jean Hoare, Montpelier
 Suzanne Hodgins, Kaneohe, H.I.
 Norma Cargill Hurteau, Milton
 Susan Esther Jackman, Brattleboro
 Patricia Ann Janowski, Cavendish
 Linae Elizabeth Johnson, Branford, Conn.
 Theresa Lynn Johnson, Burlington
 Teresa Catherine Jordan, Williston
 Jane Ellen Juchnicki, Greenfield, Mass.
 Karen Elizabeth Judson, Whitney Point, N.Y.
 Kerry Ann Kellogg, St. Johnsbury
 Karen Kiernan, Warwick, R.I.
 Nelle Ryan Knapp, Manchester Center
 †Joan Aldrich Knight, Burlington
 Marsha Kopitnikoff, Teaneck, N.J.
 Susan Clara Langmaid, St. Johnsbury
 David William Lapointe, Winooski
 Elaine Full Lawson, Burlington
 Linda Rena Lemery, Windsor
 Barbara Bowen Lewis, North Dartmouth, Mass.
 Linda Jean Liebert, Newport, *cum laude*
 †David Gino Lucaroni, Dalton, Mass.
 Sharon Bister Macia, Underhill, *cum laude*
 †John Peter Macutchan, Stowe
 Patricia Jane Mahaney, Burlington
 Robert Patrick Mahar, Fair Haven
 *Shirley Burroughs Martineau, Derby
 Susan McClenning, Bethany, Conn.
 Anne Marjorie McIntyre, Montpelier
 Dorothy Joan McKeown, St. Albans
 †Dan Lowell Miller, Shelburne
 Charlotte Ann Miraglia, Syosset, N.Y., *summa cum laude*
 Patricia Howe Mitchell, Randolph
 Mary Dorothy Mulhern, Glen Ridge, N.J.
 Gale Mary Musetti, West Rutland
 Christine Marie Nelson, Snyder, N.Y.
 Susan Diane Nelson, Ryegate
 Deborah Jean Nordfors, North Caldwell, N.J., *cum laude*
 Carol Ann Norem, Alexandria, Va., *summa cum laude*
 Linda Mae Noyes, North Bennington
 *Helene Kathryn O'Brien, Winooski
 *Carla-Marie Ojala, Proctor
 Patrick Joseph O'Reilly, Jersey City, N.J.
 *Elizabeth Shoram Parsons, Johnson
 Laura Jean Phelps, Floral Park, N.Y.
 Patricia Powers, Barrington, R.I.
 Nancy Jeannine Lavallee Provencher, Williston, *magna cum laude*
 Theresa Julia Ranta, Ludlow
 Margaret Mary Raymond, Essex Junction
 Gay Mary Reynolds, St. Albans
 †Sandra Louise Richards, Ilion, N.Y.
 †Wallace George Richardson, Vergennes
 Theodore Martin Riehle III, South Burlington
 Mary Conant Riggs, Burlington
 Anita Wood Rogers, South Royalton
 Mary Jane Roland, Rochester, N.Y.
 Iris Kathleen Root, Fair Haven
 †Nancy Scrizzi Routhier, Barre
 Susan Pauline Rowe, Wells River
 Aldo Peter Salati, Union City, N.J.
 Linda Lea Schufeldt, Memphis, Tenn.
 Sally Ann Scott, Derby
 Ingrid Searles, Newport, *cum laude*
 Jean Claire Semer, West Hartford, Conn.
 Beverly Ann Shyers, Union, N.J.
 Linda Smith, Essex Junction
 †Pamela Maynard Smith, Burlington
 Patricia Jean Smith, New City, N.Y.
 Mary Patricia Spencer, Middlebury
 Judith Cranford Stern, Colchester
 Linwood Allen Stoddard, Rochester
 Lynda Jean Strauss, Easton, Conn.
 Ruth Carolyn Streeton, Plainfield, N.J.
 *Cornelia Stevens Sullivan, Bristol
 Linda Marie Sullivan, Barre
 Linda Loncoske Thurber, Vergennes
 Elizabeth Marlene Tripp, West Brattleboro
 Marleen Sybil Weintraub, West Hartford, Conn.
 Edna Ruth Whitehead, South Norwalk, Conn.
 †Robert Joseph Williams, Shaftsbury
 Sheryl Ann Winters, Montpelier

College of Technology

WARREN ORVEL ESSLER, *Dean*

Bachelor of Science in Chemistry

Alan Jonathan White, South Norwalk,
summa cum laude

Harry Thomas Canning, Dannemora, N.Y.

* As of October 1969.

† As of February 1970.

Bachelor of Science in Civil Engineering

- Norbert Andre Blais, Burlington
 Richard William Corneille, Crown Point, N.Y.
 Arlan Wayne Elwood, Essex Junction
 William Osborn Fisk, South Burlington
 William Paul Grant, Poultney, *summa cum laude*
 Charles John Grenier, Waterbury
 Aaron Lewis Howe, Jamaica
 Gregory William Hughes, Poultney
 †Victor Alfred Hurlburt, Burlington
 Jerold Jurentkuff, Burlington
 Gary Wayne Kittell, Burlington
 Robert Cornish Krebs, Potsdam, N.Y.
 †Peter Cushing Lane, North Adams, Mass.
 William Michael Maroney, Bennington
 James Albert McDonald, East Burke
 Paul Warner Reed, Port Henry, N.Y.
 Robert Vernon Schumacher, Essex Junction
 Charles Franklin Scribner, Calais, *magna cum laude*
 †Daniel Work Stone, Delhi, N.Y.
 Gregory Nelson Sweeny, Barre, *cum laude*
 Stephen Michael Vukovich, West New York, N.J.
 †Wilson Kermit Wheatley III, Winooski
 James Donald Wood, Essex Junction

Bachelor of Science in Electrical Engineering

- †John Kendall Adams, Hartland
 Paul Ernest Allard, Burlington, *cum laude*
 Michael Lawrence Arthur, Burlington
 Edward Curren Baccei, Proctor
 Ronald Philip Belval, Underhill Center
 Robert Albert Billheimer, Fair Lawn, N.J., *summa cum laude*
 †Henry Emile Boiselle, Winooski
 Irving Walter Boucher, Jr., Burlington
 Fred Norris Burbank, Jericho
 John Cenci Cassani, Barre, *summa cum laude*
 Gary Lee Clairmont, South Burlington
 Eric Van Conrad, Brockport, N.Y.
 Jon B. Elwell, Burlington
 Bruce Joseph Hartigan, South Burlington
 William Sample Hicks, Jr., Columbia, S.C., *magna cum laude*
 Ronald Lloyd Johnson, Rutland
 Donald Lee Jordan, Middlebury, *cum laude*
 †John Thomas Longtin, Bennington
 James Bradley Loomis, Burlington
 Robert Weeks Stewart, Demarest, N.J.
 Allan Dwight St. Peter, St. Johnsbury
 Endre Phillip Thoma, Winooski
 James Hobert Tolley, Essex Junction
 Larry David Tuxbury, Burlington
 Ronald Ashton Webster, Burlington
 Robert Reynolds Wood, St. Albans, *magna cum laude*

Bachelor of Science in Management Engineering

- †Gary William Dean, Brandon
 Michael Dale Morin, Hardwick
 †William Elnathen Phelps, Jr., Watervliet, N.Y.
 †Charles Joseph Quigley, Jr., Westport, Conn.
 †James Arthur Robert, Burlington
 †Thomas Francis Shea, Burlington
 †Harland William Thompson, Sheffield
 Roland Leonard Viens, Winooski

Bachelor of Science in Mathematics

- John Francis Clark, South Burlington
 Catherine Anne Connolly, Falls Church, Va.
 Roger Joseph DeAngelis, Brattleboro
 Jon Frederic Filion, Bristol
 †Thomas William Hill, Burlington
 Edmund Arthur Hubbert, Fairfax, *cum laude*
 Andrew Barry Liston, Holden, Mass.
 Marjorie Jean McIntosh, Norwalk, Conn.
 John Gorham Moreland, Syracuse, N.Y.
 †Raymond Alfred Palmer, Lincoln, R.I., *cum laude*
 Richard Charles Ramsey, Bristol
 Denis Edward Sevee, Shelburne, *summa cum laude*
 Earle Monroe Simpson, Jr., Rochester, Vt.

Bachelor of Science in Mechanical Engineering

- †David Howard Aiken, Burlington
 Alan Wayne Austin, Vergennes
 Theodore James Burnette, Woodstock
 Timothy Charles Bryant, Manchester Center
 Robert Wilmot Castle, Rochester, N.Y., *cum laude*

† As of February 1970.

*Robert Ernest Cavoretto, Burlington
 Richard Stephen Clark, Shaker Heights, Ohio
 Thomas John Ettinger, Pompton Lakes, N.J.
 Gordon Randall Farnsworth, Randolph, *cum laude*
 Robert Joseph Filsinger, Syracuse, N.Y.
 Robert John Gibbs, Brownsville
 Robert Joseph Hutton, Burlington

Carl Henry Jacobs, Rutherford, N.J.
 Michael John Janson, St. Albans
 James Harold Keeler III, Bristol
 Eugene Bernard Raymond, Springfield
 Russell French Sackett, Winchester, Mass.
 Paul Richard Shea, Burlington, *cum laude*
 James Robert Yeates, Dorval, Que., Canada

Bachelor of Science in Physics

Bernard Edward DeVarney, South Burlington
 Ralph Gibson, Schenectady, N.Y.

John Stewart St. Peter, St. Johnsbury

College of Agriculture and Home Economics

THOMAS WHITFIELD DOWE, *Dean*

Bachelor of Science in Agriculture

Stearns Boyden Allen, Jr., Shelburne
 Karol Lou Asbjornson, Boxford, Mass.
 *Ronald Edward Beck, Grafton
 David Griswold Bishop, Shelburne Falls, Mass.
 Russell Warren Blodgett, Orleans
 †John Ellsworth Cole, Jr., Westport, Conn.
 Harold Joseph Doria, Middlebury
 Alexis Robert Dubois, Weybridge
 Deanette Mae Eastman, Hardwick
 Arturo Galo Galo, Maraita F.M., Honduras
 Paul Duncan Harris, Leominster, Mass.
 Richard Ralph Hodge, Fairlee
 Gerald Philip Lemieux, St. Johnsbury
 Lynda Beattie Lemieux, Manchester Center, *summa cum laude*

Frank Theodore Martiniuk, Union City, N.J.
 †Edward Frank McLure, Ryegate
 Catherine Louise Norris, Holyoke, Mass., *magna cum laude*
 †Frederick Morse Purinton, Bristol
 Richard H. Racusen, Burlington
 Brian Douglas Rivers, Brandon
 Dennis Charles Roberts, South Royalton
 †Gardner Hugh Smith, Windsor
 *James Guy Towle, Franklin
 Roberta Lynn Traub, West Hartford, Conn.
 Harry Martens von Holt, Kapaa, Hawaii
 *Lee William White, Essex Junction
 Margaret Flansburgh Yeaw, Ho-Ho-Kus, N.J., *summa cum laude*

Bachelor of Science in Agricultural Engineering

Elwin Ray Hamilton, West Brattleboro

Bachelor of Science in Forestry

†Jack Rawlston Dudley, Orleans
 †Raymond Louis Gauthier, Bennington
 James Robert Grace, New Britain, Conn.
 David Raymond Marvin, South Burlington
 Catherine Carse Mayo, Hinesburg
 †Ronald Horace Morgan, Milton
 †Lucien Dennis Paquette, Middlebury

David Tyler Partington, West Topsham
 Russell Sidney Reay, Brattleboro
 William James Rivers, South Hero
 †George William Smith, Armonk, N.Y.
 †Edward Charles Soutiere, Williston
 *Floyd Walter Turner, Brattleboro
 Jeffrey Alger Wallin, Elmwood, Mass.

Bachelor of Science in Home Economics

†Janet Marie Abell, Burlington
 Norma Edith Allen, Schaghticoke, N.Y., *cum laude*
 Judith Lyn Berkowitz, Saratoga Springs, N.Y.

*Susan Margaret Brown, Richford
 Susan Ann Buchanan, Flemington, N.J.
 Bonnie Lee Burbank, Chelsea
 Barbara Anne Byers, Westfield, N.J.

* As of October 1969.

† As of February 1970.

- Jan Marie Caggige, Rutland
 Kathleen Van Duyne Campbell, Acton, Mass.
 Emily Catherine Carboneau, Montpelier
 Sarajane Chervin, Worcester, Mass.
 Margaret Calahan Claffey, Burlington
 Kate Allen Cleaves, East Montpelier
 Roberta Agnes Coleman, Burlington
 Nancy Farnsworth Daly, Canal Zone
 Christine Joy Delfausse, Burlington
 †Mary Jean Desmarais, Winooski
 Elizabeth Dobson, Shelburne
 Margo Johnson Eckert, Minnetonka, Minn.
 Nyra Jane Edwards, Chelsea
 Diane Louise Fricke, Darien, Conn.
 Lois Harriet Garland, Hardwick
 *Lynda Stone Gardner, Potsdam, N.Y.
 Christine Ann Germond, Brandon
 Susan Joan Getzoff, Villanova, Pa.
 Pamela Jane Goodrich, Burlington
 Susan Charlene Gray, West Rutland
 Linda Jean Harper, Derby Line
 Linda Jane Hawkins, River Edge, N.J.
 †Margaret Louise Hazen, White River Junction
 Elizabeth Anne Heyer, Rochester, N.Y.
 Nancy M. Hoch, Philadelphia, Pa.
 Mary Theresa Holland, Margate City, N.J.
 †Meredith Willey Kendall, Thetford Center
 Linda Scharg Kelley, Westwood, N.J.
 Barbara Ann Kuhns, Matawan, N.J.
 Donna Claire McBride, Island Pond, *cum laude*
 Betsey Merrill, Brattleboro
 *Virginia Nardino, Clifton, N.J.
 Nancy Jean Paquette, Middlebury
 Cheryl Judith Payne, Vergennes
 Bonnie Stagg Quigley, Proctor
 Diane Lynn Remillard, St. Albans, *cum laude*
 †Karen Richards, Burlington
 *Lenora Duchacek Sagendorph, Burlington
 Christine Lyn Scott, Rosemont, Pa., *magna cum laude*
 Linda Elizabeth Seavey, South Burlington
 Patricia Jane Shay, Sayre, Pa.
 Jane MacDougall Sherwin, New London, Conn.
 Carlyn Gail Sichel, Cheltenham, Pa.
 Kathryn Anne Simonds, Washington Depot, Conn.
 Sharon Marie Snow, Arlington
 Karen Margaret Sorrell, Burlington
 Esther Louise Thompson, Essex Junction
 Wendy Gay VanAntwerp, Upper Montclair, N.J.
 Lorraine Joyce Wood, Fairfax

COLLEGE HONORS

Agricultural Economics

Harry von Holt

"Potential Beef Production of Tropical Pastures"

Animal Science

Margaret Flansburgh Yeaw

"A Quantative Method for the Analysis of Some of the Histological Changes in the Ovine Corpus Luteum, During the Estrous Cycle"

College of Arts and Sciences

ALFRED B. ROLLINS, JR., *Dean*

Bachelor of Science in Business Administration

- Alfred Aldo Alessi, Jr., Oradell, N.J.
 Gary Lester Anderson, Hyde Park
 †Nancy Elizabeth Anderson, Jeffersonville
 *Paul Graham Ardell, Fairfield, Conn.
 †Thomas Allen Babic, Montpelier
 Russell Howes Baker, Jr., North Attleboro, Mass.
 William Preston Ballard, Montpelier
 William Edmond Barkyoub, Fairfax
 Richard David Barrows, Burlington
 William Antonio Bartinoski, Jr., Essex Junction
 Robert Smith Bean, Lyndonville
 George Eugene Bedard, St. Johnsbury

* As of October 1969.

