

THE UNIVERSITY OF VERMONT

Bulletin April 1970

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Bulletin of THE UNIVERSITY OF V E R M O N T

 THE CATALOGUE
 1969-1970

 ANNOUNCEMENTS
 1970-1971

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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.

 \P 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.

 \P 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

National Association of Schools of Music

The American Medical Association

The American Dental Association

National League for Nursing

The Engineers Council for Professional Development

The American Chemical Society

The Philosophy and Objectives of The University of Vermont

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 wellrounded 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 Dean |
|--|--------------------------------|
| College of Arts and Sciences | Dean |
| College of Education | Dean |
| College of Technology | Dean |
| Graduate College | Dean |
| Division of Health Sciences | Dean |
| College of Medicine | Dean |
| School of Nursing | Director |
| School of Allied Health Sciences | Director |
| Continuing Education | Dean |
| Summer Session | Assistant Dean |
| Evening Division | Director |
| Conferences and Institutes | Director |
| Transcripts of Records | Registrar |
| Student Personnel | Dean of Students |
| Scholarships and Loans | Director of Financial Aid |
| Employment of Seniors and Alumni | Director of Placement |
| Matters of Alumni Interest | Alumni Secretary |
| Matters of General University Interest | The President |
| University Development | Vice President for Development |
| Vermont Educational Television | ETV Station Manager |

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March, 1964—March, 1970

LAWRENCE JAMES DOOLIN, B.S. FLOYD MERLE JAMES, B.S. GEORGE HAMILTON COOK, JR., B.S. (March, 1968-March, 1970)

March, 1965-March, 1971

WILLIAM THOMAS BURNS, B.S. EDWARD RICHARDSON EURICH LEO O'BRIEN, JR., B.A. WALTER CABOT PAINE, A.B.

March, 1966-March, 1972

JOHN LUTHER BECKLEY. Ph.B. KENNETH NASH SCOTT, B.S. LEON DONALD LATHAM, JR., Ph.B., LL.B.

March, 1967-March, 1973

PETER GIULIANI ELLWYN EDWARD MILLER, B.S. ROBERT EMMETT O'BRIEN, B.S., M.D. GEORGE HOWARD SLOAN, M.A.

March, 1968—March, 1974

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March, 1969-March, 1975

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March, 1970-March, 1976

HOWARD ALFRED ALLEN, JR., B.S. HARRY JAMES BOLWELL, B.S.M.E. ALLEN OBER EATON, B.S., LL.B.

Wynnewood, Pa. Burlington, Vt. Leominster, Mass.

Dorset, Vt.

Waitsfield, Vt.

South Burlington, Vt. Woodstock, Vt.

North Caldwell, N.I. Detroit, Mich. Burlington, Vt.

> Montpelier, Vt. Putney, Vt. Winooski, Vt. Rutland, Vt.

Mt. Carmel, Conn. Burlington, Vt. New Britain, Conn.

> Burlington, Vt. Rutland, Vt. Morgan, Vt. Burlington, Vt.

Burlington, Vt. Bloomfield, N.J. Winchester, Mass.

Officers of Administration

LYMAN SMITH ROWELL, M.S., L.H.D. WALTER G. BRUSKA, B.S. CLINTON DANA COOK, Ph.D.¹ MELVIN ALLEN DYSON, B.B.A., C.P.A. EDWARD CLINTON ANDREWS, Jr., M.D. DEAN D. CORRIGAN, Ed.D. THOMAS WHITFIELD DOWE, Ph.D. Home Econ WARREN ORVEL ESSLER, Ph.D.

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L.H.D. President Vice President for University Development Vice President for Academic Affairs C.P.A. Vice President for Financial Affairs J.r., M.D. Dean, Division of Health Sciences h.D. Dean, College of Agriculture and Home Economics and Director of Agricultural Experiment Station Dean, College of Technology Dean, Academic Administration Ph.D. Dean of the Graduate College Dean of the Graduate College Dean of Students Ph.D. Dean, College of Arts and Sciences

1. Deceased June 25, 1969

2. Leave of absence September 15, 1969 to September 1, 1971

3. Sabbatical leave 1970-71

Officers of Instruction

EMERITI

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1. Deceased June 5, 1969.

2. Deceased January 12, 1970.

3. Deceased August 15, 1969.

Assistant Professor of Education Professor of Forestry 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 Associate Professor of Clinical Pediatrics Professor of Nursing Associate Professor of English Professor of Romance Languages Professor of Geology James Marsh Professor of Intellectual and Moral Philosophy Professor of Gynecology Professor of Animal and Dairy Science Professor of History Instructor in Clinical Psychiatry Professor of Mathematics Professor of Clinical Medicine Professor of Medical Microbiology Associate Professor of Physical Education for Men Professor of Botany Associate Professor of Religion Associate Professor of Poultry Science Associate Professor of Electrical Engineering 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 Electrical Engineering and Dean of College of Technology Assistant Professor of Music 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

Associate Professor of Nursing

HAROLD BARNARD PIERCE, Ph.D. IAMES EUGENE POOLEY, A.M. WILLARD BISSELL POPE, Ph.D. ARCHIBALD THOMSON POST, Ed.M. HERBERT EVERETT PUTNAM, Ph.D. PHYLLIS MELVILLE QUINBY, B.S. WILHELM RAAB, M.D. LOUISE ADELE RAYNOR. Ph.D. ALBAN BENNETT ROONEY, M.S.¹ LAURENCE FORREST SHOREY, M.S. ARTHUR BRADLEY SOULE, JR., M.D. WALTER ALVA STULTZ, Ph.D. BENJAMIN BOOTH WAINWRIGHT, A.M. NELSON LEE WALBRIDGE, Ph.D. MYRON ELLIS WITHAM, C.E. FLORENCE MAY WOODARD, Ph.D. RICHARD S. WOODRUFF, M.D. LLOYD ABRAM WOODWARD, M.S. WILLIAM GREENHILL YOUNG, M.D. ELIZABETH K. ZIMMERLI, Ed.D.

Professor of Biochemistry Associate Professor of Classical Languages and History Professor of English Associate Professor of Physical Education for Men Associate Professor of History Associate Professor of Dental Hygiene Professor of Experimental Medicine Associate Professor of Botany Associate Professor of Physics Associate Professor of Electrical Engineering Professor of Radiology Professor of Anatomy Associate Professor of English Professor of Physics Assistant Professor of Mathematics Professor of Commerce and Economics Assistant Professor of Pathology Associate Professor of Physics Associate Professor of Psychiatry Associate Professor and Chairman of Physical Education for Women

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) JEROME J. ABRAMS, M.D. (1969) JOSEPH ANTHONY ABRUSCATO, Ph.D. (1969) PATRICIA MARLENE ABSHER, Ph.D. (1968) RICHARD GAYLON ABSHER, Ph.D. (1968) ELLEN ADAMS, M.S. (Feb. 1969)² RUTH C. ADAMS, M.P.H. (1967) WILLIAM RITCHIE ADAMS, Ph.D. (1926) WENDELL HUGH AFFSPRUNG, M.A. (1967) RUSSELL MAYNARD AGNE, M.S. (1969) PAUL COMSTOCK AGNEW, M.D. (Dec. 1964) ROBERT BASCOM AIKEN, M.D. (1941) CHARLES PETER ALBRIGHT, M.D. (Jan. 1965) PETER D. ALDEN, M.D. (1964) SUSAN JANE ALENICK, M.A. (1969) *CHRISTOPHER WHITNEY ALLEN, Ph.D. (1967) MARIE FRANCES ALLEN, B.A. (1967) SINCLAIR TOUSEY ALLEN, JR., M.D. (1948) VIRGINIA O. ALLEN, M.A.(1968) *ABBAS ALNASRAWI, Ph.D. (1968) Associate Professor of Economics and Business Administration *NORMAN ROLAND ALPERT, Ph.D. (1966) *ZUELL PHILIP AMBROSE, Ph.D. (1962)³ ELLSWORTH LYMAN AMIDON, M.D. (1933) RICHARD WALKER AMIDON, M.D. (1949) ALISON LANE ANAND, M.A. (1967) RICHARD ARNOLD ANDERSON, M.D. (1967) ALFRED JOHN ANDREA, Ph.D. (1967) *HEINZ LUDWIG ANSBACHER, Ph.D. (1946) GABOR JANOS ANTONY, M.D. (1967) FRANK HARRIS ARMSTRONG, M.F. (1968) EARL LEE ARNOLD, Ph.D. (1953) NOELLE JEANNETTE ARNOLD, B.S. (1969) WALTER PAUL ASCHENBAGH (1959)

Professor of Anesthesiology Associate Professor of Surgery Assistant Professor of Education Instructor in Medical Microbiology Assistant Professor of Electrical Engineering Instructor in Technical Nursing Associate Professor of Professional Nursing Professor of Forestry Instructor in English Assistant Professor of Education Assistant Professor of Psychiatry Associate Professor of Community Medicine Instructor in Medicine Assistant Professor of Medicine Instructor in English Assistant Professor of Chemistry Instructor in Romance Languages Associate Professor of Medicine Assistant Professor of Technical Nursing Professor of Physiology Associate Professor of Classiccs Professor of Medicine Assistant Professor of Medicine Instructor in Music Assistant Professor of Medicine Assistant Professor of History Professor of Psychology Assistant Professor of Pediatrics and Medicine Assistant Professor of Forestry Associate Professor of Agricultural Engineering Instructor in Romance Languages Assistant Professor of Art

1. Deceased August 20, 1969.

- 2. Resigned 12/31/69
- 3. Sabbatical leave academic year 1969-70

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- 1. Sabbatical leave academic year 1969-70
- 2. Resigned February 1, 1970
- 3. Sabbatical leave 1970-71
- 4. Sabbatical leave second semester 1969-70

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1. On duty with Armed Forces to 12/31/71

2. On leave of absence 9/1/69 to 6/30/70.

3. Resigned December 31, 1969

4. Sabbatical leave 1970-71

FRANCIS PEABODY COLBURN, Ph.B. (1943) GLADYS LAFLAMME COLBURN, Ph.B. (1967) JEAN AVERILL CONDON, M.A. (1967) ARTHUR JAMES CONDREN, Ph.D. (Mar. 1969) *PHILIP WILLIAM COOK, Ph.D. (1963) ROGER LEE COOKE, Ph.D. (1968) *ROBERT WILLIAM COON, M.D. (1955) JAMES P. COROLOGOS, M.Ed. (1968) *DEAN CORRIGAN, Ed.D. (1969) *REX DEE COUCH, M.D. (1962; 1967) JEAN COUSINS, A.B. (1968)1 WILTON WARNER COVEY, M.D. (1966) JOHN EDWARD CRAIGHEAD, M.D. (1968) ALBERT JAMES CRANDALL, M.D. (1939) EDWARD BYINGTON CRANE, M.D. (Jan. 1961) GRANT CRITCHFIELD, M.A. (1968) GEORGE CHAPMAN CROOKS, Ph.D. (1930) *ALBERT DARY CROWELL, Ph.D. (1955) JOHN CHARLES CUNNINGHAM, M.D. (1946) FLORENCE MARY CZERNIAWSKI, M.T. (1967) *MALCOLM DANIEL DAGGETT, Ph.D. (1945) EDWIN STUART DALRYMPLE, JR., M.Ph. (1969) *ROBERT VINCENT DANIELS, Ph.D. (1956-57; 1958) HANLYN WILKINS DAVIES, M.F.A. (1966) JOHN HERSCHEL DAVIS, M.D. (Dec. 1968) PHILIP HOVEY DAVIS, M.D. (1958) **ROBERT EARLE DAVIS, M.D.** (1968) *JEAN MARGARET DAVISON, Ph.D. (1955) * JOHN AMERPOHL DAVISON, Ph.D. (1967) WILLIAM EARL DAVISON, M.F.A. (Jan. 1966) ROBERT FRANK DAWSON, Ph.D. (1964-65; 1969) ROBERT STUART DEANE, M.B.Bch. (1967) WILLIAM NELSON DEANE, Ph.D. (1960) EDITH FAYE DECK, M.S. (1969) *LUBOMIR ATANASOV DELINESCEFF DELLIN, J.S.D. (1957) ALINE LOUISE DEMERS, M.S. (1960) GINO ALDO DENTE, M.D. (1950) DAVID ALLEN DEPATIE, Ph.D. (1967) *ROBERT WARREN DETENBECK, Ph.D. (1967) ALBERT INSKIP DICKERSON, JR., Ph.D. (1966) MARY JANE DICKERSON (MRS. A. I.) M.A. (1966) RAYMOND GEORGE DILLEY, M.A. (1965)² DAVID KENNETH DIMMOCK, M.S. (Jan. 1968) WILLIAM MANN DOBRINER, Ph.D. (1969) RICHARD BOWDITCH DOES, Ph.D. (1969) RAYMOND MADIFORD PEARDON DONAGHY, M.D. (1946) JOHN ROBERT DONNELLY, M.S. (1969) *GERALD ALTON DONOVAN, Ph.D. (Nov. 1960) HELEN MARIE DOREMUS, D.V.M. (Jan. 1970) HENRY MEADE DOREMUS, 11, D.V.M. (1964)

ROBERT KINGSLAND DOTEN, Ph.D. (1939) *RICHARD NEAL DOWNER, Ph.D. (1967) *HOWARD DUCHACEK, M.S.A.E. (1949) DAVID RICHARD DUFFELL, M.D. (Dec. 1967) *FRED WILLIAMS DUNIHUE, Ph.D. (1936) THOMAS CALVIN DUNKLEY, M.Ed. (1966) MICHAEL J. DUNN, M.D. (Mar. 1969)

Professor of Art Instructor in English Instructor in Physical Education Assistant Professor of Civil Engineering Associate Professor of Botany Assistant Professor of Mathematics Professor of Pathology Instructor in Education Professor of Education Associate Professor of Pathology Instructor in Sociology and Anthropology Clinical Instructor, in Psychiatry Professor of Pathology Clinical Instructor in Surgery Instructor in Community Medicine Instructor in Romance Languages Professor of Chemistry Professor of Physics Shipman Professor of Ophthalmology Instructor in Medical Technology Professor of Romance Languages Instructor in Philosophy and Religion Professor of History Assistant Professor of Art · Professor of Surgery Clinical Assistant Professor of Orthopedic Surgery Instructor in Obstetrics and Gynecology Professor of History Associate Professor of Zoology Assistant Professor of Art Associate Professor of Civil Engineering Assistant Professor of Surgery Assistant Professor of Psychiatry Assistant Professor of Professional Nursing and Sociology Professor of Economics and Business Administration Associate Professor of Nursing Associate Professor of Anesthesiology Assistant Professor of Physics Professor of Physics Assistant Professor of English Instructor in English Instructor in Speech Instructor in Mathematics Visiting Professor of Sociology and Anthropology Assistant Professor of Psychology Professor of Neurosurgery Assistant Professor of Forestry Professor of Animal Sciences Assistant Professor of Animal Pathology Assistant Professor of Pharmacology and Animal Pathology Professor of Geology Assistant Professor of Civil Engineering Associate Professor of Mechanical Engineering Assistant Professor of Pathology Professor of Anatomy

Assistant Professor of Physical Education Assistant Professor of Medicine

1. Resigned December 31, 1969 2. Leave of absence September 1, 1969 to June 30, 1970.

Associate Professor of Obstetrics and Gynecology HERBERT ASHLEY DURFEE, JR., M.D. (1957) *ALEXANDER HARRY DUTHIE, Ph.D. (Feb. 1964) Associate Professor of Animal Sciences JULIUS SOLOMON DWORK, Ph.D. (1954) Associate Professor of Mathematics MELVIN A. DYSON, C.P.A. (1961) Adjunct Professor of Economics and Business Administration SPENCER WRIGHT EARNSHAW, M.A. (1969) Instructor in Mathematics OLIVER ROLFE EASTMAN, M.D. (1948) Associate Professor of Obstetrics and Gynecology ROBERT WEBSTER EASTMAN, LL.B. (Feb. 1952) Instructor in Political Science WINSTON MILO EDDY, M.D. (Oct. 1960) Clinical Associate Professor of Medicine PHILIP N. ELDRED, Ph.D. (Jan. 1970) Assistant Professor of Civil Engineering Assistant Professor of Speech JOHN WIER ELLENWOOD, M.A. (1963-65; 1967) Assistant Professor of Electrical Engineering DAVID MILLER ELLIS, Ph.D. (1968) MARY JANE ELLIS, M.S. (Jan. 1966) Assistant Professor of Home Economics CAROL ANN ELMENDORF, B.S. (1967-69; Jan. 1970) Instructor in Professional Nursing Assistant Professor of Neurology **ROBERT HEALY ELWELL, M.D. (1966)** FRANK STONE EMANUEL, B.S. (Jan. 1968) Instructor in Home Economics SYLVIA JANE EMANUEL (MRS. F. S.) M.S. (1966) Assistant Professor of Home Economics FAITH GRISCOM EMERSON, M.A. (1959) Associate Professor of Nursing ROBERT RICHARD ENGISCH, M.D. (1961) Clinical Instructor in Neurology WARREN WALTER EPINETTE, M.D. (1965) Assistant Professor of Dermatology **ROBERT HODGSKIN ERDMANN, LL.B. (1967)** Instructor in Economics and **Business** Administration PAUL ANDERSON ESCHHOLZ, M.A. (1969) Instructor in English Clinical Instructor in Urology LOUIS WILLIAM ESPOSITO, M.D. (Feb. 1944; 1954) BUD ETHERTON, Ph.D. (1968) Associate Professor of Botany **JOHN CLIFFORD EVANS, B.S. (1937)** Associate Professor of Physical Education *FREDERICK CHRISTIAN EVERING, JR., Ph.D. (1965) Associate Professor of Electrical Engineering Assistant Professor of History JON BAKER FACKLER, Ph.D. (1968) Associate Professor of Urology WILLIAM THOMAS FAGAN, JR., M.D. (1954) Assistant Professor of Dental Hygiene DAVID SPERBER FAIGEL, D.D.S. (1954) GISELA HILDEGUND FALKENBERG, (MRS. K. J.) M.D. (Dec. 1969) Instructor in Anesthesiology KARL JORG FALKENBERG, M.D. (March, 1968) Instructor in Otolaryngology Assistant Professor of Physiology & Biophysics FLORENCE EILEEN FARBER, Ph.D. (Aug. 1969) Assistant Professor of Dental Hygiene and JOHN EDWARD FARNHAM, D.M.D. (1963) Associate Professor of Surgery Instructor in Physical Education SANDRA MORTON FARRELL, M.S. (1962-66; 1968) Assistant Professor of Nursing HELEN ELIZABETH FARRINGTON, M.P.H. (1962)¹ DOUGLAS PATTEN FAY, M.S. (1953) Associate Professor of Civil Engineering EDWARD JOSEPH FEIDNER, M.F.A. (1958)² Associate Professor of Speech Professor of History *JEREMY POLLARD FELT, Ph.D. (1957) Assistant Professor of Psychology JAMES GATES FERGUSON, JR., M.A. (1969) Assistant Professor of Agricultural Economics CHARLES LYNN FIFE, Ph.D. (Dec. 1966) JOHN RICHARD FITZGERALD, M.D. (1961) Clinical Assistant Professor of Medicine MARTIN EDWARD FLANAGAN, M.D. (1962) Clinical 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, M.A. (1969) Instructor in Political Science CURTIS M. FLORY, M.D. (1964) Assistant Professor of Pathology ARTHUR HOWARD FLOWER, JR., M.D. (1950) Clinical Associate Professor of Dermatology JOSEPH CLAYTON FOLEY, M.D. (1954) Clinical Associate Professor of Radiology JEANNETTE RUTH FOLTA, Ph.D. (Aug. 1969) Associate Professor of Professional Nursing, Psychiatry, and Sociology *MURRAY WILBUR FOOTE, Ph.D. (1947-51; 1953)

Associate Professor of Microbiology and Biochemistry Assistant Professor of Rehabilitation Medicine ELIZABETH M. FOREMAN, M.S.N. (Feb. 1969) Instructor in Technical Nursing Professor of Psychology

DOROTHY ELLEN FORD, M.D. (Oct. 1968)

*DONALD GABRIAL FORGAYS, Ph.D. (1964)⁸

- 1. Leave of absence 1970-71.
- 2. Sabbatical leave first semester 1969-70.
- 3. Sabbatical leave academic year 1970-71

ROSE JULIET FORGIONE, M.A. (1964) Assistant Professor of Nursing ELIZABETH 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 ROGER SHERMAN FOSTER, JR., M.D. (Jan. 1970) Assistant Professor of Surgery WAYNE LENIS FOX, Ph.D. (1969) Assistant Professor of Education Assistant Professor of Anatomy STEVEN LESLIE FREEDMAN, Ph.D. (1965) EDWARD ESAU FRIEDMAN, M.D. (1963) Clinical 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 Assistant Professor of Forestry ROBERT WEEKS FULLER, M.S. (Jan. 1966) **KENNEDY FRANCIS FUREY, A.B.** (1969) Instructor in English *DANIEL WAYNE GADE, Ph.D. (1966) Assistant Professor of Geography MARY KILGORE GADE, (MRS. D. W.) M.A. (Jan. 1967-Dec. 67; 1969) Instructor in 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) Instructor in Romance Languages THOMAS HOWARD GENO, M.A. (1965) Instructor in Romance Languages Clinical Assistant Professor of Pediatrics STOKES GENTRY, M.D. (1962) ANTONIO ISAIAS GERMAN, M.D. (1965) Instructor in Pathology *ALEXANDER GERSHOY, Ph.D. (1923) Professor of Physics 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)1 Associate Professor of Biochemistry *RICHARD WILLIAM GLADE, Ph.D. (1958) Professor of Zoology ARTHUR A. GLADSTONE, M.D. (1933-36; 1941) MARIAN GILES GLEASON, M.S. (1967) Clinical Professor of Surgery Instructor in English CHARLES MORTON GLUCK, M.D. (1965) Clinical Assistant Professor of Medicine ROBERT JOHN GOBIN, Ph.D. (1965) Associate Professor of Physical Education RICHARD HERRON GOLDSBOROUGH, M.D. (Oct. 1961) Clinical Assistant Professor of Otolaryngology ARNOLD GOLODETZ, M.D. (1969) Associate Professor of Medicine and Community Medicine *LYMAN JAY GOULD, Ph.D. (1953) Professor of Political Science CORNELIUS O. GRANAI, JR., M.D. (1967) Instructor in Obstetrics and Gynecology NADINE GRATTAROLA, (1969) Instructor in Romance Languages 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 MARY JANE GRAY, M.D. (1960)² Associate Professor of Obstetrics and Gynecology Associate Professor of Medicine GARETH MONTRAVILLE GREEN, M.D. (1968) 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 Visiting Professor of Home Economics GLADYS HOAGLAND GROVES, B.A. (1969) RICHARD GORDON GRUNDLER, D.D.S. (1969) Instructor in Dental Hygiene Clinical Assistant Professor of Radiology HOWARD THEODORE GUARE, M.D. (1952) SALLY C. GUERETTE, M.S.Ed. (1969) Instructor in Physical Education BARBARA DECKER GUIDULI, (MRS. R. C.) M.S. (1969) Lecturer in Mathematics ROBERT CESARE GUIDULI, M.D. (1966) Instructor in Ophthalmology DIETER WALTER GUMP, M.D. (1966) Assistant Professor of Medicine and Microbiology

1. Leave of absence July 1, 1969 to June 30, 1970.

2. Sabbatical leave 1970-71

ROBERT ERWIN GUSSNER, S.T.B. (1969) CARLETON RAYMOND HAINES, M.D. (1950-52; 1954) PUZANT SETRAK HALEBIAN, D.D.S. (Oct. 1965) MARY STARRITT HALL (MRS. R. W.) Ph.D. (1961-62; 1965) *ROBERT WILLIAM HALL, Ph.D. (1957) WILLIAM HALPERN, Ph.D. (Aug. 1969) BURT BENJAMIN HAMRELL, M.D. (Aug. 1968) *SAMUEL B. HAND, Ph.D. (Feb. 1961) MORRIS HANDELSMAN, Ph.D. (1969) EDWARD MICHAEL HANLEY, M.A. (1969) PETER ROBERT HANNAH, Ph.D. (Jan. 1967) **IOHN SHERWOOD HANSON, M.D. (1958)** LAWRENCE STANLEY HARRIS, M.D. (Aug. 1968) JOHN ELLIS HARTFORD, M.D. (Dec. 1969) *ROLF NORDAHL BRUN HAUGEN, Ph.D. (1947) WILLIAM A. HAVILAND, Ph.D. (1965) MARGARET ELLEN HAYES, M.S. (1966) RICHARD S. HEILMAN, M.D. (1968) MARY CATHERINE HEININGER, (MRS. P. L.) R.N. (1958) PAUL LEHMANN HEININGER, D.D.S. (1950) JOHN WILBUR HEISSE, JR., M.D. (1956) *EARL BENNETTE HENSON, Ph.D. (1965) SUSAN CHANTAL HERMITTE, (1969) *RAUL HILBERG, Ph.D. (Feb. 1956) *DAVID BYRNE HILL, Ph.D. (1965)

FRANKLIN THEODORE HOAGLUND, M.D. (Feb. 1968) WILLIAM ELWIN HODGKIN, M.D. (Oct. 1964) THOMAS WAYNE HOEKSTRA, B.S.A. (Feb. 1970) *CHARLES WILLIAM HOILMAN, M.S. (1949) ROBERT ADAMS HOLDEN, M.D. (1966) HAROLD LAKE HOLLADAY, M.A. (1968) ANNE CAROLINE DODGE HOOPER, M.D. (April 1967) *RICHARD JOHN HOPP, M.S. (1947) EDWARD SCHURR HORTON, M.D. (1967) MARTHA HILTON HOUGHTON, Ed.M. (Jan. 1970) CHARLES SNEAD HOUSTON, M.D. (Aug. 1966) PHILLIP LLOYD HOWARD, M.D. (1969) JAMES ROBINSON HOWE, Ph.D. (1964) *DAVID CHARLES HOWELL, Ph.D. (1967) LUC HUANG, Ph.D. (1968) ROBERT BRUCE HUBER, Ph.D. (1946)¹ HANS ROSENSTOCK HUESSY, M.D. (1960) *MAHENDRA SINGH HUNDAL, Ph.D. (1967) *ALLEN STANDISH HUNT, Ph.D. (Feb. 1961) *LYMAN CURTIS HUNT, Jr., D.Ed. (1966) ROBERT JACOB HUNZIKER, M.D. (Jan. 1963) MICHAEL JOHN HURZDAN, M.S. (Jan. 1970) PATRICK H. HUTTON, Ph.D. (1968) *BEAL BAKER HYDE, Ph.D. (1965) ROBERT WELLS HYDE, M.D. (Oct. 1967) **JUDITH ANN INGALLS, B.S. (Jan. 1970)** PETER RUDOLF INGOLD, M.A. (1968)² ROBERT JOHN IORIO, Ph.D. (1969) EDWARD SUTER IRWIN, M.D. (Jan. 1963) YOSHINORI ISHIKAWA, D. Ag. Sci. (1968) *JOSEPH ANTHONY IZZO, Ph.D. (1956) LOUIS MARIO IZZO, M.S. (1969) *JULIAN JOSEPH JAFFE, Ph.D. (1961)

Assistant Professor of English Professor of Philosophy and Religion Assistant Professor of Physiology and Biophysics Instructor in Physiology and Biophysics Associate Professor of History Professor of Electrical Engineering Assistant Professor of Education Assistant Professor of Forestry Associate Professor of Medicine Assistant Professor of Pathology Assistant Professor of Anesthesiology Professor of Political Science Associate Professor of Sociology and Anthropology Instructor in Physical Education Instructor in Radiology Instructor in Dental Hygiene Assistant Professor of Dental Hygiene Clinical Assistant Professor of Otolaryngology Associate Professor of Zoology Instructor in Romance Languages Professor of Political Science Associate Professor of Mathematics and **Community** Medicine Professor of Orthopedic Surgery Assistant Professor of Pediatrics Assistant Professor of Forestry Associate Professor of Electrical Engineering Assistant Professor of Medicine Instructor in English Instructor in Pathology Professor of Plant and Soil Science Assistant Professor of Medicine Instructor in Speech Professor of Community Medicine Assistant Professor of Pathology Assistant Professor of English Assistant Professor of Psychology Assistant Professor of Physics Edwin P. Lawrence Forensic Professor of Speech Professor of Psychiatry Associate Professor of Mechanical Engineering Associate Professor of Geology Professor of Education Clinical Assistant Professor of Radiology Instructor in Botany Assistant Professor of History Professor of Botany Associate Professor of Psychiatry Instructor in Dental Hygiene Assistant Professor of Geography Assistant Professor of Anatomy Assistant Professor of Ophthalmology Instructor in Biochemistry Professor of Mathematics

Instructor in Philosophy and Religion

Assistant Professor of Surgery Instructor in Dental Hygiene

Lecturer in Radiologic Physics Professor of Pharmacology

Sabbatical leave second semester 1970-71
 Leave of absence academic year 1970-71

GLADYS MARGARET JAMESON, M.Ed. (1968) CLINTON DALES JANNEY, Ph.D. (1959) ELLEN LOUISE JANSON, M.A. (1969) RICHARD HARRY JANSON, Ph.D. (1958) JUSTIN MANFRED JOFFE, Ph.D. (1969) JAN ERIK HUBERT JOHANSSON, M.A. (1969) CLARK JOHNSON, Ph.D. (1964)1 MARTIN L. JOHNSON, Ph.D. (Jan. 1970) SHIRLEY EVANGELINE JOHNSON, M.A. (1967) ELBRIDGE EUGENE JOHNSTON, M.D. (1951) *STUART LYNDE JOHNSTON, Ph.D. (1940-42; 1943-44; 1946)² Professor of Romance Languages WILLIAM HERBERT JOHNSTON, M.D. (1952) *DONALD BOYES JOHNSTONE, Ph.D. (1948)

*LEONIDAS MONROE JONES, Ph.D. (1951) WARNER EDRICK JONES, M.D. (Jan. 1968) JANET CAROLYN JOSLYN, M.N. (1969) MARY H. JOSLYN, M.A. (1967) *DAVID W. JUENKER, Ph.D. (1964)⁸ *ROY GEORGE JULOW, Ph.D. (1957)³ 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) ROBERT COLLAMER KELLY, M.S. (1963) Instructor in Economics and Business Administration WILLIAM HOWARD KELLY, Ph.D. (1969)

ROBERT EVAN KENDELL, M.D. (Jan. 1969) MARC Z. KESSLER, Ph.D. (1969) *DAVID LESLIE KINSEY, Ph.D. (1950) FLORA ELIZABETH KINSEY, (1969) THOMAS ROBERT KLEH, M.D. (1965) KAREN RUTH KLEILER, B.S. (1969) *RICHARD M. KLEIN, Ph.D. (1967) STEPHEN CECIL KNIGHT, JR., M.S. (1952) RICHARD ARNOLD KNOLLER, M.A. (1968) ESTHER LUCILE KNOWLES, M.S. (1945) JOHN HENRY KNOX, M.A. (1969) MAURICE EMILE KOHLER, Ph.D. (1965)⁴ *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)⁵ *MARTIN ERIC KUEHNE, Ph.D. (1961)6 RAYMOND FRANK KUHLMANN, M.D. (1951) Clinical Associate Professor of Orthopedic Surgery ARTHUR F. SAUL KUNIN, M.D. (1957-63; 1964)7 EDWARD ANTHONY KUPIC, M.D. (Oct. 1966) EDWARD THADDEUS KUSIAK, M.Ed. (1969) *BERT KARL KUSSEROW, M.D. (Oct. 1959) GENE EARL LABER, Ph.D. (1968) Assistant Professor of Economics and Business Administration LLOYD FRANCIS LACASSE, B.S. (1969) *DAVID CHIN LAI, Eng.D. (1965) DENIS EMERY LAMBERT, M.A. (1964)

Assistant Professor of Home Economics Associate Professor of Radiology Instructor in Art Professor of Art Assistant Professor of Psychology Instructor in Mathematics Assistant Professor of Sociology and Anthropology Adjunct Professor of Geology Instructor in English Clinical Assistant Professor of Medicine Clinical Instructor in Radiology Professor of Agricultural Biochemistry and Medical Microbiology Professor of English Clinical Instructor in Medicine Instructor in Professional Nursing Instructor in English Professor of Physics Associate Professor of Romance Languages Associate Professor of German Assistant Professor of Pathology Assistant Professor of Pathology Associate Professor of Medicine Clinical Assistant Professor of Surgery Assistant Professor of Vocational, Technical, and Extension Education Associate Professor of Psychiatry Assistant Professor of Psychology Associate Professor of Music Instructor in Music Instructor in Ophthalmology Instructor in Medical Technology Professor of Botany Associate Professor of Civil Engineering Assistant Professor of Political Science Associate Professor of Home Economics Instructor in Mathematics Assistant Professor of Romance Languages Professor of Pathology Professor of Chemistry Assistant Professor of Medicine Associate Professor of Physics Professor of Chemistry Associate Professor of Medicine Associate Professor of Radiology Instructor in Physical Education Professor of Pathology Instructor in Physical Education