† As of February 1970.

- Phillip Malcolm Bowler, Sr., Burlington
 David Charles Brower, Scotia, N.Y.
 John Jerome Buckley, Bellows Falls
 John Eddie Burgess, Shaftsbury
 Ann Patricia Costello, West Rutland
 Arthur James Cota, II, Milton
 William Joseph Crudo, Jr., Stratford, Conn.
 Charles Robert Dart, South Burlington
 Carl Rizzo DeCavalcante, Princeton, N.J.
 Daniel Anthony DeVan, Burlington
 Francis DiCesare, Jr., Burlington
 Armand Joseph Dion, East Barre
 Nancy Lynn Holton Divoll, Westminster
 John Bruce Eckert, Sarasota, Fla.
 †Bruce Lee Eddy, Hinesburg
 Keith Austin Edson, Springfield
 Loren Joseph English, Burlington
 Gregory Laurence Foster, Winthrop, Me.
 William Ernest Fous, Harrington Park, N.J.
 Gregory Gallagher, Lyndonville
 Paul Nelson Garland, Hardwick
 David Joseph Gemelli, Marshfield, Mass.
 †Robert William Gilbert, Jr., Brattleboro
 Christopher Robert Glenney, Bolton, Conn.
 Vicki Golodetz, New Rochelle, N.Y.
 Douglas George Gomez, Williamstown
 Everett Sidney Graves, Waitsfield
 †Leo Joseph Grenon, Burlington
 Craig Jay Gutchell, Burlington
 Jeffrey Karl Hass, New York, N.Y.
 †John Robert Hill, Burlington
 George Morrison Hubbard, III, Summit, N.J.
 Colin McGregor Hunter, Bound Brook, N.J.
 †John Lindsay Hynes, Manchester, N.H.
 †Barbara Jean Johnson, Springfield
 †Michael Robert Kelley, Burlington
 Matthew Martin Kleeman, West Caldwell, N.J.
 Leland Walrath Krake, III, Bethlehem, Conn.
 Karlton Roy Kunzie, St. Albans
 William James Lestage, Burlington
 Neil Christopher Mackey, Middlebury
 Samuel Armour McCaulley, III, Westfield, N.J.
 Lawrence Diskin McCrea, Jr., Burlington
 James Raymond McGee, South Burlington
 Paul Brice McKane, North Adams, Mass.
 †Richard Allyn Miller, Brattleboro
 Timothy Alexander Nisbet, Springfield
 Peter Allen Novak, Boston, Mass.
 †John Arthur Parks, Burlington
 †Thomas Leon Parrott, Wilder
 William Steele Pingree, Rutland
 Richard William Posey, Burlington
 David Striker Quackenbush, Buffalo, N.Y.
 Kennard Perkins Rawson, Sudbury, Mass.
 †Peter Wylie Raymond, Essex Junction
 James Ephraim Read, East Fairfield
 Robert Lewis Reynells, Jr., Springfield
 Thomas James Sandretto, Waterbury
 *John Bradford Savage, Rutland
 †David Gilman Schermerhorn, Charlotte
 Paul Eric Schoenbuecher, Burlington
 Avery Seaman, Jr., Providence, R.I.
 John Hollingsworth Sinclair, New York, N.Y.
 Godfrey Cabot Sluder, Armonk, N.Y.
 Steven Lane Sperlik, Rome, N.Y.
 George M. Stanis, Haverhill, Mass.
 †Roy Franklin Stowell, Townshend
 Patricia Ruth Starbuck, Westport, N.Y.
 Eugene Grant Stratton, Barre
 Michael Francis Sule, Rutland
 John Wesley Sutphen, III, Loudonville, N.Y.
 John William Sykas, Jr., Montpelier
 Robert Bancker Talbot, Jr., West Hartford, Conn.
 Milton Dwight Todd, Orleans
 †Lester Andrew Velez, Norwalk, Conn.
 †George Edmund Verret, Burlington
 †Bernard McClellan Wagon, Pittsford, N.Y.
 Henry Russell Watson, III, Milton, Mass.
 Charles Chandler Wicker, Charlotte
 Harry Louis Willard, Jr., Springfield
 Bruce Burnham Woods, Valley Stream, N.Y.
 David George Wyand, South Burlington

Bachelor of Arts

- †Anthony Albert Accorsi, Burlington
 David Herbert Adams, Fairlee
 Ilene Susan Adler, Burlington
 Newton George Africa, Woodstock
 Eleanor Frances Agnew, Plattsburgh, N.Y.
 Douglas Lee Aiken, Barre
 †William Dante Aimi, Barre
 Mary Lou Millard Aldrich, Springfield
 Ralph James Alexander, East Hartford, Conn.
 †Robert Willis Allen, Northfield Falls
 †William Lafayette Allison, Burlington
 Bette Thompson Anderson, Williston
 †David Arthur Anderson, Milton, Mass.
 Stephen Eric Anderson, Londonderry
 Jay Lloyd Ankeney, Shaker Heights, Ohio, *cum laude*
 Leslie Ann Ayvazian, Saranac Lake, N.Y.
 Sideris David Baer, Rowley, Mass.
 Betsy Ellen Reed Bahrenburg, Essex Junction
 Judith Avalon Bailey, Woodbury
 Carol Ann Ball, St. Johnsbury
 William James Ballantyne, Windsor
 James Albert Balukjian, Potsdam, N.Y.
 Kenneth Dean Barrett, Chester
 William David Barry, East Longmeadow, Mass.

* As of October 1969.

† As of February 1970.

- Lynne Bartholomew, Rochester, Minn.
 Keith Hamilton Beadle, Derby Line
 Charlotte Grace Beam, Morrisville, *cum laude*
 Stanton Leslie Bean, Northfield
 Anthony Whitcomb Beardsley,
 Newfoundland, Canada
 Katharine Burrell Beilby, Longmeadow, Mass.
 JoAnn Elizabeth Belczak, Bellows Falls
 Ellen Louise Bemis, Winchester, Mass.
 Samuel Joseph Bender, Glendale, N.Y.
 †Harry Gantcliffe Benion, Jr., Pittsburgh, Pa.
 †Robert Alan Bennett, North Bellmore, N.Y.
 Charlene Lynne Bensen, South Burlington
 Craig Lee Bensen, South Burlington
 Gerald Gregory Benson, Martinsville, N.J.
 Kim Allen Bent, Roxbury
 Kenneth Ira Berk, Pascoag, R.I.
 †Gordon Richard Bilyard, Essex Junction
 Richard Joseph Bissonnette, Winooski, *cum laude*
 *Katharine Blakely, Burlington
 Anne Elizabeth Bond, South Burlington,
 magna cum laude
 Jeanne Whitcomb Bonin, Pittsfield, *magna cum laude*
 Michael Charles Boraski, Schenectady, N.Y.
 †Thomas Virgil Bortone, Wayland, Mass.
 *Harry Dante Bossi, II, Montpelier
 Jill Barney Bosworth, Pelham, N.Y.
 †Nancy Jeanne Cadmus Bosworth, Burlington
 Don Allen Bourdon, Woodstock
 Michael Edmond Boutin, Glover
 Ronald Glen Brandolini, Pittsfield
 Eugene Keith Breger, West Roxbury, Mass.,
 summa cum laude
 Cheryl Warner Brinkman, Winooski, *cum laude*
 Michael Francis Brisbin, South Burlington
 Susan Lee Brock, Florham Park, N.J.
 †William Charles Brower, Upper Montclair,
 N.J.
 †Arthur Elliot Brown, Stamford, Conn.
 Keith Gordon Buik, Essex Junction
 Brian Fredric Bull, Thomaston, Conn.
 Nancy Louise Bundgus, Burlington
 †Michael John Burke, Rutland
 Patrick Thomas Burke, Winooski
 Pamela Evelina Buttura, Barre
 Joseph Rodolpho Buzzi, Barre
 Thomas James Cain, Burlington
 †Robert Wayne Calcagni, Morrisville
 Anne Hazard Campbell, Huntington
 Ann Louise Cangemi, South Burlington, *cum laude*
 Winthrop Case Cantrell, II, Weston, Conn.
 James Stephen Carbonneau, Newport
 Carol Susan Carpenter, Williamstown
 Allan Robert Carr, Montpelier
 Thomas Clifton Carr, Burlington
 Richard Packard Carrick, DeWitt, N.Y.
 Francine Mary Casavaw, Rutland
 *Weston Attwood Cate, III, Montpelier
 Todd Martin Centybear, Montpelier
 Paula Hunt Chapman, Canton, N.Y.
 Christopher Russell Chase, Burlington, *magna cum laude*
 Thomas Paul Clairmont, Jr., Burlington
 Antonia Ann Clark, Windsor
 *Richard Lewis Clark, Bellows Falls
 †Peter James Clifford, Shelburne
 †Daniel Adams Coane, Montpelier
 Richard Brian Cobb, Montpelier
 Jo Ann Coffin, Newport
 Alan Lee Cohen, Burlington
 Maxine Susan Shaw Cohen, Burlington
 Peter Graham Cole, Port Washington, N.Y.
 †Mahlon Wayne Conner, Jr., Burlington
 †Linda Ann Hale Conolly, Burlington
 Dana Clinton Cook, Burlington
 Gregory Joseph Cook, Wilder
 Thomas Bowers Cook, Youngstown, Ohio
 Stephen Charles Cooke, Jr., Bridport
 John Robert Corbett, Wallingford, Pa.
 William George Corey, South Burlington
 Anne Carter Council, Holyoke, Mass.
 Kathryn Ann Craig, Stamford, *cum laude*
 Stephen James Crall, Gates Mills, Ohio
 Ian Robert James Crawford, Hingham, Mass.
 Samuel Lukens Cresson, Jr., Bryn Mawr, Pa.
 Wayne Roosevelt Crosier, North Springfield
 Robert Hastings Cross, Longmeadow, Mass.
 *Wayne Allen Crown, Vergennes
 William Lawther Cunningham, Burlington
 Raymond Henry Czachor, West Rutland
 Stephen Lee Daige, Eden, *summa cum laude*
 Jeremy Robin Dakin, Falls Village, Conn.
 Norman Clark Dalrymple, Wilmington
 Peter Lawrence Danziger, Woodmere, N.Y.
 James Robert Dardick, New Haven, Conn.
 Robert Leslie Davidson, Boca Raton, Fla.
 Marcia S. Davies, Burlington
 Bruce Lee Davis, St. Johnsbury
 Ernest Stillman Davis, III, Plymouth, N.J.
 Richard Barre Davis, Jr., Bennington
 Douglas Andrew Deaett, Brattleboro
 *Thomas Slivio DeVona, Cranston, R.I.
 †Robert Edward Donnis, Chester, *cum laude*
 Bryant Joseph Dorsch, Uniondale, N.Y.
 *Betty Buda Bohne Douglas, Shoreham
 Michael Robert Doyle, Montpelier
 Joseph Norman Duguay, St. Johnsbury
 Thomas Benson Dunham, Manchester, Me.
 Michael George Dupras, Burlington
 Cecile Jeannette Dufresne Dyke, Hardwick,
 magna cum laude
 Raymond Lloyd Dyke, New Haven
 David Lee Dykhuizen, Cincinnati, Ohio, *cum laude*
 Clark Jewett Eaton, Rutland
 Douglas Manson Eddy, Beverly, Mass. *summa cum laude*
 David Walter Edsall, Windsor

* As of October 1969.

† As of February 1970.

Stuart Martin Einhorn, Hempstead, N.Y.
 Kate Estey, Londonderry
 Richard McNair Evans, Jr., Demarest, N.J.
 Bruce Ivan Faller, Bennington
 John Edward Farrar, Cavendish
 Sandra Sahler Fay, Pittsford, N.Y.
 Barbara Joan Feinberg, Burlington, *summa cum laude*
 Bernard Jack Feinberg, Scarsdale, N.Y.
 Barbara Sue Feldsher, Stamford, Conn.
 †Shannon Lee Felski, Montpelier
 †Matthew Ferriter, Claremont, N.H.
 Christopher Field, Brattleboro
 Frances Irene Fish, Burlington
 Catherine Fisher, Clifton, N.J.
 William Don Fitzsimmons, Montpelier
 *Brian Thomas Flanagan, Rutland
 †Gail Ann Black Flanagan, Springfield
 *Susan Amsden Flint, Stowe
 Rhoda Leokade Forbes, Burlington
 Dorene Mary Forney, Asheville, N.C.
 Wendy Adleen Fortier, Barre
 Gail Anne Foster, Barre
 Stephen Pierson Foster, Burlington
 *Nancy Arlene Quinn Foulkes, Madison, Wis.
 Ronald Alan Fox, Newton, Mass.
 Richard Paul Frantz, Bennington
 Terry Marie Franz, Garrett Park, Md.
 Norine Elizabeth Freeman, Garden City, N.Y., *summa cum laude*
 †Peter Warren Freeman, Great Barrington, Mass.
 *Suzanne Morley Sincerbeaux Freeman, Short Hills, N.J.
 Bartlett Holt Frisbie, Longmeadow, Mass.
 Michael John Furst, Freeport, N.Y.
 Kathleen Ann Gagnon, West Brattleboro
 †Louis Garbo, Burlington
 Ronald Ralph Gargano, Branford, Conn.
 †Marie Trahan George, Swanton
 Peter Stephan Gianacoplos, Groton, Conn.
 John Hunter Giles, Shelburne, *summa cum laude*
 Richard Pierce Gillespie, South Burlington
 Linda Sue Gilmour, Fayetteville, N.Y.
 Susan Beth Gipstein, West Hartford, Conn.
 Aaron Frank Glauberg, Hewlett, N.Y.
 Herbert Louis Gleicher, Scarsdale, N.Y.
 Charles Marks Goodrich, Jr., Pittsfield, Mass.
 Clara Rose Goulet, Montpelier
 Adrienne Gouzoulis, Glen Cove, N.Y.
 Karen Ruth Grace, Pearl River, N.Y.
 Cornelius O. Granai, Barre
 Marianne Grant, Brattleboro
 Deborah Ellen Gray, Putney
 †Susan Elizabeth Lowell Gray, Middlebury
 Donald Michael Grayson, Peckskill, N.Y., *magna cum laude*
 Robert Fisher Greene, Proctor
 Valerie Ann Greene, West Auburn, Me.
 Roy Bennett Greenman, South Orange, N.J.

* As of October 1969.

† As of February 1970.

Brian Joseph Grenon, Burlington
 Thomas Emil Gross, Branford, Conn., *summa cum laude*
 Stephen Gage Guenther, Richmond
 Barbara Adele Guidi, Bernardston, Mass.
 *Douglas Inman Guy, Vergennes
 Dianne Louise Guzzetta, Rochester, N.Y.
 James Allen Hadley, Rye, N.Y.
 John Burton Hall, Montpelier
 Christine Ann Halpin, Middlebury
 Robert Bruce Hamblett, Newport
 †Mary Anne Hamlin, Burlington
 Bert Charles Hammett, Albany, N.Y.
 William Patten Hancock, Cape Neddick, Me.
 Marcia Marie Harding, Endicott, N.Y.
 Christopher James Harris, Mt. Kisco, N.Y.
 †Stephen Rand Harrison, Richmond
 Edward Matthew Hartman, Montpelier
 Karen Ingrid Hauschild, South Woodstock, Conn.
 Anne Maria Havas, Paris, France
 Judith Ann Hayden, Burlington, *summa cum laude*
 Anne Heywood Haydock, Sharon, Conn.
 Barbara Jean Cole Heindel, Charlotte
 Geoffrey Clyde Hemenway, Burlington, *summa cum laude*
 *Cheryl Lee Henson, East Hardwick
 †Duncan Alan Higgins, Underhill Center
 †Thomas John Hitchcock, Newport
 William Edward Hobb, St. Albans
 Stephan Mark Hochstin, Windsor, *cum laude*
 Jane Elizabeth Hograf, Bristol, Conn.
 Jean Elaine Holbrook, Springfield
 James Newell Holcomb, Lancaster, N.H.
 Roger Spunar Horn, Fairfax, Va.
 Berekeley William Hotchkiss, Weybridge, *cum laude*
 Daniel Charles Houle, South Burlington
 Anne Leona Houston, Craftsbury
 James Francis Howard, Jr., Bellows Falls
 Thomas Eugene Hubbell, Bennington
 Holly Clarice Huber, Florham Park, N.J.
 *Richard Wayne Hull, Enosburg Falls
 Ellen Butterfield Ward Humphreys, South Burlington
 Allan Sumner Hunt, Burlington
 Sharon Ann Hunt, Brattleboro
 Nancy Jane Hoel Hutchinson, Marshfield
 Linda Hutton, Burlington
 Deborah Hicks Janone, Burlington
 Everett Jaros, Bloomfield Hills, Mich.
 Laurie Willis Jeffrey, Montpelier
 Helen Ballard Jervis, Norwich, *magna cum laude*
 Constance Mary Johnson, Burlington
 †Katharine Lynn DeBoer Johnson, Norwich, *cum laude*
 Martha Lynn Johnson, Bloomfield, N.J.
 Sharon Elizabeth Jones, Whitesboro, N.Y.
 Amy Louise Kahn, New York, N.Y.

- Felix I. Kahn, Burlington
 Marsha Fay Kaiz, Newton Mass., *magna cum laude*
 John James Kalahan, III, St. Albans
 George Leonidas Kallechey, Concord, N.H.
 Maureen Anne Kane, Enosburg Falls
 Sheryl Lynn Kaplan, West Hartford, Conn., *cum laude*
 Thomas Francis Kazak, Springfield
 Kevin Michael Kearns, Bennington
 *Keith Michael Keiderling, Flemington, N.J.
 Elizabeth Davis Keller, Burlington
 Lawrence Abbott Kelly, Winchester, Mass.
 Walter McCune Kelly, II, New Canaan, Conn.
 David Howard Kempner, North Woodmere, N.Y.
 Lois Adele Kenney, Essex Junction
 †Ronald Charles Kershner, Canaan
 Brenda Joyce Kimball, St. Johnsbury
 Peter Dennis King, Burlington
 Elizabeth Mae Kingsbury, Rochester
 Raymond Sidney Kirk, Chappaqua, N.Y.
 William Ernest Kittredge, St. Johnsbury
 Peter Klode, Milwaukee, Wis.
 John Fogg Kneeland, Jr., Kennebunk, Me.
 Jorene Kuhlmann, South Burlington
 George Frederick Kuntz, Jr., North Tarrytown, N.Y.
 Neil Alan Lachant, Bennington, *cum laude*
 Pilar Gomez Lagro, Montpelier
 David Louis Lalime, Winooski
 †Elizabeth Harding Lamphere, West Hartford
 Cynthia Helen Lamprecht, Delmar, N.Y.
 Stephen Lane, Lexington, Mass.
 Michael Andre Lanoue, Newport
 Thomas Joseph LaPlaca, Rutland
 Roselyne Marie Lariviere, Richford
 Susan Anne Larrabee, Shoreham
 David Carl Larsen, Pittsford, N.Y.
 Kathryn Britton Larsen, Pittsford, N.Y.
 †Judith Barbara Lasky, Long Branch, N.J., *cum laude*
 William Mark Laufer, Deal, N.J.
 Chele Diane Lavalla, South Burlington
 Barbara Louise Lawrence, South Burlington
 Deborah June Lawson, Bethel
 Dean Edwin Lea, Peru, N.Y.
 Brian Wilbur LeClair, Burlington
 Joseph Eugene LeClerc, West Glover, *cum laude*
 Barry Alan Lehman, Marblehead, Mass.
 Barbara Allan Lensing, Louisville, Ky.
 Kathleen Grace Leonard, South Burlington
 Michael Dean Leonard, South Burlington
 Jeffrey Howard Lerer, Maynard, Mass.
 Barry Kenneth Levin, Natick, Mass.
 Vernon Michael Levine, Burlington
 Joseph William Liddell, Ticonderoga, N.Y.
 Robert Allison Ligeti, Rutland
 Frances Ann Lillie, Montpelier
 Susan Linnane, Concord, N.H.
- Phillip Charles Linton, Barre
 †Joan Barbara London, Burlington
 Timothy Jon Long, St. Johnsbury
 Deborah Ross Loveitt, Dedham, Mass.
 Joseph Francis Lovett, Cranston, R.I.
 Richard David Lovett, Chester
 F. Graham Luckenbill, II, Danbury, Conn.
 Judith Ellen Lutzin, Falls Church, Va.
 Richard James Mable, St. Albans
 Rachella Mac, Rutland, *cum laude*
 Peter William MacConnell, Amherst, Mass.
 Richard Leon MacDonough, Marshalls Creek, Pa.
 †Robert Craig MacKenzie, Highland Park, N.J.
 Jean Marie Mackey, Old Greenwich, Conn.
 Thomas Edward Macksey, Arlington
 Donald Bruce Maddocks, Burlington
 †Susan Alda Maier, Portland, Me.
 John Ferris Mainieri, Burlington
 David Maloney, Branford, Conn.
 *Allan Edgar Marsceill, St. Johnsbury
 Kenneth Stewart Marshall, Longmeadow, Mass.
 *Jacqueline Helene deLoeschnigg Martell, Fairfax
 Daniel Leo Martin, Brandon
 Eleanor Camburn Martin, Burlington
 Lawrence Raymond Massucco, Bellows Falls
 George Richard Mathon, South Burlington
 Nancy S. Maurice, Tunbridge
 Gerald Eli Mayer, Middlebury
 William Parker Mayo, Williston
 Joan Louise McCulloch, Brattleboro
 Dennis John McDonough, Bristol
 Katherine Dee McGinnis, Burlington
 John Anthony McGrath, Burlington
 Gregory John McHugo, Burlington, *summa cum laude*
 †David James McLane, Maplewood, N.J.
 Gregory William McNaughton, Williamstown
 Brian Tiffany McNeary, Newfane
 Linda Ann McPhee, Reading, Mass.
 John Bernard McShane, Jr., Poultney
 Marilyn Irene Meares, Nashville, Tenn.
 †Martha Ruth Meister, Lowell, Mass.
 William Martin Mercia, Williston, *summa cum laude*
 John Airheart Wood Miller, Burlington
 Peter Stanley Milstein, Portland, Me., *magna cum laude*
 James Philippe Mongeon, Winooski
 Pamela Hurd Montague, Northboro, Mass.
 *Allen Chandler Moore, Jr., Charlotte
 Douglas Fuller Moore, Charlotte
 Edward Robert Moore, Bartonsville, *magna cum laude*
 John Frederick Moore, St. Johnsbury
 †John Francis Moreau, Morrisville
 *Stephen Allen Morse, Newfane
 Betty Jo Morwood, Winooski

* As of October 1969.

† As of February 1970.

- *William Talbot Mosenthal, Jr., Norwich
 Patricia Anne Moyer, Middlebury
 Richard James Mullany, Westfield, Mass.
 John Bernard Mullen, Port Henry, N.Y.
- *Nancy Clagett Muller, Winooski
 Emily Multer, New Haven, Conn.
 Christopher Short Murray, Middlebury
 Ernest Leonard Murray, Bennington
 Laura Helene Myers, Rutland
 Mary Ann Neal, Ludlow
- †Earle Bruce Nelson, Newbury
 Eric Charles Nichols, Fairfax, *summa cum laude*
 Roy Alan Nicholson, Montpelier
- †Sarah Lee Niebling, Short Hills, N.J., *magna cum laude*
- *Lawrence Ralph Nilssen, Ramsey, N.J.
 Karen Gene Noble, Rutland
 Cajsja Jane Nordstrom, Brattleboro, *magna cum laude*
- *Kenneth Alfred Norton, Jr., Rutland
 Karen Elizabeth Nystrom, Arlington, Va.
 Douglas Graham Oakes, Burlington
 Margaret Etta O'Connell, Bethesda, Md.
 Kenneth Joseph O'Connor, Glens Falls, N.Y.
 Jean Elizabeth O'Donnell, Amherst, Mass.
- †Edward Richard O'Hare, Gloversville, N.Y.
- *Terence Patrick O'Leary, Central Islip, N.Y.
 David Richard Ordway, Chester Depot
 Robert Dunkerson Orr, Jr., Evansville, Ind.
- †Martha Lee Baker Osmer, Madison, N.J.
 Franklin Randolph Otto, Basking Ridge, N.J.
- *Harold Merrill Owen, Bangor, Me.
 Anna Maria Parker, Pittsfield, Me.
- *Christine Ann Parkhurst, Schenectady, N.Y.
 Michael Patashnick, North Adams, Mass.
 Joseph John Pawlusik, Rutland
 Stephen Austen Pearce, Yonkers, N.Y.
 Dennis Craig Pearson, Holden, Mass.
 Patricia Ann D'Agostino Peissner, Sheldon Springs
- James Rowland Pennell, Bristol, Conn.
- †Janis Gay Peplau, Proctorsville
 Glenn Steven Perrin, Port Chester, N.Y.
- †Bradley Franklin Persing, Burlington
 John Arthur Persing, Burlington, *cum laude*
 Francis James Peterson, Bensenville, Ill.
 Karen McFarland Peterson, Hudson, N.Y.
 Marie Alice Phelps, West Boylston, Mass.
 Elliot Harris Philipson, Utica, N.Y.
 Nancy Nona Phillips, Greenfield, Mass.
 Darryl Arthur Pierce, North Bennington
 Stephen Jan Pierce, St. Albans
 Gordon Stanley Pike, Northfield Falls
 Robert Mark Politzer, Plainview, N.Y.
 Donald Leslie Poulin, Essex Junction
 Richard Powell, II, Montpelier
- †Alan Bradley Prager, Marblehead, Mass.
 John Arthur Pratt, Middlebury
 Kathleen Hornbeck Pratt, Burlington
 Richard Ned Prince, Barre
- Lorraine Parent Racusen, Richmond, *summa cum laude*
 James William Rapoport, Westbury, N.Y.
 Richard Alexander Rawson, Whiting
 Edward Joseph Reczek, West Rutland
 Sylvia Diane Reed, Stowe
 Lyndon Louis Reggio, Glastonbury, Conn.
 John Thomas Reilly, Rutland
 Michael John Ressetar, Clifton, N.J.
 Jacqueline Lou Reynolds, Bennington, *cum laude*
 Abraham Zeel Reznik, Tel Aviv, Israel
 Gerald Arthur Richard, Milton
 Raymond Emerson Riggs, New York, N.Y.
- *James Alfred Rippin, Woodstock
 Richard Daniel Roberti, Barre
- †Edward Henry Robichaud, Jr., Manomet, Mass.
 Lucinda Margaret Rochester, Hardwick
 Pamela Katherine Rogers, Rochester
 Phillip Allen Rosen, Pittsfield, Mass., *cum laude*
 Robert Jon Rosenthal, Great Neck, N.Y.
 Bonnie Lee Ross, St. Johnsbury
 Thomas Arthur Ross, Waterbury
 Georgia Pauline Rossi, Montpelier
 Lewis Roth, Glens Falls, N.Y., *summa cum laude*
- †Dana Alan Rouisse, Topsfield, Mass.
 Kathleen Esther Rouleau, Essex Junction, *cum laude*
 Judith Ann Roy, West Brookfield, Mass.
 Owen Royce, III, Milwaukee, Wis.
 Douglas Vaughn Roylance, Scotia, N.Y.
 Robert Joseph Rushlow, Newport
 Alice Sanborn Rydjeski, Springfield
 Meryle Louisa Sachs, Worcester, Mass.
- *Anne Fowler Zimmerman Sager, South Strafford, *cum laude*
 Karen Mary St. Pierre, St. Albans
 Carl Anthony Salvati, Peekskill, N.Y.
- †Kate Winifred Sanders, Fairfield, Conn.
- †Margaret Leslie Sanguinetti, Barre
 Robert Glenn Sanicki, Old Bridge, N.J.
 Andrew Nicholas Sardonis, Inglewood, Calif.
 Thomas Edward Sargent, Schenectady, N.Y.
 Barbara Middlebrook Sauer, Williston
 Jonathan Ted Schechtman, New Britain, Conn.
 Joan L. Schermerhorn, Charlotte
 Nancy Teresa Schlehner, Dumont, N.J., *cum laude*
 Barbara Ann Schmitt, South Hero
- *Edwin Calvin Schneider, Jr., South Burlington
 Paul Richard Schulman, West Hartford, Conn.
 Judith Melanie Schwolow, Proctorsville
 Colin Glenn Seeling, Woodbury, Conn.
 Joan Ilene Seitel, New York, N.Y., *magna cum laude*

* As of October 1969.

† As of February 1970.