Associate Professor of Electrical Engineering

Assistant Professor of Physical Education

- 1. Leave of absence academic year 1969-70
- 2. Sabbatical leave first semester 1969-70
- 3. Sabbatical leave second semester 1970-71
- 4. With VOSP 1969-70
- 5. Sabbatical leave 1969-70
- 6. Sabbatical leave second semester 1969-70 and second semester 1970-71
- 7. Sabbatical leave 1970-71

*LLOYD MILTON LAMBERT, JR., Ph.D. (1965) *MERTON PHILIP LAMDEN, Ph.D. (1947) S. HENRY LAMPERT, D.D.S. (1963) RICHARD H. LANDESMAN, Ph.D. (1969) CHRISTOPHER CHARLES LANE, M.A. (1969) HELENE WANDA LANG, Ed.M. (1967) JANICE LYNN LANGE, M.S. (1967) JOHN CLIFFORD LANTMAN, M.D. (1957) H. PETER LAQUEUR, M.D. (Oct. 1968) KARIN BLOM LARSON, AMT (1968) ROBERT LOWELL LARSON, Ed.D. (1968) **IEAN-PIERRE GEORGES LASCOUMES, Lic. (1964)** FRANK DAMRON LATHROP, M.D. (Jan. 1970) PETER LAWRENCE, D.D.S. (March 1968) *ROBERT BERNARD LAWSON, JR., Ph.D. (1966) GUY WHITMAN LEADBETTER, M.D. (1967) JUDETH ALICE LEGENDRE, M.S. (1969) LESLIE RAYMOND LEGGETT, D.P.E. (1962)¹ OLGA LEHOVICH, M.A. (1968) *HAROLD LEITENBERG, Ph.D. (1965) DAVID NORMAN LEMNAH, B.S. (1969) MARY ELLEN LEONARD, M.A. (1964-67; 1968) MICHAEL HEATON LEONARD, Ph.D. (1964) JONATHAN PORTER AARON LEOPOLD, M.D. (1966) EUGENE LEPESCHKIN, M.D. (Dec. 1946) IULIA W. LEPESCHKIN, (MRS. E.) M.A. (1959-61; 1962) Assistant Professor of Home Economics **JAMES MAXIMILLIAN LEVIN, Ph.D. (1969)** HYMAN BERNARD LEVINE, M.D. (Oct. 1961)

ARTHUR MAURICE LEVY, M.D. (1963) *GORDON FIELDING LEWIS, Ph.D. (1961)² JOHN DOWNES LEWIS, M.D. (1968) WILLIAM J. LEWIS, Ph.D. (1954) *FRANK WAYNE LIDRAL, Ph.D. (1960) GERTRUDE E. LIENKAEMPER, M.A. (Jan. 1970) *HARRY LIGHTHALL, JR., Ph.D. (1955)⁸ PETER CASTLE LINTON, M.D. (Jan. 1965) RICHARD LEWIS LIPSON, M.D. (Dec. 1963) GEORGE THOMAS LITTLE, Ph.D. (1950) *JOHN ERNEST LITTLE, Ph.D. (1945) JOYCE KENYON LIVAK, M.S. (1966) WAYNE EDWARD LIVERMORE, M.D. (1969) *JOHN HUTCHISON LOCHHEAD, Ph.D. (1942)² *NORMAN THEODORE LONDON, Ed.D. (1960)4 JOHN GIFFORD LONG, D.D.S. (1969) *LITTLETON LONG, Ph.D. (1949) JEROLD FRANCIS LUCEY, M.D. (1956) *WILLIAM HOSSFELD LUGINBUHL, M.D. (1960) *ELEANOR MERRIFIELD LUSE, Ph.D. (1947) THOMAS EDWARD LUX, M.A. (1968) CHRISTOPHER PATRICK McAREE, M.B. (Aug. 1962)² *HERBERT CHRISTIAN MCARTHUR, Ph.D. (1950)³ THOMAS GORDON McCARTHY, M.A. (1967) *JON JOSEPH McCORMACK, JR., Ph.D. (May 1966) MAXWELL L. MCCORMACK, JR., D.F. (1964) *H. LAWRENCE McCROREY, Ph.D. (1966)

Associate Professor of Electrical Engineering Associate Professor of Biochemistry Assistant Professor of Dental Hygiene Assistant Professor of Zoology Visiting Associate Professor of Speech Assistant Professor of Education Instructor in Physical Education Assistant Professor of Community Medicine Clinical Associate Professor of Psychiatry Instructor in Mathematics Assistant Professor of Education Instructor in Romance Languages Associate Professor of Otolaryngology Clinical Instructor in Dental Hygiene Associate Professor of Psychology Professor of Urology Instructor in Mathematics Associate Professor of Physical Education Instructor in Romance Languages Associate Professor of Psychology Instructor in Physical Education Instructor in English Assistant Professor of English Assistant Professor of Psychiatry Professor of Medicine Assistant Professor of Psychology Clinical Instructor in Community Medicine and Medicine Associate Professor of Medicine and Pediatrics Professor of Sociology and Anthropology Assistant Professor of Obstetrics and Gynecology Professor of Speech Professor of Music Assistant Professor of Home Economics Associate Professor of Mathematics Assistant Professor of Surgery Assistant Professor of Medicine Professor of Political Science Professor of Microbiology and Biochemistry Assistant Professor of Home Economics Instructor in Obstetrics and Gynecology Professor of Zoology Associate Professor of Speech Instructor in Dental Hygiene Professor of English **Professor** of **Pediatrics** Professor of Pathology Professor of Speech Instructor in Sociology and Anthropology Assistant Professor of Psychiatry Professor of English Instructor in Classics Associate Professor of Pharmacology Associate Professor of Forestry

Associate Professor of Physiology and Biophysics

- 1. Sabbatical leave first semester 1970-71
- 2. Sabbatical leave 1970-71
- 3. Leave of absence 1969-70
- 4. Sabbatical leave second semester 1969-70

JAMES BISHOP McGILL, M.D. (1952) GERALD FRANCIS McGINNISS, M.D. (1962) JOHN MARSHALL McGINNISS, JR., M.D. (Oct. 1969) *JERRY LEON McINTOSH, Ph.D. (1964)1 ELIZABETH FOOTE McKAY, M.S.W. (1969) ROBERT JAMES McKAY, JR., M.D. (1949) MARION CLAIRE McKEE, M.D. (1958) *HUGH STRATTON McKENZIE, Ph.D. (1967) RICHARD WARREN McLAY, Ph.D. (1968) E. DOUGLAS McSWEENEY, JR., M.D. (1964) JOHN HAMILTON MABRY, Ph.D. (1963)² GEORGE BUTTERICK MACCOLLUM, Ph.D. (1966)³ Associate Professor of Plant and Soil Science JAMES NEIL MACDONALD, M.A. (1966) ALBERT GEORGE MACKAY, M.D. (1933) ROBERT STANFORD MACLELLAN, D.D.S. (1969) *WILLIAM HOOPER MACMILLAN, Ph.D. (1954)3 JAMES FREDERICK MADISON, M.D. (Nov. 1964) JOHN VANSICKLEN MAECK, M.D. (1948) FRANCIS E. MAGEE, M.S.N. (1968) *FRANK MANCHEL, Ed.D. (1967) JAMES EDWARD MARCEAU, D.D.S. (1949-52; 1954) JOHN CLEVELAND MARRIOTT, Ph.D. (1969) CARLTON DEAN MARSHALL, M.D. (1966) GILBERT ADAMS MARSHALL, M.S. (1947) KATHLEEN AUDREY MARSLAND, M.S. (1964) THOMAS WILLIAMS MARTENIS, M.D. (1967) HERBERT L. MARTIN, M.D. (1965) LUTHER HOWARD MARTIN, JR., S.T.M. (1967) *FRANK MARTINEK, Ph.D. (1967) *JAMES WALLACE MARVIN, Ph.D. (1939) HUNTINGTON MAVOR, M.D. (Aug. 1969) ROBERT ARTHUR MAXWELL, Ph.D. (1962-65; 1967) JOHN EDMUND MAZUZAN, JR., M.D. (1959) HAROLD EDWARD MEDIVETSKY, M.D. (1937) CORNELIUS IRVING MEEKER, M.D. (1962) HAROLD AUSTIN MEEKS, Ph.D. (1964)5 ALBERT SIMEON MELANSON, M.D. (1969) RICHARD WALLACE PAUL MELLISH, M.B. (1963) *DONALD BURTON MELVILLE, Ph.D. (1960) DONALD J. MERCHANT, Ph.D. (1969) *BRUCE ELWYN MESERVE, Ph.D. (1964) MARION ELIZABETH METCALFE, (MRS. W. C.) B.A. (1966) WILLIAM CRAIG METCALFE, Ph.D. (1963)5 *WILLIAM LAROS MEYER, Ph.D. (1962) GARY KEITH MICHAEL, M.B.A., C.P.A. (1965) REGINALD VENN MILBANK, M.S. (1946-48; 1949) *EDWARD JERVIS MILES, Ph.D. (1962)6 MADELINE BROWN MILES, M.A. (1969) RAYMOND LEE MILHOUS, M.D. (Feb. 1968)

Clinical Assistant Professor of Surgery Assistant Professor of Psychiatry Instructor in Surgical Otolaryngology Associate Professor of Plant and Soil Science Instructor in Home Economics Professor of Pediatrics Clinical Assistant Professor of Pediatrics Assistant Professor of Education Associate Professor of Mechanical Engineering Assistant Professor of Surgery Professor of Community Medicine Instructor in Speech Professor of Surgery Instructor in Dental Hygiene Professor of Pharmacology Assistant Professor of Dermatology Professor of Obstetrics and Gynecology Assistant Professor of Professional Nursing Associate Professor of English Assistant Professor of Dental Hygiene Adjunct Professor of Education Clinical Instructor in Psychiatry Associate Professor of Mechanical Engineering Assistant Professor of Professional Nursing Instructor in Medicine Professor of Neurology Instructor in Philosophy and Religion Associate Professor of Mechanical Engineering Professor of Botany Associate Professor of Neurology Visiting Professor of Pharmacology Associate Professor of Anesthesiology Clinical Assistant Professor of Medicine Assistant Professor of Obstetrics and Gynecology Assistant Professor of Geography Instructor in Obstetrics and Gynecology Associate Professor of Pediatric Surgery Professor of Biochemistry Professor of Medical Microbiology **Professor of Mathematics** Instructor in Music Assistant Professor of History Assistant Professor of Biochemistry Assistant Professor of Economics and Business Administration Professor of Civil Engineering Professor of Geography

DAVID ALLISON MILLER, M.S. (Dec. 1969) DONALD BARKER MILLER, M.D. (1951) WILLARD MARSHALL MILLER, Ph.D. (1969)

Assistant Professor of Rehabilitation Medicine Assistant Professor of Community Medicine

Assistant Professor of Speech

Associate Professor of Thoracic and Cardiac Surgery Assistant Professor of Philosophy and Religion

- 1. Sabbatical leave January 1, 1969 to December 31, 1969
- 2. Sabbatical leave October 1, 1969 to September 30, 1970
- 3. Sabbatical leave August 1, 1969 to July 31, 1970
- 4. Leave of absence September 15, 1969 to September 1, 1971
- 5. Sabbatical leave 1970-71
- 6. Sabbatical leave 1969-70

JEAN BEATTIE MILLIGAN, M.Ed. (1953) ISABEL CLARK MILLS, M.A. (1932) JOHN HOLLISTER MILNE, M.D. (1964) HOWARD JAY MINDELL, M.D. (Oct. 1967) GAGAN MIRCHANDANI, Ph.D. (1968) WILLIAM EDWARD MITCHELL, Ph.D. (1967) THOMAS JOHN MOEHRING, Ph.D. (Jan. 1968) MAUREEN KATHERINE MOLLOY, M.D. (1968) IAMES LEO MONAHAN, B.S. (Jan. 1970) MAURICE EDWARD MONGEON, M.D. (Oct. 1966) DALE BISHOP MONTGOMERY, D.M.D. (Feb. 1965) PAUL AMOS MOODY, Ph.D. (1927) **IOSEPHINE ANN MORGAN, D.N. (Oct. 1969)** PAUL MICHAEL MORRISSEAU, M.D. (Jan. 1970) CHARLES THOMAS MORRISSEY, M.A. (1968) DOROTHY JACKSON MORROW, (MRS. R. C.) M.D. (1952) RUFUS CLEGG MORROW, M.D. (1951) *ELLEN HASTINGS MORSE, Ph.D. (1960) *DONALD EUGENE MOSER, Ph.D. (1960)1 MICHAEL JEROME MOYNIHAN, M.D. (1966) HENRY NICHOLAS MULLER, III, Ph.D. (1966) JOHN JOSEPH MURPHY, M.D. (Jan. 1969) BARBARA LEE SPAULDING MURRAY, M.S. (Mar. 1968) JOHN JOSEPH MURRAY, M.D. (1968) ROGER WALTER MURRAY, D.V.M. (1968) DANIEL FRANCIS MURTHA, B.S. (Aug. 1968)

RICHARD E. MUSTY, Ph.D. (Jan. 1968) CHARLES CHRISTOPHER MYERS, Ph.D. (1969) ELIZABETH BRIDGE CLUM MYERS, B.A. (Jan. 1969) *MILTON JOSEPH NADWORTHY, Ph.D. (1952)²

STEPHEN WILLIAM NAGY, Ph.D. (1969) WALTER NARDELLI, M.Ed. (Jan. 1970) Instructor in NARAYAN KRISHNACHARYA NARGUND, M.A. (1966)

RICHARD MILTON NARKEWICZ, M.D. (1966) ROBERT JAMES NASH, Ed.D. (1969) WILLIAM HOWARD NEDDE, JR., M.S. (1967) GARRISON NELSON, M.A. (1968) DAVID S. NEWCOMBE, M.D. (Oct. 1967) CHESTER ALBERT NEWHALL, M.D. (1929) GEORGE HUBERT NICHOLSON, M.A. (1923) ALEXANDER NIES, M.D. (1965) KAY MILLIGAN NILSON, Ph.D. (Aug. 1966) KARYN LOUISE NIRADY, M.S. (1969) JAMES ROBERT NOLFI, II, Ph.D. (1969) CHARLES PRYOR NOVOTNY, Ph.D. (1968) CHARLES LEE NOYES, M.A. (1969) MITSUO NUMOTO, M.D. (1962) *ANDREW EDGERTON NUQUIST, Ph.D. (1938) *WESLEY LEMARS NYBORG, Ph.D. (1960) *ELBERT AUSTIN NYQUIST, M.S., C.P.A. (1953)

ROBERT EMMETT O'BRIEN, M.D. (1956) RICHARD WILLIAM OEHLER, B.Ed. (1967)

DONALD CLARK OLIVEAU, M.D. (1968)

Sabbatical leave 1970-71
 Sabbatical leave second semester 1970-71

Associate Professor of Nursing Associate Professor of Art Clinical Assistant Professor of Medicine Instructor in Radiology Assistant Professor of Electrical Engineering Associate Professor of Psychiatry Assistant Professor of Medical Microbiology Assistant Professor of Orthopedic Surgery Lecturer in Political Science Assistant Professor of Medicine Instructor in Dental Hygiene Howard Professor of Natural History and Zoology Instructor in Obstetrics and Gynecology Nursing Assistant Professor of Urology Adjunct Professor of History Assistant Professor of Pediatrics Professor of Otolaryngology Professor of Home Economics Associate Professor of Mathematics Assistant Professor of Medicine Assistant Professor of History Clinical Instructor in Psychiatry Instructor in Professional Nursing Instructor in Pediatrics Associate Professor of Animal Pathology Major, U.S. Army, Assistant Professor of Military Science Assistant Professor of Psychology Assistant Professor of Forestry Instructor in Philosophy and Religion Professor of Economics and Business Administration Assistant Professor of Physics Instructor in Economics and Business Administration Assistant Professor of Economics and Business Administration **Clinical Instructor in Pediatrics** Assistant Professor of Education Instructor in Physical Education Instructor in Political Science Associate Professor of Medicine Thayer Professor of Anatomy Lecturer in Mathematics Assistant Professor of Psychiatry Associate Professor of Animal Sciences Instructor in Microbiology and Biochemistry Assistant Professor of Zoology Assistant Professor of Medical Microbiology Instructor in History Associate Professor of Surgery McCullough Professor of Political Science Professor of Physics Professor of Economics and Business Administration Clinical Associate Professor of Medicine Lt. Colonel, U.S. Army, Professor of Military Science Assistant Professor of Psychiatry

HERLUF V. OLSEN, JR., M.H.A. (Oct. 1967) JAMES PAUL OLSON, Ph.D. (1969) * JOSEPH CLARENCE OPPENLANDER, Ph.D. (Jan. 1969) *RALPH HARRY ORTH, Ph.D. (1959) MARILYN MAY OSBORN, M.Ed. (1968) CLARE MARSHALL O'SHEA, M.D. (1955-64; 1967) *JOHN OGDEN OUTWATER, Sc.D. (1956) JAMES HARRIS OVERFIELD, Ph.D. (1968) BRENDA KATHLEEN OWRE, (MRS. E. M.), M.A. (1969) EDWIN MERTON OWRE, M.F.A. (1969) JAMES STEVEN PACY, M.A. (1967) WILLIAM EDWARD PADEN, Ph.D. (1965) PAUL PAGANUZZI, Ph.D. (1961) HAROLD GORDON PAGE, M.D. (1954) MARY ELLEN HUNT PALMER, M.S. (1953) *IPPOCRATES PAPPOUTSAKIS, M.Mus. (1940) DAVID RAYMOND PARK, M.D. (1969) MALCOLM SKEELS PARKER, D.M.L. (1953) MARTHA ELIZABETH PARKER, M.A. (1969) EVELYN LOUISE PARKS, M.D. (Jan. 1970) **RODNEY LAWRENCE PARSONS, Ph.D.** (1967) ALAN KIMMEL PASKOW, M.A. (1968) *WAYNE CURTIS PATTERSON, Ph.D. (Jan. 1965) HENRI ROGER PAUCKER, Ph.D. (1969) EDWIN MATTSON PAXSON, M.D. (1957) RICHARD EDWARD PEASE, M.D. (Dec. 1969) *NORMAN EUGENE PELLETT, Ph.D. (1967) *MERVIN WILLIAM PERRINE, Ph.D. (1961)1 *JAMES ALLAN PETERSON, Ed.D. (1966) OSCAR SYLVANDER PETERSON, JR., M.D. (1944) MARY MARGARET PETRUSICK, Ph.D. (1962)1 C. ALAN PHILLIPS, M.D. (1966) CAROL FENTON PHILLIPS, M.D. (Aug. 1968) JEANETTE TERESA PHILLIPS, B.S. (1969) RONALD CHESTER PICOFF, M.D. (1965) DAVID BOGART PILCHER, M.D. (1969) *SIDNEY BORIS POGER, Ph.D. (1962)² ZANDER PONZO, Ph.D. (Jan. 1970) LUCENE LOUISE POOLEY, (MRS. J. E.), B.S. (Jan. 1970) WILLARD BISSELL POPE, Ph.D. (1934) CHARLES MARCEL POSER, M.D. (Dec. 1968) *MILTON POTASH, Ph.D. (1951) AGNES TERESA POWELL, M.S. (Apr. 1963) PLATT RUGAR POWELL, M.D. (1949) RONALD EUGENE PRATHER, Ph.D. (1969) CHARLES LOW PRATT, III, Ph.D. (1969) WILLIAM ARTHUR PRATT, M.D. (1954) FAITH KENYON PRIOR, M.S. (1967)³ ANN PEMRICK QUINN, M.A. (Jan. 1967) WILHELM RAAB, M.D. (1939) *DAVID WILLIAM RACUSEN, Ph.D. (1958) CHARLES LEWIS RAVARIS, M.D. (1965) EVELYN R. READ, M.M. (1969) THOMAS LAWRENCE READ, M.M. (1967) RICHARD REA REED, D.D.S. (1969) PAUL THOMAS REINHARDT, B.S.E. (1968) *ERNEST REIT, Ph.D. (Dec. 1965)

Professor of Hospital Administration Assistant Professor of Civil Engineering Professor of Civil Engineering Associate Professor of English Instructor in Home Economics Instructor in Medicine Professor of Mechanical Engineering Assistant Professor of History Instructor in English Assistant Professor of Art Assistant Professor of Political Science Assistant Professor of Philosophy and Religion Associate Professor of Russian Clinical Professor of Surgery Associate Professor of Nursing Professor of Music Clinical Instructor in Medicine Associate Professor of Romance Languages Instructor in English Instructor in Sociology and Anthropology Assistant Professor of Physiology and Biophysics Instructor in Philosophy and Religion Associate Professor of Psychology Assistant Professor of German Clinical Assistant Professor of Pediatrics Assistant Professor of Anesthesiology Assistant Professor of Plant and Soil Science Associate Professor of Psychology Assistant Professor of Education Clinical Associate Professor of Radiology Associate Professor of Education Associate Professor of Medicine and Medical Microbiology Instructor in Pediatrics Instructor in Dental Hygiene Assistant Professor of Pathology Assistant Professor of Surgery Associate Professor of English Adjunct Professor of Education Instructor in Home Economics Professor of English Professor of Neurology Professor of Zoology Associate Professor of Home Economics Clinical Professor of Urology Associate Professor of Mathematics Assistant Professor of Psychology Clinical Instructor in Medicine Assistant Professor of Home Economics Instructor in Professional Nursing Professor of Medicine Professor of Agricultural Biochemistry Assistant Professor of Psychiatry Instructor in Music Assistant Professor of Music Instructor in Dental Hygiene Instructor in Physical Education Associate Professor of Pharmacology

1. Sabbatical leave 1970-71

2. Sabbatical leave second semester 1969-70

3. Sabbatical leave first semester 1970-71

IOHN DOWNING RICE, JR., M.D. (Nov. 1968) VERONICA CHRISTINE RICHEL, Ph.D. (1969) LESTER EDMUND RICHWAGEN, B.S. (1965) WILLIAM G. RIEDERER, B.S. (Oct. 1969) DONALD L. RIFE, M.D. (Jan. 1970) *HEATH KENYON RIGGS, Ph.D. (1940-42;1953) RUSSELL HOWARD RILEY, Ed.D. (1967) BENJAMIN ALBERT RING, M.D. (1959) SOL ALEXANDER RIPPA, Ed.D. (1960) FRANCISCO JOSE RIVERA, M.A. (1969) DONALD STETSON ROBINSON, M.D. (1968) ALICE KELLY RODGERS, M.S. (1962) MARGARET DAMM ROLAND, Ph.D. (1966) JON ERIK ROLF, B.A. (Jan. 1970) *ALFRED BROOKS ROLLINS, JR., Ph.D. (1967) DIRK ROMEYN, M.D. (1967) THOMAS K. RONEY, M.A. (1967) ALFRED FELIX ROSA, M.A. (1969) CHARLES ROBERT ROSS, L.L.B. (Jan. 1969) RAYMOND JOSEPH ROSS, D.Ed. (Jan. 1970) *WILFRED ROTH, Ph.D. (1964)1 SHELDON IRA ROTHBERG, M.A. (1969) *HOWARD ROTHSTEIN, Ph.D. (1962) *LYMAN SMITH ROWELL, L.H.D. (1925) MARY 10 RUDD, M.A. (1969) BARBARA McNEIL RULE, M.Ed. (Feb. 1969) CARL FREDERICK RUNGE, M.D. (1969) *STANLEY RUSH, Ph.D. (1962)² ELEANOR MARY RUSSELL, B.S. (1967) JOSEPH N. RUSSO, M.D. (1968) CHARLES BRUSH RUST, M.D. (1948) WILLIAM JOHN RYAN, M.D. (Jan. 1970) RICHARD ALAN RYDER, M.D. (1967) THOMAS DUDLEY SACHS, Ph.D. (Feb. 1962) *ALBERT WILLIAM SADLER, Ph.D. (1956) HARVEY SALGO, M.A. (1969) EUGENE SAPADIN, Ph.D. (1969) *FREDERIC OBERLIN SARGENT, Ph.D. (Aug. 1962)³ HERBERT SAVEL, M.D. (1967) WADI ISSA SAWABINI, D.D.S. (1951) JANET RUTH SAWYER, Ph.D. (1968) ROBERT NEWTON SAXBY, M.D. (1954) *LEONARD MICHAEL SCARFONE, Ph.D. (1963)⁸ GEORGE SCATCHARD, B.A. (1966) WARREN IRA SCHAEFFER, Ph.D. (Dec. 1967) *ARNOLD HAROLD SCHEIN, Ph.D. (1947)4 WILLIAM MURRELL SCHENK, M.A. (1965) ROBIN RUDOLF SCHLUNK, Ph.D. (1967) CARL LUDWIG SCHMIDER, M.A. (1968) *WOLFE WILHELM SCHMOKEL, Ph.D. (1962-64; 1965)2. KAYE F. SCHMUCKER, Ph.D. (1968) EDWIN CALVIN SCHNEIDER, M.S. (1946) RONALD MICHAEL SCHNITZLER, Ph.D. (March, 1969) Instructor in Physiology and Biophysics

Associate Professor of Pathology Assistant Professor of German Professor of Hospital Administration Capt. U.S. Army, Assistant Professor of Military Science Clinical Assistant Professor of Psychiatry Professor of Mathematics Assistant Professor of Education Associate Professor of Radiology Professor of Education Instructor in Romance Languages Assistant Professor of Medicine Assistant Professor of Nursing Assistant Professor of Art Assistant Professor of Psychology Professor of History Clinical Instructor in Obstetrics and Gynecology Instructor in Mathematics Instructor in English Adjunct Professor of Economics and **Business** Administration Associate Professor of Vocational, Technical and Extension Education Professor of Electrical Engineering Instructor in English Associate Professor of Zoology Associate Professor of Zoology Instructor in Speech Instructor in Technical Nursing Instructor in Medicine Professor of Electrical Engineering Instructor in Medical Technology Clinical Assistant Professor of Obstetrics and Gynecology Clinical Associate Professor of Orthopedic Surgery **Clinical Instructor in Medicine** Instructor in Medicine Assistant Professor of Physics Professor of Philosophy and Religion Assistant Professor of Economics and Business Administration Lecturer in Philosophy and Religion Professor of Agricultural Economics Assistant Professor of Medicine Associate Professor of Dental Hygiene Associate Professor of Nursing Clinical Instructor in Radiology Associate Professor of Physics Assistant Professor of Art Assistant Professor of Medical Microbiology Associate Professor of Biochemistry Assistant Professor of Speech Assistant Professor of Classics Instructor in Speech Associate Professor of History Adjunct Professor in Education Professor of Agricultural Engineering

- 1. Sabbatical leave 1970-71
- 2. Sabbatical leave 1969-70

3. Sabbatical leave second semester 1969-70

4. On leave of absence July 15, 1969 to June 30, 1970

*NORMAN JAMES SCHOONMAKER, Ph.D. (1956) Professor of Mathematics TRENT SCHROYER, Ph.D. (1969)4 Assistant Professor of Sociology and Anthropology *HAROLD SEESSEL SCHULTZ, Ph.D. (1946) Professor of History HERBERT LOUIS SCHULTZ, M.A. (1957)² Associate Professor of Music 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) Instructor in Economics and Business Administration JO ANN SCRANTON, M.S. (1968) Instructor in Professional Nursing FINLEY ALEXANDER SEAGLE, M.D. (1969) Clinical Instructor in Medicine BARBARA MCEVOY SEPE, M.A. (1969) Instructor in Romance Languages ANTHONY DOMINIC SERRA, M.A. (1967) 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) **Clinical Instructor in Psychiatry** WILLIAM IRELAND SHEA, M.D. (1952) Clinical Assistant Professor of Surgery ALLEN GLASS SHEPHERD, III, Ph.D. (1965) Assistant 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. (Jan. 1969) Instructor in Obstetrics and Gynecology *KENNETH ROGERS SIMMONS, Ph.D. (Jan. 1963) Associate Professor of Animal Sciences MORRIS LEON SIMON, M.A. (1954)³ Assistant 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 SIOGREN, Ph.D. (1967) Assistant Professor of Microbiology and Biochemistry HOWARD DARRELL SLACK, D.D.S. (1950) Assistant Professor of Dental Hygiene WILLIAM JOSEPH SLAVIN, M.D. (May 1943) Professor of Obstetrics and Gynecology Instructor in Dental Hygiene MARY GREENLAW SLOANAKER, B.S. (1968) *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) Professor of Pharmacology HOWARD MARSHALL SMITH, JR., M.S. (1947) Professor of Electrical Engineering JAMES WARREN SMITH, M.D. (1967) Assistant Professor of Pathology MARK SMITH, Ph.D. (Jan. 1970) Adjunct Professor in Education NANCY RISDON SMITH, B.S. (1969) Adjunct Instructor in Dental Hygiene NEIL GIBSON SMITH, M.A. (1968) Lecturer in Speech DAVID LEE SOBERS, Ph.D. (1965) Assistant Professor of Philosophy and Religion SAMUEL SOLOMON, Ph.D. (1968) Visiting Professor of Obstetrics and Gynecology FELIX SOMMER, M.D. (Jan. 1965) Clinical Instructor in Psychiatry ARTHUR BRADLEY SOULE, JR., M.D. (1929) Professor of Radiology M. PHYLLIS SOULE, B.S. (1968) Instructor in Home Economics *THOMAS JOHN SPINNER, JR., Ph.D. (1957-59; 1962)4 Associate Professor of History *THOMAS SPROSTON, JR., Ph.D. (1946) Professor of Botany HORACE HARRISON SQUIRE, Ph.D. (1962) Assistant 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 PAUL BYRON STANILONIS, M.D. (1969) Clinical Instructor in Medicine *ROLFE SEATON STANLEY, Ph.D. (1964) Associate Professor of Geology ERNEST STARK, M.D. (1945) Associate Professor of Pathology JOHN NEWHALL STARK, M.D. (Jan. 1967) Instructor in Psychiatry 1. Resigned December 31, 1969

- 2. Sabbatical leave first semester 1970-71
- 3. Sabbatical leave second semester 1970-71
- 4. Sabbatical leave 1969-70

Associate Professor of Political Science STANISLAW JAN STARON, Ph.D. (1961) BURDETT KINNEY STEARNS, Ph.D. (Nov. 1965) Adjunct Assistant Professor of Civil Engineering RONALD ALBERT STEFFENHAGEN, Ph.D. (1966) Assistant Professor of Sociology and Anthropology Assistant Professor of History HENRY JOHN STEFFENS, Ph.D. (1969) Instructor in Mathematics WILLIAM MARK STEIN, M.A. (1967) WILLIAM ALEXANDER STEPHANY, Ph.D. (1968) Assistant Professor of English Associate Professor of Zoology DEAN FINLEY STEVENS, Ph.D. (1967) Instructor in Psychiatry CARYL J. STEWART, M.S.W. (1968) *WARREN R. STINEBRING, Ph.D. (Dec. 1967) Professor of Medical Microbiology PATRICIA ANN STONE, Ph.D. (1967) Assistant Professor of Psychology **Clinical Instructor in Medicine** WILLIAM HAYDN STOUCH, M.D. (1967) *NEIL RALPH STOUT, Ph.D. (1964)¹ Associate Professor of History Assistant Professor of Physical Education NORMAN KENNETH STRASSBURG, M.Ed. (1946) Assistant Professor of Chemistry MICHAEL JOHN STRAUSS, Ph.D. (1968) Clinical Professor of Pediatrics RALPH DANIEL SUSSMAN, M.D. (1946) Instructor in Pediatrics DONALD REED SWARTZ, M.D. (1967) Associate Professor of Mathematics and *DAVID LUTHER SYLWESTER, Ph.D. (1965) Community Medicine Professor of Medicine BURTON SAMUEL TABAKIN, M.D. (1954)1 Assistant Professor of Obstetrics and Gynecology DAVID LATHAM TABER, M.D. (1953) JOHN PETER TAMPAS, M.D. (1962) Associate Professor of Radiology and Pediatrics RICHARD LAURENCE TANNEN, M.D. (Mar. 1969) Assistant Professor of Medicine Associate Professor of Electrical Engineering *CHARLES FRANCIS TAYLOR, Ph.D. (Feb. 1964)1 Professor of Botany FRED HERBERT TAYLOR, Ph.D. (1943)² HOWARD CANNING TAYLOR, III, M.D. (1962) Assistant Professor of Pathology Clinical Associate Professor of Medicine CHRISTOPHER MARLOWE TERRIEN, M.D. (1939) LOUIS GEORGE THABAULT, M.D. (1939) Clinical Instructor in Surgery WILFRED LOUIS THABAULT, M.D. (Jan. 1958) Assistant Professor of Obstetrics and Gynecology Assistant Professor of Biochemistry *IOHN WALTER THANASSI, Ph.D. (Aug. 1967) Assistant Professor of Psychiatry GORDON CLARK GREGORY THOMAS, M.D. (Dec. 1968) Assistant Professor of Nursing MARY ELIZABETH THOMPSON, M.A. (1958) RICHARD STUART THOMSEN, M.A. (1966) Assistant Professor of Speech Assistant Professor of Social Work, Psychiatry RUTH EMILY THOMSON, M.S. (1969) JOHN EDWARD THRESHER, JR., B.S. (1969) Instructor in Geology Instructor in German KLAWA NEPSCHA THRESHER, M.A. (1968) *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 Clinical Assistant Professor of Psychiatry JAMES MARTIN TODD, Ph.D. (1969) Associate Professor of Pathology HELENE WALLACE TOOLAN, (MRS. J. M.) Ph.D. (1964) Assistant Professor of Psychiatry JAMES MICHAEL TOOLAN, M.D. (1964) DAVID M. TORMEY, M.D. (Aug. 1968) Associate Professor of Community Medicine THERESE CECILE TRAHAN, M.A. (1969) Instructor in Music 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) Associate Professor of Agricultural Economics *JACK TREVITHICK, Ph.D. (1946) Professor of English **KEITH FRANK TRUAX, M.D. (1932)** Clinical Associate Professor of Surgery MARSHALL MACDONALD TRUE, Ph.D. (1966) Assistant Professor of History CHARLES FREDERICK TSCHOPP, M.D. (Aug. 1968) Assistant Professor of Otolaryngology ARTHUR FREDERICK TUTHILL, M.S. (1943)8 Professor of Mechanical Engineering JOHN CUSHMAN TWITCHELL, M.D. (1961) Assistant Professor of Medicine Associate Professor of Romance Languages *LOUIS MALDONADO UGALDE, Ph.D. (1962)3 Assistant Professor of Professional Nursing HELENA A. URE, M.S. (1968) ESTHER JANE URIE, M.A.T. (1968) Instructor in English HENRY CARMER VANBUREN, M.D. (1962) Assistant Professor of Medicine