- Earl Mark Seligman, Fall River, Mass.
 *Priscilla Allyson Goekmeyer Senecal, Burlington, *magna cum laude*
 *Pamela Jeanne Newton Shafer, Vergennes
 Bradford Earl Shedd, Wallingford
 Donald Foster Shephard, Jr., Braintree, Mass.
 John Philip Sherlock, Barre
 Mark David Sherman, Hollywood, Fla.
 Margot Frances Shorter, Wilmington, Del.
 Robert Harris Shrier, Waban, Mass.
 Ann Marilyn Siegel, Northampton, Mass.
 †Sara Patricia Sierra, Barre
 Eleanor Sikora, East Hartford, Conn., *magna cum laude*
 Richard Bern Simmonds, Auburn, N.Y.
 Robert Gerth Simon, Kensington, Md.
 Carol Helen Simpson, Manhasset, N.Y.
 †Robert William Sinclair, South Burlington
 Deborah Ellen Sistare, Fairhaven, Mass.
 Peter Whitney Slayton, Montpelier
 Christiana Long Smith, Washington, D.C.
 Enid Rae Smith, Peterborough, N.H.
 Joanna Karen Smith, Easton, Conn.
 Reginald Heber Smith, III, Wenham, Mass.
 †Robert Fenton Smith, Jr., Bridgewater
 William Harmon Smith, South Woodstock
 Renee Lee Salzman Snow, Pearl River, N.Y., *cum laude*
 †David Gordon Southard, Shelburne
 Katherine Ann Stahl, Burlington
 Frederick Weeks Steadman, Ashland, Mass.
 Diane Elizabeth Stearns, Burlington, *summa cum laude*
 Jay Gregory Stearns, Shelburne
 †John Vincent Stec, Essex Junction
 †Janet Bradford Steff, Marion, Mass.
 Susan Lee Steinfort, Larchmont, N.Y.
 Constance Fran Stewart, New York, N.Y.
 †Donald Young Stiles, Jr., Westport, N.Y.
 Nancy Allen Stillings, Cuttingsville
 Sally Annabelle Stockwell, Brattleboro
 Barry Lee Stone, Burlington
 James Elbert Stowell, East Hartford, Conn.
 Lynne Erica Swanson, Valley Stream, N.Y., *cum laude*
 James Michael Tabor, West Hartford, Conn., *cum laude*
 Barbara Anne Tatler, South Burlington
 Donald Young Tenney, Milton, Mass.
 Linda Thomas, Burlington
 Jennie Thompson, Wellesley, Mass., *cum laude*
 Richard Palmer Thompson, South Portland, Me.
 Roger Bernard Thompson, Jr., Woodstock
 Gail Wheeler Thornton, Stratford
 Barbara Louise Todd, Washington, D.C.
 Lynn Ellen Tomasetti, Northampton, Mass.
 †Terry Marie Treiber, Manhasset, N.Y., *cum laude*
 Paul Wyman Trono, Burlington
 Jan Thomas Troost, St. James, N.Y.
 †Raymond Louise Usle, Barre
 John Howard Van Benthuyssen, Ossining, N.Y.
 Alice Mae Van Buren, Burlington, *summa cum laude*
 George Lesher Van Buskirk, Burlington
 Victoria Vandeventer, Burlington
 James Vincent Varricchione, Burlington
 Thomas Ray Varricchione, Burlington
 †Renee Clemence Verrier, Bayside, N.Y., *cum laude*
 Robert Nicholas Vlachos, Jr., Morristown, N.J.
 †Amelia Ruth Andrews Wagner, Richmond, *cum laude*
 Jeffrey Crane Wagner, Rutland
 Gail Patricia Walker, White River Junction
 James Kaunity Wallman, Burlington
 Stevenson Haig Waltien, Jr., Saranac Lake, N.Y.
 Ruth Anne Warheit, Rockville Centre, N.Y.
 David Warman, Burlington
 Robert Irwin Warner, Westbury, N.Y.
 Kathleen Hope Watt, Pompton Lakes, N.J.
 Linda Way, Burlington
 Charles Stephen Weidman, Woodstock, N.Y.
 *Joel Weiner, Brockton, Mass.
 Richard Michael Weintraub, Wyncote, Pa.
 Martin David Weiss, Rutland
 †Arnold Charles Wetherhead, Springfield
 James Alexander Wheeler, Mt. Kisco, N.Y.
 Robert Brent Whitcomb, East Barre
 James Hilton Wick, Burlington
 Lois Trombley Williams, Kirkwood, Mo.
 Roberta Virginia Williams, Burgettstown, Pa.
 Bruce Duxbury Wilson, Ridgewood, N.J.
 Stanley Theodore Winer, Newton, Mass.
 Raymond Alphenus Withey, Poultney
 John William Wojciechowski, Cheshire, Mass.
 Suellen Wolfson, Forest Hills, N.Y.
 Allen Richard Wood, Sheffield
 Charles Coleman Woodhams, Rome, Italy
 Harry Eugene Woodley, Essex Junction
 Linda Lucille Wooster, Middlebury
 Grace Katharine Worcester, Swampscott, Mass.
 Paula Margaret Wright, Orleans, *cum laude*
 Terrie Wurzbacher, Garden City, N.Y.
 Steven K. Yanagi, Methuen, Mass.
 Roland David Yandow, Swanton
 Janet Ann Young, Wilder
 Thomas Walter Yourk, Bethlehem, Conn.
 Pamela Lee Zeller, Sayville, N.Y., *cum laude*
 Mary Penrose Zimmerman, Fayetteville, N.Y.

* As of October 1969.

† As of February 1970.

Bachelor of Science

†Douglas Wells Johnson, Burlington
 †Sanford Lyman, Glen Cove, N.Y.

†Robert Edward Martin, Greenfield, Mass.

COLLEGE HONORS

Botany

Michael E. Boutin

"An Investigation into the Possible Control Mechanism of Chlorophyll Synthesis in *Euglen Gracilis*"

Joseph E. LeClerc

"Studies on Requirements for Sporulation in Selected Hypoxylon Species"

Classics

Berkeley W. Hotchkiss

"*Odyssey Upsilon*: The Point of No Return"

English

Alice M. Giroux

"The Image of the American Indian in Nineteenth Century American Biography and Drama"

James Tabor

"The Middle Ground—Experiments in Short Fiction"

Linda Thomas

"The Concept of the *Ars Moriendi*: Literary Applications from the Medieval Times to the Present"

Thomas R. Varricchione

"Revelations: Good Dreams, Bad Dreams and Living Every Day Prose and Poems"

Geology

Kathy Rouleau

"The Structural and Metamorphic History of a Portion of the Meetinghouse Slate, Eastern Vermont"

German

Jean E. O'Donnell

"Signs and Consciousness in the Hörspiele of Günter Eich"

History

Geoffrey Hemenway

"Social Protest Literature and the Agrarian Problem in Latin America"

Gordon S. Pike

"A Study from Probate Inventories: Chelsea and Washington, Vermont, 1799-1850"

Lewis Roth

"The Convention that Wasn't; Vermont Constitutional Revision 1969"

Robert G. Simon

"John Dos Passos: Architect of History"

† As of February 1970.

Mathematics

Cajsa J. Nordstrom

"Simulation of Batch Processing and Multi-Programming on the IBM 360 Model 44"

Music

Robert W. Allen

"Chorale, Prelude, and Fugue in a Jazz Idiom"

Helen B. Jervis

"A Literary-Musical Study of the Paltstrina and Rore Settings of Petrarch's *Vergine Canzone*"

Physics

Mark D. Sherman

"Effects of Ultrasound on Biological Cells"

Peter Slayton

"Calculations Concerning a Microbubble Population Experiment"

Psychology

Jennie Thompson

"An Investigation of the Effect of Positive Reenforcement, Practice and Feedback on the Eliminating of Fear of Darkness in Children"

Gail P. Walker

"The Socialization Effects of Television on Children from an Urban Rural Population"

Speech

R. L. Snow

"The Cameri Theater: A History"

Zoology

Norine E. Freeman

"Formulation of Growth and Maintenance Media for Organ Culture of the Amphibian Lens"

James F. Howard

"The Morphology of the 'Vestigial' Mesonephric Duct in *Gallus Domesticus*"

Elliot H. Philipson

"A Study of Mucopolysaccharide Storage in Genetic Disorders by a Tissue Culture Technique"

Sally A. Stockwell

"Drug Resistance Transfer in *Escherichia coli*"

Fifth-Year Certificate in Education

*Samuel Milton Bass, Lombard, Ill.

Katrina Brockway Bianchi, Stowe

Sylvia May Canales, Barre

†Pauline Shenk Cole, Quechee

*Marilyn Johnson Dunn, South Burlington

Elizabeth Sprague Dyer, Burlington

David Squier Edson, Burlington

Barbara Ann Ellison, Alburg

Brian Alan Haskell, Bellows Falls

Edward Allan LaMoy, Highgate Center

John Joseph Murphy, Labrador City, N.F.,
Canada

*Mary Gaudette Parker, Middletown Springs

Dorothy Rockwell Pickard, Alburg

Frank Robert Alan Resnick, West Hartford,
Conn.

* As of October 1969.

† As of February 1970.

Thomas Keith Robinson, Washington, D.C.
 *Robert Jay Sherman, Ripton
 *Michael Andre Sicard, Vergennes
 Jessica Batchelder Siegars, Shelburne
 †Hazel Osgood Stearns, Burlington

Dorothy Stewart Stein, Burlington
 †Barbara Allen Viele, Morrisville
 †Nancy Gibbs Wanke, Westport, Conn.
 Donald Durand Yaggy, Winooski

Graduate College

DONALD B. JOHNSTONE, *Dean*

Master of Business Administration

Charles Anthony Luciano, B.S. (Fairleigh Dickinson Univ.) 1965; Essex Center—*in absentia*
 Margo McKenzie Schwyer, B.S. (Univ. of Arizona) 1960; South Burlington

Master of Education

- *Dora Rita Aubertin, B.S. (Johnson State College) 1957; Barre
 *Dorothy Jean Dix Austin, B.S. (Univ. of Vermont) 1966; Burlington
 *Barbara Jean Barrett, B.S. (California State College) 1965; Washington, Pa.—*in absentia*
 William Crawford Blanton, Jr., B.S./B.A. (Michigan State) 1968; Hodgenville, Ky.
 *Louise Collins Boutwell, B.A. (Middlebury) 1967; Middlebury—*in absentia*
 †Barbara Ann Brasure, B.A. (Washington College) 1951; Bristol—*in absentia*
 *Bruce Campbell, B.A. (McGill) 1950; Dollard des Ormeaux, Que., Canada—*in absentia*
 Joanne Nelson Chickering, B.S. (Simmons College) 1950; East Montpelier—*in absentia*
 *John A. Child, B.S. (Univ. of Vermont) 1950; South Burlington—*in absentia*
 Vicki Jane Cook, B.A. (Michigan State) 1966; East Lansing, Mich.
 John Franklin Cross, B.S. (Castleton Teachers) 1955; Essex Center
 *Ethelyn Findlay Dutton, A.B. (George Washington Univ.) 1938; Lyndon Center—*in absentia*
 *Ann Nevin Egner, B.A. (Westminster College) 1960; Vergennes—*in absentia*
 †Terrance M. Everts, B.A. (Univ. of Vermont) 1963; Walcham
 Wayne Edward Fillback, B.A. (Colby College) 1964; Winooski—*in absentia*
 James Martin Fitzpatrick, B.S. (Kent State) 1967; Stowe—*in absentia*
 *Louise Blackmore Fitzpatrick, A.B. (Syracuse) 1950; Barre—*in absentia*
 *Agnes Ellen McKenzie Flanagan, B.S. (Univ. of Vermont) 1951; Burlington
 *Patricia G. Smith Fowler, B.A. (Univ. of Massachusetts) 1947; Montpelier
 Jane Greenlaw Fox, B.S. (Univ. of Maine) 1964; New Haven
 Geoffrey Eden Grant, A.B. (St. Michael's College) 1968; Potomac, Md.—*in absentia*
 *Marion Elizabeth Hadley, B.A. (Hood College) 1965; Arlington
 Barbara Heeter, B.S. (Indiana Univ. of Pennsylvania) 1958; Shelburne—*in absentia*
 *Richard Elliot Higgins, B.S. (Massachusetts State College) 1953; Northfield
 Kerry Reilly Ingold, A.B. (Middlebury College) 1962; Boston, Mass.—*in absentia*
 William Gerard Joyce, A.B. (St. Michael's College) 1968; Port Henry, N.Y.
 *William Maurice Leete, Jr., B.S. (Univ. of Vermont) 1967; Williamstown, Mass.—*in absentia*
 Jean Kebabian Liccione, B.S. (State Univ. College at Brockport, N.Y.) 1967; Rochester, N.Y.—*in absentia*
 *Katherine Cannon McDevitt, B.S. (Castleton Teachers) 1961; Rutland
 *G. Alfred Mercaldo, B.A. (Univ. of Vermont) 1959; Burlington
 *Robert Sanford Northrup, B.S. (State Univ. of New York) 1965; Burlington
 Clotilde Whitney Pitkin, B.A. (Goddard College) 1953; Marshfield—*in absentia*
 Sally Howe Pollak, A.B. (Vassar) 1966; Charlotte
 *Donald Weldon Potts, B.A. (Sir George Williams Univ.) 1956; Montreal, Que., Canada—*in absentia*
 Alice Poppe Prall, B.S. (Midland Lutheran College) 1969; Scribner, Neb.
 Barbara Rosenberg, A.B. (Pembroke College) 1949; Burlington—*in absentia*
 *Alf Torsten Rylander, Jr., B.A. (Hofstra) 1963; Ferrisburg
 Laura Elizabeth Mack Schneider, B.A. (Skidmore) 1940; South Burlington—*in absentia*
 *Richard Allen Shanley, B.A. (Univ. of Vermont) 1964; Morrisville
 *Shirley Daegney Thomson Smith, B.S. (Castleton Teachers) 1959; Rutland—*in absentia*
 Barbara Grace Burroughs Thornton, B.S. (Univ. of Vermont) 1960; Lebanon, N.H.
 *Gwenneth Claire Wilneff, B.A. (Acadia Univ.) 1960, B.Ed. (Acadia Univ.) 1961; Lunenburg, N.S., Canada—*in absentia*

* As of October 1969.

† As of February 1970.

Master of Arts in Teaching

- †Mary Ellen Anderson, B.S. (Univ. of Vermont) 1969; South Burlington
 *Ronald Edward Benoit, A.B. (St. Michael's) 1965; Winooski
 *Arthur Marcia Brink, Jr., B.S. (Univ. of Vermont) 1966; Burlington—in *absentia*
 *Gerald A. Brow, B.A. (Univ. of Vermont) 1962; Alburg—in *absentia*
 *Irene Miller Carcich, B.A. (Univ. of Vermont) 1966; East Topsham—in *absentia*
 *James Richard Concannon, B.A. (Univ. of Vermont) 1967; Essex Junction
 †Judith Agnes Dannehy, A.B. (Tufts Univ.) 1958; Brattleboro
 *Alison Menard Dayton, B.S. (Univ. of Vermont) 1968; Shoreham—in *absentia*
 Geoffrey Lawrence Demong, A.B. (Middlebury College) 1967; Middlebury—in *absentia*
 Lane M. Dunn, B.A. (Univ. of Vermont) 1968; Croton-on-Hudson, N.Y.—in *absentia*
 *Richard Cameron Evans, B.S. (Springfield College) 1965; Wells River—in *absentia*
 *Nancy Lee Farrell, B.M. (Skidmore) 1955; Burlington—in *absentia*
 Deane Hamilton Flood, B.A. (Univ. of Vermont) 1964; Burlington
 *Bea Robinson Fox, B.A. (Univ. of New Hampshire) 1960; Summit, N.J.—in *absentia*
 †Bernard Arthur Kelley, B.S. (Univ. of Vermont) 1968; Belchertown, Mass.
 *Sister Helene Marie Kelly, S.P., B.S. (St. Mary-of-the-Woods College) 1961; Chelsea, Mass.
 †Janet W. Nicholas, B.S. (Marietta College) 1967; Reading, Mass.—in *absentia*
 Michael V. Riley, B.S. (State University of New York at Plattsburgh) 1964; Lake Placid, N.Y.
 Kathryn Mary Rock, B.S. (Univ. of Vermont) 1968; Burlington
 James Edward Sattler, B.S. (Cornell Univ.) 1968; Boonville, N.Y.
 *Heather Jean Scofield, B.S. (Connecticut State College) 1968; Cheshire, Conn.
 Phyllis McGovern Soule, B.S. (Univ. of Vermont) 1940; Fairfax
 Gail Fairbank Stewart, B.A. State Univ. of New York at Albany) 1968; Dannemora, N.Y.
 *Joseph Vincent Teta, B.A. (Univ. of Vermont) 1955; Rutland
 Georgia Walsh, B.A. (Univ. of Vermont) 1968; Manhasset, N.Y.—in *absentia*
 Sarah Wetherbee Wheeler, A.B. (Wheaton College) 1962; South Burlington—in *absentia*
 *Robert William Williams, B.S. (State Univ. of New York at Oswego) 1966; Windsor, N.Y.—in *absentia*
 *Stephen West Wilson, B.A. (Wesleyan Univ.) 1966; Brookfield, Conn.—in *absentia*

Master of Science in Teaching

- *Gerald Patrick Cleary, B.S. (St. Joseph's College) 1958; M.Ed. (Boston College) 1962; Burlington—in *absentia*

Master of Extension Education

- *Paul Alfred Kingsbury, A.B. (Houghton College) 1947; A.M. (Univ. of Pennsylvania) 1949; Cavendish—in *absentia*
 John Doty Merchant, B.S. (Cornell Univ.) 1935; Essex Junction
 *Thomas Shearer Stanley, B.S. (Lehigh Univ.) 1951; North Hornell, N.Y.
 Noah Cyrus Thompson, B.S. (Univ. of Vermont) 1953; Essex Center

Master of Science

AGRICULTURAL ECONOMICS

- John Gardner Bradley, B.S. (Cornell Univ.) 1968; Silver Springs, N.Y.
 John Clement Finley, B.S. (Univ. of Vermont) 1965; Vergennes
 Robert Leslie Foster, B.A. (Univ. of Vermont) 1968; Middlebury—in *absentia*
 *Nguyen Pho Lu, Bacc. (Lyceum Chu Van An, Hanoi, V.N.) 1948; Diploma (Institute Technique de Pratique Agricole, Paris) 1953; Saigon, Viet-Nam.

ANIMAL SCIENCES

- Paul Bruns, B.S. (Univ. of Vermont) 1968; Bellows Falls
 Cristobal Gomez de Lasse, "Title" (National School of Agriculture, Chapingo, Mexico) 1968; Mexico City, Mexico

* As of October 1969.

† As of February 1970.

DEGREES GRANTED

BIOCHEMISTRY

Linda Miller Frey, B.A. (Mt. Holyoke) 1964; Hamden, Conn.

BOTANY

Dorothea Bedigian, B.A. (Sacramento State College) 1965; Yonkers, N.Y.

*Peter Andrew Biddle, B.S. (State Univ. of New York at Oswego) 1964; Saranac Lake, N.Y.—
in absentia

CIVIL ENGINEERING

Donald Jasper Parker, B.S. (Univ. of Vermont) 1952; West Chazy, N.Y.

ELECTRICAL ENGINEERING

Donald Paul Gaffney, B.S. (Univ. of Scranton) 1960; Scranton, Pa.

†Jakob Hans Hohl, Diploma (Technical Institute of Canton of Zurich) 1953; Heiden A.R.,
Switzerland

MECHANICAL ENGINEERING

John Leonard Amidon, B.S. (South Dakota State College) 1958; Burlington

Wayne Thompson Bonhag, B.S. (Univ. of Vermont) 1968; Glen Rock, N.J.

Edward Michael Buturla, Jr., B.S. (Univ. of Connecticut) 1967; Fairfield, Conn.

John Robert Chevalier, B.S. (Univ. of Vermont) 1968; Swanton

Carl Frederick Ettlinger, B.S. (Univ. of Vermont) 1966; Underhill

Ramesh C. Rastogi, B.Sc. (Agra Univ., India) 1961; M.Sc. (Agra Univ. India) 1963; B.S.
(Howard Univ.) 1967; Moradabad, India

James Dexter Scanlon, B.S. (Lafayette College) 1961; Burlington

Paul Michael Whalen, Jr., B.S. (Carnegie-Mellon Univ.) 1968; Norwich, Conn.

GEOLOGY

†James Sheldon Dinger, B.S. (Juniata College) 1967; Camp Hill, Pa.—*in absentia*

†Richard Henry Fillon, B.S. (Rensselaer Polytechnic Inst.) 1966; Mt. Fern, Dover, N.J.—
absentia

†Philip Hall Johnson, B.A. (Univ. of Vermont) 1966; Norwich—*in absentia*

Arthur Corey Sarkisian, B.A. (Univ. of Vermont) 1967; Forest Hills, N.Y.—*in absentia*

John Edward Thresher, Jr., (Univ. of Wisconsin) 1967; Madison, Wis.

Peter Harold Townsend, B.A. (Williams College) 1965; Lebanon, N.H.—*in absentia*

PHARMACOLOGY

David Marshall Benjamin, A.B. (Boston Univ.) 1968; Newton, Mass.

PHYSICS

Hilarian Braun, B.A. (Central Connecticut State College) 1967; Burlington—*in absentia*

Brian Ford Lloyd, A.B. (Earlham College) 1964; Fletcher—*in absentia*

*Donald Leo Storm, B.S. (Univ. of Scranton) 1966; Burlington

Paul Reid Temple, B.A. (Lawrence Univ.) 1967; Bolton, Mass.

Bob Hong Yun, B.S. (City College of New York) 1963; Essex Junction—*in absentia*

PHYSIOLOGY AND BIOPHYSICS

*Gordon W. Josephson, B.A. (Univ. of Vermont) 1967; Rockville Center, N.Y.—*in absentia*

Beverly Brooke Taylor, B.A. (Univ. of Vermont) 1968; Owensboro, Ky.—*in absentia*

Orien Lee Tulp, B.S. (Univ. of Vermont) 1968; Stockholm, N.J.

* As of October 1969.

† As of February 1970.

PLANT AND SOIL SCIENCE

Carolyn Goodrich Carter, B.S. (Univ. of Vermont) 1967; Burlington
 Domingo Castillo Riego, B.S. (Univ. of the Philippines) 1965; St. Thomas, Batangas, P.I.

SPEECH PATHOLOGY

*Earle David Dunphy, B.A. (Univ. of Vermont) 1966; Burlington
 Donna Lee Godfrey, B.S. (Univ. of Vermont) 1968; St. Albans—*in absentia*
 †Janet Roberts Price, B.S. (Univ. of Vermont) 1953; Ferrisburg—*in absentia*

ZOOLOGY

*Louis Enos Sage, B.A. (Univ. of Vermont) 1964; Bethlehem, Pa.—*in absentia*
 Dorothy Marie Schwalje, A.B. (Gettysburg College) 1968; Metuchen, N.J.—*in absentia*
 *Richard Jeremy Strauss, B.A. (Univ. of Vermont) 1967; Marblehead, Mass.—*in absentia*
 †John Howard Vibber, B.A. (Univ. of Vermont) 1966; Rutland—*in absentia*
 †Mark Alan Wolfe, B.S. (Delaware Valley College of Science and Agriculture) 1967; Northampton, Mass.—*in absentia*

Master of Arts

ENGLISH

*Roger Lee Bower, B.S. (Columbia Univ.) 1964; New York, N.Y.—*in absentia*
 *Carol L. Brinkman, B.S. (Univ. of Kansas) 1964; Wichita, Kan.—*in absentia*
 Dorothy Ann Elmer, B.A. (Univ. of Vermont) 1949; Middlebury
 Bruce Robert MacDonald, A.B. (Brown Univ.) 1963; Essex Junction
 Mary Gove Macey, B.S. (Univ. of Vermont) 1959; Bristol
 *Sheldon Ira Rothberg, B.A. (Univ. of Vermont) 1962; Burlington—*in absentia*
 David Ray Steinhart, B.A. (Lycoming College) 1966; Mount Carmel, Pa.—*in absentia*
 *Joseph B. Valente, B.A. (Norwich Univ.) 1963; Concord, N.H.—*in absentia*

FRENCH

Charles Simington Lewis, B.A. (Fisk Univ.) 1926; Montpelier

GEOGRAPHY

David Allan Cobb, B.A. (Univ. of Vermont) 1968; Middlebury
 William Earl Graper, A.B. (Middlebury College) 1968; Schenectady, N.Y.

HISTORY

†Stephen Dechman Brown, A.B. (Middlebury College) 1964; Madison, Wis.—*in absentia*
 Richard Lawrence Greene, B.A. (Univ. of Massachusetts) 1965; Lowell, Mass.
 †Charles Anthony Rostkowski, B.A. (Univ. of Vermont) 1966; Burlington
 Jayne Lena Warner, B.S. (Univ. of Vermont) 1968; North Troy, N.Y.
 Susan Jackson Wolpin, B.A. (Beloit College) 1963; Winooski—*in absentia*

LATIN

*Paula Winsor Sage, B.S. (Univ. of Vermont) 1966; Johnson, R.I.—*in absentia*

MATHEMATICS

Normand Auger, B.A. (Univ. of Vermont) 1966; Cocoa, Fla.—*in absentia*
 *David Armand Ducham, A.B. (St. Michael's College) 1966; Amherst, Mass.—*in absentia*
 Douglass James Studdard, B.A. (Miles College) 1967; Birmingham, Ala.—*in absentia*

* As of October 1969.

† As of February 1970.

POLITICAL SCIENCE

Katherine Jourdan Houston, A.B. (Mt. Holyoke College) 1966; Sandwich, N.H.—*in absentia*

SPANISH

†Mary Willix Farmer, B.A. (Univ. of Washington) 1965; Seattle, Wash.—*in absentia*

Division of Health Sciences

College of Medicine

WILLIAM HOSSFELD LUGINBUHL, Dean

Doctor of Medicine

Michael Bruce Andorsky, B.A., West
Hartford, Conn.
Raymond Joseph Anton, A.B., Palmer, Mass.
Edward Norman Bailey, B.A., Waterbury,
cum laude
Anthony Raymond Bazzocchi, Jr., B.S.,
Portsmouth, N.H.
John Francis Beamis, Jr., B.S., Sommersworth,
N.H.
Laurence Walter Betts, B.A., Manchester,
N.H.
Alan Burton Bulotsky, B.A., Brockton, Mass.
Robert Argo Burton, Jr., A.B., Essex Junction
Philip Miles Buttaravoli, B.A., Massapequa
Park, N.Y.
Elizabeth J. M. Carter, A.B., Rochester, N.Y.
Preston Leroy Carter, A.B., Etna, Me.
Joseph Ira Chartor, A.B., Milton, Mass.
David Harold Cheney, B.A., Springfield
Thomas Fox Claffey, B.S., Wethersfield, Conn.
Joseph Victor Copulsky, B.A., Brooklyn, N.Y.
Joseph Michael DeCenzo, B.A., Westwood,
Mass.
Vincent Arthur DeCesaris, B.A., North
Reading, Mass.
George Stephen Durisek, B.S., Richfield
Springs, N.Y.
William Alois Fajman, A.B., Massapequa
Park, N.Y.
Richard Michael Faraci, B.S., Bradford, Mass.
Robert Vincent Fernandez, B.S., Jamaica
Plain, Mass.
Christopher Robert Flory, B.S., New York,
N.Y.
Eugene Frederick Fuchs, B.S., Lansford, N.D.
Richard Maurice Gendron, A.B., Saco, Me.
Norbert Joseph Gilmore, B.A., Ph.D.,
Burlington
Thomas Joseph Grady, A.B., Waltham, Mass.
James Roby Green, A.B., Newport, R.I., *cum
laude*
Theodore Henry Harwood, Jr., B.A., B.S.,
Grand Forks, N.D.

David Carl Hinsman, B.A., Rutland
Peter David Hoden, B.A., Seekonk, Mass.
John Edward Hunt, Jr., B.S., Norwood, Mass.
Kenneth Irving Hunt, B.A., Pawtucket, R.I.
Frank Williams Kilpatrick, A.B., Washington,
D.C.
Michael Ellis Lupo, A.B., Cheverly, Md.
Keith Norman Megathlin, A.B., M.S.,
Cohasset, Mass.
Walter August Minaert, Jr., A.B.,
Jeffersonville
Jeffrey Clement Morse, A.B., Waterford,
Conn.
Joel Hutchings Mumford, B.A., Killington
Andrew Dennis Parent, A.B., Enosburg Falls
Lawrence Perlmutter, B.A., Burlington
Karen Preis, B.A., River Edge, N.J., *cum
laude*
Darryl Lee Raszl, B.A., Syracuse, N.Y.
Martin Jay Rosenstein, A.B., New York,
N.Y., *cum laude*
Williams Nevins Rush, B.A., South
Burlington
Joel Arthur Sabean, A.B., Hudson, Mass.
Arthur Jay Sakowitz, B.A., Riverdale, N.Y.
Steven Hugh Sherman, B.A., Newton, Mass.
David Allen Simundson, B.A., B.S., Mohall,
N.D.
Norman Jay Snow, B.A., Burlington
Thomas Ingalls Soule, B.A., Fairfax, *cum
laude*
David Clayton Staples, B.S., Brewer, Me.
Daniel Carl Sullivan, A.B., Cranston, R.I.
Joel Philip Sussman, B.A., Burlington
Normand Francis Tremblay, A.B., Springfield,
Mass.
Judith Hope Tyson, A.B., M.A., Burlington
Louis Vito, A.B., Providence, R.I.
Clyde Arthur Wright, B.S., Bradford, N.H.
William James Young, A.B., North Ferrisburg

† As of February 1970.

Graduate College

DONALD BOYES JOHNSTONE, *Dean*

Doctor of Philosophy

BIOCHEMISTRY

- Peter John Kasvinsky, B.S. (Bucknell Univ.) 1964; Fairfield, Conn.—*in absentia*
Thesis: The Effect of pH and Temperature on the Kinetics of Native and Altered Glycogen Phosphorylase

CHEMISTRY

- *Sister Margaret Brault, A.B. (Trinity College) 1957; M.S. (Notre Dame) 1965; Burlington
Thesis: Hammett Correlations of the *L*-Chymotryptic Hydrolysis of Esters
- *Wendell Wilkie Brooks, B.S. (Alabama Agricultural and Mechanical College) 1962; M.A. (Fisk Univ.) 1964; Alberta, Ala.
Thesis: Studies Directed toward the Total Synthesis of Acorone
- Peter Michael Fichte, B.A. (New York Univ.) 1963; New Rochelle, N.Y.
Thesis: I. The Kinetics of Dehydration of Microcrystalline Nickel Oxalate Dihydrate
 II. The Kinetics of the Dehydration of Single Crystals of Copper Formate Tetrahydrate and the Rehydration of its Anhydride
- †Theodore John Garbacik, B.S. (Penn State Univ.) 1961; West Hazelton, Pa.
Thesis: Part I. The Relative Reactivity of Enamines
 Part II. The Investigation into the Synthesis of Ensulfonamides
- *Maria Melachowski Heaton, B.S. (Chestnut Hill College) 1953; New York, N.Y.—*in absentia*
Thesis: The Electronic Structure of the $^1E^+$ State of the CH^+ Molecule
- *Robert Gail Johanson, B.A. (Reed College) 1960; Vancouver, Wash.
Thesis: Solvolytic Studies of Cycloalkylcarbonyl and Neopentyl-Related Tosylates
- *Herbert Lee Kopperman, B.A. (Univ. of Oregon) 1965; Cottage Grove, Ore.
Thesis: Synthesis of Spiro [4.5] Decane and Hydroazulene Systems
- *Richard Carl Krauss, B.A. (The College of Wooster) 1964; Cleveland, Ohio—*in absentia*
Thesis: A Study of Phenacyl Chymotrypsins
- *John A. Lerbscher, B.A. (Franklin and Marshall College) 1965; Lancaster, Pa.—*in absentia*
Thesis: Low-Temperature Phase Behavior of Ammonium Hexabromohypoantimonate
- Edgar Edward Moore, Jr., B.S. (Western Michigan Univ.) 1961; Midland, Mich.—*in absentia*
Thesis: An Investigation of the Benzidine Rearrangement
- *John William Schneller, B.S. (Queens College) 1963; Washington, D.C.—*in absentia*
Thesis: Thermal Decomposition Studies of Silver Nitrite and Silver Permanganate

PHARMACOLOGY

- *James Wavell Aiken, B.A. (Dartmouth College) 1965; Shelburne
Thesis: The Sensitivity of Adrenergic and Cholinergic Neurons in the Cat Stellate Ganglion to Chemical Stimuli
- Donald Matthew Valerino, B.S. (Rensselaer Polytechnic Inst.) 1963; Syracuse, N.Y.—*in absentia*
Thesis: Studies of the Oxidation of Aminopteridines and Epinephrine by Xanthine Oxidase

PHYSICS

- Terrance Edward Dengler, B.S. (State Univ. of New York at Fredonia) 1965; Dunkirk, N.Y.
Thesis: Relativistic Corrections to the Statistical Mechanics of a Dense Electron Gas
- *Lee Drew Matthews, B.S. (Platteville State College) 1964; M.S. (Univ. of Vermont) 1967; Platteville, Wis.—*in absentia*
Thesis: Photoelectric Work Function and Radiotracer Studies of Carbon Monoxide Chemisorption on (110) and (100) Single Crystal Faces of Molybdenum
- James Arthur Rooney, A.B. (Clark Univ.) 1965; M.S. (Univ. of Vermont) 1967; Springfield
Thesis: Hemolysis with Ultrasonically Induced Stable Cavitation

* As of October 1969.