1. Sabbatical leave 1970-71.

2. Sabbatical leave first semester 1970-71.

3. Sabbatical leave second semester 1969-70.

FREDERICK WILLIAM VANBUSKIRK, M.D. (1946) Clinical Associate Professor of Radiology Assistant Professor of Plant and Soil Science KENNETH EVERSON VARNEY, M.S. (1946) ROSS EDWARD VAUGHN, M.S. (1969) Instructor in Physical Education JANE ROSE VINCENT, M.A.T. (1969) Instructor in Mathematics *HUBERT WALTER VOGELMANN, Ph.D. (1955)1 Associate Professor of Botany JAMES ANTHONY VOLLKOMMER, M.S. (1967) Instructor in Geology IOHANNES GEORG VONTRAPP, M.F.Sc. (1969) Lecturer in Forestry *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, (1968-1969; Jan. 1970) Instructor in Art HAROLD JAMES WALLACE, JR., M.D. (1964)² Assistant Professor of Medicine and Pharmacology JULIAN ARNOLD WALLER, M.D. (1968) Professor of Community Medicine GORAN CARL WALLGREN, M.D. (Jan. 1970) Visiting Professor of Pediatrics and Medicine LESTER JULIAN WALLMAN, M.D. (1948) Professor of Neurosurgery MAURICE JAMES WALSH, M.D. (Jan. 1968) Instructor in Community Medicine JOSEPH FRANKLIN WARK, D.M.D. (Nov. 1964) Clinical Instructor in Dental Hygiene RICHARD RALPH WARNER, M.A. (1967) Assistant Professor of Political Science ROBERT JAMES WATSON, D.M.D. (March 1968) Clinical Instructor in Dental Hygiene LELON 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)^d Associate Professor of Home Economics *TRUMAN MARION WEBSTER, Ph.D. (1945) Professor of German MAIDA EWING WEDELL, M.A. (1967) Instructor in Art LAWRENCE L. WEED, M.D. (1969) Professor of Medicine and Community Medicine THOMAS ALLEN WEIDMAN, Ph.D. (1969) Assistant Professor of Anatomy *JOHN GEORGE WEIGER, Ph.D. (1958-62; 1964) Associate Professor of Romance Languages FRANCIS ALEXANDER WEINRICH, M.A. (1950) Assistant Professor of Music *JAMES GRAHAM WELCH, Ph.D. (Jan. 1968) Associate 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, 3rd., M.D. (Jan. 1956) Associate Professor of Medicine *EUGEN EMMANUEL WELTIN, Dr.sc.nat. (1966) Assistant Professor of Chemistry Assistant Professor of Anatomy EMMA FRANCA WENNBERG, (MRS. J. E.) M.D. (1967) 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 WILLIAM LEIGHTON WHEELER, B.A. (Jan. 1970) Instructor in Economics and Business Administration WENDEL JENNISON WHITCHER, Ph.D. (1952) Associate Professor of Chemistry JAMES FELLOWS WHITE, Ph.D. (1955) Professor of German LAURA LUCILLE WHITE, M.A. (1968) Instructor in English *WILLIAM NORTH WHITE, Ph.D. (1963) Professor of Chemistry BUDD BERGOVOY WHITEBOOK, M.Phil. (1969). Instructor in English SUSAN MARION WHITEBOOK, (MRS. B. B.) B.A. (1969) Instructor in Romance Languages *ROY ALVIN WHITMORE, JR., M.F. (1958) Associate Professor of Forestry MARGARET BEACH WHITTLESEY, M.S.W. (1964) Assistant Professor of Home Economics ELBERT BENJAMIN WHORTON, JR., Ph.D. (June, 1968) Assistant Professor of Community Medicine and Mathematics *SAMUEL CLAUDE WIGGANS, Ph.D. (Feb. 1963) Professor of Plant and Soil Science 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

1. Sabbatical leave second semester 1969-70, and second semester 1970-71.

- 2. Resigned January 31, 1970.
- 3. Sabbatical leave second semester 1969-70

*BLAIR WILLIAMS, M.S. (1946-48; 1949) CLODIUS WILLIS, Ph.D. (1969) MARY SWEIG WILSON, Ph.D. (1969) WILLIAM GERARD WINTERS, M.D. (1968) SARAH ALLENE WISE, M.S. (1967) CATHARINE MARGARET WOOD, B.S. (1969) GLEN MEREDITH WOOD, Ph.D. (1950)1 NORMA LOWYN WOODRUFF, Ph.D. (1952) RICHARD S. WOODRUFF, M.D. (1950) WILLIAM ALOYSIUS WOODRUFF, M.B. (1962) *ROBERT CUMMINGS WOODWORTH, Ph.D. (1961) GERALD WOOLF, Ph.D. (1968) *ROBERT KINGMAN WRIGHT, Ph.D. (1966) *CLAUS ADOLF WULFF, Ph.D. (1965) ALBERT WILHELM WURTHMANN, M.A. (Jan. 1947) ROY EDWARD WUTHIER, Ph.D. (1969) DHARAM PAUL YADAV, Ph.D. (Jan. 1970) HENRY GEORGE YOUNG, JR., M.S.M.E. (Jan. 1970) WILLIAM GREENHILL YOUNG, M.D. (1949) *WILLIAM JOHNSON YOUNG, II, Ph.D. (May 1968) MARJORIE B. ZEUCH, M.A. (1968) ELIZABETH K. ZIMMERLI, Ed.D. (1967) SALVATORE MARIO ZUMBO, M.A. (1968)

Associate Professor of Home Economics Assistant Professor of Romance Languages Assistant Professor of Speech Assistant Professor of Medicine Instructor in Medical Technology Instructor in Medical Technology Associate Professor of Plant and Soil Science Professor of Nursing Assistant Professor of Pathology Associate Professor of Psychiatry Assistant Professor of Biochemistry Associate Professor of Speech Assistant Professor of Mathematics Associate Professor of Chemistry Assistant Professor of German Assistant Professor of Biochemistry Assistant Professor of Speech Instructor in Mechanical Engineering Clinical Associate Professor of Psychiatry Professor of Anatomy Instructor in English Associate Professor of Physical Education Instructor in Romance Languages

Associates in Instruction and Research

ROSEMARY C. BREWSTER, M.D. HARRY LIVINGSTON COLOMBO, M.D. JOHN PATRICK CORLEY, M.D. WILLIAM HENRY HEININGER, M.D. HERMAN CONRAD HERRLICH, Ph.D. PATRICIA KATHERINE HICKCOX, B.A. J. LORIMER HOLM, M.D. M. STEPHEN HUNTLEY, B.S. YOSHINORI ISHIKAWA, D.Ag.Sci. SHIGEMASA IKEDA, M.D. KATHRYN DYKSTRA IORIO, M.D. RICHARD HARRY JAGELS, Ph.D. FREDERICK MITCHELL LAING, M.S. ELIZABETH K. LINCOLN, M.S.W. GEORGE LUCCHINA, M.D. GEORGE E. LUCIA, JR., M.D. IOAN MOEHRING, Ph.D. CHARLES E. MOISAN, JR., M.D. JOHN LOUIS SAIA, M.D. JAN R. SCHULTZ, M.S. NAMIK K. UZSAY, M.D. MAURICE JAMES WALSH, M.D.

Clinical Associate in Psychiatry Clinical Associate in Medicine Clinical Associate in Medicine Clinical Associate in Medicine Research Associate in Experimental Medicine Research Associate in Regional Medical Program Clinical Associate in Radiology Research Associate in Psychology Research Associate in Biochemistry Research Associate and Clinical Associate in Anesthesiology Research Associate in Regional Medical Program Research Associate in Botany Research Associate in Botany Research Associate in Psychiatry Research Associate in Physiology Clinical Associate in Surgery Research Associate in Microbiology Clinical Associate in Medicine Clinical Associate in Medicine Research Associate in Medicine Clinical Associate in Medicine Clinical Associate in Medicine

Administration

DAVID RICHARD ABBOTT, M.A. (1965) EDWIN BARTLETT ABBOTT (1921) HARRIS GRIFFITH ABBOTT (1969) STEPHEN P. ADAMS, B.A. (1967) RICHARD WALKER AMIDON, M.D. (1950) SARA WALTON ANDREWS, M.S.L.S. (1969) HAROLD C. AVERY, JR., B.S. (March, 1967) DAVID BABBOTT, M.D. (Aug. 1967) HERBERT A. BAHRENBURG, B.Ch.E. (1969) RICHARD OTTO BARWIN, M.A. (1968)

Assistant Dean, College of Arts and Sciences Auditor Emeritus Ĉivil Engineer, Land Records Office Administrative Associate, Department of Medicine Director of Student Health Services Catalog Librarian, Dana Medical Library Associate Accountant, Sponsored Projects Assistant Dean, College of Medicine Director of Physical Plant Administrative Assistant, Graduate College

1. Leave of absence October 1, 1969 through August 31, 1970

NORMAN C. BASELOW (Jan. 1970) Superintendent, Project Construction THOMAS DAY SEYMOUR BASSETT, Ph.D. (1958)1 Curator, Wilbur Collection and University Archivist Executive Assistant to Dean, College of Medicine IAMES HENRY BATES, M.Ed. (Jan. 1958) WILLIAM HENRY BEARDSLEY, B.A. (1969) Assistant to the Dean, College of Agriculture and Home Economics NORMAN ASHLEY BISHOP, SR., B.S. (1965) Construction Engineer, Business Manager's Office NORMAN A. BLAIR, B.S. (1967) Budget Officer RICHARD EMILE BOUCHARD, M.D. (1955) **Regional Medical Program** DALLAS RICHARD BOUSHEY (1966) Demonstrator, Department of Anatomy Assistant Director, School of Allied Health Sciences MARY EVELYN BREEN, B.S. (1957) ARTHUR M. BRINK, JR., B.S. (1968)2 Alumni Secretary, External Affairs HECTOR E. BRODEUR, Dip. (1968) Associate Accountant, Accounting Office Assistant Director of Purchasing FLORENCE K. BRODIE (1933) OTTO ANTON BRUSIS, M.D. (1967)³ 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 Assistant Dean, College of Medicine STANLEY LIVINGSTON BURNS, JR., M.D. (1960) **IOHN ROBERT BUSHEY, B.S. (1966)** Director, Evening Division and Conferences MITCHELL NELSON CALL, A.B. (Jan. 1967) Staff Associate, Institutional Studies WILLARD GUY CAMPBELL (1969) Maintenance Engineer, ETV STEPHEN VEALE CANTRILL, A.B. (1969) Assistant Director, Medical Records Program, Department of Medicine MELVIN ALFRED CARLSON, JR., M.S. (Mar. 1969) Catalog Librarian, Bailey Library Writer-Editor for Social Sciences and the Arts, ROBERT W. CHAMBERS, B.A. (1966) **Public Relations** NORBERT FABIAN CHARBONNEAU, M.A. (1961) **Operations Manager, Computation Center** ALAN JOHN CHARRON, M.A. (Feb. 1969) Organization & Management Specialists, Health Sciences 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 NANCY MAE CRANE, M.S. (1969) Reference Librarian, Bailey Library NORMAN L. CRANFORD (1968) Director of the Print Shop JAMES MICHAEL CROSS, B.S. (1964) Head Hockey Coach MILTON HARLEY CROUCH, M.S. (1969) Head of Readers Services, Bailey Library DONALD JOHN DANIELSON, MHA. (1969) Regional Medical Program **ROBERT POWERS DAVISON, M.E. (1957)** Director, Extension Service MALIA WARDEN DEAN, B.A. (1966) Assistant Director of Financial Aid RICHARD VINAL DEGRASSE, B.S.E.E. (1967) Systems Engineer, Computation Center DAVID DANIEL DEMSKY (1948) Superintendent of Grounds and Custodians RAYMOND GEORGE DILLEY, M.A. (1967)³ Director of In-School Service, ETV RICHARD BOWDITCH DOES, Ph.D. (1969) Director, Counseling and Testing, Student Personnel Services JOHN EDWARD DONNELLY, M.A. (1952) Director of Athletics GERALD ALTON DONOVAN, Ph.D. (1966) Associate Director, Experiment Station Director, Animal Services, College of Medicine HENRY MEADE DOREMUS, II, D.V.M. (1960) CHARLES ROGER DUNHAM, M.S. (1967) Engineer, Department of Civil Engineering WILLIAM LINDSAY DUNLOP, M.L.S. (1968) Head, Acquisition Department, Bailey Library WALLACE KILBY EDWARDS (June 1966) Chief Engineer, ETV WILLIAM TAFT EMERY, B.S. (Oct. 1968) Transfer Specialist, Technical Information Genter PAUL DEMUND EVANS, Ph.D. (1930) Bibliographer, Bailey Library LOIS MARIE FINLAY, M.A. (Mar. 1969) Reference Librarian, Dana Medical Library

1. Sabbatical leave 1970-71.

2. Military leave for two years, May 31, 1969 to June 1, 1971.

3. Leave of absence September 1, 1969 to June 30, 1970.

Superintendent, Project Construction Division RUDOLPH J. FISCHER (1949) WILLIAM DAVID FITZGERALD (Dec. 1967) Associate Accountant, Accounting Office Counselor, Testing Service, Student Personnel Service JANET RUTH FORGAYS, M.Ed. (1967) WILLETT SHERMAN FOSTER, B.A. (Dec. 1969) Alumni Secretary, External Relations Assistant Football Coach CHARLES J. FOX, M.Ed. (1967) Coordinator of Admissions Programs RICHARD LOUIS GERARD, M.A. (Dec. 1969) Assistant Librarian, Dana Medical Library ELLEN MARGARET GILLIES (March, 1969) GERALD GOOLD, B.A. (1968) Administrative Associate, Continuing Medical Education **IACOUELINE MARIE GRIBBONS, M.A. (1966)** Dean of Women Science-Writer-Editor, Public Relations ROGER GRIFFITH, A.B. (1966) LINDA ELIZABETH HALSTED, M.S. (1966) Systems Programmer, Computation Center Director of Placement DOUGLAS OLIVER HANAU, M.A. (1952) RICHARD STEPHEN HANSEN, M.S. (1969) Director of Student Activities Associate Radiological Safety Officer, **IOHN FARWELL HARWOOD, B.S. (1964)** Department of Radiology Publications Specialist RICHARD BRUCE HATFIELD, B.F.A. (Jan. 1970) GEORGE A. HEDENBURG, JR. (1967) Housing Director FREDERICK OWEN HENEY (1962) Manager, University Store Director of Computation Center DAVID BYRNE HILL, Ph.D. (1965) DOUGLAS LEONARD HOLMQUIST, M.A. (1968) Coach of Baseball Staff Associate, Institutional Studies CHARLES C. HOWE, B.S. (1969) GEORGE HAMMOND HUNTER, B.L.S. (1962) Medical Librarian, Dana Medical Library Associate Dean, College of Technology JOSEPH ANTHONY IZZO, JR., Ph.D. (1956) LYNVILLE WALTER JARVIS, M.A. (1967) Producer-Director, ETV MERRILL GEORGE JARVIS (October 1967) Producer-Director, ETV RICHARD ALBERT JOHANNINGMEIER, B.S. (Mar. 1968) Assistant Coach of Football LYNWOOD SPEED JOHNSTON, M.A. (1965) Reference Librarian, Bailey Library Associate Accountant LEWIS L. JONES, B.S. (Dec. 1969) Tutor in Radiologic Physics, Department of ALBERT GUSTAV KASENTER, A.B. (Feb. 1967)1 Radiology PAUL BLAKESLEE KEBABIAN, B.S. (1966) Director of Libraries DAVID E. KELLEY, B.S. (1968) Assistant Director of Data Processing WILLIAM HOWARD KELLY, Ph.D. (1969) Assistant to the Dean, College of Agriculture and Home Economics Assistant (Social Work), Department of Physical LOUISE MARTIEN KELSEY, M.S. (1967) Medicine and Rehabilitation ALAN GRANT KENNEDY (1941) Director of Data Processing GEORGE VINCENT KIDDER, Ph.D. (1922) Assistant to the President Director, Institutional Studies RICHARD ARNOLD KNOLLER, M.A. (1968) NSF Senior Foreign Scientist, Department of Psychology IVO KOHLER, Ph.D. (1969) KARL A. KURT, M.A. (1969) Associate in Development for Corporate & Foundation Support MIKYUNG PAIK KWON, M.L.S. (Mar. 1969) Catalog Librarian, Bailey Library BETTY MAY LAGRANGE, M.S. (1967) Demonstrator, Department of Biochemistry DENIS EMERY LAMBERT, M.A. (1969) Assistant Director of Athletics and Head Ski Coach MICHAEL ALAN LAPIDES, M.Ed. (1968) Assistant Dean of Men ROBERT LOWELL LARSON, Ed.D. (1968) Assistant to Dean, College of Education RAYBURN VAUGHAN LAVIGNE, M.B.A. (Dec. 1968) Assistant Director of Housing HARRY LIGHTHALL, JR., Ph.D. (1967)2 Assistant Dean, College of Arts and Sciences JOHN ERNEST LITTLE, Ph.D. (1945) Assistant Dean of Summer Session ARTHUR KENNETH LOCHE, B.S. (1965) Head Basketball Coach ROBERT BIRCHALL LORENZ, Ph.D. (1969) Director, Office of Instructional Resources, Division of Health Science PROCTOR MAYO LOVELL, M.B.A. (Apr. 1965) **Business** Manager WILLIAM HOSSFELD LUGINBUHL, M.D. (Jan. 1967) Associate Dean, College of Medicine GEORGE HENRY LUHR (Feb. 1966) Director, Instrumentation & Model Facility HERBERT CHRISTIAN MCARTHUR, Ph.D. (1950) Associate Dean, College of Arts and Sciences MURDO GLENN MACDONALD, M.D. (1960) Staff Physician, Wasson Infirmary DONALD BREHAUT MACPHAIL, A.B. (Jan. 1969) Director of Administration, Division of Health Sciences ARTHUR JOHN MAHONEY, B.A. (1966) Administrative Associate, Department of Obstetrics and Gynecology

I. Leave of absence September 1, 1969 to September 8, 1970.

2. Leave of absence 1969-70.

RUTH ALICE HELEN MANSON, M.L.S. (1969) Reference Librarian, Dana Medical Library PAUL S. MASSIE, B.S. (1969) GIUSTINO NICHOLAS MASTRO, MSEE (1966) JOHN EDMUND MAZUZAN, JR., M.D. (1959) ELIZABETH LOUISE MEIKLE, M.S. (1968) DARWIN GENE MERRILL, M.S. (Apr. 1967) WILLIAM HENRY MORAN, B.A. (Jan. 1970) **KEITH GOLEY MORGAN, M.S.** (1969) MARGARET MOSELEY, M.L.S. (Jan. 1970) HENRY NICHOLAS MULLER, III, Ph.D. (1966) WILLIAM HOWARD NEDDE, M.S. (1967) CHARLES W. NEWELL (1966) WILBUR E. NEWTON (1967) HELEN FICKWEILER OUSTINOFF, A.B. (Feb. 1951) DONALD LEROY OWENS, B.S. (1965) HERBERT JAMES PAINTER, B.S. (1969) BARBARA TENNY PARKER, M.L.S. (1969) CAMILLA STEGE PETERSON, M.L.S. (Jan. 1970) SIDNEY CADWELL PETERSON, M.L.S. (Jan. 1970) LOUIS MICHAEL PHILLIPS, B.F.A. (1967) DAVID CURTIS PINKHAM, B.C.E. (Oct. 1967) JUDITH ANNE PITNEY, M.A. (Aug. 1969) MARJORIE NUTTING PORTER, Ed.M. (1965) RICHARD WAYLAND POWERS, Ph.D. (Aug. 1967) FRANK HOBBS PREBLE (1965) RAYMOND BROWN PRINDLE, JR., M.L.S. (1969) IAMES P. REUSCHEL, B.A. (Oct. 1968) GEORGE SAUNDERS, B.S. (1954) WADI ISSA SAWABINI, D.D.S. (1951) JOSEPH L. SCANNELLA, M.A. (Feb. 1970) KAY FRANCES SCHMUCKER, Ed.D. (1968) JOHN HENRY SENNING, B.S. (Aug. 1968) GARRY C. SIMPSON, B.A. (Apr. 1967) HOWARD ODELL SKINNER, B.S. (1966) ERROL CARLETON SLACK, M.S. (Nov. 1946) HERMAN EMERSON SMITH, M.S. (Mar. 1968) HOWARD MARSHALL SMITH, JR., M.S. (1947) JOHN FRANKLIN SMITH, A.B. (1964) LARRY L. SNYDER, A.B. (Oct. 1969) JOHN DESMOND STANTON, B.S. (Dec. 1969) CARYL J. STEWART, M.S.W. (Mar. 1968) STEPHEN HUGH STODDARD (1964) FRANCIS CHAMBERLAIN THOMPSON, JR., M.A. (1969) Acting Director In-School Service, ETV GLORIA ANN THOMPSON, M.A. (Aug. 1967) HENRY J. TYMECKI, B.S. (Feb. 1967) LAWRENCE E. VAN BENTHUYSEN, B.A. (1953) DONNA RUTH VAN KIRK, M.S. (Aug. 1969) JAMES NICHOLAS VLAMIS, M.A. (1967) ALLEN LEE WALKER, A.M. (Feb. 1965) PETER M. WATTS, B.E.E. (1968) GEORGE DONALD WEAVER, B.S. (1966) JOHN GEORGE WEIGER, Ph.D. (1958) BARBARA GAIL WEINSIEDER, B.L.Sc. (Aug. 1969) STEPHEN TOWNSEND WELCH, M.B.A. (Mar. 1966)

GEORGE WILLIAM WELSH, M.D. (Jan. 1956)

Engineer, Department of Mechanical Engineering Assistant Dean for Regional Medical Program Director of Rehabilitation Nursing Program, Department of Rehabilitation Medicine Project Manager, Regional Medical Program Producer-Director, ETV Assistant Director Medical Program, Department of Medicine Reference Librarian, Bailey Library Assistant Dean, College of Arts and Sciences Track Coach Auditor Superintendent, Building Maintenance Division Assistant Director and Technical Services Librarian, Bailey Library Assistant Athletic Trainer Bursar Head, Catalog Department, Bailey Library Catalog Librarian, Bailey Library Acquisitions Department, Bailey Library Film Producer, ETV Director-Technical Information Center, and Administrative Assistant, Dean's Office, College of Technology Associate Coordinator of Federal Programs Instructor, Coronary Care Program, **Regional Medical Program** Dean of Men and Associate Dean of Students Coordinator of Civil Defense Catalog Librarian, Bailey Library Administrative Associate, Department of Surgery Administrative Associate, Dean's Office, College of Medicine Director, Department of Dental Hygiene Head Football Coach Counselor, Testing Service Mathematician, Regional Medical Program Program Director, ETV Station Manager, ETV Catalog Librarian, Dana Medical Library Assistant Coach of Football Assistant to the President for Campus Planning Director, University Photographic Center Registrar Assistant Registrar Program Manager, Regional Medical Program Assistant Director, Sponsored Projects Office Assistant Dean of Women Director of Personnel Director of Public Relations Director of Redstone Residence Complex Associate Director for Management Systems. **Computation** Center Director of Financial Aid Project Engineer, Regional Medical Program Director of Purchasing Associate Dean, College of Arts and Sciences Regional Medical Librarian, Dana Medical Library Comptroller Director of Continuing Education for

Health Sciences

Assistant Director of Audio-Visual

Director, Regional Medical Program JOHN EGMONT WENNBERG, M.D. (1967) Writer-Editor of Public Relations RICHARD PATTERSON WHITTIER, B.A. (Sept. 1969) Director of Wasson Infirmary ANNE ELIZABETH WILSON, R.N. (1949) Coordinator of Federal Programs LEONARD USHER WILSON, B.A. (Sept. 1969) CHARLES LEWIS WOLF, M.A. (1965) Associate Comptroller Administrative Assistant, Office of Dean of Students BRUCE WONNACOTT, A.B. (1969) Director, School of Nursing NORMA WOODRUFF, Ph.D. (1952) HAROLD DEAN WOODS, B.D. (1969) Coordinator, Fraternity Affairs

Retired Officers of Administration

 MARY OLIVE BOYNTON
 Librarian, Medical Library

 HORACE BYRON ELDRED
 Director of Audio-Visual Services

 FOR EST WILKINS KEHOE
 Superintendent of Buildings and Grounds, and Associate Registrar

 LAURA LOUDON
 Assistant in Public Relations

 MARY JEAN SIMPSON, Ph.B.
 Dean of Women

Experiment Station Staff

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.

THOMAS WHITFIELD DOWE. Ph.D. GERALD ALTON DONOVAN, Ph.D. FRANK HARRIS ARMSTRONG, M.F. EARL LEE ARNOLD, Ph.D. HENRY VERNON ATHERTON, Ph.D. DONALD JAMES BALCH, Ph.D. RICHMOND JAY BARTLETT, Ph.D. WILLIAM H. BEARDSLEY, Ph.D. DAVID E. BEE, Ph.D. MALCOLM IRVING BEVINS, M.S. WESSON DUDLEY BOLTON, D.V.M. BERTIE REYNOLD BOYCE, Ph.D. LYNDON B. CAREW, Ph.D. WALLACE WAYNE CHRISTENSEN, Ph.D. ROBERT PATRICK CLARK, M.S. JOHN R. DONNELLY, M.S. ELIZABETH NANCY DOWNER, Ph.B. ALEXANDER HARRY DUTHIE, Ph.D. MARY JANE ELLIS, M.S. CHARLES LYNN FIFE, Ph.D. THEODORE ROSS FLANAGAN, Ph.D. MURRAY WILBUR FOOTE, Ph.D. DONALD CUSHING FOSS, Ph.D. **ROBERT WEEKS FULLER, M.S.** ALPHONSE H. GILBERT, Ph.D. PETER ROBERT HANNAH, Ph.D. THOMAS W. HOESKTRA, B.S.A. RICHARD JOHN HOPP, M.S. BEAL BAKER HYDE, Ph.D. RICHARD H. JAEGELS, Ph.D. WILLIAM H. KELLY, Ph.D. DONALD EUGENE KEYSER, Ph.D. RICHARD M. KLEIN, Ph.D. KARIN KRISTIANSSON, M.A. FREDERICK MITCHELL LAING, M.S. GEORGE BUTTERICK MACCOLLOM, Ph.D. JAMES WALLACE MARVIN, Ph.D. MAXWELL LELAND MCCORMACK, D.F. THOMAS JAMES MCCORMICK, M.E.E. JERRY LEON, McINTOSH, Ph.D. PATRICIA ANNE MALONE, B.S. SUSAN BREWSTER MERROW, M.Ed. ELLEN HASTINGS MORSE, Ph.D. ROGER WALTER MURRAY, D.V.M. CHARLES C. MYERS, Ph.D. KAY MILLIGAN NILSON, Ph.D. BRUCE LAWRENCE PARKER, Ph.D. NORMAN EUGENE PELLETT, Ph.D. MILTON POTASH, Ph.D. DAVID WILLIAM RACUSEN, Ph.D. RAYMOND J. ROSS, D.Ed. FREDERICK OBERLIN SARGENT, Ph.D.

Dean and Director Associate Director Assistant Forester Associate Agricultural Engineer Dairy Bacteriologist Associate Animal Scientist Soil Scientist Assistant Resource Economist Statistician Associate Resource Economist Animal Pathologist Assistant Horticulturist Associate Poultry Nutritionist Forester Assistant Biochemist Assistant Forester Administrative Assistant Associate Dairy Chemist Research Home Economist Assistant Agricultural Economist Assistant Agronomist Associate Biochemist Assistant Poultry Scientist Assistant Wildlife Management Specialist Assistant Resource Economist Assistant Forester Assistant Forester Horticulturist **Cell** Biologist Research Associate Assistant Education Specialist Assistant Biochemist Cell Biologist Associate Editor Research Associate Associate Entomologist Plant Physiologist Associate Forester Associate Editor Assistant Soil Scientist Assistant Editor, Office of Information Associate Nutritionist Associate Nutritionist Associate Animal Pathologist Assistant Forester Associate in Dairy Manufacturing Assistant Entomologist Assistant Ornamental Horticulturist Associate Limnologist Biochemist Associate Education Specialist Resource Economist

EDWIN CALVIN SCHNEIDER, M.S. GERARD C. SHREWSBURY, M.S. KENNETH ROGERS SIMMONS, Ph.D. ROBERT ORVILLE SINCLAIR, Ph.D. ROBERT ERIK SIOGREN. Ph.D. ALBERT MATTHEWS SMITH, Ph.D. **IOHN WALLACE SPAVEN, B.S.** THOMAS SPROSTON, JR., Ph.D. ENOCH HAROLD TOMPKINS, M.S. RAYMOND HERMAN TREMBLAY, Ph.D. TERRY LAWRENCE TURNER, M.S. KENNETH EVERSON VARNEY, M.S. KATHLEEN BEAVINGTON WEBB, B.S. FRED CLARENCE WEBSTER, Ph.D. JAMES GRAHAM WELCH, Ph.D. DAVID LLOYD WELLER, Ph.D. SAMUEL CLAUDE WIGGANS, Ph.D. BLAIR WILLIAMS, M.S. ROY ALVIN WHITMORE, JR., M.F. DAVID M. WILSON, Ph.D. GLEN MEREDITH WOOD, Ph.D.

Agricultural Engineer Research Associate Animal Scientist Agricultural Economist Assistant Microbiologist **Dairy Scientist** Editor Plant Pathologist and Mycologist Associate Resource Economist Agricultural Economist, Farm Management Assistant Forester Associate Agronomist Associate Editor Agricultural Economist, Marketing Associate Animal Scientist Assistant Biochemist Horticulturist Home Economist Associate Forester Assistant Plant Pathologist Associate Agronomist

ENGINEERING

WARREN ORVEL ESSLER, Ph.D. REGINALD VENN MILBANK, M.S. JOHN OGDEN OUTWATER, Sc.D. 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.