† As of February 1970.

PHYSIOLOGY AND BIOPHYSICS

- *William Halpern, B.E.E. (City College of New York) 1944; M.S.E.E. (Rutgers) 1948; M.S. (Stanford Univ.) 1966
Thesis: An Evaluation of the Use of Pseudo-Random White Noise Signals in the Investigation of the Mechanical Properties of Skeletal Muscle
- †Donald Edward Heald, B.S. (Slippery Rock State College) 1957; Conneautville, Pa.
Thesis: The Effects of Ammonium Ions on the Electrical and Mechanical Response of Striated Muscle
- Paul Frederick Hoar, A.B. (Merrimack College) 1964; North Tewksbury, Mass.
Thesis: The ATPase Activity of Cardiac Myosin B from Hypertrophied Non-Failing Cat Hearts
- †Ernest Walter Johnson, B.S. (Muhlenberg College) 1965; Wayne, N.J.
Thesis: Neuromuscular Blockade and Postjunctional Membrane Receptor Inhibition: An Overview
- Donald Hector Lambert, B.S. (Univ. of Rhode Island) 1966; Tiverton, R.I.
Thesis: Influence of Polyvalent Cations on the Activation and Desensitization of Muscle Postjunctional Membrane Receptors

PSYCHOLOGY

- Merrill Stephen Huntley, Jr., B.A. (Univ. of New Hampshire) 1959; M.A. (Univ. of New Hampshire) 1965; Dover, N.H.
Thesis: Effects of Alcohol and Fixation-Task Demands upon Human Reaction Time to Achromatic Targets in the Horizontal Meridian of the Visual Field
- *James Maximilian Levin, B.A. (Univ. of Vermont) 1962; M.A. (New School for Social Research) 1964; Stowe
Thesis: Arousal and Sensation Seeking
- †Susan Smart Smith, B.A. (Swarthmore) 1964; M.A. (Univ. of Minnesota) 1965; Fairfield
Thesis: Effects of Complexity and Visual and Auditory Stimuli as Reinforcers of Lever-Pushing by Young Children
- Dale Ervin Wright, A.B. (Chico State College) 1959; B.D. (Berkeley Baptist Divinity School) 1962; M.A. (Western Michigan Univ.) 1966; Chico, Calif.
Thesis: The Effects of Selective Positive Social Reinforcement and in Vivo Practice on the Systematic Desensitization of Snake Phobias

ZOOLOGY

- *Mihir Bagchi, B.S. (Ranchi College) 1959; M.S. (Ranchi Univ.) 1962; Ranchi, India
Thesis: Involvement of Protein Synthesis in Mitotic Activation of Cultured and Injured Frog Lenses
- *Alan Wright Johnson, B.A. (Univ. of Vermont) 1964; M.S. (Univ. of Vermont) 1965; Allentown, Pa.
Thesis: Characterization and Activity of Amphibian Lense Histones in Relation to the Cell Cycle

Degrees Honoris Causa

| | |
|--|--------------------------|
| Edward Fairman Crane | Doctor of Humane Letters |
| Presented by Governor Deane C. Davis | |
| Charles Lawrence Forsyth | Doctor of Divinity |
| Presented by Dean Alfred B. Rollins, Jr. | |
| Winifred Holmes Griffin | Doctor of Science |
| Presented by Professor Norma L. Woodruff | |
| Lawrence Harland Marvin | Doctor of Laws |
| Presented by Bingham J. Humphrey | |
| Robert Theodore Stafford | Doctor of Laws |
| Presented by Dr. Edward C. Andrews, Jr. | |
| Russell I. Thackrey | Doctor of Laws |
| Presented by Dean Thomas W. Dowe | |

* As of October 1969.

† As of February 1970.

RETIRING FACULTY

Heinz Ansbacher, Professor, Department of Psychology, College of Arts and Sciences since 1946.

George Crooks, Professor, Department of Chemistry, College of Technology since 1930.

Richard Hopp, Professor, Department of Plant and Soil Science, College of Agriculture, and Home Economics since 1947; Acting Chairman of the Department of Horticulture from 5/2/61 to 1/30/63.

Eleanor Luse, Professor, Department of Speech, College of Arts and Sciences since 1947.

Karl Treial, Clinical Instructor, Department of Psychiatry, College of Medicine since 1968.

Keith Truax, Associate Professor, Department of Surgery, College of Medicine since 1932.

Department of Military Science

Commissioned Second Lieutenant, United States Army

*David Herbert Adams, Infantry

*Thomas James Cain, Infantry

*William Sample Hicks, Jr., Signal Corps

*William Edward Hobb, Jr., Air Defense Artillery

Commissioned Second Lieutenant, United States Army Reserve

Stearns Boyden Allen, Jr., Armor

Edward Curren Baccei, Signal Corps

Stanton Leslie Bean, Infantry

David Griswold Bishop, Armor

Todd Martin Centybear, Medical Service Corps

Douglas Earl Coolidge, Corps of Engineers

*William Joseph Crudo, Jr., Medical Service Corps

Michael Robert Doyle, Infantry

Michael George Dupras, Quartermaster Corps

Clark Jewett Eaton, Field Artillery

David Walter Edsall, Medical Service Corps

Thomas John Ettinger, Ordnance Corps

Richard McNair Evans, Jr., Medical Service Corps

Robert Joseph Filsinger, Corps of Engineers

Gregory Laurence Foster, Adjutant General's Corps

David Joseph Gemelli, Field Artillery

Douglas George Gomez, Infantry

Cornelius O. Granai, III, Medical Service Corps

Christopher James Harris, Signal Corps

Rodger Spunar Horn, Infantry

Karlton Roy Kunzie, Medical Service Corps

William Mark Laufer, Military Intelligence

Jeffrey Howard Lerer, Air Defense Artillery

*Thomas Edward Macksey, Medical Service Corps

*Gregory John McHugo, Air Defense Artillery

Paul Brice McKane, Signal Corps

Roy Alan Nicholson, Medical Service Corps

Timothy Alexander Nisbet, Transportation Corps

Douglas Graham Oakes, Transportation Corps

*Gerald Arthur Richard, Chemical Corps

William James Rivers, Jr., Ordnance Corps

Richard Daniel Roberti, Infantry

Dennis Charles Roberts, Field Artillery

*Charles Franklin Scribner, Corps of Engineers

Godfrey Cabot Sluder, Field Artillery

Ernest Rogers Tomasi, Medical Service Corps

John Howard Van Benthuyzen, Infantry

Stevenson Haig Waltien, Jr., Infantry

Martin David Weiss, Infantry

Allen Richard Wood, Military Intelligence

Commission of Second Lieutenant, United States Army Reserve,
Upon Completion of ROTC Camp

Walter MacEwan Adams, Jr., Corps of Engineers

Russell Howes Baker, Jr., Infantry

Patrick Thomas Burke, Infantry

Paul Warner Reed, Corps of Engineers

Harry Martens von Holt, II, Quartermaster Corps

Commissioned Second Lieutenant, United States Marine Corps,
Marine Corps Platoon Leaders' Class

Phillip Charles Linton

* Distinguished Military Graduates.

Sources of Financial Aid Awarded by the University

General Financial Aid

Scholarship Funds

LIZZIE P. ALLEN Founded in 1900 by Lizzie P. Allen, a descendant of Ira Allen, founder of the University.

ALUMNI ANNUAL GIVING FUND Established in 1968 from annual alumni giving and bequest.

REV. LUCIUS E. BARNARD, Class of 1853. Established by bequest in 1903.

ADA S. BLAIRE Established by bequest in 1926.

ELIZABETH CHAPMAN Established by bequest in 1950.

CLASS OF 1861 Endowed and made available in 1891.

CLASS OF 1881 Endowed in 1937 by William H. Rice.

CLASS OF 1940 No restriction.

JOHN H. CONVERSE, Class of 1861 Established in 1882.

ROLLO J. FRANCISCO Established by bequest in 1951.

GENERAL MOTORS SCHOLARSHIP PROGRAM Open to any U. S. citizen entering college as a freshman. No restrictions on course of study. Awards range from \$200 to \$2,000 a year, depending upon demonstrated need.

GENERAL SCHOLARSHIP

ALBERT T. HENDERSON Established in 1945 by a bequest from William J. Henderson in memory of his son.

FRANCIS WHELPLEY HICKOK, Class of 1871 Founded in 1902 by Mrs. Julia F. Hickok, widow of James W. Hickok, Class of 1837, in memory of their son.

HIGHER EDUCATION ACT OPPORTUNITY GRANTS, established by passage of the Higher Education Act of 1965. Provides for scholarships in the amount of \$200 to \$1,000.

DAVIS HOLLIS

CHARLES A. HOYT, Class of 1858 Established by bequest in 1904.

MARTIN LUTHER KING, 8 tuition grants and other aid with respect to need, to minority ethnic groups with primary consideration to members of the Negro race.

MORETOWN AND MIDDLESEX Founded by the Rev. E. C. Bass, Class of 1859.

C. E. AND C. C. PARKER Founded in 1880 by Rev. Charles C. Parker, D.D., Class of 1841, in memory of himself and his son, Charles Edmund Parker, Class of 1867.

MINNIE A. PICKERING Established in 1938 by gift in memory of her daughter.

LILLIAN BRYAN PROCTOR MEMORIAL SCHOLARSHIP, established in 1965 by the Vermont Federation of Women's Clubs. The income from this fund will be awarded each year to a Vermont boy or girl attending the University.

IRA B. SAFFORD SCHOLARSHIP Established in 1966 by bequest of Alice H. Safford.

LUCY B. SCHIEFFELIN SCHOLARSHIP Established in 1966.

MINNIE ADAMS SEGAR Established in 1962 by the friends of Minnie Adams Segar for worthy students, male and female.

SAMUEL SIDNEY SMITH Founded in 1896 by bequest of Mrs. Eliza Smith in memory of her husband.

HATTIE LAURA WETHERBY WESTON Established by bequest in 1936.

JAMES B. WILBUR The University of Vermont Trust Fund, amounting to about two million dollars, was established by James B. Wilbur as an endowment for scholarships for Vermont students who are in need of assistance to undertake college work and who have earned entrance or college records that indicate extraordinary scholastic ability.

NORMAN WILLIAMS

Loan Funds

ELIZABETH CHAPMAN Established by bequest in 1950.

CLASS OF 1929 LOAN FUND.

THE CONSOLIDATED FUND Composed of the following: the Class of 1916 Fund, the Class of 1923 Fund, the Class of 1924 Fund, the Class of 1925 Fund, the Emergency Loan Fund, the Julia I. Bates Fund, the Student Loan Fund, the B. F. Taylor Fund, the New York alumni Fund of November, 1927, the Edmund Seymour Fund, the Kidder Loan Fund, the Lydia M. Blood Loan Fund, the Charles H. Bayley Fund, the Charles S. and Etta M. Kehoe Fund, the Sealand W. Landon Fund, the Annette Fiske Mereness Fund, the Pearl E. and Iddie F. Stone Loan Fund, the Student Emergency Loan Fund, and the Emily and Thomas Telfer Fund.

DONALD DRESSER MEMORIAL FUND No restrictions.

Long term loans to be repaid after graduation:

NATIONAL DEFENSE STUDENT LOAN FUND.

NEW ENGLAND SOCIETY IN THE CITY OF NEW YORK LOAN FUND Temporary loans.

F. H. AND GRACE M. SHEPARDSON For deserving students, subject to such regulations as the Board of Trustees shall prescribe.

HENRY MARTIN STANTON AND HARRIET BABCOCK STANTON MEMORIAL LOAN FUND Established by the Estate of Eleanor Louise Stanton.

General Financial Aid for Women

Scholarship Funds

MARCIA P. BROWNE Established by bequest for women students.

EMORY N. BURRITT Established by bequest for women students.

SARAH L. BURRITT Established by bequest for women students.

CELINDA B. LILLEY Founded in 1880 for women students.

PANHELLENIC COUNCIL Proceeds of the Panhellenic picnic or similar function are donated each year to the University to provide a scholarship for an out-of-state girl.

THEODORA AGNES PECK Established by bequest in 1965 income to be used to aid worthy young women to obtain a university education.

Loan Funds

CATHERINE ARMSTRONG LOAN FUND For women only.

MATTHEW HENRY BUCKHAM Any needy girl.

ASA FISKE Established for women students by Annette Fiske Mereness in memory of her father.

MARY GRAVES Established for women students by Annette Fiske Mereness in memory of her mother.

LADIES OF THE FACULTY For women students. Not more than fifty dollars is loaned to any one student.

MARY A. SHAW AND FANNY E. SHAW Established by Mrs. Willard Pope, daughter of Mary A. Shaw, for women students.

THE WOMEN'S STUDENT HEALTH COUNCIL FUND For women designated by the Dean of Women and the Chairman of the Department of Physical Education for Women, under special regulations as to interest and repayment.

ELLEN E. H. WOODRUFF For personal emergencies for any girl with limit of \$50.00 and approved by the Dean of Women.

General Financial Aid for Men

Scholarship Funds

LOUIS COLLINS DODD Established by bequest in 1962 for worthy and deserving male students who need financial assistance.

LOUISA H. HOWARD Founded in 1882; available for men.

- CLARK AND EDWARD S. ISHAM SCHOLARSHIP FUND Established by Lois C. Isham to aid needy boys.
- WILLIAM G. SHAW, Class of 1849 Originally founded in 1892 by bequest of one thousand dollars and increased by his daughter, Mrs. Willard Pope; available for men students.
- CHARLES D. SIAS Established by bequest in 1943; available for men.

Loan Funds

- CORNELIUS A. JEDEVINE Established by Allen E. Jeudevine as a memorial to his son to aid Vermont men in obtaining a liberal education.

Financial Aid by Geographical Areas

Scholarship Funds

- ANONYMOUS Craftsbury preference.
- FRANKLIN BALDWIN Established in 1915 by bequest of Mr. Baldwin for students from Putney.
- SEYMOUR ISRAEL BAROWSKY Preference given to a student from Holyoke, Massachusetts.
- REUBEN CLARK BENTON, Class of 1854 Established by bequest for students from Waterford and Lunenburg, Vermont, or from Minneapolis, Minnesota.
- ELIZABETH F. BRIGHAM Established by bequest in 1910; preference to be given to students from Brigham Academy.
- EZRA HOYT BYINGTON Founded in 1905 in memory of Mr. Byington by Mrs. Louise J. Byington for students from Hinesburg, or students bearing the name of Byington, Boynton, or Hoyt, or Wortman, or in some way related to these families.
- CONE FOUNDATION SCHOLARSHIPS to be awarded to boys or girls from Windsor, Vermont and vicinity including sons and daughters of any employees of the Cone Automatic Machine Company.
- CRAFTSBURY Founded in 1900 for relatives of Mr. and Mrs. Nathan S. Hill, or residents of Craftsbury or Isle La Motte.
- PHILIP HENRY CREER Founded by Ex-Gov. Redfield Proctor for students from Proctor.
- ISLE LA MOTTE Founded in 1884 by Nathan S. Hill; for students from Isle La Motte or from Craftsbury.
- SARAH B. JACOBS Founded in 1882; available for graduates of Brigham Academy only.
- ROBERT J. KIMBALL Founded in 1900 for students from Randolph. The Trustees of Randolph High School may make nominations for this scholarship.
- LYNDON INSTITUTE Endowed by George E. P. Smith, Class of 1897; awarded annually to a graduate of Lyndon Institute nominated by the faculty of that school.
- CHARLES MUNSON MARSH Established by bequest in 1893 for students from Woodstock by Charles P. Marsh in memory of his son.
- CHARLES P. MARSH Established by bequest in 1893; for men and women from Windsor County.
- EDWIN WRIGHT MARSH, 1872 Founded in 1883 by Charles P. Marsh, Class of 1839, in memory of his son; for students from the town of Weathersfield or from Windsor County.
- MARGARET PATTERSON McDANIELS Established in 1941 by a bequest of George M. McDaniels in memory of his mother; preference to be given to applicants from the towns of Craftsbury and Greensboro.
- JUSTIN S. MORRILL Founded in 1900 by Senator Justin S. Morrill; for students from Strafford.
- ARTHUR W. AND LOUISE S. PERKINS Established in their memory in 1947 by their sons and daughters. The income provides aid for students of high character and reasonably good scholarship who are graduates of a secondary school in Rutland. School authorities in Rutland are to be consulted regarding the qualifications of candidates who are not already enrolled in the University.
- H. P. RUSSELL SCHOLARSHIP For students from Grand Isle County.
- SHATTUCK SCHOLARSHIP Established in 1962 by George Lysander Shattuck in memory of his wife Carolyn, for boys and girls who are natives of Bakersfield, Vermont, and graduates of Brigham Academy.
- ANNA C. SMITH SCHOLARSHIP FUND To aid deserving and needy students from the Ludlow, Vermont area.

- MARIA H. AND PERCY B. SWEET SCHOLARSHIP FUND Preference to be given to students from Newport.
- JOHN AND MARY WATERMAN Endowed in 1923 by Charles W. Waterman, Class of 1885, in memory of his father and mother; for residents of Waitsfield or Denver, Colorado.
- WESTFORD Founded in 1882 by Luke P. Poland; available first to students from the town of Westford.
- JOHN A. S. WHITE Established by bequest; for students from Washington County or from Vermont.
- CLAYTON J. WRIGHT Established by bequest; available first for students from the town of Williston.
- DAVID PARKER WRIGHT AND ALICE M. WRIGHT Established in 1958 for students from Westminster, Vermont.

Loan Funds

- JOHN H. AND MARY A. BLODGETT Established in 1938 by bequest of Mary A. Blodgett of Bellows Falls, preference to be given to graduates of the Kurn Hattin and Warner Memorial Homes and to residents of Rockingham.
- ELLIS EDWIN FOSTER LOAN FUND Preference to graduates of Peoples Academy of Morrisville, Vermont.
- GREATER NEW YORK CITY ALUMNI LOAN FUND Preference given to students from the greater New York area.
- LEWIS RALPH JONES AND ANNA CLARK JONES LOAN FUND Loan Fund to derive from the income of the investment of the above-named estate. To aid worthy and needy students in such manner as the trustees deem proper. Preference—students from Brookfield, Vermont.
- CHARLES D. AND CARRIE D. ORDWAY Bequeathed by Charles D. Ordway in 1933, for Vermont students.
- RIXFORD MANUFACTURING COMPANY For students from Highgate.

Financial Aid by Academic Areas

College of Agriculture and Home Economics

Scholarship Funds

- AMERICAN AGRICULTURIST FOUNDATION SCHOLARSHIP Two hundred dollars to any student in the college with preference given to rural residents and transfer students from a two-year college.
- DEAN JOSEPH E. CARRIGAN Established in 1957 by the people of Vermont to honor Dean Carrigan. The income from this fund is used to provide scholarships for Vermont boys and girls attending the College of Agriculture and Home Economics.
- CHARLES M. COX Income from this trust fund provides a scholarship of \$300 for a student in Agriculture, preferably to one majoring in Dairy or Poultry Science, on the basis of need, character, and scholarship.
- DAIRYMEN'S LEAGUE COOPERATIVE ASSOCIATION, INC. \$500 to a student who has completed at least two years in the College of Agriculture and Home Economics. Preference is given to a student who is most likely to make a contribution to agricultural or home economics education, dairy marketing or dairy technology, with final selection based on character, scholastic record and financial need.
- EASTERN MILK PRODUCERS ASSOCIATION SCHOLARSHIP FUND Two \$250 scholarships for students in the College of Agriculture and Home Economics with need, scholastic ability and leadership qualities. Preference given to freshmen and sons and daughters of members of the association.
- RICHARD H. HOLZER \$1500, restricted to agricultural students.
- DR. CHARLES H. HOOD Given by the Charles H. Hood Dairy Foundation. Five \$600 scholarships awarded preferably to upperclass students studying milk production. One or two selections may be made from among first-year students who plan to major in dairy-related curricula.

RALSTON PURINA \$500 awarded at the beginning of the senior year to a student majoring in an area related to animal nutrition on the basis of need, scholarship, leadership and character.

SEARS-ROEBUCK FOUNDATION A total annual award of \$600 is available to students majoring in home economics with preference given to those students planning to teach or enter extension work.

Loan Funds

THURSTON M. ADAMS MEMORIAL FUND Preference given to students in Agricultural Economics.

AMERICAN AGRICULTURIST RESEARCH FOUNDATION For juniors and seniors in Home Economics.

ROBERT M. CARTER Agriculture and Home Economics students.

JOSEPH LAWRENCE HILLS LOAN FUND Established by Friends of Dean Hills who completed fifty years of service to the University in 1937 and contributions by Alpha Zeta, Agricultural Honorary Society.

KENNETH J. SHELDON LOAN FUND Gift from various donors established as a loan fund for Vermont Agricultural students.

TERRILL-HOLBROOK For women students, preference being shown to those in Home Economics.

College of Medicine

Scholarship Funds

DR. ELLICE M. ALGER SCHOLARSHIP FUND Established 1967 to aid worthy and needy medical students.

MOSES D. CARBEE, Class of 1873 Established by a bequest from Mrs. Mary D. Carbee in memory of her husband; available for medical students.

GROVER C. EMERY Established by bequest in 1968 for students in College of Medicine who are residents from State of Maine or a premedical student from State of Maine.

JOHN W. AND JOHN SEELEY ESTABROOK Established by bequest in 1956; for students in the College of Medicine from Rutland County, preference being given to students from Brandon.

HEALTH PROFESSIONS SCHOLARSHIPS Established by the Health Professions Educational Assistance Amendments Act of 1965. Available only to those students from low income families who demonstrate exceptional financial need.

DR. EDWARD EVERETT HAWES Established by bequest in 1946; available for medical students.

EDITH BLANCHE KIDDER Established by Joseph W. Kidder for students in the College of Medicine; preference to be given to legal residents of Barre.

ALDO J. LEANI, M.D., Class of 1934, established in 1961 for students in the College of Medicine.

NEW YORK LIFE INSURANCE COMPANY SCHOLARSHIP Established in 1966 for students in College of Medicine.

JOHN ORDRONAUX Founded in 1909; for students in the Academic and Medical Colleges.

HORTENSE A. QUIMBY Established by bequest in 1968; income to be used to provide scholarships to medical students with preference being given to students from Essex County, Vermont.

PETER J. SHAMMON SCHOLARSHIP FUND Established in 1967 as a memorial to Mrs. Marian Shammon.

DR. H. C. TINKHAM Established by bequest in 1956; for students in the College of Medicine.

Loan Funds

MOSES DYER CARBEE, M.D., Class of 1873 Established by Mrs. May D. Carbee in memory of her husband for students of the College of Medicine.

DR. THOMAS HARMAN DENNE MEMORIAL LOAN FUND Established in 1963 by relatives and friends of the late Dr. Thomas H. Denne, Class of 1905, the income to be used for deserving students in the College of Medicine.

- HEALTH PROFESSIONS STUDENT LOANS Long term loans to be repaid after completion of Medical School.
- G. STEDMAN HUARD MEDICAL STUDENT LOAN FUND Established by G. Stedman Huard, M.D., Class of 1946, for aid to senior medical students who are Vermont residents, preference to be given to Winooski residents.
- KELLOGG FOUNDATION LOAN FUND Medical students.
- DR. JOSEPH E. LUMBARD Established in 1946 by the gift of Mr. J. Edward Lumbard, Jr., for students in the College of Medicine.
- MEDICAL STUDENT LOAN FUND Established in 1933 by Medical College alumni for students in the College of Medicine.
- ELIZABETH D. AND CLIFFORD R. PROCTOR Established in 1953 for students in the College of Medicine.
- QUARTER-OF-A-CENTURY LOAN FUND A loan fund for medical students established by the Class of 1938 and added to by the following 25-year classes.
- JAMES A. SINGISER MEDICAL STUDENT LOAN FUND Established by James A. Singiser, M.D., to aid needy medical students.
- UNIVERSITY OF VERMONT MEDICAL SCHOOL LOAN FUND For medical students from New Hampshire, established in 1963 by Dr. Thomas R. Plowright.
- MRS. HAROLD T. WHITE MEDICAL STUDENT LOAN FUND Preference given to medical students.

College of Arts and Sciences

Scholarship Funds

- LIZZIE S. CONVERSE Founded by bequest of Sarah Elizabeth Converse for students of classics.
- CHARLES W. RICH, Class of 1836 Founded in 1883 for students in the College of Arts and Sciences.
- SOPHIA STOW Endowed in 1937 by bequest of George L. Stow, '73, in memory of his mother; for students of classical languages.
- NORMAN SARETT MEMORIAL FOUNDATION, INC. In memory of Norman Sarett. To be awarded to a sophomore student in the liberal arts curriculum.

Loan Funds

- STEPHEN DWIGHT AND LIDA MASON HODGE For women students in the College of Arts and Sciences.

School of Nursing

Scholarship Funds

- ELIDA N. RYALS SCHOLARSHIP FUND To be awarded annually to a student or students in the Nursing curriculum.
- NURSING SCHOLARSHIP PROGRAM For nursing students with exceptional financial need. \$200 to \$1500 per year depending on need.

Loan Fund

- NURSING STUDENT LOAN PROGRAM Awarded on the basis of need. \$1,500.00 maximum per year. 50% may be forgiven for five years' service in a public or private non-profit institution as a nurse after graduation.

Department of Chemistry

Scholarship Funds

NATHAN F. MERRILL SCHOLARSHIP FUND The income from this fund is used for three scholarships annually for students pursuing Chemistry as their primary study.
LELAND MASON WILLEY Preference to students majoring in Chemistry.
THE CHEMICAL CLUB OF NEW ENGLAND \$500 annually to a student of chemistry or chemical engineering.

Department of Education

Loan Fund

MARY MAUD PATRICK Established by Epsilon Sigma as a memorial to Mary Maud Patrick for students in Elementary Education.

Department of Athletics

Scholarship Funds

ALUMNI MEMORIAL Restricted to athletics.
ANONYMOUS ATHLETIC Restricted to students who participate in intercollegiate athletics.
ERNEST A. BRODIE ATHLETIC SCHOLARSHIP To be used to help needy athletes.
CENTENNIAL CLUB SCHOLARSHIPS Awarded only to athletes.
GEORGE H. COOK, JR. Athletic scholarship with preference to students from Cushing Academy.
RALPH LaPOINTE Established in 1968 from gifts: income to be used annually to support an undergraduate student athlete's scholarship; preference to baseball program.
EDWARD G. NEMER Established in 1961 from a gift in memory of the late Edward G. Nemer, for athletic scholarships.
SAGA FOOD SERVICE, INC. \$550 yearly to help defray the expense incurred in the purchase of University board contracts by two University students participating in intercollegiate athletics.
VENDING MACHINE FUNDS Awarded only to athletes.

Program in Dental Hygiene

Loan Fund

DENTAL MEMORIAL LOAN FUND Established by Vermont Dental Society for financial assistance to second-year Dental Hygiene students.

Department of Engineering

Scholarship Funds

ALCOA SCHOLARSHIPS \$750.00 per year. Awarded to a Mechanical Engineering student.
ELECTRICAL MANUFACTURERS' REPRESENTATIVES CLUB OF NEW ENGLAND, INC. Scholarships totalling \$500 will be awarded to two Electrical Engineering students on the basis of need and quality of scholarship.
JOHN M. EVANS Established in 1958 in memory of himself and his wife, Mary Hickey Evans, for worthy students in Civil Engineering.
VERMONT ELECTRICAL ASSOCIATION SCHOLARSHIP FUND Awarded to a junior or senior majoring in Electrical Engineering who is a resident of Vermont.
WESTERN ELECTRIC SCHOLARSHIP FUND Awarded to an undergraduate in the Engineering Department. \$800 or the cost of tuition, books, and fees, whichever is lower. The fixed amount in no event will be less than \$400. In addition, a grant-in-aid amounting to three-quarters of the amount of the scholarship.

Loan Funds

- CHESTNUT FUND For students in Mechanical Engineering upon recommendations of the department chairman.
- LEONARD PERLEY DICKINSON For students in Engineering, preference to be given to those in Electrical Engineering.
- HORACE E. STEVENS, Class of 1870 Established in 1926 by his relatives for students in Engineering.

Professions

Law

Loan Fund

- HENRY BIGELOW SHAW, Class of 1896 Established in 1938 by Mrs. Willard Pope, in memory of her brother, for those who plan to study at Harvard University Law School.

Ministry

Scholarship Fund

- DR. DANIEL WASHBURN Founded in 1853 for young men; preference to be given to those studying for the ministry.

Financial Aid With Special Restrictions

Scholarship Funds

- PARKER J. BUXTON Available to a needy and deserving member of the Senior Class.
- DANIEL PITKIN MINER Established by bequest in 1943; for native-born students, not over twenty-five years of age.
- DR. WALTER CARPENTER Established by bequest; preference to be given to sons of clergymen and physicians.
- SOLDIERS' Founded in 1913 by a group of Civil War Veterans for students who are descendants of soldiers in the Civil War.

Loan Funds

- PHI BETA KAPPA Available to members of the Senior Class; preference being shown to members of the society.
- REV. STEPHEN G. BARNES To provide loans or gifts for needy students to attend religious conferences.

Military

- U. S. ARMY ROTC SCHOLARSHIPS Established by Public Law 88-647 in 1964; for students motivated toward a career as an officer in the United States Army. For details, see page 67.

Prizes and Awards

- W. R. ADAMS FORESTRY AWARD This award is based on the highest cumulative grade point average following completion of seven semesters or 120 hours or more in courses acceptable for the B.S. degree in forestry or wildlife (subject to approval by the faculty). The award may not be received twice by the same individual.
- AGRICULTURAL ECONOMICS AWARD The Department of Agricultural Economics will present a Junior membership in the American Agricultural Economics Association to an outstanding student majoring in Agricultural Economics who has completed four courses in the department.