THOMAS WHITFIELD DOWE, Ph.D. WESSON DUDLEY BOLTON, D.V.M. HOLLIS EARL BUCKLAND, B.S. KENNETH STEWART GIBSON, M.S. ROGER WALTER MURRAY, D.V.M. KAY MILLIGAN NILSON, Ph.D. HARRY LEONARD SAWYER, JR., B.S. THOMAS SPROSTON, JR., Ph.D. JAMES ROGER WADSWORTH, V.M.D. ROBERT THOMAS WETHERBEE, M.S. Dean and Director Animal Pathologist Seed Analyst Dairyman Associate Animal Pathologist Associate in Dairy Manufacturing Associate Chemist Plant Pathologist and Mycologist 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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Dean Director Dairy Bacteriologist Animal Scientist Agricultural Economist Extension Economist, Food Marketing Area Resource Development Specialist Animal Pathologist Horticulturist Nutritionist Urban Youth Specialist Agricultural Economist Area Resource Development Specialist Area Community Affairs Specialist Health Education Specialist Assistant Agronomist Director, Rutland Urban Youth Center Forester Dairyman Agricultural Economist, Farm Management Housing Specialist Associate Editor Dairyman, DHIA Recreation Development Specialist Entomologist Associate Editor Assistant Editor Supervisor and Program Leader (Youth Work) Poultryman Government Relations Specialist Housing and Utilities Engineer Specialist Entomologist **Ornamental** Horticulturist Director, Windsor Low Income Center Family Economist Supervisor and Program Leader (Youth Work) **Resource** Economist Editor Supervisor and Program Leader (Home Economics)

1. On leave September 1, 1968 to July 1, 1970. 2. On leave August 1, 1969 to June 31, 1970.

3. On leave August 1, 1970 to January 31, 1971.
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| MPS MARION STONE HARRIS RS | Bennington |
| WIT I IAM SNOW BS | Bennington |
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| MRS. ALICE JOHNSON BLAIK, D.S. I INDRAY THOMAS TOWNSEND BS | St. Johnsbury |
| Chittenden County | St. Johnsbury |
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Woodstock Woodstock Woodstock

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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 Services; the Graduate College, and the Summer Session and Evening Division.

The College of Arts and Sciences

In common with the practice at most of the early universities, the original curriculum was based on languages, rhetoric, and mathematics, theology, and moral philosophy. Today, the College of Arts and Sciences, often considered the direct descendant of the original University, provides a general four-year curriculum leading to the degree of Bachelor of Arts, with opportunity for concentration in one or more of the following studies: anthropology, area studies, art, botany, chemistry, economics, English, French, geology, geography, German, Greek, history, Latin, mathematics, music, philosophy, physics, political science, psychology, religion, sociology, Spanish, speech, and zoology.

Majors in the Department of Economics and Business Administration may specialize in options which include accounting; banking and finance; industrial management; and marketing and sales promotion. These programs lead to the degree of Bachelor of Science in Economics and Business Administration.

Students interested in continuing their studies beyond the bachelor's degree may, by making a proper selection of courses, meet all requirements for admission to graduate schools, and such professional schools and colleges as those of medicine, dentistry, law, theology, optometry, journalism, and social work. Those who have completed three years of premedical study at the University may qualify for the degree of Bachelor of Science after successfully completing one year of study in an approved college of medicine.

The College of Agriculture and Home Economics

In 1862, the Congress of the United States enacted legislation, fostered by Vermont Senator Justin Smith Morrill, which provided for the establishment of a system of colleges—one for every state—which would make possible college education for all who were qualified. These institutions came to be known as the Land-Grant institutions of America because the Morrill Act provided federal funds for each state which would set aside lands for the new colleges. Their aim was to make possible a new kind of education which combined and blended the agricultural and mechanic arts with education in the liberal and scientific courses. The State of Vermont moved to charter a land-grant institution, the Vermont College of Agriculture, in 1864, and this new college was joined with the University of Vermont in 1865. Under later federal legislation, the services of the land-grant colleges were expanded by the creation of agricultural research and service divisions—the Agricultural Experimental Station and the Agricultural Extension Service respectively.

Today the College of Agriculture and Home Economics offers fouryear curricula leading to the degree of Bachelor of Science in Agriculture, Bachelor of Science in Agricultural Engineering, Bachelor of Science in Forestry, and Bachelor of Science in Home Economics. It also offers a twoyear program in preveterinary science which prepares students for admission to other institutions for professional training.

The curriculum in agriculture provides options in general agriculture, agricultural economics, agricultural education, agricultural engineering management, animal and dairy science, botany, dairy industry, foreign agricultural service, plant and soil science, and poultry science.

The curriculum in home economics provides options in clothing, textiles and related art; family living, human development, preprofessional social work; food and nutrition; teaching and extension education; and housing and home management.

The College of Education

The University of Vermont has contributed teachers to its state, region and nation virtually since its founding. The evolution of formal professional education preparation resulted first in the department, then the School of Education in 1946, in 1951 the College of Education and Nursing, and in 1968 the College of Education. It offers four-year curricula leading to the Bachelor of Science degree in the fields of elementary education, secondary education, physical education, and music education.

Although approaches have varied, the primary concern of the education curricula has been to produce qualified teachers who have a strong background in academic subject matter and an adequate preparation in professional education.

The College of Technology

The University of Vermont was probably the first nonmilitary institution in America to offer instruction in engineering and was certainly the first of the present land-grant colleges to give any instruction in this area which was incorporated later into the Morrill Act. Engineering was taught in a separate department until 1911, when a College of Engineering was established. In 1946 the College of Technology was formed. Today it offers programs in civil, electrical, mechanical, and management engineering; professional chemistry; mathematics; and professional physics.

The Division of Health Sciences

The University has initiated a comprehensive reorganization of its programs in health education which will develop a brand new sequence of options open to the young man or woman interested in a career in medicine, nursing, or in one of the widening range of allied health professions which are an increasingly important part of the nation's health resources.

The School of Allied Health Sciences offers programs in Dental Hygiene, Medical Technology, and plans are underway for programs in Radiologic Technology and Physical Therapy. Associate in Science Degrees are awarded upon successful completion of the two-year programs. Two-year programs are offered in Dental Hygiene and Radiologic Technology; a four-year program in Physical Therapy is being planned. The Department of Medical Technology offers both two and four-year programs.

The School of Nursing, established in 1943 as a Department of Nursing in the College of Arts and Sciences and later moved to the College of Education and Nursing, offers a four-year program leading to the degree of Bachelor of Science in Nursing. This program prepares qualified individuals for the practice of professional nursing in beginning positions in various health agencies, the home, and the community and provides a foundation for graduate study in nursing. The School also conducts a twoyear curriculum leading to an associate degree. This program offers qualified students the opportunity to acquire competencies associated with direct care of patients in various settings where medical or nursing supervision is available. Graduates of both programs are eligible to take the examination for licensure as registered nurses.

The College of Medicine is historically almost as old as the University itself. Medical lectures became part of the offerings in 1804 and degrees were granted in medicine in 1822. There were some interruptions in the operation of the medical courses in 1836, but since 1853 qualified physicians have been graduated annually to serve Vermont and neighboring states. Today, the College of Medicine offers a four-year graduate curriculum leading to the degree of Doctor of Medicine and provides facilities for a limited number of candidates for other graduate degrees to take courses in its departments. A separate catalogue describing Medical College programs is available from the office of the Dean.

The Graduate College

Many academic departments of the University have a long history of providing formal graduate study for well qualified candidates. The Graduate College was formally established in 1952, and since that time has served to provide graduate study opportunities in academic fields in which University resources have made sound graduate programs possible. In recent years several doctoral programs have been inaugurated and more are being planned. The Graduate College administers all studies beyond the Bachelor's degree with the exception of the program of the College of Medicine leading to the Doctor of Medicine.

Scholarship aid fellowships, assistantships and special loan programs are available in increasing numbers for graduate study for the student who achieves a good academic record in his undergraduate program. Nationally, the demand for men and women with advanced training continues to be urgent.

A separate catalogue describing graduate programs at Vermont is available from the Office of the Dean of the Graduate College.

Continuing Education

The Summer Session and Evening Division programs of the University offer a wide range of courses both on and off campus.

Regional Cooperation

The University of Vermont is an active participant with the Universities of Connecticut, Maine, Massachusetts, New Hampshire, and Rhode Island, in a program of regional cooperation aimed at increasing educational opportunities for the 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. The University of Vermont offers several programs in which qualified residents of other New England states may be granted admissions preference and resident tuition benefits. A special brochure detailing these specialized curricula, has been prepared by the New England Board of Higher Education and is available through the University of Vermont admissions office and from the other New England state universities.

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

Classics, Massachusetts, Rhode Island; graduate, Maine, Massachusetts and Rhode Island.

Dairy Manufacturing, Maine, New Hampshire, Rhode Island.

Foreign Agricultural Service, Massachusetts, Rhode Island.

Medical Electronics, graduate, Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island.

Microbiology, graduate, Maine, Rhode Island.

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 which still stands as today's Old Mill. A modern classroom addition, Lafayette Hall, was dedicated in 1958 with a direct 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 generous private philanthropy.

The Billings Library, now serving as a student center, was one of several structures dedicated 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. The effect of changing times is illustrated by the fact that a recent renovation of the chemistry department facilities in Williams Science Hall cost over \$400,000.

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".

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 the class of 1884, who served as dean of the then College of Engineering at Vermont from 1901 until his death in 1931.

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 Memorial 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, recreation facilities, 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. The I.B.M. 360, 1620, and 1130 model electronic computers are used for teaching, research, and administrative programs.

In 1949, a group of modern buildings, financed by state appropriation, was erected on the East campus. These include 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.

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 threeyear fund drive which saw alumni contributions more than match a federal grant which permitted completion of a \$1,200,000 first unit of a threephase program.

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.

Development of the College of Medicine, together with the affiliated Medical Center Hospital, has meant the development in Burlington of a modern medical center which serves citizens of all three northern New England states, as well as many residing in upper New York. In the fall of 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. Landscaping of this area accents the central Mall with the interconnecting plazas.

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, another imposing Georgian structure, 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 Calvin Coolidge, President of the United States.

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.

Other buildings of interest include Grassmount, a gracious Georgian mansion which was the home of a former Governor of Vermont; Pomeroy 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 Negro 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 Medical Library of the College of Medicine.

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 Special Collections Department.

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 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 Museum has a conference room, a lounge with a high-fidelity sound system, and a kitchenette available for meetings and social functions, a collection of several thousand photographs of painting and sculpture, and study area for courses in art.

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 largest collegiate artists series in the country. It was inaugurated in 1955 by a gift of over \$300,000 from the late Mrs. Lane, in honor of her husband, George Bishop Lane of the Class of 1883.

The Lane Series makes it possible for the University to bring to the campus and the community a continuing program of outstanding musical, theatrical, dance and other artistic productions for a moderate admission fee.

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 and groups, 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 Rubinstein, 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 semester, 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 of Vermont. Wherever it is possible to do so, the University is pleased to cooperate in making its facilities available for this purpose. Nominal charges are made to cover costs to the University.

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

Educational Television

The University owns and operates Vermont Educational Television in behalf of all educational interests of the state. The state-wide network broadcasts in school, in service, and cultural programming 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, and 79 at Manchester, Wilmington, and Bennington. 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 Director of Intercollegiate Activities, Dean of Men, Dean of Women, Director of Testing and Counseling, Director of Admissions, Registrar, Director of Financial Aid, Director of Placement, Director of University Health Services, Advisor to Foreign Students and Scholars, Consultant on Religious Programs, 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 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.

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 actives 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 four 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 housing. 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 Dean of Women or the Dean of Men. 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.

Usually only junior and senior women are permitted to live in sorority houses. Only upperclass fraternity men may contract for meals or a room in fraternity housing.

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 and 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; Women's Student Government Association; Panhellenic Council; Interfraternity Council; Student Committee on Discipline; University of Vermont Music and Film Festival; Cynic; Ariel; and Billings Center Governing Board.

UNIVERSITY LODGE Located near Madonna Mountain ski area in Jeffersonville, Vermont, the UVM Outing Club Lodge or "Boulder Lodge," as it is known to many on campus, is a facility that enhances the outdoor recreational program of the University.

The Lodge Advisory Board recommends policies for the operation of the Lodge which was built with the support of students, alumni, and friends of the Outing Club and the University.

The University Lodge provides overnight dormitory-style accommodations for sixty persons. Preference is given to: 1) "Charter Members" who have given financial support; 2) other students; and 3) "the University family."

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 committees.

STUDENT COMMITTEE ON DISCIPLINE The judicial authority of the Student Association is vested in the Student

Committee on Discipline, which consists of representatives of each of the undergraduate colleges. The Committee has exclusive 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 Dean of Women, the Dean of Men or the Standing Committee on Jurisdiction.

WOMEN'S STUDENT GOVERNMENT Association Every woman who enrolls as an undergraduate stu-

dent at the University becomes a member of the Women's Student Government Association. W.S.G.A. Council, elected by the women students, works to educate students to become self-directing individuals, to respect the rights of others, and to develop into responsible citizens of the college community.

W.S.G.A.'s primary purpose is to promote the academic success and the social development of all women students, while at the same time respecting the personality and the worth of the individual.

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, Phi Sigma Delta, Sigma Alpha Epsilon, Sigma Nu, Sigma Phi, Sigma Phi Epsilon, Tau Epsilon Phi, and Theta Chi. Chapters of the following national sororities are represented: Alpha Chi Omega, Alpha Delta Pi, Alpha Epsilon Phi, 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 inter-

ests. 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 departmental 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

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and Women's Chorus give three annual concerts and the Madrigal Singers sing for various groups around the State. The University Orchestra presents two annual concerts, assists the Choir in a third, and plays for musical productions.

UNIVERSITY OF VERMONT WINTER MUSIC AND FILM FESTIVAL The outstanding

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 work in the fine arts. Among the highlights of the Festival are exhibitions of painting, 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. Headquarters for Vermont's statewide educational television network are located at the University. Its studios will be utilized by students in the broadcasting curriculum. Additionally, the Public Relations Office currently produces four weekly radio programs which are distributed to fifteen radio stations in three states. 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 twice a week by students. The Ariel, the annual yearbook, is 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.

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 \$10 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 planning to enter the College of Agriculture and Home Economics should present a second year of algebra for a total of three years of mathematics. 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.

Types of Enrollment

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

NON-MATRICULATED STUDENTS Students who have presented minimum credentials and are permitted to enroll in

one of the colleges of the University to undertake limited course work for a purpose other than the earning of a degree.

Students who have been dismissed for low scholarship must, if readmitted, enroll as full-time matriculated students.

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

Non-matriculated students intending to use courses taken for graduate credit as a basis for admission to the Graduate College at some future time must contact the Dean of the Graduate College prior to enrollment.

Non-matriculated students must be officially enrolled and registered and are subject to all regulations of the University.

College Entrance Examinations

The College Entrance Examination Board will administer a series of tests during 1970 on November 7 and December 5, and in 1971 on January 9, March 6, April 17, May 1 and July 10. 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.

ADMISSION OF STUDENTS

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 in June 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 adviser and academic dean and complete his registration for the September opening of college. Student Expenses

The student expenses outlined in the following paragraphs are the anticipated charges for the academic year 1970-71. Changing costs, however, may require an adjustment of these charges before the opening of college.

APPLICATION FEE An application fee of \$10.00 is charged each applicant for admission to the University.

ORIENTATION FEE 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 de-

posit 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.

An applicant to the Graduate College for a program beginning in July or September will receive a \$15.00 refund if the Dean is notified by May 1; if the program is to begin in January, the deadline is December 1.

TUITION The tuition charges are in accordance with the following schedule. 1. VERMONT RESIDENTS

All full-time students (twelve hours or more) \$ 600.00 per year

Part-time students (fewer than twelve hours) 25.00 per credit hour 2. NON-RESIDENTS OF VERMONT

All full-time students (twelve hours or more) \$2200.00 per year Part-time students (fewer than twelve hours) 85.00 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 APPLIED MUSIC Private lessons are approximately one-half hour in length, fifteen being given in each

semester. Students who enroll as regulaf full-time students in a music education curriculum, paying full tuition, are charged one-half the regular rates for applied music for such courses as are required in the curriculum. All others pay the scheduled charge.

FORESTRY SUMMER PROGRAM The charges for the Forestry Summer Program (see page 83) are Vermont resident tuition \$168.00: non-resident tuition \$256.00. 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 \$460.00 per year is charged. The charge for a single room, when available, is \$510.00. 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 the 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 Residence Hall's activities programs.

Written notice is required of any student cancelling his room contract. Any student cancelling his contract after June 30 will automatically be assessed a \$50 penalty.

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 \$540.00 per year. 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 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. Students enrolled in three hours or less are not subject to the library fee. This fee is assessed to retire the bond issue under which the library was built and equipped.

ATHLETIC BOND FEE An athletic fee of \$30.00 per year is charged to all full-time students. Students have the privilege of using the facilities in the gymnasium at scheduled times and have free admission to intercollegiate home games. This fee is assessed to retire the bond issue which helped make possible construction of the gymnasium complex.

STUDENT HEALTH SERVICE FEE A fee of \$20.00 each semester is charged to all (full-time) students at the University of Vermont.

STUDENT ACTIVITY FEE Full-time students enrolled in the Colleges of Arts and Sciences, of Technology, of Agriculture and Home Economics, and of Education, and undergraduate students in the Division of Health Sciences are charged a fee of \$10.75 per semester. This fee is assessed and allocated by Student Association toward the support of student organizations and student activities. First-year medical students who enter the College of Med-

icine 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 123) will be at the summer session credit hour rate. Room and board are available for those desiring University housing.

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 Year

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

| Resident Tuition \$ 600.00 |
|--|
| Non-Resident Tuition |
| Meals (contract 20 per week) |
| Room (per person) 460.00 |
| Library and Athletic Fees |
| Student Health Service Fee 40.00 |
| Student Association Fee |
| Residence Hall Activities Fee |
| Books and Supplies ¹ (estimated) 165.00 |
| |
| Resident Total\$1892.50 |
| 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.

- 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.
- 1. Students in the professional nursing program add about \$100 for uniforms and special equipment prior to beginning the sophomore year; students in the technical nursing program add about \$75 at the time of registration.

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.

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.

Banking Facilities

An arrangement with the Howard National Bank and Trust Company of Burlington enables students to open and maintain regular checking accounts through the University Store. Applications for new accounts, deposits to individual accounts, and orders for checkbooks are accepted during office hours in the University Store. The bank's normal charge of $121/2^{e}$ per check is made for this service. 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.

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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 306. A brochure presenting in more detail the types of aid available may be obtained from the Financial Aid office.
General Information

Definition of "Vermont Resident"

The following rules of residence, adopted by the Board of Trustees on October 18, 1952, are used in determining a student's eligibility to benefit from the reduced tuition rate for residents of Vermont.

1. A student who is of age when he first enrolls in the University shall be deemed to be a Vermont resident if, and only if, he had his domicile in Vermont for a period of one year next preceding his first enrollment in the University, except as otherwise provided by these rules.

2. A student who is a minor when he first enrolls in the University shall be deemed to be a resident of Vermont, if, and only if, his parents had their domicile in Vermont for one year preceding his first enrollment at the University, except as otherwse provided in these rules.

3. A student, who, at the time of his first enrollment at 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 resident of the State of Vermont if, and only if, the governing rule of law made Vermont his residence for a period of at least one year preceding his first enrollment.

4. In all cases in which a nonresident student claims that he has become a resident of the State of Vermont by reason of the application of a special rule of law (resulting from the appointment of a guardian, marriage of a woman student, etc.), the circumstances claimed to have made the student a resident must have taken place at least one year prior to the next regular student enrollment. In such cases, the new resident status of the student shall take effect at the time of the next regular enrollment.

5. Whenever a resident student shall lose his Vermont domicile (as in the case of a minor whose parents move from the State and excepting women who marry nonresidents), the student shall immediately be reclassified as a nonresident.

6. It shall be incumbent upon any student whose status changes from resident to nonresident, to inform the dean of his college, or the Registrar, promptly, of the facts relating to his residence.

7. The burden of proof shall, in all cases, rest upon the student claiming a residence of the State of Vermont.

8. 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 8 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 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 officers or as 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, army security and intelli-

gence, artillery, engineers, finance, infantry, medical service, signal, ordinance, 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 or a four-year period, but are contingent on enrollment in the fouryear 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-CE, Fort George C. 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 fouryear 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 \$160.00, 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 \$260.00, 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 equivilent 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 qualiy 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 \$500.00 for each illness and up to \$1000.00 for each accident. The cost for one year's coverage is \$25.00. 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 three 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 Office of Continuing Education is necessary for auditing courses in the Evening Division and Summer Session.

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.

| | Grade | Quality points |
|-----------|-------|----------------|
| Excellent | Α | 4 |
| Good | В | 3 |
| Fair | С | 2 |
| Poor | D | 1 |
| Failure | F | 0 |

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. Students who have been dismissed for low scholarship may re-enter only as full-time matriculated students.
- d. 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 matriculated student, not on academic trial, be permitted to take as many as six courses (or as many courses as he has semesters remaining for members of the Class of 1969 and 1970 and 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 students gradepoint 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 advisor's endorsement that the request conforms to the policy established by the University Senate. Any question about a course or courses being appropriately elected as Pass—No Pass for a student will be resolved by the student's college dean.
- 3. Submit your request to be placed on Pass—No Pass status at the Registrar's Office during the first three 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 Dean of Men or the Dean of Women, 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 | This temporary grade indicates that some work required in a course |
|-----|---|
| | has not been completed for an acceptable reason, such as illness. It |
| | can be recorded by permission of the student's college dean. A |
| | time limit is set by the instructor and the dean within which the work |
| | is to be completed. This shall not be later than the beginning of the |
| | corresponding semester of the next academic year. If the work is not |
| | completed within the time set, the course is regarded as failed, unless |
| | the dean rules otherwise. |

- NP Not passed. The grade is omitted in averaging.
- P Passed. The grade is omitted in averaging.
- W The student was permitted by the dean to withdraw without penalty. The grade is omitted in averaging.
- WF The student withdrew with failure. The grade is weighted as an "F" in averaging.

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 secondary 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.

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 curricula designed to give a foundation in the social sciences and humanities plus a fundamental technical education. These curricula, which include many options, encompass agriculture, forestry, home economics, and preveterinary medicine.

Most options in the College of Agriculture and Home Economics leading to the Bachelor of Science degree require 120 to 130 semester hours of prescribed and elective courses, plus credit for required courses in physical education. The Forestry Curriculum 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 field certain courses are prescribed, with allowance made for the election of additional courses, to provide a well-balanced and integrated educational program and to insure reasonable concentration. Faculty advisers counsel students in the selection of elective courses and other educational problems. Students should work in their field of specialization sometime during their college career. Such opportunities are often provided by departments in the College of Agriculture and Home Economics.

A student may transfer from one curriculum, option or program in the College to another, provided the established course requirements are satisfied. Arrangements may be made for transfer within the College through counsel with the student's faculty adviser.

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 an honors committee and are relatively free of the customary restrictions. 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.

THE CURRICULUM IN AGRICULTURE

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

| Agricultural Economics | General Agriculture |
|--------------------------|---|
| Agricultural Engineering | Microbiology and Biochemistry |
| Animal Pathology | Plant and Soil Science |
| Animal Sciences | Recreation Resource Management |
| Biological Science | Vocational, Technical and Extension Education |
| Botany | |

The curriculum in agriculture is 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 an area of concentration within one of the above departments or programs upon entering the College. The candidate must then fulfill the requirements stated below and complete a total of 120 semester hours of credit, which may include not more than 16 semester hours of military science, plus credit for required courses in physical education.

Required of All Students

- A. Four courses in communications, of which two shall be Freshman English.
- B. Two courses in physical or biological sciences: botany, chemistry, geology, physics, zoology.
- C. Two courses in the social sciences and the humanities.
- D. Five credit hours in mathematics and statistics.

- E. Introductory Animal Science and Introductory Plant Science (must be in addition to any courses taken under B above).
- F. Option requirements: Specific courses to be taken in each option are listed in the descriptions following. Course programs within each option are developed in consultation with the student's adviser or the department chairman.

Two-Year Biological Sciences Core Program

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 | Spring |
| English | English |
| Chemistry | Chemistry |
| Mathematics | Mathematics |
| Plant Science | Animal Science |
| Elective | Electives |
| Sophomore Year | |
| Fall | Spring |
| Physics | Physics |
| Organic Chemistry | Organic Chemistry |
| Social Science or Humanities | Social Science or Humanities |
| Biology | Biology |

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

Year

Elective

Program

Elective



Department Options and Requirements

AGRICULTURAL ECONOMICS Students of Agricultural Economics may concentrate

in any of four options. Each option is designed to give the student a general understanding of economic theory and to guide him to advanced courses suited to his own talents and the requirements of specialized fields of economics. Agribusiness and Marketing: This option prepares a student to meet the complex problems of administration and management of small businesses and agricultural firms and to understand the marketing problems of such firms. Students in this option prepare themselves for work in business management, Extension Service work, sales, and market analysis, or for graduate study.

Farm Management: This option prepares a student to manage a farm or other small business or to work in fields related to agricultural production.

Resource Economics: This option follows an interdisciplinary approach with a focus on resource economics. It is designed to prepare students to do graduate work or to prepare 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.

Required Courses: Each student majoring in Agricultural Economics 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 ENGINEERING TECHNOLOGY This option leads to the Bachelor of Science Degree in Agriculture. It pro-

vides the student with technical and practical instruction in agricultural engineering technology. 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 5-6, plant and soil science 11 and 61, animal science 2, civil engineering 53, mathematics 110, economics 11-12, 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.

ANIMAL PATHOLOGY Laboratory Animal Technology. This option 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 responsibility for groups of laboratory animals 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 in Agriculture. 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.

Lat

0-4

| | | TOPP | |
|--------------------|------------------------------|----------|-------|
| The Freshman Year | | SEME | STER |
| English 1-2 | 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 electi | ves for the first semester | | |
| | | lst. | 2nd. |
| The Sophomore Year | | SEME | STER |
| Chem. 131-132 | Organic Chemistry | 4 | 4 |
| Microbiol. 55 | Introductory Microbiology | 4 | |
| Pl. Sci. 11 | Introductory Plant Science | 4 | |
| Speech 11 | Public Speaking | | 3 |
| An. Sci. 2 | Introductory Animal Science | | 4 |
| | Electives | 4-7 | 5-8 |
| | | lst. | 2nd. |
| The Junior Year | | SEME | STER |
| Chem. 123 | Quantitative Analysis | 4 | |
| An. Path. 107-108 | Laboratory Animal Techniques | 3 | 3 |
| Med. Tech. 111-112 | Biochem. for Med. Techs. | 4 | 4 |
| An. Path. 105 | Anatomy and Physiology | 3 | |
| An. Path. 106 | Animal Diseases | <u> </u> | 3 |
| | Electives | 2-5 | 6-9 |
| | | lst. | 2nd. |
| The Senior Year | | SEME | STER |
| An. Path. 217-218 | Laboratory Animals | . 3 | 3 |
| Eng. or Speech | Course in Communications | 3 | _ |
| An. Path. 220 | Laboratory Assignments | - | 3 |
| | Electives | 10-13 | 10-19 |

Preveterinary: 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 fouryear 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, and federal, state and municipal disease control work.

Elective courses will be selected in consultation with department advisors 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.

A 3

The preveterinary program follows:

| The Freshman Year | | SEME | STER |
|---------------------------|---------------------------------------|----------|-------|
| English 1-9 | Freehman English | 8 | 8 |
| Chemistry 1.9 | Introductory Chemistry | 4 | 4 |
| Biology 1 2 | Principles of Biology | Å | Â |
| Math 0 | College Algebra | 3 | _ |
| Math 9 | Plane Trigonometry | | 8 |
| Matn. 4 | Electives | | 2-5 |
| Note: No electiv | ves for the first semester | | |
| | | lst. | 2nd. |
| The Sophomore Year | | SEME | STER |
| Chem. 131-132 | Organic Chemistry | 4 | 4 |
| Physics 5, 6 | Elementary Physics | 4 | 4 |
| | Political Science or History | 3 | 3 |
| Pl. Sci. 11 | Introductory Plant Science | 4 | |
| An. Sci. 2 | Introductory Animal Science | ****** | 4 |
| | Electives | 1-3 | 1-3 |
| | | lst. | 2nd. |
| The Junior Year | | SEME | STER |
| Zool. 101 | Genetics | 3 | _ |
| An. Path. 105 | Anatomy and Physiology | 3 | — |
| Speech 11 | Public Speaking | 3 | |
| | Course in Communications | — | 3 |
| An. Path. 106 | Animal Diseases | <u> </u> | 3 |
| Math. 11 | Anal. Geom. & Calculus | _ | 5 |
| | Electives | 7-10 | 5-8 |
| | | lst. | 2nd. |
| The Senior Year | | SEME | STER |
| Electives selected in con | sultation with the student's advisor. | 16-19 | 16-19 |

ANIMAL SCIENCES Students interested in the animal sciences may elect to concentrate in one of four options. These options have been designed

for men and women to provide a liberal education in the biological sciences with primary emphasis on the animal sciences. Sufficient flexibility exists in all options so that the program will be individualized to fulfill each student's needs.

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.

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Basic 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.

Required Courses: Satisfactory completion of eight semester courses in Animal Science, including at least five of advanced standing. Additional courses to be selected by the student in consultation with the departmental advisers in order that proper emphasis can be placed on the student's special field of interest.

BIOLOGICAL SCIENCE 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" (pg. 75).

Junior and Senior Years

| General | Systematics and Phylogeny (2 courses) |
|--|---|
| Zoo. 101 Genetics | Bot. 110 Plant Systematics and Phylogeny |
| 103 General Structure and Function | Zoo. 109 Field Zoology |
| Micro & Biochem 201 General Biochemistry Math 110 or For 208 Statistics | Environmental Biology (2 courses) Bot. 160 Plant Ecology |
| Plant and Animal Kingdom (3 courses) | Zoo. 102 Environmental Zoology |
| Bot. 105 Developmental Plant Structure | Micro & Biochem 220 Environmental Microbiology |
| Zoo. 104 Comparative Structure and Function | Pl & Soil Sci 102 Natural Resource Conservation |
| An Sci 58 Avian Biology | |
| Zoo. 150 Invertebrate Zoology | |

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 advisor 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. 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 |
| | |

Two additional semester courses in Botany and Math 9, 2 or Math 7, 8 or Math 11 are also required. Six credit hours of modern foreign language are strongly recommended.

GENERAL AGRICULTURE This option is designed for students seeking a general rather than a specialized knowledge in the field of agri-

culture; for those desiring to prepare for county extension work. Through the proper selection of electives, a student may choose a field of concentration in agriculture, and at the same time select courses that contribute to a liberal education.

Required courses: Each student majoring in general agriculture 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 departmental adviser.

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 two-year Biological Sciences Core Program (pg. —). 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.).

PLANT AND SOIL SCIENCE Students interested in economically important plants and how they are used for food, feed, fiber, recreation, ornamental purposes, or in soils may elect the Plant and Soil Science option. This program is designed for both men and women with either rural or urban backgrounds.

The Plant and Soil Science option includes basic biological and physical science courses and allows students to specialize in plant science or soil science. It has been designed with sufficient flexibility so that the student may place his primary interest in either science or in agribusiness.

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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 Introduction to Plant Science, Introduction to 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, or soils, 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.

RECREATION RESOURCE MANAGEMENT If you like to work outdoors, enjoy recreational activities, and want to help pre-

serve our natural resources, then this option may prepare you for just the career you are looking for. The program is designed to graduate individuals capable of planning and/or managing the use of plant, animal, soil, water, human, and other resources for recreational purposes.

Required courses: Satisfactory completion of 12 hours in communications; 12 hours in mathematics and engineering; 11 hours in physical sciences; 30 hours in biological sciences; and 23 hours in technical and professional courses.

VOCATIONAL, TECHNICAL AND EXTENSION EDUCATION Students may major in this department by electing the

Agricultural Education, Technical Education or Industrial Education option. 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 option 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 option 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 option. A student in this option 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 selecting this option 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 option 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 option 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 option is not open to students in other departments or programs.

All courses for students majoring in this department will be selected with, and approved by, an adviser. Students majoring in other departments and electing an option in this department will select all professional education courses with, and obtain the approval of, an adviser in this department.

The Agricultural Engineering Program

A. Agricultural Engineering Technology (see the Curriculum in Agriculture, page 74).

B. 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 | | lst | 2nd |
|---------------------------------|------|-------|---------------------------------|------|------|
| The Freshman Year | SEMI | ESTER | The Sophomore Year | SEME | STER |
| Engineering Mathematics | | | Engineering Mathematics, | | |
| Math. 13, 14 | 4 | 4 | Math. 123 | 4 | |
| General Physics, Physics 17, 18 | 3 | 3 | Differential Equations, | | |
| English, 1-2 | 3 | 3 | Math. 211 | | 3 |
| Engineering Graphics, I-II, | | | Physics 27, 28 | 4 | 4 |
| M.E. 1, 2 | 2 | - 2 | Plane Surveying, C.E. 53 | 4 | |
| Introductory Chemistry, | | | Statics, C.E. 24 | 3 | |
| Chem. 1-2 | 4 | 4 | Thermodynamics, M.E. 113 | 3 | |
| | | | Dynamics, C.E. 130 | | 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 will be taken at the University of Maine under Regional Cooperation Program. (See page 37). For a trial period through 1970-71, 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

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

The Curriculum in Forestry

The curriculum leading to the degree of Bachelor of Science in Forestry provides a liberal education in the humanities and sciences and a professional education in forest management or wildlife management. It is designed to prepare men for positions in forest management, in wildlife management, or for graduate study in the forest or wildlife sciences.

The curriculum emphasizes the science and technique of coordinating the management of forest and wild land for forest products, wildlife, water, and for recreation. Selection of the Forest Management option or the Wildlife Management must be made by the second semester of the sophomore year.

A minimum of 138 semester credit hours of prescribed and elective courses is required for graduation. Eight credit hours are earned for the summer program which immediately follows the second semester of the sophomore year.

Graduates may be employed by Federal and State agencies, by forest products and related industries, and private consulting foresters.

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Forest Management and Wildlife Management

| | lst | 2nd | | lst | 2nd |
|---------------------------------------|------|-------|----------------------------------|------|------|
| The Freshman Year | SEME | ESTER | The Sophomore Year | SEME | STER |
| College Algebra, Math. 9 ¹ | 3 | | Elementary Statistics, Math. 110 | | 3 |
| Trigonometry, Math. 2 | | 3 | Silvics, For. 122 | • • | 3 |
| Engineering Graphics, M.E. 1 | | 2 | Dendrology, For. 5 | 4 | |
| Freshman English, Engl. 1, 2 | 3 | 3 | Plane Surveying, C.E. 53 | 4 | |
| Principles of Biology, Biol. 1, 2 | 4 | 4 | Principles of Economics, | | |
| Introduction to Forestry, For. 1 | 2 | | Econ. 11, 12 | 3 | 3 |
| Freshman Seminar | | 1 | Public Speaking, Speech 11 | • • | 3 |
| Introductory Chemistry, | | | Elementary Physics, Physics 5 | 4 | |
| Chem. 1-2 | 4 | 4 | Forest Biometry I, For. 144 | | 3 |
| | | | Electives | 2-3 | 2-3 |

1. Qualified students may substitute Math. 11 or 13 for Math. 9 and 2.

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| Summer Field Program ² | |
|-----------------------------------|---|
| Forest Biometry II, For. 140 | 4 |
| Forest Bioecology, For. 100 | 4 |
| | |

| A. Forest Management Option | | | | | |
|--------------------------------|----------|------|-----------------------------------|----------|------|
| | lst | 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, P+SS. 108 | • • | 3 | Forest Recreation Mgt., For. 133 | 2 | |
| Wood Technology, For. 162 | | 3 | Timber Harvesting, For. 163 | 3 | |
| American Government, | | | Forest Pathology, For. 111 | | |
| Pol. Sci. 21 | 3 | | Forest Policy and Administration, | | |
| Communications Elective | 3 | 3 | For. 152 | | 3 |
| Electives ³ | 7-9 | 5-7 | Seminar, For. 282 | | 1 |
| | | | Electives ³ | 5-7 | 9-11 |
| B. Wildlife Management Option | | | | | |
| | 1st | 2nd | | 1st | 2nd |
| The Junior Year | SEME | STER | The Senior Year | SEME | STER |
| Structure and Function, | | | Field Zoology, Zoo. 109 | 4 | • • |
| Zoo. 103, 104 | 4 | 4 | Wildlife Mgt., For. 171, 172 | 3 | 3 |
| Silviculture, For. 123 | 3 | | Wildlife, Path., An. Path. 110 | | 3 |
| Taxonomy, Bot. 110 | | 3 | Seminar, For. 282 | | 1 |
| Environmental Zoology, | | | American Government, | | |
| Zoo. 102 | | 4 | Pol. Sci. 21 | 3 | |
| Forest Entomology, P+SS. 108 | | 3 | Electives ³ | 6-8 | 9-11 |
| Communications Elective | 3 | | | | |
| Electives ³ | 6-9 | 2-4 | | | |

Courses in eight-week program immediately following the second semester of the sophomore year.
 Nine credit hours of electives must be from approved courses in the Arts, Humanities, Languages, Social Sciences, or Mathematics. Not more than 4 credits of Military Science can be counted toward meeting this requirement. One course must be selected from approved courses in the Earth Sciences.

The Curriculum in Home Economics

The curriculum leading to the degree of Bachelor of Science in Home Economics provides a liberal education in the humanities and sciences and in subject matter related to home and family with concentration in a professional area of home economics. Specialization is provided through one of five options listed below:

Clothing, Textiles and Related Art Education—Teaching and Extension Food and Nutrition Housing and Home Management Preprofessional Social Work

Candidates for the degree must present 130 semester hours of credit including the requirements listed below, additional courses as indicated, and required courses in physical education. Elective courses allow a student to pursue a special area of interest for the completion of the degree requirements.

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| ٨ | I anomage and Fine Ante | | Trank Condition | |
|----|--|------------------------------|-----------------|--------|
| л. | English 6 | | Total Credits: | 15 |
| | English 0 | •• | | |
| | - Speccar 3 Choose 6 hours from the fellowing | | | |
| | Ant English Equip Languages Charing | Marsha Carach | | |
| | Art, English, Foreign Languages*, Classics, | Music, Speech. | | |
| В. | Social Sciences | | Total Credits | 18 |
| | Choose from 3 or 4 of the following areas: | | | |
| | History | Sociology and Anthropology | , | |
| | Political Science | Philosophy | | |
| | Economics | Religion | | |
| | Psychology | Geography | | |
| C. | Laboratory Sciences | | Total Credits: | 8(6) |
| | Two semesters of a Laboratory Science ¹ | | | |
| | (Chemistry, Physics, Zoology) | | | |
| | | | Total : | 39-41 |
| | The selection of the above courses may be de | etermined by certain require | ments of each o | ption. |
| D. | Home Economics: | | | |
| | Orientation required of all Freshmen. | | 1 | |
| | 15 Design | | 3 | |
| | 20 Introduction to Textiles and Clothing | | 3 | |
| | 35 Nutrition ² | | 3 | |
| | 51 Housing | | 3 | |
| | 56 Principles of Management | | 3 | |
| | 163 Dynamics of Family Development | | 3 | |
| | | | | |
| | | | 19 | |

E. Option requirements. Each student, not later than the sophomore year, should select one of the following options. Professional requirements and selected electives complete the 130 semester hours for the degree.

Options in Home Economics

CLOTHING, TEXTILES AND RELATED ART This option provides the opportunity for study in the field of fashion, textiles

and design for clothing and the home. By the addition of selected courses to meet individual needs and goals the option can be used effectively as preparation for careers in merchandising, consumer research and counseling, the clothing and textile industries, writing, radio, television, and extension services. The program also provides a strong background for further work leading to careers in fashion illustration and textile designing. Graduate work will be necessary for jobs at certain levels, such as college teaching and textile research.

Professional Requirements: 24 additional credits in clothing, textiles, related art and housing selected in consultation with adviser and approved by the department.

EDUCATION—TEACHING AND EXTENSION Homemaking and Consumer Education for junior and senior high schools in Vermont and other states. Through selection of special courses and summer work experience, concentration for teaching wage earning at the senior high school level may be planned. Openings in middle school homemaking related programs

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^{*}This department accepts credit for 2 semesters of a foreign language.

^{1.} Certain fields of specialization have specific requirements within these areas.

^{2.} Most fields of specialization require H.E. 35, Basic Concepts of Food and Nutrition-4 credits.

are also becoming more frequent and may be planned for through consultation with an advisor.

Early Childhood Education prepares students for nursery school and kindergarten positions in Vermont meeting the certification standards for this level either through home economics or through the College of Education.

Extension Education—Through appropriate selection of courses a student may gain professional background for work with the Extension Service for adults and through the 4-H program.

PREPROFESSIONAL SOCIAL WORK This sequence is available to students enrolled

in any college of the University. It may be elected as a field of study in Home Economics or may be combined with a major in another University department. Opportunities are provided for both field observation and experiences. The concentration in Preprofessional Social Work for students from other colleges is based on a broad liberal arts program, including courses in Sociology, Psychology and Human Development, Political Science, History, and Economics.

The Department of Home Economics is affiliated with the Merrill-Palmer Institute, Detroit, Michigan. Through this program a student may spend one semester, usually during the senior year, at the Institute. The cost is comparable to the cost of one semester at the University of Vermont. Selection is made on the basis of program emphasis and recommendation of the staff.

Professional Requirements: (1) Early Childhood Education, 33 credits in home economics selected in consultation with adviser and approved by the department. 3 advanced credits in psychology. (2) Social Welfare, 25 credits in home economics selected in consultation with adviser and approved by the department, 3 credits additional in speech, Sociology 41.

HOUSING AND HOME MANAGEMENT Professional careers in this option include work with public utility home service de-

partments, magazines, newspapers, radio and TV. Students may prepare to become interior designers, consultants in homemaking rehabilitation, directors of homemaker services, housing managers or researchers in housing design, materials, furnishings or equipment.

Graduate study in this field prepares for college teaching and work as an Extension Specialist in Housing, Home Furnishings, Equipment, Home Management, Family Economics, Consumer Education.

Professional Requirements: 21 credits in home economics selected in consultation with adviser and approved by the department. Economics 121.

FOOD AND NUTRITION This option prepares students for positions in the fields of food testing and promotion, food service management

and food demonstration. 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 nutrition.

Men find many opportunities in the fields of food and nutrition. They may prepare for them through this program.

Professional Requirements: 28 credits in home economics selected in consultation with adviser and approved by the department. Organic Chemistry 4 credits. Microbiology 4 credits. Selection sequence (a), (b), (c) below or 9 additional credits in Foods or Nutrition.

Additional courses to meet academic requirements for an American Dietetic Association Internship.

- (a) Therapeutic and Administrative Dietetics Zoology 5-6, Education 3 credits, Economics and Business Administration 251, Agricultural Biochemistry 151, Home Economics 244, 239
- (b) Hospitality Industry—Food Service Administration Economics and Business Administration 13-14, 141, 251, Home Economics 239
- (c) Science—Food and Nutrition Education 7 or 202 or Home Economics 173, nine additional credits in Foods or Nutrition, Agricultural Biochemistry 151

Vocational, Technical and Extension Education

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Associate Professors Fuller (Chairman), Ross; Assistant Professor Kelly; Mr. Davison; Mr. Spaven; Mrs. Malone.

102 EXTENSION METHODS (1-2) Methods and techniques of extension teaching. *Prerequisite:* junior standing. Two hours. Mr. Davison. Alternate years, 1970-71.

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. Credit will be given upon completion of all requirements in the industrial education curriculum. Thirty hours. Staff.

152 INTRODUCTION TO VOCATIONAL AND TECHNICAL EDUCATION (1-2) 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. Two hours. Mr. Fuller.

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. Ross.

173 COMMUNICATION METHODS (see Home Economics 173). Prerequisite: junior standing. Three hours. Miss Osborn and Mr. Spaven.

197, 198 SENIOR RESEARCH Work on a research problem under the direction of a staff member. Findings submitted in written form as prescribed by the department. *Prerequisite:* senior standing. Three hours. Staff.

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:* 152 and concurrent enrollment in 155. Three hours. Mr. Fuller and Mr. Ross.

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, 296 SPECIAL TOPICS IN VOCATIONAL, TECHNICAL AND EXTENSION EDUCA-TION 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. *Prerequisites:* senior standing or departmental permission. Credit as arranged. Staff.

301, 302, 303, 304 RESEARCH IN VOCATIONAL, TECHNICAL AND EXTENSION EDU-CATION Investigation of a research topic under the direction of an assigned staff member. Credit as arranged. Staff.

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The College of Arts and Sciences

The College of Arts and Sciences aims to provide for young men and women the means and opportunity of fitting themselves intellectually to play a responsible part in the world of thought and action. It devotes itself to the cultivation of ideas and of ideals. It seeks to encourage habits of clear, independent thinking and effective expression; to stimulate an appreciative understanding of the thought and achievement of man; to develop sound critical judgment and a spirit of tolerance; to arouse the intellectual curiosity which is the basis of continuing self-education.

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 department.

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.

B. FINE ARTS AND PHILOSOPHY

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

*Intermediate level or above

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

C. Social Sciences

anthropology economics geography history political science 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.

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 STUDIES Anthropology 21; Economics 11, 12; Geography 11, 12; History 13; Political Science 51, 71; nine hours selected from two disci-

plines 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 1, 2, 5, 6, and at least fifteen additional hours, including at least two advanced semester courses in studio and at least two advanced semester courses in art history.

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BOTANY Mathematics 9, 2, r 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 recom-

mended.

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. (Note that Mathematics 110 is a prerequisite for Economics 188.) 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 100or 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-eight hours in geology courses numbered above 100. Twentyfive hours in the natural sciences or mathematics.

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 taking the above combinations. 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 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 advisors and specifically approved by them.

SOCIOLOGY AND ANTHROPOLOGY follows: Sociology: 22, 250, 251, 255, and at least five additional semester courses in sociology; psychology 5. Anthropology: 21, 24, 26, 225, 290, and at least four additional advanced semester courses in anthro-

pology. 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 from 105, 150 and 200-level courses.

Special Provisions Concerning Credit

Courses Offered in Other Colleges Acceptable for Full Credit Toward the B.A. Degree¹

Agricultural Biochemistry 201; General Biochemistry

Agricultural Biochemistry 253: Microbial Biochemistry

Botany: all courses

Chemistry: all courses

Education 50: Introduction to Dance

Education 140: Art for the Elementary School

Education 145-146; Learning and Human Development

Education 190: History of Educational Thought

Education 202: Philosophy of Education

Education 205: History of American Education

Education 255: The School as a Social Institution

Forestry 208: Biological Statistics

Home Economics 15: Design

Home Economics 117: History of Costume

Home Economics 163: Dynamics of Family Development

Home Economics 166: Social Welfare as a Social Institution

Mathematics: all courses

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.

Other Courses Acceptable Toward the B.A. Degree

A given student may count as free electives not more than fourteen semester hours from other University courses in economics and business administration

1. Other courses may be approved in individual cases by the Committee on Studies.

or courses outside the College of Arts and Sciences. Only courses carrying at least three credits each are acceptable under this provision.

The Business Administration Curriculum

The Department of Economics and Business Administration offers two curricula: one leads to a Bachelor of Arts 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. 1901 | 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 | 8 |
| 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 6 Business Law, BA 9, 10 6 Intermediate Accounting, BA 161-162 Cost Accounting, BA 272 Advanced Accounting, BA 266 Basic Federal Taxes, BA 164 Auditing, BA 271 Corporate Finance, BA 207

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.

3

8 3

3

3

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 37) 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 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 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 purposes of the Center are to encourage and coordinate interdisciplinary study and research of selected foreign areas. The Center sponsors also interdisciplinary seminars and guest lectures. The directors and programs of the Center are listed under "Area Studies" and the staff and course offerings are included under the various academic departments.

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 four foreign areas: Asia, Canada, Latin America, and Russia and Eastern Europe. For the 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 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 World Affairs Center

The World Affairs Center, located at 479 Main Street on the University campus, is the focus for programs and services in international education. The Center is staffed jointly by the University and the Vermont Council on World Affairs, a Vermont citizens' group concerned to further greater understanding of world affairs and responsible participation in U. S. foreign policy. A library on world affairs, national foreign policies, and international organizations is maintained at the Center for the use of University members and Vermont residents. Advice and services for international students and visitors are part of the Center's program.

The Center cooperates with the State of Vermont, the United States, the United Nations, and many other international, national, and local organizations in arranging speakers, programs, materials for distribution, hospitality for international visitors, and consultations with groups throughout Vermont on various aspects of international education. The Center serves as a coordinating agent and occasionally sponsors educational activities such as specialized conferences, non-credit courses, contests, and programs.

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 depart-
mental major requirements and advanced course prerequisites must still be met. (Students should consult their advisors 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.

First semester freshmen in the Experimental Program take one seminar in each of the areas of humanities, social science, and natural science, together with one conventional course in the regular program. In the second semester students may elect two seminars and two conventional courses, three and one, or four seminars. All students have an advisor 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), Jean Davison (Classics)**, Gans (Pharmacology), Gilleland (Classics)*, Gregg (Chemistry), Korson (Pathology), Lewis (Speech)*, Pappoutsakis (Music)**, Sproston (Botany)*; Associate Professors Etherton (Botany)**, Feidner (The ater)**, Kunin (Medicine), Phillips (Medicine), Stanfield (Sociology); Assistant Professors Cooke (Mathematics), William Davison (Art), Fackler (History), Hall (English), Metcalfe (History), Musty (Psychology), Nolfi (Zoology), Paden (Religion), Pratt (Psychology), Simon (Political Science), Sobers (Philosophy)*, Taylor (Pathology); Instructors Brubaker (Political Science, Assistant Director of the Experimental Program), Geno (Romance Languages), Paskow (Philosophy)**, Simone (English); Adjunct Professor Ross (Economics); Visiting Assistant Professor Fishman (Political Science)**

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 1969-70 are listed for the purpose of illustration:

Art:

Visual forms. Mr. Davison (both semesters) Botany:

Mr. Sproston (fall semester)

Mr. Etherton (spring semester)

Chemistry:

Mr. Gregg (both semesters)

Classics:

The Greek and Latin Epic in Translation. Mr. Gilleland (fall semester) Archaeology. Miss Davison (spring semester)

*fall semester,1969

**spring semester, 1970

Economics: Mr. Ross (both semesters) English: Modern Psychological Novels. Mrs. Hall (fall semester) The Contemporary Novel and Poetry. Mr. Simone (fall semester) Myth and Poetry. Mrs. Hall (spring semester) Shakespeare. Mr. Simone (spring semester) French: The Contemporary French Theater. Mr. Geno (Both semesters. Class conducted in French.) History: Revolution. Mr. Daniels (fall semester) Backgrounds of American Problems, Mr. Fackler (fall semester) Cultural Life in Early Modern Europe. Mr. Metcalfe (fall semester) American Reformers. Mr. Fackler (spring semester) Canada in the Twentieth Century. Mr. Metcalfe (spring semester) Mathematics: Calculus (History and application). Mr. Cooke (both semesters) Medical Science: Drs. Gans, Korson, Kunin, Phillips, and Taylor (both semesters) Music: Music in Western Culture. Mr. Pappoutsakis (spring semester) Philosophy: Mr. Sobers (fall semester) Mr. Paskow (spring semester) **Physics:** Mr. Crowell (both semesters) **Political Science:** Political Values. Mr. Brubaker (fall semester) The Politics of Decision Making, Mr. Simon (fall semester) Urban Politics. Mr. Brubaker (spring semester) Civil and Political Rights. Mr. Fishman (spring semester) Politics on the Road. Mr. Simon (spring semester) Psychology: Psychology in Historical Perspective. Mr. Musty (fall semester) Psychology. Mr. Pratt (fall semester) Psychology in the Year 2000. Mr. Musty (spring semester) Personality. Mr. Pratt (spring semester) **Religion:** World Views. Mr. Paden (both semesters) Sociology: Sociology of the University. Mr. Stanfield (both semesters) Speech and Theater: Mass Communications. Mr. Lewis (fall semester) The Drama. Mr. Feidner (spring semester) Zoology: Ecology. Mr. Nolfi (both semesters) Interdisciplinary seminars: Vision. Messrs. Davison, Nolfi, Paden, Pratt, and Simone (spring semester) The Nature of Man. (spring semester. Student-developed seminar.)

The College of Education

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

These curricula are designed to prepare teachers for the kindergartenelementary level, middle and junior high schools, and assignments calling for subject specialties in elementary, secondary, and twelve-grade situations. The programs provide a liberal education, specialization in a field of knowledge and professional understandings and experiences. Preparation for teachers is also concerned with developing insights about the school's role as a social institution and the nature of the learner and of the means for teaching him most effectively.

General education courses may be elected in the College of Arts and Sciences, Technology, and Agriculture and Home Economics. Professional courses are taken in the College of Education. Professional laboratory experiences are provided in the College of Education and in schools under the supervision of the College of Education.

The nationally accredited education curricula in the College of Education meet requirements for teaching certification in most of the states. Adjustments in individual programs may be made to fit special requirements for certification in specific states. If in doubt about certification requirements, students should consult with their advisers or with the Dean of the College of Education.

The College of Education, in cooperation with an All-University Coordinating Committee for Teacher 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.

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

Fifth-Year Certificate in Education

A special fifth-year program culminating in a certificate of advanced study is offered for students who wish to work beyond the bachelor's degree but who

need or desire more flexibility than is possible in any of the standard programs for master's degrees.

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

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

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

(1) Candidates must hold a bachelor's degree.

(2) Candidates must make written application on forms obtained from the Office of the Dean of the College of Education.

(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 \hat{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 Dean of the College of Education.

In addition to the planned program leading to the *Fifth-Year Certificate*, the Department of Education will arrange for college graduates special programs leading to qualification for teaching certificates in either elementary or secondary education. To be accepted for these special programs, candidates must have included appropriate academic courses in their degree curricula, and they must satisfy the Department of Education that they have desirable personal qualifications for teaching.

Elementary Education

The elementary education program is intended to prepare teachers for any of the elementary grades and kindergarten. The Bachelor of Science in Education is awarded upon satisfactory completion of an approved program.

The elementary education curriculum includes a base of required academic courses, a planned sequence of professional courses, laboratory experiences, and elective academic courses. The student must use electives during the four years to build an academic major of twenty-four to thirty-three credits. Specific information about majors may be obtained from advisers, or from the office of the dean. The foundation in general education includes required courses in the social sciences, in mathematics, in laboratory science, in English and literature, in psychology and in speech. Courses in fine arts and in languages may be elected.

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.

In each year of the program, the curriculum provides for elective courses from other colleges. Total electives approximate forty semester hours and open to the student in elementary education attractive majors in music, art, speech, language, literature, history, and other fields of study offered by the University.

Students are expected to maintain a high standard of scholarship. A grade of less than C may not be applied to the minimum required credits in areas of concentration and professional education.

| | 1st 2nd | | lst 2nd |
|--------------------------------------|----------|---------------------------------|----------|
| The Freshman Year | SEMESTER | The Sophomore Year | SEMESTER |
| Foundations of Education | 3 or 3 | Sophomore Literature | 3 3 |
| Speech 11 or 31 | 3 or 3 | U. S. History 23 & 24 | 3 3 |
| Science | 4 4 | Mathematics 125, 126 | 3 3 |
| Freshman English | 3 3 | General Psychology ¹ | 3 or 3 |
| Philosophy 1, 2, 3 or 4 ¹ | 3 or 3 | World Geography ¹ | 3 or 3 |
| Sociology/Anthropology | 3 or 3 | Approved Electives | 3-6 3-6 |
| Approved Elective | 3 or 3 | (Field of Concentration) | |
| | | Child and Community | l or l |
| | | Music 9 & 10 | 33 |
| | lst 2nd | | lst 2nd |
| The Junior Year | SEMESTER | The Senior Year | SEMESTER |
| Art for Elementary School | 3 | Teaching Mathematics and | |
| Children's Literature and | | Critical Thinking | 3 |
| Language Arts | 3 | Physical Education for | |
| Learning and Human | | Elementary Schools | 2 or 2 |
| Development | 3 3 | Health Education | 2 or 2 |
| Approved Electives | 6 6 | Student Teaching | 8 |
| (Field of Concentration) | | History of Educational | |
| Reading and Language Arts | 3 | Thought | 3 |
| Teaching Science and | | Art (History or Appreciation) | 3 |
| Social Studies | 3 | Approved Electives | 6 |
| Political Science 21 ¹ | 3 or 3 | (Field of Concentration) | |

1. Courses may be taken at different times in the four-year program to accommodate fields of concentration. A minimum of 125 approved semester hours, plus credit in required courses in physical education, 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 degree of Bachelor of Science in Education is awarded upon satisfactory completion of an approved program.

During the first two years the curriculum consists generally of basic courses in English, fine arts, foreign languages, mathematics, science, and social science. Sophomores begin concentration on majors and minors in *approved teaching* fields and are given opportunity to participate in teaching experiences in local secondary schools. The junior and senior years combine courses in the teaching fields, professional courses in education, and laboratory experiences in teaching.

PROFESSIONAL REQUIREMENTS Candidates for the degree in secondary education are expected to complete with a high standard of scholarship at least twenty-eight semester hours of course work in professional education.

TEACHING MAJORS AND MINORS Candidates for the degree in secondary education are required to complete approved courses

in two *teaching fields common to secondary schools*, or in one of two broad fields combining either natural sciences or social sciences. Broad field majors include approximately fifty semester hours in related courses, single subject majors include at least thirty semester hours, and minors include at least eighteen semester hours. The major-minor program must include credits in advanced courses.

Students should choose majors and minors which bear logical relationships and which commonly occur as teaching combinations in secondary schools. Suggested major and minor fields are English, foreign languages, mathematics, physical education, social sciences, and the sciences. Advisers can assist students in making choices which are in accord with student aptitudes and interests and which are likely teaching combinations. Outlines of suggested course sequences for majors and minors may be obtained from advisers, or from the office of the dean of the college.

Students are expected to maintain a high standard of scholarship. A grade of less than C may not be applied to the minimum required credits in majors and minors and professional education.

EXPERIENCES IN PUBLIC SCHOOLS Students in secondary education have direct experiences in public schools at two points in the four-year curriculum. During the sophomore year students observe and participate as toosher excitation leads in rise and environ high schools.

ticipate 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 well 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.

THE COLLEGE OF EDUCATION

| The Freshman Year | lst 2nd semester | The Sophomore Year | lst 2nd semester |
|---|---------------------|--------------------------------|---------------------|
| Foundations of Education | 3 or 3 | Literature | 3 3 |
| Laboratory Science | 4 4 | General Psychology | 3 or 3 |
| English 1, 2 | 3 3 | Participation | 2 or 2 |
| Foreign Language | 3-4 3-4 | Foreign Language ² | 3 3 |
| History or Political Science ¹ | 3 3 | Approved Electives | 6-9 6-9 |
| Speech | 3 or 3 | | |
| | lst 2nd | | lst 2nd |
| The Junior Year | SEMESTER | The Senior Year | SEMESTER |
| Learning and Human | | Secondary Education Methods | 3 or 3 |
| Development | 3 3 | Special Methods | 3 |
| Approved Electives in | | History of Educational Thought | 3 or 3 |
| Teaching Fields | 12-15 12-15 | Student Teaching | 8 |
| | | Approved Electives | 12-15 3-6 |

A minimum of 122 approved semester hours, plus credit in required courses in physical education, 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.

| | lst | 2 | nd | | ls | t 2nd |
|------------------------------------|----------|-----|-----|------------------------------------|-----|---------------|
| The Freshman Year | SEMESTER | | ſER | The Sophomore Year | SEI | MESTER |
| Theory I | 3 | | 3 | Theory II | 3 | 3 |
| Survey of Mus. Lit. | 3 | | 3 | Performance Study: Major, piano, | | |
| Performance Study: Major, | | | | voice, & woodwind classes | 4 | 4 |
| Piano, ³ & String class | 3 | | 3 | Ensembles: Major, secondary | | |
| Major Ensemble | 1 | | 1 | or chamber music ⁵ | 2 | 2 |
| Foundations of Ed. | 3 | or | 3 | Participation | 2 | or 2 |
| Speech 11 or 31 | 3 | or | 3 | Electives ⁴ | 6 | 6 |
| Electives ⁴ | 3 | | 3 | | | |
| | lst | 2 | nd | | lst | 2nd |
| The Junior Year | SEN | (ES | TER | The Senior Year | SEN | AESTER |
| Orchestration | 3 | | | Student Teaching in Music | 8 | |
| Counterpoint | 3 | | • • | Elem. & Secondary Music Meth. | 5 | |
| History of Music | 3 | | 3 | Performance Study: Major, recital, | | |
| Learning & Human Development | 3 | | 3 | percussion & repair classes | 1 | 4 |
| Performance Study: Major | | | | Ensembles: Major, secondary, | | |
| Brass Class | 3 | | 3 | or Chamber Music ⁵ | | 2 |
| Ensembles: Major, Secondary, | | | | Form & Analysis | | 3 |
| or Chamber Music | 2 | | 2 | History of Educational Thought | | 3 |
| Conducting | | | 3 | Elective ⁴ | | 3 |
| Elective ⁴ | | | 3 | | | |

1. If History is chosen, European Civilization is recommended.

2. An approved elective if intermediate language has been completed.

3. Until functional piano facility achieved (see Performance, page 234)

4. To meet Arts and Sciences College distribution requirements.

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

A minimum of 126 approved semester hours, plus credit in required courses in physical education, is required for the degree.

Physical Education

The teaching major in physical education, open to men and women, qualifies candidates to teach physical education in both elementary and secondary schools. Satisfactory completion of the program earns a Bachelor of Science in Education degree.

Candidates will include 30-38 credits in physical education and will be required to demonstrate competency in a variety of sports from the intermediate to advanced levels. Competency requirements may be satisfied by performance in regular activity courses, which are a part of the basic physical education program, or by demonstration of equivalent knowledge and skills in scheduled tests.

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

| | lst 2nd | | lst 2nd |
|--------------------------|----------|-------------------------------|----------|
| The Freshman Year | SEMESTER | The Sophomore Year | SEMESTER |
| Foundations of Phys. Ed. | 3 | Devel. of Motor Skills | 2 |
| Science Elective (1) | 3-4 3-4 | English Literature | 3 3 |
| English 1, 2 | 3 3 | Foreign Language ¹ | 3 3 |
| Public Speaking | 3 or 3 | Social Science Elective | 3 3 |
| Gen. Psychology | 3 or 3 | Anatomy and Physiology | 3 3 |
| Foreign Language | 3-4 3-4 | Health Education (2) | 3 or 3 |
| Foundations of Ed. | | O and A of Phys. Ed. (2) | 3 or 3 |
| Phys. Ed. Activity | 1 1 | Participation | 2 |
| Phys. Ed. Activity | | Phys. Ed. Activity | 1 1 |
| | | Phys. Ed. Activity | |
| | lst 2nd | | lst 2nd |
| The Junior Year | SEMESTER | The Senior Year | SEMESTER |
| P. E. in the El. School | 3 or 3 | Phys. Ed. for the Atypical | 3., |
| P. E. in the Sec. School | 3 or 3 | Coaching (2) | 3 |
| Kinesiology | 3 or 3 | C and P Athletic | |
| Physiology of Muscular | | Injuries (2) | 2 |
| Activity | 3 or 3 | Tests and Measurements in | |
| Learning and Human | | Physical Ed. (3) | 3 or 3 |
| Development | 3 3 | History of Ed. Thought (3) | 3 or 3 |
| Elective | 3 | Student Teaching | 8 |
| Coaching (2) | 3 | Elective | 3 3 |
| Elective | 3 3 | Elective | 3 |
| Phys. Ed. Activity | | Elective | 3 |
| | | Phys. Ed. Activity | |

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

¹ An approved elective if intermediate language has been completed.

(1) Botany, Biology, Zoology, Chemistry, Physics

(2) Recommended elective

(3) Accelerated course

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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, in medical technology, 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 College of Technology

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, and only those who so qualify will be recommended as chemists by the department. 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.

| | lst | 2nd | | lst | 2nd |
|---------------------------------|----------|-------|--|----------------|--------|
| The Freshman Year | SEMESTER | | The Sophomore Year | SEN | 1ESTER |
| 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, 1241 | 3 | 3 |
| | | — | Physics 27 | 4 | |
| | · 16 | 16 | German ² or Elective Humanities and/or | 3-4 | 3-4 |
| | | | Social Sciences ^a | 3 | 3 |
| | | | | 16-17 | 17-18 |
| | lst | 2nd | | lst | 2nd |
| The Junior Year | SEM | ESTER | The Senior Year | SEN | IESTER |
| 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, 1986 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 ⁸ | 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 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, the courses can be arranged to accommodate transfer from other curricula. Two years of physical education are normally required of all students.

- 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.
- Courses in biochemistry are acceptable as advanced chemistry electives.
 An audit of Chemistry 381 (Graduate Seminar) is a prerequisite for 184 (Senior Seminar).
 May be taken only with permission of the department.
- 7. Advanced courses in physics and mathematics are highly recommended.