- ALPHA LAMBDA DELTA AWARD presented by the National Council to the senior girl who has the highest average for four years.
- ALPHA ZETA PROFICIENCY AWARD for the agricultural student who in his freshman year is deemed most proficient in scholarship, extracurricular activities, and self-support.
- AMANDA AWARD for excellence in musical composition, was established in honor of Professor Betty Bandel; the winner is determined by annual competition.
- AMERICAN INSTITUTE OF CHEMISTS AWARD given to a senior with high potential for advancement of chemistry as a profession, based on leadership, ability and character with high scholastic standing.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS AWARD, President's Award for meritorious service and award for best technical paper.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS AWARD for outstanding effort and accomplishment in behalf of the ASME Student Section.
- AMERICAN LEGION AWARD to the cadet commander of the Army ROTC Company adjudged to be the most proficient during the year.
- ARMY RESERVE OFFICERS ASSOCIATION AWARD to the Army ROTC cadet in the senior class who has shown the greatest versatility and participation in the ROTC program.
- ARMY SUPERIOR CADET AWARDS to the outstanding Army ROTC cadet in military and academic proficiency in each class.
- ASSOCIATION OF THE U. S. ARMY AWARD to the Army ROTC cadet in the junior class who has contributed the most through his leadership to advancing the standing of the ROTC unit and the Military Department of the University of Vermont.
- ASSOCIATION OF THE U. S. ARMY MILITARY HISTORY PRIZE to a freshman ROTC cadet for excellence in Military History.
- ATHLETIC COUNCIL MANAGERIAL AWARD to the senior sports manager who has shown the greatest proficiency.
- WARREN R. AND MILDRED L. AUSTIN AWARD to the student who has shown the most interest and endeavor in knowledge of international organization for the principles and purposes of the United Nations.
- EMMA FREDERICK BANDEL AWARD for excellence in undergraduate acting; the winner is determined by vote of the Drama Faculty.
- BENEDICT ESSAY AWARD established by Robert Dewey Benedict of the Class of 1848, to be awarded annually to the member of the senior class who presents the best essay on international arbitration.
- BENNETT ESSAY AWARD, endowed by Philo Sherman Bennett, provides an annual award for the best essay discussing the principles of free government.
- COLONEL WESTON L. BLANCHARD AWARD to the cadet commander of the ROTC Battalion adjudged to be the most proficient during the year.
- B'NAI B'RITH AWARD, given annually by the Joseph Frank Lodge of Burlington to that student who has done the most to encourage interfaith cooperation and activities.
- BORDEN AGRICULTURAL AWARD to the senior Agricultural student in the College of Agriculture and Home Economics who enters senior year with the highest average.
- ERNEST C. BRAUN PRIZE, awarded annually to a student in chemistry.
- WILLIAM EUSTIS BROWN ALUMNI PRIZE to a graduating student on the basis of broad cultural interests and loyalty to the College of Medicine.
- BURLINGTON GARDEN CLUB MEMORIAL AWARD IN HORTICULTURE For an outstanding graduate or undergraduate student showing proficiency and interest in ornamental horticulture.
- BURPEE AWARD IN HORTICULTURE on the basis of scholarship, practical experience, and interest in flower and vegetable growing.
- BUTLER DEBATING AWARDS, endowed by Edward Page Butler, 1870, given annually to the three women students who have shown the greatest ability in debate.
- ERNEST HIRAM BUTTLES CENTURY CLUB PRIZE awarded annually to the second-year student selected by the Department of Pathology for outstanding performance in that subject.
- CARBEE MEDICAL AWARD established by the late Mrs. May D. Carbee in memory of her husband, Moses Dyer Carbee, M.D., of the Class of 1873, to be given to the senior in the College of Medicine who has shown the greatest proficiency in the field of Obstetrics.
- CARPENTER GERMAN AWARD in honor of Professor Fred D. Carpenter, given annually to the student who has shown the most progress and improvement in the study of German during the first two years.
- CARPENTER TENNIS AWARD presented in appreciation of Professor Fred D. Carpenter's service as coach of the tennis team and as a member of the Athletic Council, to the mem-

ber of the varsity tennis squad who has demonstrated the greatest degree of progress in tennis proficiency during the season.

UNIVERSITY OF VERMONT CENTURY CLUB AWARD FOR SCHOLARSHIP to the graduating student in the College of Medicine who has attained the highest scholastic rank in his class during the four years.

UNIVERSITY OF VERMONT CENTURY CLUB AWARD FOR UNDERGRADUATE RESEARCH in the College of Medicine for excellence in conducting an independent research project.

CHEMICAL RUBBER COMPANY ACHIEVEMENT AWARDS to each of the highest ranking students in the beginning courses in chemistry, mathematics and physics.

CONVERSE AWARDS, established by John Heman Converse, 1861, to outstanding students in the Department of Economics and Business Administration.

CORSE TRAVELING FELLOWSHIP established by Frederick M. Corse, Class of 1888, to a Bachelor of Arts graduate having a language major and preparing for a career in college teaching.

FAYE CRABBE AWARD established in honor of Faye Crabbe by the alumnae and faculty of the University of Vermont School of Nursing, awarded to the senior majoring in nursing who has excelled in scholarship, nursing ability, and service to the University.

CRAIG TROPHY donated by Major M. E. Craig in honor of the 1936-37 Rifle Team, has each year engraved upon it the name of the man making the highest cumulative score through the year in the principal matches in which the rifle team competes.

DAUGHTERS OF FOUNDERS AND PATRIOTS OF AMERICA AWARD to the ROTC cadet of the junior class for outstanding ROTC academic achievement.

EMERSON AWARD IN HISTORY, in memory of Samuel Franklin Emerson, Professor of History for forty-two years, awarded to an undergraduate for the best essay on any topic chosen from any field of history.

GOLDBERG AWARD by Phi Chapter of Phi Sigma Delta Fraternity to a senior man who plans on graduate work and has excelled in scholarship, intramural athletics, and contribution to University life.

SALLY ANN HALL MEMORIAL AWARD presented annually to a woman student in her junior year in the Elementary Education curriculum who has financial need and who has demonstrated commitment to teaching.

HAMILTON WATCH COMPANY AWARD to the senior engineer who has most successfully combined proficiency in his major field of study with notable achievements in the social studies and humanities.

HOWARD AWARDS, established by a bequest from Mrs. Hannah T. Howard, for students in the College of Arts and Sciences who have shown excellence in the work of the freshman year.

ELWIN LEROY INGALLS AWARD, established in 1934 to honor Elwin Leroy Ingalls, 1896, who had then completed twenty years of continuous service as State 4-H Club Leader, to be given to a student outstanding in character, 4-H Club work, and scholarship.

INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS AWARD to the student member who has shown the greatest professional development, accomplishment, and interest in the activities of the student branch.

INTERFRATERNITY SCHOLASTIC CUP for the fraternity having the highest scholastic average during the preceding semester.

INTERFRATERNITY SCHOLASTIC TROPHY for the fraternity whose scholastic average shows the greatest improvement during the last two semesters.

LEWIS RALPH JONES AWARD established in 1963 to be given to a student displaying outstanding proficiency in plant sciences.

JOHN F. KENNEY PRIZE awarded annually to one or more graduate students for excellence in mathematics.

A. ATWATER KENT AWARD awarded annually for excellence of judgment and general grasp of the principles of electrical engineering, development in personality and greatest promise of success in this field.

KIDDER MEDAL established in memory of Dr. F. T. Kidder, 1880, a Trustee of the University, to be awarded to the senior man ranking first in character, leadership, and scholarship.

LAMB FOUNDATION ESSAY AWARDS to students in the College of Medicine showing greatest comprehension and appreciation of the doctor-patient relationship.

ALEXANDER LAMPORT AWARD established in 1962 to be given to an outstanding student in Hebrew.

- ROBERT ASHTON LAWRENCE DEBATING AWARDS for students who exhibit the greatest proficiency in debate, established by Edwin Winship Lawrence, 1901, in memory of his brother, Robert Ashton Lawrence, 1899.
- ROBERT ASHTON LAWRENCE AND GEORGE EDWIN LAWRENCE DEBATING AWARDS to the four students of the University of Vermont and/or Middlebury College showing the greatest proficiency in a joint debate between the two institutions; these awards established by Edwin Winship Lawrence, 1901, in memory of his brother, Robert Ashton Lawrence, 1899, and his father, George Edwin Lawrence (Middlebury College, 1867).
- ELIZABETH C. LISMAN MEMORIAL AWARD, established in 1962 by Louis Lisman and others, in memory of his wife, to be presented annually for outstanding participation in group discussion.
- EDMUND F. LITTLE CUP, established by Arlington P. Little, 1901, to the outstanding student in mechanical engineering.
- MERCK CO. INDEX AWARDS for proficiency in chemistry to be given to the outstanding junior and the outstanding senior.
- HELAINÉ MESCH MEMORIAL AWARD given annually by the Class of 1961 to the most deserving senior in the College of Medicine, to be selected by his classmates.
- MORTAR BOARD SCHOLARSHIP CUP to the women's living unit, including all four classes, attaining the highest scholarship average for the spring semester.
- MORTAR BOARD SCHOLARSHIP TROPHY for the women's living unit, including all four classes, attaining the highest scholarship average for the fall semester.
- OMICRON NU CUP to the student in home economics who attains the highest scholastic average during her freshman year.
- OUTING CLUB SKI TROPHY to the member of the varsity ski team showing outstanding leadership, character, and athletic attainment in skiing during the past year.
- PANHELLENIC CUP awarded to the sorority with the highest scholastic average.
- PANHELLENIC PLAQUE awarded to the sorority whose scholastic average shows the greatest improvement in the fall semester.
- COMPANY L-12 PERSHING RIFLES TROPHY to the ROTC platoon adjudged to be the most proficient during the year.
- PHELPS AWARD established by Edward J. Phelps in memory of his son, Edward Haight Phelps, 1872, to be given annually to an outstanding senior in civil engineering.
- PHI BETA KAPPA AWARD to the student in the humanities with the highest standing at the end of the first three semesters.
- PROFESSOR OF MILITARY SCIENCE AWARD for cadets of the senior class who have made outstanding contribution to the ROTC program.
- COLONEL WADSWORTH RAMSEY-SMITH AWARD to the outstanding senior cadet of the ROTC. This was established by Mrs. Ramsey-Smith in honor of her husband.
- RETIRED OFFICERS' ASSOCIATION (GREEN MOUNTAIN CHAPTER) AWARD to the sophomore cadet who has contributed the most to the ROTC program.
- FREEMAN M. SALTUS AWARD established in 1956 to be given to a student writing an outstanding essay on labor and/or economics.
- SEMANS TROPHY, presented by the local chapter of Tau Epsilon Phi Fraternity in memory of Henry Semans, 1924, awarded annually to a senior showing outstanding qualities of leadership, loyalty and service to the University, active participation in athletics, and winning the respect and regard of his fellow students.
- SERGEANT'S MEDAL to the outstanding ROTC cadet in the junior class in leadership and drill proficiency.
- SEYMOUR HORTICULTURAL AWARD established by William W. Seymour in memory of his father, Henry E. Seymour, 1835, for the senior who has done the best work in original horticultural research.
- MARY JEAN SIMPSON CUP to the senior woman who best exemplifies the character, service, and constructive influence which Dean Simpson strove to develop in undergraduate women.
- KIRBY FLOWER SMITH LATIN AWARD, established as a memorial to Kirby Flower Smith, 1884, by his wife, for the student having the highest standing in second-year college Latin.
- MASTER SERGEANT JOEL SURRELL RIFLE TEAM TROPHY for the member of the ROTC Rifle Team who has the highest average for the season.
- LA SOCIÉTÉ DES 40 HOMMES ET 8 CHEVAUX AWARD to the Army ROTC cadet in the senior class for the highest academic achievement through the advanced course and who intends to accept a Regular Army Commission.
- SONS OF THE AMERICAN REVOLUTION AWARD to the ROTC cadets of the sophomore and freshman classes for their outstanding character, conduct, leadership and practical knowledge of the year's course.

STROH TROPHY, named for Charles Stroh, 1934, awarded annually to the member of the baseball team who achieves the highest total of runs-batted-in during scheduled games each year.

SUNDERLAND MEMORIAL TROPHY awarded to the senior man who has best exemplified those qualities of character, leadership, and persistence in overcoming obstacles which were outstanding traits in the life of Russell O. Sunderland, 1938.

TAU BETA PI AWARD for the sophomore in engineering who has achieved the highest scholastic average for the first three semesters.

SOCIETY OF UVM CHEMISTS AWARDS for excellence in general freshman chemistry.

UNITED BUSINESS EDUCATION ASSOCIATION AWARD for outstanding achievement in business education.

VERMONT CERTIFIED PUBLIC ACCOUNTANTS AWARD for the outstanding student in accounting.

VERMONT STATE FEDERATED GARDEN CLUB SCHOLARSHIP to a student who has done outstanding work in horticulture and conservation.

VETERANS OF FOREIGN WARS AWARD to the most proficient member of the freshman ROTC class.

DR. FREDERICK ARNOLD VINTON AWARD established in 1952, for a student displaying proficiency in Latin or Greek.

THE GEORGE H. WALKER DAIRY AWARD established by George H. Walker, one of the founders of the Walker-Gordon Milk Company, to be awarded to an outstanding senior in dairy studies.

WALL STREET JOURNAL AWARD to the senior who shows the greatest proficiency in the field of finance.

WASSON ATHLETIC AWARD established by Mrs. Pearl Randall Wasson in memory of her husband, Dr. Watsin I. Wasson, 1901, for the member of the senior class who has maintained the highest standard of academic scholarship and athletic attainment.

WOODBURY MEDICAL AWARDS established by Mrs. Pauline S. Woodbury in memory of her husband, Dr. Urban A. Woodbury, 1859, for a senior in the College of Medicine showing the greatest proficiency in the clinical subjects in his senior year; and to a sophomore in the College of Medicine who has received the highest standing of the class in all subjects of the freshman and sophomore years.

V

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V Academic Calendar

Spring Semester 1971

| | | | |
|----------|------------|-----------------|--|
| January | 18 | Monday | Registration |
| January | 19 | Tuesday | Registration |
| January | 20 | Wednesday | Classes Begin |
| February | 19-20 | Friday-Saturday | Winter Weekend Recess |
| March | 6 | Saturday | Grade Reports (Freshmen Only) |
| March | 22-April 2 | Monday-Friday | Enrollment |
| April | 12-16 | Monday-Friday | |
| April | 5 | Monday | Spring Recess Begins |
| April | 12 | Monday | Classes Resume |
| April | 21 | Wednesday | Honors Day, Special Class Schedule will be announced |
| May | 8 | Saturday | Classes End |
| May | 12 | Wednesday | Examinations Begin |
| May | 18 | Tuesday | Examinations End |
| May | 23 | Sunday | Commencement |

Summer Session 1971

| | | | |
|--------|----|---------|--------------------------------------|
| June | 21 | Monday | Eight-week Session Begins |
| July | 6 | Tuesday | Six-week Session Begins |
| August | 13 | Friday | Six-week and Eight-week Sessions End |

Tentative Fall Semester 1971

| | | | |
|-----------|-----------------|-------------------|-------------------------------|
| August | 31 | Tuesday | Registration |
| September | 1 | Wednesday | Registration |
| September | 2 | Thursday | Classes Begin |
| October | 9-11 | Saturday-Monday | Columbus Day Recess |
| October | 23 | Saturday | Grade Reports (Freshmen Only) |
| October | 25-November 12— | Monday-Friday | Enrollment |
| November | 25-27 | Thursday-Saturday | Thanksgiving Recess |
| December | 11 | Saturday | Classes End |
| December | 15 | Wednesday | Examinations Begin |
| December | 21 | Tuesday | Examinations End |

Tentative

Spring Semester 1972

| | | | |
|----------|-------|-----------------|--|
| January | 17 | Monday | Registration |
| January | 18 | Tuesday | Registration |
| January | 19 | Wednesday | Classes Begin |
| February | 18-19 | Friday-Saturday | Winter Weekend Recess |
| March | 4 | Saturday | Grade Reports (Freshmen Only) |
| March | 20-24 | Monday-Friday | Enrollment |
| April | 3-14 | Monday-Friday | |
| March | 27 | Monday | Spring Recess Begins |
| April | 3 | Monday | Classes Resume |
| April | 19 | Wednesday | Honors Day, Special Class Schedule will be announced |
| May | 6 | Saturday | Classes End |
| May | 10 | Wednesday | Examinations Begin |
| May | 16 | Tuesday | Examinations End |
| May | 23 | Sunday | Commencement |

*"Behold, I do not give lectures, or a little
charity, when I give I give myself."*

WALT WHITMAN