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 humani-

ties 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 in the second semester of his freshman year, 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 |
| | | |
| | Minimum total | 24 |

Elective Areas

| Geography | Intermediate Classical Languages |
|-------------------|---|
| History | Intermediate Romance Languages |
| Philosophy | Intermediate German |
| Religion | Intermediate Russian |
| Political Science | Advanced Literature courses |
| Psychology | Art (history courses only) ¹ |
| Sociology | Music (history and Survey courses only) ² |
| World Problems | 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

| | 180 | zna |
|--|------|----------|
| | SEMI | STER |
| 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 |
| | | <u> </u> |
| | 16 | 16 |

Civil Engineering

| | lst | 2nd |
|---|------|-------|
| The Sophomore Year | SEMI | ESTER |
| Engineering Mathematics, 123 | 4 | |
| Applied Math. for Engineers and Scientists, Math. 201 | | 3 |
| Computer Programming, Math. 31 | | 2 |
| General Physics, 127 | .4 | |
| Introductory Modern Physics, 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 |
| | | |
| | 18 | 19 |

| | lst | 2nd | | lst | 2nd |
|--|-----|-------|--|-----|-------|
| The Junior Year | | ESTER | The Senior Year | | ESTER |
| 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, | | | Soil Mechanics, C.E. 180 | 4 | |
| Principles, 101 | 4 | | Structural Analysis II, C.E. 171 | 3 | |
| Transportation Engineering, | | | Humanistic-Social Studies ⁴ | 3 | 3 |
| C.E. 140 | 3 | | Substructure Design, C.E. 181 | | 4 |
| Thermodynamics and Heat | | | Sanitary Engineering II, | | |
| Transfer, M.E. 113 | | 3 | C.E. 151 | | 3 |
| Humanistic-Social Studies ⁴ | 3 | 3 | Adv. Structural Design, | | |
| Mech. of Materials Lab., C.E. 101 | | 1 | C.E. 172 | | 4 |
| Engineering Contracts, C.E. 120 | | 2 | Professional Elective ⁵ | • • | 3 |
| Hydraulics, C.E. 160 | | 4 | | | _ |
| Structural Analysis I, C.E. 170 | | 4 | | 16 | 17 |
| | — | — | | | |
| | 16 | 17 | | | |
| | | | | | |

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

- See footnote under course offerings of the Department of Mathematics.
 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 (Economics II, 12 is recommended for C.E. students).
- 5. A course chosen from engineering, science, mathematics, or economics with the approval of the Civil Engineering Faculty.

Electrical Engineering

| | lst | 2nd |
|--|-----|-------|
| The Sophomore Year | SEM | ESTER |
| Humanistic-Social Studies | 3 | 3 |
| Mathematics, 123 | 4 | |
| Elem. Probability, Math. 191 | | 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 |

| The Junior Year | lst Semi | 2nd ESTER | The Senior Year | lst SEM | 2nd ESTER |
|-------------------------------|-------------|--------------|-----------------------------------|------------|--------------|
| Humanistic-Social Studies | 3 | 3 | Humanistic-Social Studies | 3 | 3 |
| Electromagnetic Field Theory, | | | Approved Mathematics Elective | 3 | |
| E.E. 143, 144 | 3 | 3 | Solid State Physical Electronics, | | |
| Thermodynamics, M.E. 115 | 3 | | E.E. 163 | 3 | |
| Electronics I, E.E. 121 | 3 | | Laboratory, 185 | 2 | |
| Laboratory, 183, 184 | 2 | 2 | Energy Conversion I, E.E. 113 | 3 | |
| Signals and Systems, E.E. 171 | 3 | | Electronics III, E.E. 123 | 3 | |
| Electromagnetic Properties of | | | Information Transmission | | |
| Materials, E.E. 162 | | 3 | Systems, E.E. 174 | | 3 |
| Control Systems, E.E. 111 | | 3 | Laboratory, E.E. 186 | | 1 |
| Electronics II, E.E. 122 | | 3 | Laboratory, E.E. 188 | | 1 |
| | | | Energy Conversion II, E.E. 114 | | 3 |
| | 17 | 17 | 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.

Mechanical Engineering

| | 15 | t 2nd |
|---|---------|--------|
| The Sophomore Year | SE | MESTER |
| 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. 24 | 3 | |
| Creative Design, M.E. 73 | 3 | |
| Programming and Numerical Methods, Math. 31 | | 2 |
| Introduction to Modern Physics, Physics 128 | | 4 |
| Kinematics and Dynamics, M.E. 133 | | 3 |
| Thermodynamics I, M.E. 92 | ., | 2 |
| Mechanical Instrumentation, M.E. 84 | • • • • | 1 |
| | - | |
| | 17 | 15 |

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| The Junior Year | lst sem | 2nd ESTER | The Senior Year | lst Sem | 2nd ESTER |
|------------------------------------|------------|--------------|--|------------|--------------|
| Mech. of Materials, C.E. 131 | 3 | ••• | Industrial Materials I. M.E. 271 | 3 | |
| Thermodynamics II, M.E. 111 | 4 | | Advanced Fluid Mechanics. | - | |
| Applied Math. for Engrs. | | | M.E. 243 | 3 | |
| and Scientists, Math 201 | 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, M.E. 135 | | 4 | Engineering Design Analysis and | | - |
| Humanistic-Social Studies1 | 3 | 3 | Synthesis, M.E. 294 | | 4 |
| | — | | 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 advisor.

Management Engineering

| Engineering Math III, Math. 1234General Physics III, Physics 274Creative Design, M.E. 733Statics, C.E. 243Manufacturing Processes, M.E. 533English Elective3Programming and Numerical Methods, Math 31Intro. to Modern Physics, Physics 128Kinematics and Dynamics, M.E. 133General Psychology, Psych. 1Thermo. and Heat Transfer, M.E. 11317 | ESTER |
|---|-------|
| General Physics 111, Physics 274Creative Design, M.E. 733Statics, C.E. 248Manufacturing Processes, M.E. 533English Elective3Programming and Numerical Methods, Math 31Intro. to Modern Physics, Physics 128Kinematics and Dynamics, M.E. 133General Psychology, Psych. 1Thermo. and Heat Transfer, M.E. 11317 | |
| Creative Design, M.E. 733Statics, C.E. 248Manufacturing Processes, M.E. 583English Elective3Programming and Numerical Methods, Math 31Intro. to Modern Physics, Physics 128Kinematics and Dynamics, M.E. 133General Psychology, Psych. 1Thermo. and Heat Transfer, M.E. 11317 | ., |
| Statics, C.E. 243Manufacturing Processes, M.E. 533English Elective3Programming and Numerical Methods, Math 31Intro. to Modern Physics, Physics 128Kinematics and Dynamics, M.E. 133General Psychology, Psych. 1Thermo. and Heat Transfer, M.E. 11317 | |
| Manufacturing Processes, M.E. 533English Elective3Programming and Numerical Methods, Math 31Intro. to Modern Physics, Physics 128Kinematics and Dynamics, M.E. 133General Psychology, Psych. 1Thermo. and Heat Transfer, M.E. 11317 | |
| English Elective3Programming and Numerical Methods, Math 31Intro. to Modern Physics, Physics 128Kinematics and Dynamics, M.E. 133General Psychology, Psych. 1Thermo. and Heat Transfer, M.E. 11317 | or 3 |
| Programming and Numerical Methods, Math 31 Intro. to Modern Physics, Physics 128 Kinematics and Dynamics, M.E. 133 General Psychology, Psych. 1 Thermo. and Heat Transfer, M.E. 113 17 | or 3 |
| Intro. to Modern Physics, Physics 128 Kinematics and Dynamics, M.E. 133 General Psychology, Psych. 1 Thermo. and Heat Transfer, M.E. 113 17 | 2 |
| Kinematics and Dynamics, M.E. 133 General Psychology, Psych. 1 Thermo. and Heat Transfer, M.E. 113 17 | 4 |
| General Psychology, Psych. 1 Thermo. and Heat Transfer, M.E. 113 17 | 3 |
| Thermo. and Heat Transfer, M.E. 113 | 3 |
| 17 | 3 |
| 17 | - |
| | 18 |
| lst | 2nd |
| The Junior Year SEM | ISTER |
| Applied Math for Engrs. and Sc., Math 201 3 | |
| Principles of Economics, Econ. 11, 12 3 | 3 |
| Principles of Accounting, Econ. 13-14 4 | 4 |
| Electrical Engineering Principles, E.E. 101, 102 4 | 4 |
| Statistical Methodology, Math 192 3 | |
| Elementary Statistics, Econ. 188 | 3 |
| Fluid Mechanics, M.E. 142 | 3 |
| | 17 |

1. See distribution of Humanistic-Social Studies on page 110. 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.

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| | lst 2nd |
|--|----------|
| The Senior Year | SEMESTER |
| Mechanics of Materials, C.E. 131 | 3 |
| Methods Engineering, M.E. 175 | 3 |
| Industrial Materials, M.E. 271 | 3 |
| Personnel Admin., Econ. 251 | . 3 |
| Business Law, Econ. 9, 10 | 3 3 |
| Plant Organization, M.E. 176 | 4 |
| Engineering Design I, M.E. 135 | 4 |
| Humanistic-Social Studies ¹ | 6 |
| | · |
| | 15 17 |

A minimum of 133 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 advisor.

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.

| · | lst | 2nd | | lst | 2nd |
|------------------------------------|------|-------|------------------------------------|-----|-------|
| The Freshman Year | SEME | STER | The Sophomore Year | SEM | ESTER |
| 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 |
| | lst | 2nd | | lst | 2nd |
| The Junior Year | SEM | ESTER | The Senior Year | SEM | ESTER |
| 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 | | _ | |
| | | _ | | 15 | 15 |
| | 17 | 18 | | | |

1. See distribution of Humanistic-Social Studies on page 110.

2. Physical science, biological science, agricultural science, medical science or engineering courses.

3. Beyond Mathematics 102.

4. Physical science, biological science, agricultural science, medical science or engineering courses beyond the sophomore level, to constitute a minor specialization.

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 | Intermediate Komance Languages |
|----------------------------------|--------------------------------|
| Anthropology | Intermediate Russian |
| Art | Music |
| Economics | Philosophy |
| English | Political Science |
| Geography | Psychology |
| History | Religion |
| Intermediate Classical Languages | Sociology |
| Intermediate German | 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.

| | lst | 2nd | | lst | 2nd |
|--|-------|-------|--|-------|-------|
| The Freshman Yean | SEM. | ESTER | The Sophomore Year | SEM | ESTER |
| English Electives | 3 | 3 | Liberal Arts Elective | 3 | 3 |
| Mathematics ^{1,3} 11, 12 or | | | Mathematics 121, 124 or 123, 124 | 34 | 3 |
| 13, 14 | 4—5 | 4-5 | German, French or Russian ⁴ | 4 | 4 |
| Chemistry ^{2,8} 11-12 | 5 | 5 | Physics 27, 128 | 4 | 4 |
| Physics 17, 18 | 3 | 3 | Elective ⁵ | 34 | 3—4 |
| | | | | • | |
| | 15 | 15 | | 17 | 17 |
| | or 16 | or 16 | | to 19 | to 18 |
| | lst | 2nd | | lst | 2nd |
| The Junior Year | SEM | ESTER | The Senior Year | SEM | ESTER |
| German, French or Russian ⁴ | 3 | 3 | Physics 271, 272 | 3 | 3 |
| Physics 213, 214 | 3 | 3 | Physics 197, 198 or 203, 204 | 23 | 3—4 |
| Physics 211, 216 | 3 | 3 | Physics 265 | 3 | |
| Physics 101, 102 | 3 | 3 | Scientific Elective | | 3—4 |
| Mathematics Elective ⁶ | 3 | 3 | Mathematics Elective ⁶ | 3 | 3 |
| Elective ⁵ | 3 | 3 | Elective ⁵ | 3—4 | 34 |
| | — | - | | | |
| | 18 | 18 | | 14 | 15 |
| | | | | to 16 | to 18 |

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 129 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.

^{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.

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 | lst sem | 2nd ESTER | The Sophomore Year | lst semi | 2nd ESTER |
|---|------------|--------------|--|-------------|--------------|
| Freshman English, Eng. 1-2 | 3 | 3 | The Cultures of Man, | | |
| Oral Anatomy 11 and Physiology | 4 | | Soc. and Anthrop, 21 | 3 | |
| Oral Histology and | | | Oral Pathology, 53-54 | 2 | 2 |
| Embryology, 22 | | 3 | Radiology, 61-62 | 1 | 1 |
| Dental Hygiene, 1 | 2 | | Public Health, 74 | | 2 |
| Dental Hygiene, 2 | | 3 | Clinical Dental Hygiene, 81-82 | 5 | 5 |
| Medical Emergencies, 31 | 1 | | Dental Health Education, 72 | | |
| General Psychology, Psych. 1 | | 3 | Pharmacology and | | |
| Physical Education | 1 | 1 | Anesthesiology, 51-52 | 1 | 1 |
| Integrated Science | 5 | 5 | Assisting, Materials, Ethics and | | |
| *Freshman Laboratory Science, | | | Office Management, 91-92 | 1 | 1 |
| 11, 12 | 3 | 3 | Public Speaking, Speech, 11 | | 3 |
| Dynamics of Health Care, 1, 2 | I | I | Home Economics, F & N, 87 | 3 | |
| -,,- | _ | | Periodontics, 55 | 1 | |
| 11, 12 Dynamics of Health Care, 1, 2 | 3 1 | 3 1 | Public Speaking, Speech, 11 Home Economics, F & N, 87 Periodontics, 55 | 3 1 | 3 |

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.

DIVISION OF HEALTH SCIENCES

| | lst | 2nd | | lst | 2nd |
|------------------------------|------|-------|--|------|-------|
| The Freshman Year | SEM: | ESTER | The Sophomore Year | SEM) | ESTER |
| *English | 3 | 3 | Zoology 103 | 4 | |
| Chemistry 1-2 | 4 | 4 | Chemistry 16 | | 4 |
| *Mathematics | 3 | 3 | Physics 5-6 | 4 | 4 |
| Biology 1-2 | 4 | 4 | Approved electives | 8 | 8 |
| Dynamics of | | | | | — |
| Health Care | 1 | | | 16 | 16 |
| Approved Electives | | 3 | and the second | | |
| Physical Education | 1 | 1 | | | |
| | | | | | |
| | 16 | 18 | | | |
| | lst | 2nd | | lst | 2nd |
| The Junior Year | SEMI | ESTER | The Senior Year | SEMI | ESTER |
| 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 131, 132 may be substituted for Chemistry 16.

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:

| The First Year | lst sem | 2nd ESTER | The Second Year | lst Sem | 2nd ESTER |
|---|---|--|--|--------------------------|---------------------------|
| Dynamics of Health Care, 1, 2 *English *Math Psychology 1 Integrated Science 9, 10 Freshman Lab Science 11, 12 Physical Education | $ \begin{array}{c} 1 \\ 3 \\ 3 \\ 5 \\ 3 \\ 1 \\ -1 \\ 16 \end{array} $ | $1 \\ 3 \\ \\ 3 \\ 5 \\ 3 \\ 1 \\ \\ 16$ | Medical Technology 20-21 Medical Technology 40-41 Introductory Microbiology 55 Medical Orientation 3 Electives | 6 2 4 6 | 4 9 1 14 |

Notes: * Course dependent upon Freshman placement.

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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 in the process of development. It is anticipated that the clinical instruction (i.e., junior and senior years) will be initiated in the fall of 1971. The major emphasis of the first two years of the program is placed on the general cultural aspects of education which prepare the student for more specialized study during the final five semesters. Beginning with the junior year the student concentrates on the basic sciences, medical sciences, basic professional courses in physical therapy and introduction to clinical education. A tentative curriculum for the first two years is as follows:

| Freshman Year | lst seм | 2nd ESTER | Sophomore Year | lst SEM | 2nd ESTER |
|-----------------------------|------------|--------------|----------------|------------|--------------|
| *English | 3 | 3 | *English | 3 | 3 |
| Chemistry 3-4 | 4 | 4 | Physics 5-6 | 4 | 4 |
| Mathematics 7 | 3 | | Psychology 1 | 3 | |
| Biology 1-2 | 4 | 4 | Psychology 100 | | 3 |
| Dynamics of Health Care 1,2 | 1 | 1 | Zoology 5-6 | 3 | 3 |
| Anthropology 21 | | 3 | Speech 11 | 3 | |
| | | | Elective | | 3 |
| | 15 | 15 | | | - |
| | | | | 16 | 16 |

* Course dependent upon Freshman placement.

Advisors: Asst. Prof. Raymond Milhous and Dorothy Ford, Dept. of Rehabilitation Medicine.

The Program in Radiologic Technology

The design of the program is to provide training in radio-diagnosis, radiotherapy or nuclear medicine, within the framework of a two year college program in association with co-operating hospitals for the development of technical skills. This program is to be supplemented by a 10 months program in approved hospitals, where the student can perfect his technical skills doing practical work under supervision. A tentative curriculum follows:

| The First Year | lst SEM | 2nd ESTER | The Second Year | lst SEM: | 2nd ESTER |
|--------------------------------|------------|--------------|--------------------------------|-------------|--------------|
| Diagnostic-Therapeutic-Nuclear | Medicine | | Diagnostic-Therapeutic-Nuclear | Medicine | |
| *English | 3 | 3 | Electives | 6 | |
| Psychology 1 | | 3 | Radiological Physics- | | |
| Integrated Science 9, 10 | 5 | 5 | Mathematics 1 | 4 | |
| Freshman Lab Science 11, 12 | 3 | 3 | Radiological Positioning 2 | 3 | |
| * Mathematics | 3 | | Medical-Surgical Diseases 3 | 2 | |
| Dynamics of Health Care 1, 2 | 1 | 1 | X-Ray Practicum | 1 | |
| Physical Education | 1 | 1 | Radiological Biology and | | |
| X-Ray Practicum | 1 | 1 | Pathology 4 | | 3 |
| | | — | | | |
| | 17 | 17 | | 16 | |

* Course dependent upon Freshman placement.

DIVISION OF HEALTH SCIENCES

| Diagnostic | |
|--------------------------------|----|
| Principles of Radiologic | |
| Exposure 5 | 2 |
| Advanced Positioning and | |
| Applied Anatomy 6 | 3 |
| Special Procedures 7 | 2 |
| Radiology 100 8 | 1 |
| X-Ray Practicum | 4 |
| Nuclear Medicine and Radio | |
| Therapy 9 | 1 |
| | |
| | 16 |
| | |
| Therapy | |
| Management | 1 |
| Treatment Planning 10 | 3 |
| Special Techniques 11 | 3 |
| Nursing Procedures 12 | 1 |
| Practicum | 4 |
| | |
| | 15 |
| | |
| Nuclear Medicine | |
| Management | 1 |
| Nuclear Instrumentation 13 | 3 |
| Radio Pharmaceuticals 14 | 2 |
| Diagnostic Therapeutic Uses 15 | 3 |
| Practicum | 4 |
| | |
| | 16 |

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 in Science in Nursing 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.

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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 responsibilities 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, and other selected community agencies.

The 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.

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 | lst semi | 2nd ESTER | The Sophomore Year | lst SEM | 2nd ESTER |
|----------------------------------|-------------|--------------|------------------------------|------------|--------------|
| English | 3 | 3 | English | 3 | 3 |
| Mammalian Anatomy and | | | Introductory Microbiology, | | v |
| Physiology, Zool. 5-6 | 3 | 3 | Ag. 13 | 4 | |
| Outline of Chemistry, | | | Home Economics, F & N 41 | 3 | |
| Chem. 3-4 | 4 | 4 | General Psychology, Psych, 1 | | 3 |
| Public Speaking, Speech 11 | 3 | | Nursing 21-22 | 6 | 6 |
| Principles of Sociology, Soc. 22 | | 3 | Elective | | 3 |
| Elective | 3 | 3 | | | |
| | lst | 2nd | | lst | 2nd |
| The Junior Year ¹ | SEMI | ESTER | The Senior Year ¹ | SEM. | ESTER |
| Nursing 121, 122 | 9 | 9 | Nursing 156 | 6 | |
| Human Development and | | | Nursing 176 | 6 | |
| Personality, Home Ec. 63 | . 3 | ••• | Nursing 165 | | 3 |
| Electives | 3 | 6 | Nursing 167 | | 3 |
| | | | 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 | Electives | 12 |
| Physical Education | 2 | | |

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

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 will need to plan on summer sessions.

The faculty reserves the right to alter the curriculum.

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 degree of Associate in Science in Nursing, are eligible to apply for licensure as registered nurses, and are prepared to give direct nursing care to patients of all age groups, in partnership with the professional nurse 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 and other health agencies.

The Program is designed to meet the minimum standards for approval by the Vermont State Board of Nursing and 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:

| | lst | 2nd | | lst | 2nd |
|------------------------|------|-------|--------------------|-----|-------|
| The Freshman Year | SEMI | ESTER | The Sophomore Year | SEM | ESTER |
| English | 3 | 3 | Nursing 27-28 | 9 | 10 |
| Integrated Science | 5 | 5 | Nursing Trends | | 2 |
| Sociology | | 3 | Group Discussion, | | |
| Psychology | 3 | | Speech 14 | 3 | |
| Fundamentals of | | | Elective | 3 | 3 |
| Nursing 11-12 | 4 | 4 | | | |
| Physical Education | 1 | 1 | | | |
| Summer Session-4 weeks | | | | | |
| Nursing 14 | 4 | | | | |

A minimum of 64 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 accord with University policy, the registered nurse student may apply for credit by examination in selected nursing and non-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

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.

Financial aid is available in the form of scholarships, loans, prizes and employment (see page 306). 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

George Brooks, M.D., Superintendent, Vermont State Hospital

Grace Buttolph, R.N., Director, Mary Fletcher Hospital School of Nursing, Medical Center Hospital of Vermont, Mary Fletcher Unit

Sister Armstrong, R.H.S.J., R.N., Director, Jeanne Mance School of Nursing, Medical Center Hospital of Vermont, DeGoesbriand Unit

- 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
- Elizabeth Miekle, R.N., Director of Rehabilitation Nursing, Vermont Rehabilitation Center

Sally Sample, R.N., Director of Nursing, Medical Center Hospital of Vermont

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

The College of Medicine

Requirements for Admission

The College of Medicine requires that an applicant complete the requirements for admission in an institution listed among the "Accredited Institutions of Higher Education," compiled and published by the National Committee of Regional Accrediting Agencies of the United States. The College of Medicine requires one year each of biology; English; physics, including laboratory; general chemistry; organic chemistry; a satisfactory one-semester course in quantitative chemistry or physical chemistry; and one year of fundamental mathematical principles at the college level.

The College strongly recommends that the applicant, while in college, study in depth one or more fields of interest to him.

Students must complete satisfactorily all requirements for admission to the College of Medicine by July 1 preceding the September admission. Ordinarily courses taken in other than a liberal arts college will not meet our admission requirements.

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

- 1. The scholastic record of the applicant in his premedical work.
- 2. Personality and general fitness of the applicant for the study and practice of medicine as determined by recommendations of the applicant's college teachers and others, and by personal interview with the Admissions Committee.
- 3. The applicant's scores on the Medical College Admissions Test. Such scores are taken into consideration but are not used as the final determinant in accepting students. Applicants are urged to take the Medical College Admission Test in May if a majority (all but one or two) of the required courses have been or will be completed by the end of that academic year.
- 4. Candidates invited for an interview are required to submit a health report completed by their college or university health service and not by their personal physician.

A maximum of seventy-five students is admitted to the entering class. Preference for admission is according to the following priorities:

- 1. Qualified residents of Vermont.
- 2. 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 force with the states of Maine, New Hampshire, Massachusetts and Rhode Island.
- 3. Qualified residents of other areas.

Sons and daughters of the alumni of the College of Medicine of the University of Vermont 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 ten dollars, payable to The University of Vermont, must accompany all formal applications and is not refundable.

When an applicant who is not a Vermont resident is offered admission to the College of Medicine and wishes to accept the place offered, a deposit of \$100 must be paid not 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, should the student release his place in the class. The deposit is applied toward the student's tuition in the first semester upon matriculation in the College of Medicine. Checks should be made payable to the University of Vermont and should be sent to the Admissions Office, College of Medicine, University of Vermont, Burlington, Vermont 05401.

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

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psychiatry. There will be a brief summer vacation. During this year students will work within the hospitals and clinics and instructions will be based on the care of patients.

Major Program

The major program will extend from January of the junior year of medical school until graduation in May of the following year. During this period each student will pursue a course of study which is tailored to his individual interests and objectives. For example, students interested in family practice will pursue one course of study while students interested in surgery or a surgical specialty will pursue another. The senior major program will commence with a return to the basic sciences which are related to the student's area of interest. This return will constitute both a review and an extension of the material covered in the basic science core. Following this basic science study, students will take blocks of clinical work related to their interests. The basic science work will consist of approximately one-quarter and the clinical work approximately three-quarters of the major program.

The major program is not designed to supplant or duplicate any portion of residency training but is designed rather to prepare students more adequately for subsequent training for family practice, a medical specialty, or teaching and research. In this last regard the faculty is considering the option of allowing students to spend the entire period of time in a basic science department. The final details for the major program are currently under active development.

Further details are given in the Medical College bulletin.

Teaching Facilities

All departments of the College of Medicine are housed in a new building which was completed in 1968. Clinical facilities for teaching are in the Medical Center Hospital of Vermont, an institution with approximately 750 beds.

STATE SCHOLARSHIPS

The scholarships available to students in the College of Medicine are listed on page 311, and information on loan programs may be obtained from the Director of Financial Aid.

Vermont residents in real need of financial assistance may receive up to \$800 in state scholarships and loans. Loan funds are also available. Contact the Assistant Dean's Office of the College of Medicine for further information.

The Graduate College

The purpose of the Graduate College is to serve the needs of college graduates who desire a broader and more thorough knowledge of scholarship and research in their chosen fields. At present the College offers sixty-five different programs leading to the master's degree and ten programs leading 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 more detailed information refer to the Graduate College Bulletin available from the Graduate College Office.

Attention is also drawn to the special fifth-year program offered by the College of Education leading to a certificate of advanced study in Education.

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:

Reading—Elementary and Secondary Guidance—Public School Personnel Work in Higher Education Administration and Supervision Special Education Elementary and Secondary Education

Master of Arts in Teaching

This degree is appropriate for teachers who are interested primarily in increasing their knowledge of their subject matter field 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 & Technical Education Zoology

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Master of Extension Education

This degree is designed to provide opportunity for those who work in nonschool educational and counseling programs to develop knowledge and understanding in activities related to program management and educational methodology.

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 and available in biology, mathematics, and physical sciences.

Master of Science

Programs are offered in the following fields:

Agricultural Economics Anatomy Animal Sciences Animal Pathology Biochemistry Biomedical Engineering Botany Chemistry Civil Engineering Electrical Biophysics Electrical Engineering Forestry Geology Home Economics Mechanical Engineering Medical Microbiology Microbiology

Pathology Pharmacology Physics Physiology and Biophysics Plant and Soil Science Speech Pathology Zoology

Microbiology and Biochemistry

Master of Arts

Programs are offered in the following fields:

Economics English French Geography German Greek History Latin Mathematics Music Philosophy Political Science Psychology Spanish

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.

Doctor of Philosophy

Doctoral programs are offered for qualified students in the fields of:

| Biochemistry | Microbiology | Psycholog |
|------------------------|---------------------------|-----------|
| Botany | Pharmacology | Zoology |
| Chemistry | Physics | |
| Electrical Engineering | Physiology and Biophysics | |

Admission

To be eligible for admission a student should hold a baccalaureate degree, prior to the date of first enrollment, or have completed work equivalent to that required for a baccalaureate. His undergraduate records should indicate that he is capable of successful study at the graduate level. Graduates of unaccredited institutions must support their applications with satisfactory aptitude and advanced scores on the Graduate Record Examinations. Foreign students, see special instruction on page 130.

Admission is limited to students who intend to become candidates for advanced degrees, other than Doctor of Medicine, and students whose enrollment will consist of courses to be taken for graduate credit. Students who hold bachelors' degrees but whose entire enrollment will be in undergraduate courses should seek admission as non-matriculated students in the appropriate undergraduate college.

Only applicants who desire to work along lines in which the University offers graduate programs will be admitted to the Graduate College. Students in the Graduate College therefore fall into three categories: (1) duly admitted students accepted to candidacy, (2) degree candidates at other institutions who study at the University of Vermont for transfer of credit, (3) duly admitted students not yet accepted to candidacy.

Students seeking admission to the Graduate College must make application on an official form which can be obtained from the Office of the Graduate College. All applications must be supported by official transcripts from each college or university attended and by three letters of recommendation from persons qualified to assess the applicant's capacity for graduate work.

The deadline for applications for admission in the fall semester is May 15. It is not always possible to admit additional students at midyear in all departments. Such applications should be initiated well in advance of the date study is to begin. Students who wish to be considered for fellowships as well as admission should complete the appropriate section on the application form. Such applications, with supporting materials, and GRE scores must be filed by March 1 of the academic year preceding that for which the application is made.

Admission to the Graduate College does not mean that a student is automatically accepted as a candidate for an advanced degree.

FOREIGN STUDENTS Applications from students who are citizens of the United Kingdom, Australia, New Zealand and Canada will be accepted directly. Foreign students currently studying in the United States may apply directly but must submit evidence of proficiency in English.

Foreign students should apply through the following international agencies:

| Africa | The African-American Institute |
|------------------------|--|
| Middle East | New York, New York 10017 American Friends of the Middle East, Inc. Middle East House |
| | 1607 New Hampshire Avenue, N.W. |
| | Washington, D. C. 20009 |
| Korea | The American-Korean Foundation, Inc. |
| | 345 East 46 Street |
| | New York, New York 10017 |
| Europe, South America, | Institute of International Education |
| and South East Asia | 809 United Nations Plaza |
| | New York, New York 10017 |

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Foreign applicants must be highly qualified, and present evidence of independent financial support (approximately \$3,500 U.S.) per year. Applicants should submit Graduate Record Examination scores. In the case of non-English speaking countries, applicants should submit scores of the Graduate Record Examination or Test of English as a Foreign Language. Information on these examinations may be obtained from the Educational Testing Service, Box 592, Princeton, New Jersey 08540.

APTITUDE AND ACHIEVEMENT TESTS Applicants for admission to graduate programs in some departments must submit scores on the Graduate Record Examination and the Miller Analogies Test.

All applicants requesting fellowship support must submit scores on the Graduate Record Examination prior to March 1.

Credentials submitted by the student, such as transcripts and letters of recommendation, become the property of the Graduate College and may not be returned.

GENERAL REQUIREMENTS

Each student is expected to be familiar with the general requirements and procedures of the Graduate College and with the specific degree requirements in his chosen field of study. He should refer to the Graduate College Bulletin.

ACCEPTANCE TO CANDIDACY Applicants for the master's degree may be accepted to candidacy concurrent with admission, or candi-

dacy may be deferred pending a period of satisfactory graduate study at the University of Vermont. Acceptance to candidacy for the master's degree is granted only to those students who have fully met all undergraduate prerequisites for the courses that are required in his graduate degree program. The approval of the department and the Dean is required.

Candidacy for the doctoral degree requires a full year of graduate study in residence at the University of Vermont. A doctoral student is accepted to candidacy upon the approval of the student's Studies Committee, the department or departments concerned, and the Dean.

MINIMUM RESIDENCE REQUIREMENTS The residency requirement is fulfilled with

courses that (1) are taken for graduate

credit on the University of Vermont campus, either in the academic year or in summers, and (2) are taken after the student has been admitted to the Graduate College. Each candidate for the master's degree must satisfactorily complete twenty-one hours in residence. Each candidate for the doctoral degree must satisfactorily complete a minimum of fifty hours in residence.

Each doctoral candidate must spend one full year on the University of Vermont campus and be available for and participate in departmental functions such as seminars and research within the department. A year of residency is interpreted as at least 6 credit hours in each of two consecutive semesters and a minimum total of 15 credit hours for the twelve-month period.

Departments may require more hours in residence than the minimum.

TEACHING REQUIREMENT Each degree candidate must acquire appropriate teaching experience in his chosen field prior to the award of his degree. The nature and the amount of this teaching, for which no academic credit is allowed by the Graduate College, will be determined by the department concerned.

GRADUATE CREDIT Courses numbered 400 or above are limited to candidates for the degree of Doctor of Philosophy; courses numbered 300

to 399 are limited to graduate students; courses numbered 200 to 299 are graduate courses open to advanced undergraduates. Courses numbered 100 to 199 may not be taken for graduate credit except upon recommendation of a student's Studies Committee and with the authorization of the Dean. Under no circumstances will graduate credit be allowed for a course numbered below 100.

GRADE REQUIREMENTS Courses taken for graduate credit are given the letter grades of A (excellent), B (good), C (fair), and F (failure). Graduate credit is given for letter grades A, B, and C. This grading system differs somewhat from that for undergraduate level courses in that there is no letter grade of D.

A candidate for a graduate degree must complete his program with a minimum overall quality point average of 3.0 (B).

Designations of S, satisfactory and U, unsatisfactory, are used to indicate levels of performance for credits received in Thesis Research and may be used to indicate levels of performance in Seminar.

MAXIMUM TIME LIMITS

MASTERS DEGREE

Full Time Student Fellow or Trainee (Non-Federal) Salaried University Employee Day—Part Time Evenings Only Summers Only 3 Years 3 Years 3 Years 5 Years 5 Years 7 Years

DOCTORAL DEGREE

All Students

9 Years

These time limits apply both to study at the University of Vermont and to courses presented for transfer of credit. Individual departments may set dead-lines within these time limits.

TRANSFER OF CREDIT Upon request of the department, transfer of credit for appropriate courses completed at other institutions may

appropriate courses completed at other institutions may be accepted by the Graduate College. A maximum of nine hours' credit in the case of master's candidates and twenty-four hours in the case of doctoral candidates may be accepted in transfer for appropriate courses completed in residence in other institutions. Such courses must have been taken in a fully accredited college or university which offers graduate study and must be acceptable at that institution in partial fulfillment of its requirements for an advanced degree. Credit cannot be transferred for (1) courses which would not, if taken at the University of Vermont, receive graduate credit, (2) courses in which a grade lower than 80 (B—) was received, (3) correspondence courses, (4) courses which are inappropriate for inclusion in any degree program offered by the Graduate College, (5) courses which were taken more than seven years prior to the completion of a degree program, (6) thesis credits received at another university. Courses taken for graduate credit at the off-campus locations will be considered as transfer credit.

Requirements for Master's Degree

All master's programs require a minimum of thirty semester hours of graduate credit. In programs that require a thesis, the number of credit hours to be earned in thesis research may vary between six (minimum) and fifteen (maximum); these credits are included in the minimum of thirty required for the degree.

Master of Education

Before acceptance to candidacy for the degree of Master of Education, the student must present a satisfactory score in the Miller Analogies Test. Before the degree is awarded, the candidate must have completed one year of successful teaching experience or other educational service.

The graduate program of each student admitted to candidacy for the degree of Master of Education is planned and supervised by an individual committee, which includes *ex-officio* the Deans of the Graduate College and the College of Education. Program planning takes into consideration the student's undergraduate curriculum, his professional experience, and his aims and purposes in pursuing the master's degree. Each program must include either thirty semester hours of approved course work or twenty-four hours earned in courses and six hours in thesis research. If a student's preparation is inadequate for him to begin study at the graduate level in certain aspects of his program, additional undergraduate courses will be required.

In order to insure effective planning of a graduate program for the degree of Master of Education, not more than nine hours credit will be accepted in partial fulfillment of degree requirements for courses taken prior to acceptance to candidacy. A prospective candidate should therefore make application for acceptance to candidacy before his first semester of residence, or, if he has been a student in Summer Session, prior to his second summer in residence. Candidates must expect to earn on the University of Vermont campus a part of the credit to be applied to a graduate degree. In most cases candidates who are in residence during the regular academic year must also attend one or two summer sessions in order to have a suitable selection of available courses.

Master of Arts in Teaching

The program leading to the degree of Master of Arts in Teaching is designed primarily for teachers with the purpose of enhancing their teaching ability and strengthening their background in their subject matter field.

A minimum of thirty semester hours is required in courses numbered above 200, of which not less than six semester hours shall be in Education taken at the University of Vermont. No thesis is allowable in this degree program; a student must complete at least twenty hours, and usually twenty-four, in a single department offering courses for graduate credit or in any acceptable combination of such departments. In order to be accepted to candidacy for this degree, a student must have completed an undergraduate major within the area of his specialization, have submitted a satisfactory score on the Miller Analogies Test, and be acceptable to the department or departments concerned.

In his undergraduate program, a candidate is expected to have completed the necessary courses in education to meet minimum requirements for a teaching certificate. If candidates have not qualified for teaching certification, they cannot expect to complete the degree in one academic year. To qualify for the degree of Master of Arts in Teaching, the candidate must present at least eighteen semester hours in education in his combined undergraduate and graduate program. This requirement is specified to ensure that the degree recipient can meet minimum state certification requirements.

Master of Extension Education

A minimum of 30 semester hours is required in courses numbered above 200. Each candidate is expected to complete 12 semester hours of course credit in Agriculture and/or Home Economics or related basic courses; including a minimum of 6 semester hours in Vocational, Technical Extension and/or Home Economics Education. The minimum of 18 semester hours of approved electives provides the candidate with the opportunity of concentrating his study in an appropriate field.

The graduate program of each student admitted to candidacy for the degree of Master of Extension Education is planned and supervised by an individual committee, which includes the Chairman of the Departments of Home Economics and Vocational, Technical and Extension Education.

A student must present a satisfactory score in the Miller Analogies Test. The candidate must have completed one year of successful professional experience before the degree is granted.

The candidate is at liberty to select the manner in which he will complete the requirements for the degree through Summer Sessions, Evening Division and/or full time residency.

Master of Arts and Master of Science

FIELD OF SPECIALIZATION At least twenty-one hours of graduate credit, including credit for the thesis and research leading to the thesis,

must be earned in the field of specialization.

RELATED STUDY A graduate program may include advanced courses outside the field of specialization. In order to be included as part of the master's program, these courses must be approved in advance by the department in which the student is specializing.

LANGUAGE REQUIREMENT Certain departments require a reading knowledge of an appropriate language. If required, it may be com-

pleted by satisfactory performance on the Educational Testing Service's Foreign Language Examinations.

RESEARCH AND THESIS Each candidate will undertake a problem of original research under the direction of a member of the department in which he is specializing. At the conclusion of the investigation the stu-

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dent must present a thesis which embodies the results of his work and which demonstrates his capability for independent research.

Master of Business Administration

A minimum of thirty semester hours is required in courses numbered above 200. Specific course requirements include Economics 207, 228, 252, and 289, a total of twelve hours. An additional twelve hours (4 courses) of approved electives plus six hours of thesis credit comprise the minimum of thirty credits. The twelve hours of elective credit provide the candidate with the opportunity of concentrating his study in an appropriate field.

Each candidate will pursue a thesis research topic consistent with his area of concentration and overall educational objective. At the conclusion of the research the student must present a thesis which embodies the results of his work and demonstrates his capability.

Information on the M.B.A. course offerings may be found in the Evening Division Catalogue.

After April 1, 1968, not more than six credit hours of graduate work completed prior to the date of becoming a candidate for the M.B.A. will be applied toward the degree requirements.

Final Examinations

Both written and oral comprehensive examinations are required for the culmination of the program of graduate study leading to the master's degree.

Requirements for the Degree of Doctor of Philosophy

The degree of Doctor of Philosophy requires of candidates a minimum of seventy-five credit hours to be earned in courses and in thesis research.

At least forty hours must be earned in courses and seminars. The first year of each doctoral program consists almost entirely of required courses; in the following years appropriate courses are selected by the Studies Committee in consultation with the candidate.

LANGUAGE REQUIREMENTS The determination of language requirements is established by each individual department. If knowledge

of a foreign language is required, it may be completed by satisfactory performance on the Educational Testing Service's Foreign Language Examinations.

RESEARCH AND THESIS Each candidate, while in residence at the University of Vermont, must complete an acceptable original research project which contributes new knowledge or techniques in his academic field. A minimum of twenty credits will be allowed for thesis research.

EXAMINATIONS The examinations culminating the program of graduate study for the doctoral degree include both a comprehensive written examination in the field of study and an oral examination in which the candidate defends his thesis.
Continuing Education

The University through its extension services 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 subects 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.

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.

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.

A separate number is used for each semester course and for each semester of a year course.

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 letter "S" preceding the course number indicates the course is offered normally in the Summer Session.

The letter "A" preceding the course number indicates the course is offered normally in the Evening Division program.

The letter "I" preceding the course number indicates the offering is

made up of more than one component and is presented as an Institute.

The number of credit hours *per semester* is stated in each course description.

Odd-numbered courses are offered the first semester; even-numbered courses the second semester, unless otherwise 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.

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 agricultural biochemistry 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 departmental permission. 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.

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 AGRICULTURE Historical development and pattern of agriculture to the present. Emphasis on the adjustment of agriculture to natural and economic phenomena. Present pattern of crop and livestock production, trade, and consumption in Vermont, the United States, and the world. 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. Alternate years 1970-71.

61 ECONOMICS OF AMERICAN AGRICULTURE The role of agriculture in the American economy; an introductory analysis to microeconomics and social problems of the agricultural and rural sector. *Prerequisite:* sophomore standing. Three hours. Mr. Sinclair.

103 RURAL SOCIOLOGY Analysis of selected research data concerning all populations in rural areas—rural farm, nonfarm, and suburban—and their social in-

teraction as it relates to the concept of urbanized social organization. Prerequisite: junior standing. Three hours. Staff.

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. Four 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 MANAGEMENT (3-2) Organization and operation of a successful farm business. *Prerequisite:* economics 11-12 or agricultural economics 61; junior standing. Four hours. Mr. Tremblay.

203 RESOURCE ECONOMICS The field of resource economics, benefit-cost analysis, economic appraisal of public resource development investments, water problems, the legal framework of resource development, economic aspects of rural development, land classification, land use planning. *Prerequisite:* economics 11-12, or agricultural economics 61. Three hours. Mr. Gilbert.

206 REGIONAL PLANNING Definition of region, the legal basis of planning, and the political process of planning. The determination of public goals. Types of zoning. The ecological approach to planning. Current planning programs. *Prerequisite:* senior standing and principles of economics or equivalent. Three hours. Mr. Sargent.

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.

220 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. Staff.

253 THEORY OF AGRICULTURAL PRODUCTION ECONOMICS Application of the theory of the firm to agricultural production units. Emphasis on resource allocation and production efficiency. Principles of marginal analysis applied to production problems in a static and dynamic economy. *Prerequisite:* twelve hours in agricultural economics and/or economics, senior standing, and departmental permission. Three hours. I or II. 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.

AGRICULTURAL ENGINEERING

303 ECONOMICS OF ECOLOGICAL PLANNING A discussion of concepts of ecological planning with special emphasis on economic base analysis, benefit-cost analysis, resource base analysis, and economic impact studies. Current literature and current problems will be discussed and each student will make a study of economic aspects of a resource development proposal. 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 and other social sciences. One hour. Staff.

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

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. 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) Practices and structures used in the conservation of the development of soil and water resources in agriculture, recreation and rural area development. *Prerequisite:* plant and soil science 61 and civil engineering 53. Three hours. Alternate years, 1970-71. 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. *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

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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, 1970-71. Mr. Arnold.

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. *Prerequisite:* physics 6. Three hours. Alternate years, 1970-71. Mr. Arnold.

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.

Animal Sciences

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professors Atherton and Smith (Chairman); Associate Professors Balch, Carew, Duthie, Nilson, Simmons, and Welch; 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, 1970-71.

55 FUNDAMENTALS OF LIVESTOCK FEEDING (8-2) 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 pat-

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terns, 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, 1970-71.

153 MILK PROCESSING (2-2) Technical aspects of processing fluid milk and fluid milk products. *Prerequisite:* departmental permission. Three hours. Mr. Nilson. Alternate years, 1970-71.

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, 1970-71.

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.

ANIMAL SCIENCES

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, 1970-71.

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 to breeding of livestock. *Prerequisite:* 2. Three hours. Mr. Balch. Alternate years, 1969-70.

271 ENDOCRINOLOGY (2-2) Anatomy, physiology, glandular interrelationships, and assay methods of the endocrine glands and their hormones. *Prerequi*site: 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, 1970-71.

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

ANIMAL PATHOLOGY

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.

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COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Animal Pathology

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. Three hours. Dr. Murray.

106 ANIMAL DISEASES Fundamentals of disease control and prevention. Special disease problems in cattle, sheep, horses, and swine with emphasis on control measures. *Prerequisite:* 105 strongly 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 PATHOLOGY (3-0) 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 Zoology. Three hours. Dr. Bolton.

116 POULTRY DISEASES (2-2) Anatomy and physiology of the fowl. General principles of sanitation. Major diseases of chickens and turkeys. *Prerequisite:* microbiology and biochemistry 55. Three hours. Dr. Murray.

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.

217-218¹ 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.

220¹ LABORATORY ASSIGNMENTS (1-6) Rotating assignments in the Animal Pathology Laboratory, Division of Animal Services in the College of Medicine,

1. Approval for graduate credit pending.

and the Bureau of Laboratories in the State Department of Health. Students are assigned responsibility for groups of experimental animals 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.

Art

COLLEGE OF ARTS AND SCIENCES

Professor R. Janson (Chairman); Associate Professors J. Davison and Mills; Assistant Professors Aschenbach, Davies, W. Davison, Roland, Scatchard; Instructors E. Janson, 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 toward creative insight and evaluation. Lectures, discussion, projects. Three hours. Messrs. Davies and Owre.

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. Scatchard.

21 DRAWING An investigation of various aspects of drawing through class assignments, individual projects, and group criticisms. Three hours. I, II. Messrs. W. Davison and 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. Wedell.

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. Staff.

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. Mrs. E. Janson.

108 AMERICAN ARCHITECTURE The Colonial period to Frank Lloyd Wright. Research projects particularly on buildings of historical interest in the area. *Pre-requisite:* 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. Prerequi-

site: 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,

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. Mrs. E. Janson.

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.

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. Davies and Staff.

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professors Dodge,¹ Gershoy,² Hyde (Chairman), Klein, Marvin, Sproston, and Taylor; Associate Professors Cook, Etherton and Vogelmann; Assistant Professor Wilson.

Biology

1, 2 PRINCIPLES OF BIOLOGY (8-3) 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 2. Four hours. Mr. Klein, Mr. Stevens, Botany and Zoology Staff and guest lecturers.

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.

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. Staff.

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.

111 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

1. Visiting professor.

2. Emeritus.

150

Botany

BOTANY

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 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. Vogelmann. Alternate years, 1970-71.

193, 194 HONORS IN BOTANY

197, 198 UNDERGRADUATE RESEARCH An introduction to original research under the direction of a member of the faculty of the Department of Botany and/or faculty member in a related department. *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, 1970-71.

207 WATER RELATIONS OF PLANTS Absorbtion, 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, 1970-71.

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, 1970-71.

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, 1970-71.

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, 1970-71.

BOTANY

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, 1970-71.

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, 1970-71.

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, 1970-71.

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.

Chemistry

COLLEGE OF TECHNOLOGY

Professors White (Chairman), Crooks, Gregg, Flanagan, Krapcho, and Kuehne; 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) General inorganic chemistry. Lectures, recitations and laboratory, including elementary qualitative analysis. Acceptable prerequisite to advanced courses. *Prerequisite:* at least one year of high school mathematics. Four hours. Messrs. Gregg, Whitcher and Allen and staff.

3-4 OUTLINE OF CHEMISTRY (3-3) Backgrounds of inorganic, organic, and biochemistry, primarily for students in nursing or for dental hygienists. Elective for others with the approval of the dean of their college and the chemistry department. *Prerequisite:* at least one year of high school mathematics. One year of high school chemistry or physics recommended. Four hours. Mr. Crooks and staff.

11-12 GENERAL CHEMISTRY (3-6) Lectures, recitations and laboratory, including general experiments in elementary qualitative and quantitative analysis. Recommended for those concentrating in physical science. *Prerequisite:* one year of high school chemistry and concurrent enrollment in mathematics 11 or 13 for chemistry 11. Five hours. Mr. Strauss.

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 organic chemistry. This course is not a prerequisite for any other course in chemistry. Credit cannot be granted for 16 and also for 4 or 131. *Prerequisite*: 2 or 3 or 12. Four hours. Mr. White.

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). Mr. White and staff.

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.

CHEMISTRY

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:* 1-2, 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:* 1-2 or 11-12; physics 16; mathematics 21; 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; valance 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 1971-1972

350, 351 SPECIAL TOPICS IN INORGANIC CHEMISTRY Advanced theoretical treatment of bonding and physical properties of transition metal complexes; detailed 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, electrometric, chromatographic, and radiochemical methods of analysis. *Prerequisite*:

CHEMISTRY

11-12 or 123; 141 and credit for or concurrent enrollment in 142. Four hours. Mr. Whitcher.

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. Alternate years, 1970-71.

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. 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, 1970-71.

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, 1969-70.

336, 338 SPECIAL TOPICS IN ORGANIC CHEMISTRY Advanced level discussion of specific topics in organic chemistry of current interest such as photo-chemistry, 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 24 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.

CHEMISTRY

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, 1970-71.

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, 1971-72.

344 QUANTUM CHEMISTRY Applications of quantum mechanical techniques to problems of chemical interest. *Prerequisite*: 247. Three hours. Mr. Weltin. Alternate years, 1970-71.

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.

CLASSICS

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. Miss Davison.

11, 12 INTERMEDIATE GREEK Review of syntax. Selections from Plato's dialogues, the speeches of Lysias, and Xenophon's *Hellenica;* Euripides' Alcestis. Three hours. Mr. Gilleland.

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. Mr. Gilleland. Alternate years, 1971-72.

153 GREEK HISTORIANS IN TRANSLATION Works of Herodotus, Thucydides, Xenophon, Polybius, Arrian, and others. Introduction to Greek historiography. Three hours. Mr. Schlunk. Alternate years, 1970-71.

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, 1969-70.

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, 1969-70.

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, 1969-70.

CLASSICS

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.

152 ROMAN EPIC IN TRANSLATION Latin epic poetry, from Ennius to Ausonius; its development, fruition, and decline. Three hours. Mr. Ambrose. Alternate years, 1970-71.

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. Mr. Bliss. Alternate years, 1969-70.

193, 194 College Honors

195, 196 Special Topics

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197, 198 READINGS AND RESEARCH

203 REPUBLICAN PROSE Reading in Caesar and Sallust, and in the speeches of Cicero. Three hours. Mr. Ambrose.

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.

204 EPIC POETS Reading in Lucretius, Vergil, Ovid, and others. Three hours. Mr. Bliss.

227 ROMAN LYRIC POETS Selection 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, 1969-70.

252 COMEDY Two plays of Plautus and Terence. Development of this literary form. Three hours. Mr. Bliss. Alternate years, 1969-70.

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, 1969-70.

255 HISTORIANS OF THE EMPIRE Augustus, Res Gestae; Tactitus, 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, 1969-70.

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, Lampert; Instructors Halebian, M. C. Heininger, Long, MacLellan, Montgomery, Phillips, Sloanaker, Wark

1 DENTAL HYGIENE (2) The dental hygiene movement; history, growth, status of dental hygienist, scope of operations, standards and ethics, personal qualifications and personality traits. Two hours. Mrs. Sloanaker.

DENTAL HYGIENE

2 DENTAL HYGIENE (0-6) Principles and technics of instrumentation for scaling and polishing teeth with use of manikins. Examination and charting of mouth and general clincial procedures. Three hours. Staff.

11 ORAL ANATOMY (2-4) Anatomy of head and neck; form and structure of teeth, nomenclature and relationship; calcification and eruption of teeth; drawing, carving, and identification of individual teeth. Four hours. Dr. Heininger.

22 GENERAL AND ORAL HISTOLOGY AND EMBRYOLOGY (2-2) Microscopic structure and development of the basic tissues of the body with emphasis on dental and oral material. Use of microscope, colored slide projections and drawings. Three hours. Dr. Wark.

31 MEDICAL EMERGENCIES (1-0) Basic principles of emergency aid taught to prevent and cope with emergencies that arise in the dental office. One hour. Mrs. Heininger.

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.

61-62 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. Staff.

72 DENTAL HEALTH EDUCATION (2-0) Demonstration and practical applications 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 DENTAL ASSISTING, DENTAL MATERIALS, ETHICS AND OFFICE MANAGE-MENT (1-0) Principles of professional ethics and economics; office management and essentials of practice building; dental assistant and 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, and Severance; Assistant Professors Bayer, Chase, Laber, Michael, Nargund, Salgo, and H. Squire; Instructors Erdmann, Kelly, Ross, and Schweyer.

- 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.

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. *Prērequisite*: 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. Staff.

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. Mr. Greif.

✓ 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 unionmanagement 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, exemp-

ECONOMICS AND BUSINESS ADMINISTRATION

tions, 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. Messrs. Bayer, Squire, and Ross.

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. Messrs. Laber and Severance.

188 ELEMENTARY STATISTICS (2-2) Analyses of variance index number theory and construction, time series analysis, analysis of correlation and regression, and non-parametric tests. *Prerequisite:* mathematics 110. Three hours. Mr. Nargund.

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

203 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. Messrs. Bayer and Campagna.

204 STATE AND LOCAL FINANCE 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. Mr. Bayer.

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. Staff.

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. Messrs. Alnasrawi and Nargund.

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. Messrs. Greif and Diamond.

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.

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 programs 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. *Pre-requisite:* 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. *Prerequisites:* 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 byproduct 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:* math. 110. 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. Mr. Nargund.

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.

341 MANAGERIAL ECONOMICS Techniques used in management decisionmaking 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. Messrs. Campagna and Nargund.

377 ADVANCED MICROECONOMIC THEORY Micro-economic 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. *Prerequisites*: 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, 105, 141, 142, 181, 183, 186, 188, 190, 193, 194, 195, 196, 197, 198, 203, 204, 216, 240, 241, 256, 258, 267, 285, 290, 291, 292, 295, 297, 298.

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.

Education

COLLEGE OF EDUCATION

Professors Baker, Hunt, Rippa; Associate Professors Boller, Gobin, Petrusich, Wheeler, Zimmerli; Assistant Professors Abruscato, Agne, Case, Cheney, Dunkley, Fox, Hanley, Lang, Larson, McKenzie, Nash, Peterson, Riley; Instructors Bloomenthal, Corologos. Affiliated faculty: Professors Lidral, Meserve, Pappoutsakis; Associate Professors Manchel, Schultz; Assistant Professors Read, Weinrich; Instructors Geno, McCarty, Sherman.

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 preservice 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. 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.

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 psychology. Three hours. Miss Boller, Mr. Nash, Mr. Rippa.

204 HISTORY OF EUROPEAN EDUCATION Seminar 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 Psychology or a 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 psychology, 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 psychology or a major in the social sciences. 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 psychology. 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 psychology. Three hours. Mr. Hanley.

220 PERSONALITY DEVELOPMENT AND MENTAL HYGIENE 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. Three hours. Mr. Riley.

222 IMPROVEMENT OF READING INSTRUCTIONS 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 psychology 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 psychology, including an introductory course in reading or departmental 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/or Psychology 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 psychology. Three hours. Mr. Wheeler.

248 EDUCATIONAL MEDIA. Modern instructional aids, theory and practice; educational media related to psychology of teaching and learning. *Prerequisite:* twelve hours in education and psychology. Three hours. Staff.

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 psychology or departmental permission. Three hours. Miss Boller.

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 psychology, including an introductory course in reading or departmental permission. Three hours. Mr. Hunt.

276 LABORATORY EXPERIENCES IN READING AND RELATED LANGUAGE INSTRUC-TION 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-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 Psychology. 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. One hour. Miss Boller.

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.

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.

140 ART FOR THE ELEMENTARY SCHOOL Purposes and methods of contemporary art education in the development of the child. Lectures, discussions, and direct experience in creative art for classroom teachers. Three hours. Miss Sherman.

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. 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. Miss Boller and staff.

161 STUDENT TEACHING Eight full weeks of teaching in the elementary schools of Burlington and vicinity under the guidance of cooperating teachers and college supervisors. *Prerequisite:* senior standing; approval of the supervisors of student teaching. Eight hours. Mr. Cheney and staff.

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. *Prerequisite:* departmental permission. Two hours. Mr. Cheney and staff.

178 SECONDARY METHODS AND PROCEDURES General methods of secondary school instruction; classroom problems common to all teachers. *Prerequisite*: satisfactory completion of six hours in education; senior standing; acceptance in teacher education. Three hours. Taken coordinately with student teaching, Mr. Abruscato.

179 CONTENT, CURRICULUM, METHODS AND MATERIALS IN SPECIAL SUBJECT AREAS (Latin, mathematics, romance languages and social studies) *Prerequi*site: education 178 and acceptance in teacher education. Three hours. Mr. Agne, Mr. Geno, Mr. Manchel, Mr. McCarty, and Mr. Meserve. See Mathematics 179.

181 STUDENT TEACHING IN SECONDARY SCHOOLS Eight full weeks of teaching in the public schools of Vermont under the guidance of cooperating teachers, principals, and college supervisors. *Prerequisite*: 15, 145-146, 178 and 179 (or Ed.-Eng. 182); high achievement in professional courses and in appropriate teach

ing fields; acceptance in teacher education. Candidates must make written application at least one full semester in advance of the teaching assignment. Eight hours. Mr. Cheney and staff.

182 SEMINAR FOR PROSPECTVE TEACHERS OF ENGLISH (English 182).

217 SECONDARY SCHOOL CURRICULUM Principles and problems in curriculum development for secondary schools. *Prerequisite:* twelve hours of education and psychology. Three hours. Mr. Abruscato.

303-304 PROBLEMS AND RESEARCH IN TEACHING SECONDARY SCHOOL ENGLISH (see English 303-304).

319, 320 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.

381-382 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 six hours. Staff.

HOME ECONOMICS, EARLY CHILDHOOD, AND KINDERGARTEN EDUCATION (see Home Economics Education program courses number 65, 82, 183 and 184.)

Music Education

For 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.

151 STUDENT TEACHING IN MUSIC Eight weeks of teaching in the public schools of Vermont under the guidance of cooperating teachers, principals, and college supervisors. *Prerequisite*: Concurrent enrollment in 131 and departmental permission. Eight hours. Mr. Schultz.

243 RECENT TRENDS IN MUSIC EDUCATION A study of recent thought and practices in music education. Examination of current trends in the Contemporary Music Project, Comprehensive Musicianship, The Tanglewood Symposium, recreational music, music in the inner city, and other topics of concern. Prerequisite: an undergraduate major in music education or consent of instructor. Three hours. Mr. Lidral.

251, 253 PRACTICUM IN MUSIC EDUCATION Current methodology in music education for music specialist and classroom teacher. Students will study and learn to present courses in music in the public schools including Orff and Kedaly approaches general music, comprehensive musicianship, and other recently introduced and promising methods. Each year the emphasis will be in a different area of concentration. *Prerequisite:* an undergraduate major in music education or elementary education and teaching experience or consent of instructor. Credit (1-4 hours) as arranged. Staff.
EDUCATION

290 BASIC CONCEPTS IN MUSIC EDUCATION Disciplinary backgrounds; historical and philosophical foundations; fundamental considerations of the functions of music in the schools; development of a personal philosophy. *Prerequisite:* senior standing as a music education major. Three hours. Staff.

291 PSYCHOLOGY OF MUSIC Psychological dimensions of tone and rhythm; the learning process in music; emotional and aesthetic response; musical ability; musical behavior and its measurement; American and European viewpoints and contributions. *Prerequisite*: 145-146 or psychology 1 and 205. Three hours. Mr. Lidral.

390 ORGANIZATION AND ADMINISTRATION OF MUSIC EDUCATION A study of the organization and administration of vocal and instrumental music in the public schools. *Prerequisite:* graduate standing in music education and teaching experience. Three hours. Mr. Schultz.

Physical Education

100 PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL (See Physical Education 100).

116 HEALTH EDUCATION (See Physical Education 116).

155 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 107 and page 241.

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.

| Number | Title | Credit Hours |
|--------|--|--------------|
| 75 | Driver Education Workshop, Basic | . 2 |
| 113 | School Music | . 3 |
| 122 | Developmental Reading | . 3 |
| 132 | Teaching Arithmetic | . 3 |
| 150 | Intensive Teacher Preparation | . 4 |
| 172 | The Creative Process Through Art | . 3 |
| 175 | Driver Education, Advanced | . 2 |
| 209 | Education of Teachers of the Mentally Retarded—I | |
| | Early Years | . 3–6 |
| 210 | Education of Teachers of the Mentally Retarded-II | |
| | Later Years | . 3–6 |
| 214 | The Slow Learner (Education of the Exceptional Child) | . 3–6 |
| 215 | The Gifted Child | . 3 |
| 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 |

EDUCATION

| Number | Title | Credit Hours |
|------------|---|--------------|
| 229 | Communicative Arts in Secondary Schools (Teaching English | h |
| 445 | in Secondary Schools) | - 8 |
| 941 | Science Methods (Science for Elementary Schools) | . 8 8 |
| 944 | Social Studies in the Elementary School | . 3 8 |
| 244 056 | Social Studies III the Elementary School Mathematic | . 3 |
| 200 | The him Mathematics in the Secondary School Mathematic | 5 9 |
| 257 | Teaching Mathematics in the Secondary Schools | . 3 |
| 259 | leaching Foreign Language | . 3 |
| 260 | Improvements in Teaching Bookkeeping and Basic Busines | s 3 |
| 261 | Seminar in Business Education | |
| 269 | Principles Problems and Trends in Business Education | . 8 |
| 968 | Improvement in Teaching Secretarial Subjects | . 3 |
| 203 | Business Education Curriculum | . J g |
| 204 | Kindepreseten Methode and Organization | . ປ |
| 270 | Laboratory Expansion and Organization | . 9 |
| 2/1 | Laboratory Experiences in Kindergarten Education | . 3 |
| 303, 304 | Problems and Research in Teaching Secondary School | ٥ |
| | English | . 3 |
| 310 | Methods for Deriving and Achieving Special Education | |
| | Objectives | . 3 |
| 312 | Analysis of Classroom Behavior—The Handicapped Learne | r 3 |
| 313 | Statistical Methods in Education | . 3 |
| 316 | Seminar in Research in the Education of Handicapped | |
| | Learners | . 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 |
| 373 | Individual Testing | . 3 |
| 374 | Counseling Theory and Practice | . 3 |
| 876 | Analysis of Reading and Related Language Difficulties | 3 |
| 276 | Laboratory Experiences in Reading and Related Language | a. |
| 570 | Instruction | 8 |
| 877 | Seminar in Educational Develology | 8 |
| 970 | Advanced Study and Research in Reading and Related | |
| 510 | Language Arte | 8 |
| 970 | Language Arts | . <i>3</i> |
| 379 | Seminar in Reading Instruction | . J 9 |
| 380 | Professional Problems in Education | . 3 |
| 383 | Personalizing Information Processes in Guidance | . J A |
| 384 | Practicum in Counseling | . J |
| 385 | Student Personnel Services in Higher Education | . 0 A |
| 386 | Organization and Coordination of Guidance Programs | . 3 |
| 390 | Organization and Administration of Music Education | . 3 |
| 391-393 | Master's Thesis Research | . 6 |
| 397-398 | Problems in Education | . 3-6 |
| 399 | Research Methods in Education | . 3 |
| | (For 300 level course descriptions see Graduate College Bulle | tin) |

Engineering, Agricultural

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

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

154 AGRICULTURAL MACHINERY AND EQUIPMENT (2-2) Theory, design, operation and maintenance of agricultural machinery and equipment. *Prerequisite:* civil engineering 130 and 131. Three hours. Mr. Arnold. For BSAE degree candidates only.

155 SOIL AND WATER ENGINEERING (2-2) Study of hydrologic, hydraulic, and agronomic principles as related to design and installation of drainage and irrigation systems, erosion control facilities, farm and small watershed flood control reservoirs, and stream channel improvements. Philosophy of soil and water conservation. *Prerequisite:* plant and soil science 61, civil engineering 53. Three hours. Mr. Bornstein. Alternate years, 1971-72.

158 FARM POWER MACHINERY (2-2) Theory, design, operation, and maintenance of tractors and their engines. *Prerequisite:* mechanical engineering 113, civil engineering 131 or concurrent enrollment. Three hours. Mr. Arnold. For BSAE degree candidates only.

Engineering, Civil

COLLEGE OF TECHNOLOGY

Professors Oppenlander (Chairman), Milbank; Associate Professors Dawson, Fay and Knight; Assistant Professors Condren, Downer, Eldred and Olson; Engineer Dunham; 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, 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; simple harmonic motion. *Prerequisite:* 01, also 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.

174

11 GEOMETRICS (2-4) Selected items in analytical photogrammetry; elements of photo-interpretation; theory of curves and earthworks. *Prerequisite:* 10 or 12 and mathematics 14. Three hours. Staff.

12 PLANE SURVEYING (3-4) Fundamental surveying methods; elements of topographic surveying; special problems as presented in fields affected. 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; also mathematics 14. Three hours. Staff.

101 MECHANICS OF MATERIALS LABORATORY (0-3) Experimental stress analysis methods; fundamental properties of metals, plastics, and wood; 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 and engineering specifications, ethics and professional conduct. *Prerequisite*: junior standing. Two hours. Mr. Milbank.

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 and geometric design. Economic analysis during planning, design, and construction phases; critical path scheduling techniques. *Prerequisite:* 10, Mathematics 31 and Junior standing. Three hours. Mr. Dawson.

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. Laboratory studies on waste water characteristics and treatment. *Prerequsite:* 150, 160, chemistry 1-2. Three hours. Mr. Condren.

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; experiments with hydraulic machinery. *Prerequisite:* 02. Four hours. Mr. Downer.

170 STRUCTURAL ANALYSIS I (3-3) Analysis and design of statically determinate structures; prefaced by 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 load; base plates; eccentric connections. Laboratory practice in the graphic statics and design computations, including use of electronic computation methods. *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; prefaced by 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. 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. Theory of prestressed concrete. *Prerequisite:* concurrent enrollment in 171. Three hours. M., Milbank.

180 SOIL MECHANICS I (2-6) 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. Laboratory practice in testing for: index properties, permeability, consolidation, shear, and the effects of additives and cementing agents on particulate systems, as illustrated by Portland cement and bituminous concretes. *Prerequisite:* 100 and senior standing. Four hours. Mr. Olson.

181 SUBSTRUCTURE ANALYSIS AND DESIGN (3-3) Evaluation of subsoil conditions and earth pressures; design of retaining walls, substructures for buildings and bridges, and cofferdams. *Prerequisite:* 173 and 180. Four hours. Mr. Milbank.

200 MECHANICS OF MATERIALS II The study of stresses and strains at a point under plane and three-dimensional loading using Mohr's circle; failure theories and energy methods; plastic design and buckling of plates and shells. *Prerequisite*: 172 or concurrent enrollment. Three hours. Mr. Fay.

220 CONSTRUCTION ENGINEERING 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 the CPM and PERT techniques including crashing procedures. Special problems in measurements of construction efficiency, cost estimating, specification preparation, and case studies of local projects under construction. *Prerequisite:* senior or graduate standing. Three hours. Mr. Knight.

225 ENGINEERING ECONOMY Mathematical comparison of alternatives to maximize the financial return on engineering designs and processes. Project feasibility studies and design decision making are presented. The effect of taxes on engineering decisions and analysis of risk and uncertainty are included. *Prerequisite:* Senior or graduate standing. Three hours. Staff.

226 CIVIL ENGINEERING SYSTEMS ANALYSIS 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. Mr. Oppenlander.

230 URBAN PLANNING TECHNIQUES 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 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 revewal; organization and administration of planning agencies; and financial planning. *Prerequisite:* 230 or consent of instructor. Three hours, Mr. Oppenlander.

240 TRAFFIC ENGINEERING CHARACTERISTICS 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 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 WATER TREATMENT PROCESSES A rigorous study of the design concepts involved in the planning of water and waste water treatment plants. *Prerequisite*: 151. Three hours. Mr. Condren.

260 HYDROLOGY 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, Mechanical Engineering 142, or consent of the instructor. Three hours. Mr. Downer.

261 OPEN CHANNEL FLOW 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. *Prerequisites*: 160, Mathematics 201. Three hours. Mr. Downer.

270 INDETERMINATE STRUCTURES II 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. Knight.

280 SOIL MECHANICS II Index and engineering properties of soils with emphasis on current research problems; critical evaluation of the theories of ground water movement, frost action, consolidation, shearing strength, and stress distribution; and case histories and comparison of failure conditions with predictions based on laboratory tests. *Prerequisite:* 180. Three hours. Mr. Olson.

281 HIGHWAY AND AIRPORT PAVEMENT DESIGN Structural design of flexible and rigid pavements; types of wheel and axle configurations; tire pressures; 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; mix-design methods; Westergaard analysis for rigid pavements; design of joints and reinforcing steel; rigid pavement pumping; pavement evaluation; pavement selection criteria; and test roads. *Prerequisites*: 140, 180. Four hours. Messrs. Knight and Olson.

290 ENGINEERING INVESTIGATION 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 The theory of elasticity with applications to curved beams, combined stresses, torsion of non-circular sections, relaxation procedures. *Prerequisites:* 100, Mathematics 201. Three hours. Mr. Fay.

301 PHOTOELASTICITY 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. *Prerequisites*: 100, Mathematics 201. Three hours. Mr. Fay.

340 TRAFFIC ENGINEERING OPERATIONS 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 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 alinements, cross section, intersections, interchanges, control of access, and frontage roads; and emerging concepts of geometric design for modern highways. *Prerequisite:* 240. Three hours. Messr. Dawson and Oppenlander.

342 URBAN TRANSPORTATION SYSTEMS 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. *Prerequisites*: 230, 241. Three hours. Mr. Oppenlander.

360 ADVANCED HYDROLOGY Application of recent developments in applied 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. *Prerequisites:* 260, Mathematics 201. Three hours. Offered as occasion warrants. Mr. Downer.

370 ULTIMATE STRENGTH DESIGN Development of ultimate load theory, virtual work, and statistical 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. *Prerequisites:* 172, 173, 180. Four hours. Mr. Knight.

371 PRESTRESSED CONCRETE STRUCTURES Comparison of service and ultimate strength theories for concrete structures with emphasis on prestress effects; topics considered include prestressed beam analysis, load balancing methods, curved girders, columns and piles, bent analysis, yield line theory, and circular prestressing in domes and tanks; and critical discussion of current design specifications. *Prerequisite:* 173. Three hours. Mr. Milbank.

372 ADVANCED DYNAMICS The study of Coriolis acceleration; gyroscopic forces; dynamic measurements; and vibrations, earthquakes, and blast shocks on structures. *Prerequisites*: 172, 173, Mathematics 201. Three hours. Staff.

380 SOIL ENGINEERING Applications of soil mechanics to special problems of earth structures and foundations including bearing capacity evaluation, earth pressures, stabilization, effects of vibratory loading, earth dam, and roadway construction. *Prerequisite:* 280. Three hours. Mr. Knight.

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 Absher, Ellis, and Mirchandani

* 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.

X 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.

Y 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:* 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, magnetohydrody-

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namic (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 ELECTROMAGNETIC PROPERTIES OF MATERIALS (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 (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 191. 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, transients 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.

ENGINEERING, ELECTRICAL

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 117. 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 (3-1) 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 E.E. 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 191. 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 E.E. or departmental permission. Three hours. Mr. Roth.

287, 288 SPECIAL TOPICS (2-3) Formulation and solution of theoretical and practical problems dealing with electrical circuits, apparatus, machines or systems. *Prerequisite:* 4. Three hours.

311, 312 ADVANCED CONTROL SYSTEMS (3-0) Multiple input-output control system analysis. State space techniques, sampled-data and nonlinear control systems. Design using optimal control theory. *Prerequisite:* 111, 311 for 312. Three hours. Mr. Absher.

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 211. Three hours. Staff.

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

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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 processes. 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

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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 AND RELATED FIELDS 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.

* Areas of research include control systems, instrumentation, electromagnetic fields, biomedical engineering, solid state materials and devices, information processing and communication theory.

Engineering, Mechanical

Professors Berry, Outwater, and Tuthill; Associate Professors Carpenter, (Chairman) Duchacek, Hundal, Marshall, Martinek, and McLay; Instructor Mastro

1 ENGINEERING GRAPHICS I (0.6) Basic geometrical constructions, freehand sketching and lettering, charts and graphs, orthographic projection and applications of orthographic principles to typical engineering problems. Introduction to descriptive geometry. Two hours.

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 M.E. Three hours.

84 MECHANICAL INSTRUMENTATION (1-0) Engineering measurements; experimental error; test sequence; data analysis. *Prerequisite*: mathematics 14. One hour.

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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.

133 KINEMATICS AND DYNAMICS (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:* C.E. 24. 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:* M.E. 133, C.E. 131. 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 201. 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:* III, 142, 266. 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 ADVANCED MECHANICS (3-0) Development of the foundations of mechanics leading to Hamilton's principle and LaGrange's equations; vibration and stability of systems with many degrees of freedom; gyroscopic effects in mechanical systems; systems with variable co-efficients and non-linear systems. *Prerequisite*: 133. Three hours.

203 ADVANCED MECHANICAL VIBRATION (3-0) Vibration phenomena in single and multi-degree of freedom systems; response of systems to periodic and transient excitation; random vibration theory; general normal mode theory; impedance, matrix and numerical methods for vibration problems; isolation of shock, vibration and noise; vibration of continuous systems; methods of nonlinear analysis. *Prerequisite:* senior standing. Three hours.

204 ADVANCED SYSTEMS ANALYSIS (3-0) Lumped-parameter and distributedparameter systems analysis of mechanical thermal, hydraulic, pneumatic and electromechanical systems; system response to periodic, transient and random excitation. *Prerequisite*: senior standing. Three hours.

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.

211 ADVANCED MECHANICAL STRUCTURES I (3-0) Statically indeterminate problems in bending; general expression of strain energy; theorem of Castigliano and its application to statically indeterminate problems; the reciprocal theorem and influence lines; theory of curved bars; beams on elastic foundation; combined direct compression and lateral loaded beams; continuous beams; theory of thin plates and shells with their applications. *Prerequisite:* senior standing. Three hours.

222 ADVANCED MECHANICAL STRUCTURES II (3-0) Lateral buckling of beams, struts, circular rings, circular arches and tubes under external pressure; thick wall cylinder; torsion of shafts of non-circular cross-section and rolled profile section; membrane analogy; torsional buckling of thin-walled compression members; combined bending and torsion; various strength theories; theory of plates and shells with their applications. *Prerequisite:* senior standing. Three hours.

ENGINEERING, MECHANICAL

243 ADVANCED FLUID MECHANICS (3-0) Foundations of compressible flow; isentropic flow; normal and oblique shock waves; Prandtl-Meyer flow; flow with friction and with heating and cooling; flow in electric and magnetic fields; potential flow; linearized flows; method of characteristics. *Prerequisite:* M.E. 142. Three hours.

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.

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. *Prerequisites* M.E. 243 or concurrent enrollment therein. One hour.

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.

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.

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.

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 201. Three hours.

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 201. Three hours.

271 INDUSTRIAL MATERIALS I (3-0) Fundamentals of ferrous and nonferrous physical metallurgy, and non-metallic 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.

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.

ENGINEERING, MECHANICAL

274 INDUSTRIAL MATERIALS II (3-0) Geometrical crystallography; packings in crystals; formation and transformations in crystals; structure of metals, semiconductors, and insulators. *Prerequisite:* 271. Three hours.

281, 282 SEMINAR (1-0) Presentation and discussion of advanced mechanical engineering problems and current developments. *Prerequisite:* senior or graduate engineering enrollment. One hour.

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.

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.

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.

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; timedependent behavior of reactors; reactor control theory; reactor accident and transient analysis. *Prerequisite:* senior standing. Three hours.

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 M.E. Four hours.

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 M.E. Four hours.

303 STRESS ANALYSIS (THEORY AND EXPERIMENT) (3-0) Theory and experimental method for 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 M.E. Three hours.

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 M.E. Three hours.

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-Strokes 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 M.E. Four hours.

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; La-Grange'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 M.E. Three hours.

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 M.E. Three hours.

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 M.E. Three hours.

311 ADVANCED GAS DYNAMICS (3-0) Analysis of compressible flow in ducts with area change, friction and heat transfer; shock waves; oblique shock; twoand three-dimensional compressible flow; small perturbation theory; similarity in high speed flow; transonic and supersonic flow; method of characteristics. *Prerequisite*: graduate standing in M.E. Three hours.

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 M.E. Three hours.

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 M.E. Three hours.

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 M.E. Three hours.

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 M.E. Three hours.

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 M.E. Three hours.

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 M.E. Three hours.

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.

COLLEGE OF ARTS AND SCIENCES

Professors Bandel, Bogorad,¹ Cochran, Jones, Long, Rothwell (Chairman), and Trevithick; Associatre Professors Manchel, Orth, and Poger; Assistant Professors T. A. Broughton, Clark, A. I. Dickerson, Hall, Howe, Leonard, Shepherd, and Stephany; Instructors Affsprung, Bradley, M. T. Broughton, Campolucci, M. J. Dickerson, Eschholz, Johnson, Kohler, Miller, Rosa, Sheridan, Simone, Tillinghast, 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

¹ Sabbatical leave 1970-71.

English

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.

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 of 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. Mr. Leonard.

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 Langston 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 LAN-GUAGE; literary interpretation and criticism; allied problems useful to teachers of English. *Prerequisite*: 16, 261. Three hours. Mr. Manchel.

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. Leonard. 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:* 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. Mr. Leonard.

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. Trevithick and Mr. Shepherd.

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 Southwest 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 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.

EXTRA-DEPARTMENTAL COURSES

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

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. Gard.

FORESTRY

Meteorology

61 INTRODUCTORY METEOROLOGY An introductory study of weather elements and the dynamic processes 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.

Forestry

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professor Christensen (Chairman); Associate Professors McCormack and Whitmore; Assistant Professors Armstrong, Donnelly, Fuller, Hannah, Hoekstra, Myers; Lecturer Von Trapp

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.

111 FOREST PATHOLOGY (See Botany 111) 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.

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. von Trapp.

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.

FORESTRY

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 53, 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. Myers

144 FOREST BIOMETRY I (2-8) 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. Christensen.

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. Staff.

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.

171 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.

172 PRACTICE OF WILDLIFE MANAGEMENT (2-3) Life history, ecology, and management of important game birds and mammals in relation to other land management objectives; techniques for research and management. *Prerequisite*: 171. 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.

FORESTRY

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 MENSURATION Advanced mensuration principles in forest land management. Current developments in the science of forest mensuration. *Prerequisite:* 144. 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.

282, 284 FORESTRY SEMINAR Review and discussion of current forestry problems. Required of forestry seniors and graduate students. One hour. Mr. Christensen.

381, 382 SPECIAL TOPICS Advanced readings and discussion of forestry 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. Credits as arranged.

COLLEGE OF ARTS AND SCIENCES

Geography

Professor Miles (Chairman); Associate Professor Barnum; Assistant Professors Beardsley, Gade, Ingold, and Meeks.

Note: The normal introductory sequence is 11, 12 although 11, 14 is a recommended alternative, especially for students in economics and business administration.

11 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. Not open to students who have taken Geography 33. Three hours. Staff.

12 INTRODUCTION TO HUMAN GEOGRAPHY The cultural diversity among people as it affects the organization and use of the environment. Not open to students who have taken Geography 33. 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. Mr. Ingold.

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. Meeks.

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.

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:* twelve hours in the social sciences. Three hours.

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.

GEOGRAPHY

108 GEOGRAPHY OF EAST ASIA Mr. Ingold.

109 GEOGRAPHY OF SOUTH ASIA Mr. Ingold.

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 or 28, plus nine additional hours in geography, history, or other social sciences. Three hours. Mr. Miles.

202 HISTORICAL GEOGRAPHY OF EUROPE (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 or 13, plus six additional hours in geography, history, or other social sciences. 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.

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 11. 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 nine additional hours in geography, economics or other social sciences. Three hours. Mr. Ingold.

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 12 and nine 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. Pre-

GEOGRAPHY

requisite: 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. *Prerequisites:* Geography 12 and nine 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 or 202 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.

COLLEGE OF ARTS AND SCIENCES

204

Geology

Associate Professors Hunt and Stanley (Chairman); Assistant Professors Bucke, Drake and Wagner; Instructors Thresher and Vollkommer.

 \vee 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, 12 MINERALOGY (3-3, 2-3) Crystallographic, chemical and physical properties of minerals with emphasis on their geologic environment. Laboratory sessions will stress identification of minerals in hand specimen and by means of x-ray methods and the polarizing microscope. *Prerequisite:* 1. Introductory chemistry is advisable and may be taken concurrently. Four, three hours. Mr. Drake.

61 INTRODUCTORY METEOROLOGY. (see p. 198).

103 GEOMORPHOLOGY (2-3) The description and interpretation of earth land forms with emphasis on processes by which land forms evolve. A survey of the physiographic provinces of North America. Aerial photographic interpretations of land forms. *Prerequisite:* 1. Three hours. Mr. Wagner.

105, 106 PETROLOGY (3-3) The igneous, sedimentary, and metamorphic rocks with emphasis on geologic processes instrumental in their formation. Laboratories present various methods utilized in rock analysis. *Prerequisite:* 12 for 105, open to others by departmental permission; 105 for 106. Four hours. Staff.

116 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. Three hours. Mr. Stanley.

121 PALEONTOLOGY (2-8) Principles of classification, methods of interpretation, and a survey of ancient life. Consideration is given to the species concept, the fossil sample, principles of evolution, uses of fossils, and other bsaic topics. *Prerequisite:* 1 or zoology 1, or the equivalent. Three hours. Mr. Hunt.

125 FIELD GEOLOGY (1-6) Geologic mapping of a nearby area or field study of selected structural features within a 100-mile radius of the University. 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:* 116 or departmental permission. Three hours. Mr. Stanley.

GEOLOGY

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 or 21. Three hours. Staff.

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.

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:* 103 or 106. Three hours. Mr. Wagner. Alternate years, 1968-69.

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:* Geology 103 or 216. Mr. Wagner. Alternate year, 1969-70. Three hours.

224 STRATIGRAPHY (2-2) Sequential development and distribution of the sedimentary rocks. *Prerequisite*: 106. Three hours. Staff. Alternate years, 1969-70.

242 REGIONAL GEOLOGY (3-0) Comprehensive study of the geology and sequential development of selected regions of the earth's crust. *Prerequisite:* 106 (or concurrent enrollment), 116, 125. Mr. Stanley. Three hours.

251 GEOLOGY OF ORE DEPOSITS Special emphasis is placed upon the study of the origins and geologic associations of ore deposits. Other aspects include consideration of the application of physical and chemical methods for their discovery. Laboratory work will include thin and polished section techniques as well as chemical investigations. *Prerequisite:* 106. Staff. Alternate years, 1968-69.

271, 272, 273, 274 TOPICS IN GEOLOGY (1-0) Selected topics of current interest. *Prerequisite*: 106, 116. One hour. Staff.

312 ADVANCED MINERALOGY (2-3) Selected topics in mineralogy including crystal chemistry, experimental mineralogy, and current problems in mineralogy. *Prerequisite:* 105 and 106. Three hours. Mr. Drake. Alternate years, 1968-69.

321 IGNEOUS GEOLOGY (2-3) Paragenesis of igneous rocks; laboratory work on selected suites of specimens. *Prerequisite*: 105, 106. Three hours. Staff. Alternate years, 1968-69.

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 spacial relationship of metamorphism to tectogenesis. *Prerequisite:* 105, 106. Three hours. Messrs. Drake and Stanley. Alternate years, 1968-69.

GEOLOGY

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 stratigraphic paleontology. 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.

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 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; 13 for 14. Three hours. Messrs. White and Wurthmann.

15, 16 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:* 15 or 11 for 16. Three hours. Mr. Ganz.

81, 82 SCIENTIFIC GERMAN Development of ability to read accurately and efficiently original German in the field of each student's scientific interest. *Pre-requisite*: 14 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 16 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 16 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
GERMAN

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, Hebeel, 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.

Department of German and Russian

Proposed courses at the 300 level for the year 1970-71:

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.

Hebrew

History

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, 1969-70.

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. 1970-71.

COLLEGE OF ARTS AND SCIENCES

Professors Bliss, Daniels, Davison, Evans (Emeritus), Felt (Chairman), Rollins, and Schultz; Associate Professors Hand, Schmokel¹, Spinner¹, and Stout; Assistant Professors Andrea, Fackler, Gard, Hutton, Metcalfe, Muller, Overfield, Seybolt, Steffens, and True; Adjunct Professor Morrissey; Instructors Carlson, and Noyes; Lecturer Carden.

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.

1. On leave, 1969-1970.

11, 12 EUROPEAN CIVILIZATION History of Europe, 1500 to the present. Three hours. Messrs. Andrea, Carden, Gard, Hutton, Metcalfe, Noyes, Overfield, Schmokel, Seybolt, Spinner, and Steffens.

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 31 or 32 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. Carlson, Felt, Hand, Morrissey, Muller, Schultz, Stout, and True.

40 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.

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 importance of science to western culture is emphasized. *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, or 13; 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, or 28. Three hours. Mr. Hand.

125 HISTORY OF THE NEGRO IN THE UNITED STATES The Negro in American History; economic, social, political, and intellectual developments in U. S. history as they have affected and been affected by the Black American; emphasis on the period since 1865. *Prerequisite:* 23 and 24, or 28, or appropriate work in social science. Three hours. Mr. Felt.

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:* 12 hours of history including 91 or 301 or concurrent enrollment in 301. Three hours. Mr. Andrea.

208 THE HIGH MIDDLE AGES Western Europe, 1000-1300. Emphasis on religious, intellectual, and artistic developments. *Prerequisite:* 207. 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, 13, 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, or 13. 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. *Prerequisite:* sophomore standing. Three hours. Messrs. Metcalfe and Muller.

221 THE AMERICAN COLONIES The colonial period of American history from the earliest explorations to 1763. *Prerequisite:* 11 or 13. Three hours. Mr. 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. Mr. 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, or 28. 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, or 13. Three hours. Messrs. Hutton and Noyes.

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, or 13. 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, or 13. 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, or 13, and economics 12 (one of the prerequisites may be taken concurrently). Three hours. Mr. Stout. (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, or 28, 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 13, 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, or 13. 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, or 13. 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, or 28. 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, or 28. 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 28, 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 28, 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: 1893present. *Prerequisite:* 11 and 12, or 13, or 23 and 24, or 28. Three hours. Staff.

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. (1968-69)

353, 354 THE HISTORY OF ENGLAND Mr. Metcalfe, Mr. Spinner.

355, 356 RECENT EUROPEAN HISTORY Mr. Schmokel and staff. (1968-69)

357, 358 U.S. POLITICAL HISTORY Mr. Hand, Mr. Schultz. (1968-69)

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 Mr. Daniels and 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

Professor Morse; Associate Professors Brown, Caldwell, Knowles, Powell, Webster1, Williams (Chairman); Assistant Professors Atwood, Ellis, J. Emanuel, Jameson, Lepeschkin, Livak, Prior, and Whittlesey; Instructors McKay, Osborn, Soule, and F. Emanuel; Visiting Professors Groves², and Lienkaemper³; Lecturers Keyser and Spaven.

ORIENTATION Home Economics in the Land-Grant College-teaching, re-1 search, and extension. The historical development of the field, its common core of family and individual, and the professional opportunities which are available. Required of all freshmen. 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.

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 and Miss Lienkaemper.

1. Sabbatical leave second semester 1969-70.

Academic year 1969-70.
Second semester only, 1969-70.

119 HOME FURNISHING 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 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 HOME FURNISHING 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 (1-4) Historical and sociological background to textiles and textile design; testing techniques and recent developments in the field. *Prerequisite*: 20. 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. Miss Lienkaemper.

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.

Food and Nutrition

35 BASIC CONCEPTS OF FOOD AND NUTRITION (3-2) Principles of nutrition for the individual related to growth and health in family setting. Basic principles of food purchasing and preparation presented through demonstration-lectures. Four hours. I, II. Mrs. Livak, Miss Williams.

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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.

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, sociology 21, 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.

243 ADVANCED NUTRITION (3-0) Human nutrition; the nutritive value of foods with application in calculating food requirements; diets for children, adults and family groups. *Prerequisite*: 135; agricultural biochemistry 151; zoology 6. Three hours. Miss Morse.

244 DIET THERAPY (2-2) Adaptations of the normal diet in conditions affected by or affecting the utilization of food. *Prerequisite:* 243. Three 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 HOUSING Survey of family shelter, needs and supply. Discussion of problems of site location, financing, utilization of space and materials. Three hours. Miss Knowles.

52 SOCIO-ECONOMIC ASPECTS OF HOUSING A study of the housing supply, how it meets the needs of American families, especially the low income, elderly, physically handicapped and minority groups. 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.

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Home 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.

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.

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. Miss Ellis.

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. Staff.

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. Mr. Samenfink, 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. Two 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 Euro-

pean 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. (Graduate Credit Pending)

263 SEMINAR IN FAMILY RELATIONS AND HUMAN DEVELOPMENT Theory and research on the family. *Prerequisite*: 163 and/or sociology 151 or equivalent. Three hours. Mrs. Groves. Alternate years, 1969-70.

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. Staff.

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. Staff.

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. Four 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.

189 PRESCHOOL PRACTICUM (1-5) Supervised planning and conducting the preschool laboratory program. *Prerequisite:* 63, 82, 164 and 185. Six hours. Staff.

Preprofessional Social Work

166 SOCIAL WELFARE AS A SOCIAL INSTITUTION History, philosophy, purpose of social welfare; review of fields and processes of social work. *Prerequisite*: sociology 21, psychology 1. Three hours. I, II. Miss Whittlesey.

167 SOCIAL WELFARE AS A PROFESSION Major components of professional social work services; structure and functions of social agencies in the U.S.: basic methods of social work practice. *Prerequisite*: 166; sociology 22. Three hours. I, II. Miss Whittlesey.

168 SOCIAL WORK IN THE COMMUNITY Study and discussion of social work services in the community: field experience in community social agencies. *Prerequisite*: 166, 167, or permission of instructor. Four hours. I, II. Mrs. McKay and Miss Whittlesey.

366 SOCIAL WELFARE AND SOCIAL WORK AS SOCIAL INSTITUTIONS Critical survey of the philosophy and purpose of social welfare and systems of service delivery in welfare agencies. Investigation of basic concepts of social work practice. 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. Two 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. Two or three hours. Miss Brown and Miss Osborn.

272 TEACHING ADULTS (1-2) 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.

297, 298 PROBLEMS IN EDUCATION (see education 297, 298) 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. Misses Morse and Ellis.

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, and Riggs; Associate Professors Bee, Chamberlain, Dwrok, Hill, Lighthall, Moser, Nicholson, Prather, and Sylwester; Assistant Professors Burgmeier, Cooke, Whorton and Wright; Instructors Brown, Dimmock, Earnshaw, Johansson, Knox, LeGendre, Roney, Stein 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.

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 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.

* 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.

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

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.

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.

121 SOPHOMORE MATHEMATICS Partial differentiation, multiple integrals, infinite series, and elementary differential equations. *Prerequisite:* 12. Three hours. Staff.

X 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.

 χ 191 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. *Prerequisite:* 12. Three hours. Staff.

192 STATISTICAL METHODOLOGY Fundamental ideas and techniques of statistics, including randomization, confidence intervals and 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

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problems (e.g., education, biology, economics, psychology, agricultural engineering). Computer programming recommended. Credit for one but not both 192 and 292 for mathematics majors. *Prerequisite*: 12. Three hours. Staff.

201 APPLIED MATH FOR ENGINEERS AND SCIENTISTS I Matrix theory, vector analysis, linear ordinary differential equations. Emphasis on methods of solution, including numerical methods. *Prerequisites*: 123 and knowledge of Fortran Programming. Three hours. Staff.

202 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*: 201. Three hours. Staff.

205 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.

207, 208 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 analysis and applied mathematics. *Prerequisites:* 102 and 121; 207 for 208. Three hours. Staff.

209 PROJECTIVE GEOMETRY Principle of duality, perspectivity, projectivity, harmonic sets, cross ratio, the theorems of Pascal and Brianchon, and poles and polars. *Prerequisite*: 124. Three hours. Staff.

210 FOUNDATIONS OF GEOMETRY Geometry as an axiomatic science, various non-Euclidean geometries, and relationships existing between Euclidean plane geometry and other geometries. The development of geometry as a science based upon invariant properties. *Prerequisite:* 12. Three hours. Staff.

211 DIFFERENTIAL EQUATIONS Solutions of linear ordinary differential equations, the Laplace transformation, and series solutions of differential equations. *Prerequisite:* 121. Three hours. Staff.

212 APPLIED MATHEMATICS Boundary-value problems, orthogonal functions and vector analysis. *Prerequisites:* 124 and 211. Three hours. Staff.

213, 214 APPLIED MATHEMATICS First semester: partial differential equations, solutions of partial differential equations of mathematical physics, and functions of a complex variable. Second semester: calculus of variations, difference equations, and integral equations. *Prerequisite:* 212; 213 for 214. Three hours. Staff.

220 VECTOR ANALYSIS Introduction to vector methods including the elements of vector algebra and vector calculus with applications to physics and mechanics. *Prerequisite*: 121. Three hours. Staff.

222 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. Staff.

225, 226 TOPOLOGY The elements of point set topology; closed sets and open sets in metric spaces, continuous mappings, connection, Peano curves, separation theorems and homotopy. *Prerequisite:* 102 or 208, 225 for 226. Three hours. Staff.

227 DIFFERENTIAL GEOMETRY Analytic metric differential geometry of curves and surfaces in ordinary three dimensional space; curvature, torsion, Frenet formulas, involutes, developable and ruled surfaces, and geodesic curves. *Prerequisite*: 121. Three hours. Alternate years, 1969-70. Staff.

228 NUMBER THEORY Divisibility, prime numbers, Diophantine equations, congruence of numbers, and methods of solving congruences. *Prerequisite:* 121 Three hours. Staff.

231, 232 FUNCTION OF A COMPLEX VARIABLE Differention 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*: 208; 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*: 208; 233 for 234. Three hours. Staff.

235, 236, 237 SPECIAL TOPICS IN ANALYSIS For advanced students in the field of analysis. Lectures, reports and directed readings on advanced topics in analysis. *Prerequisite:* 232 or 234 and consent of instructor. Credit as arranged. Offered as occasion warrants. Staff.

241, 242 MODERN HIGHER ALGEBRA Fundamental concepts of Abstract Algebra. Sets, mappings, groups, rings, integral domains, fields, homomorphisms, isomorphisms, linear transformations and vector spaces. *Prerequisite*: 12; 102 highly desirable; 124 and 241 for 242. Three hours. Staff.

243 THEORY OF GROUPS The study of the various kinds and structures of groups. *Prerequisite*: 241. Three hours. Alternate years, 1969-70. Staff.

244 GALOIS THEORY The study of Galois theory leading to the insolvability of general quintic equations by radicals and theorems on constructions with ruler and compasses. *Prerequisite:* 243. Three hours. Alternate years, 1969-70. Staff.

245, 246, 247 SPECIAL TOPICS IN ALGEBRA For advanced students in the field of algebra. Lectures, reports and directed readings on advanced topics in algebra. *Prerequisite*: 241 and consent of instructor. Credit as arranged. Offered as occasion warrants. Staff.

249 NUMERICAL ANALYSIS Error analysis, evaluation of functions by power series, Chebyshev series, continued fractions. Numerical evaluation of integrals by various methods. Other topics. Assigned problems on IBM 1620 or 1130. *Prerequisite:* 121 or 123, 31 or knowledge of Fortran programming, 124 desirable. Three hours. Staff.

226

251 THE THEORY OF DIGITAL COMPUTING MACHINES AND NUMERICAL ANALYSIS Mathematical theory underlying digital computing machines including assigned problems on the IBM 1620, or 1130, including programming in machine language and Fortran language. About half of the course is devoted to elementary numerical analysis. *Prerequisite:* 121, 124 highly desirable. Three hours. Staff.

252 ADVANCED NUMERICAL ANALYSIS Finite difference methods, numerical solution of differential equations, numerical solutions of systems of linear equations, linear programming and approximations of various types. Problems solved on the university computer. *Prerequisite:* 249 and credit or concurrent enrollment in 124. Three hours. Staff.

253 ADVANCED PROGRAMMING Assembly language programming, subroutines, structure of operating systems and compilers. *Prerequisite:* 31 or knowledge of Fortran programming. Three hours. Staff.

255, 256, 257 SPECIAL TOPICS IN GEOMETRY For advanced students in the field of geometry. Lectures, reports and directed readings on advanced topics in geometry. *Prerequisite:* 209 or 227 and consent of instructor. Credit as arranged. Offered as occasion warrants. Staff.

259, 260 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. *Prerequisite:* 102 or consent of instructor; 259 for 260. Three hours. Staff.

261, 262, 263 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:* 252 and 253. Credit as arranged. Staff.

265, 266, 267 SPECIAL TOPICS IN TOPOLOGY For advanced students in the field of topology. Lectures, reports and directed readings on advanced topics in topology. *Prerequisite:* 226 and consent of instructor. Credit as arranged. Offered as occasion warrants. Staff.

270, 271 ORDINARY DIFFERENTIAL EQUATIONS Linear and non-linear systems, approximate solutions, existence, uniqueness, stability, asymptotic behavior of solutions. *Prerequisite*: 208; 270 for 271. Three hours. Mr. Chamberlain.

275, 276 FUNCTIONAL ANALYSIS L² 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. *Prerequisite*: 234; 275 for 276. Three hours. Staff.

281, 282, 283, 284, 285, 286 SEMINAR Members of the staff and approved students meet weekly to study contemporary advances in mathematics and for reports on current research. One hour. Staff.

291 PROBABILITY THEORY Basic non-measure-theoretic course in probability theory with some applications. Axioms of probability, random variables, mo-

ment 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. *Prerequisite*: 102, 124. Three hours. Staff.

292 MATHEMATICAL STATISTICS I Theory and application of classical statistical methods. Sampling distributions and order statistics, estimation procedures, tests of hypothesis and confidence intervals. Credit for one but not both 292 and 192 for mathematics majors. *Prerequisite*: 291. Three hours. Staff.

293 MATHEMATICAL STATISTICS II Theory and application of modern statistical procedures. Non-parametric methods, multi-variate techniques, decision theory, sequential procedures. *Prerequisite*: 292. Three hours. Staff.

294 EXPERIMENTAL DESIGN AND ANALYSIS, METHODOLOGY Techniques of regression, analysis of variance and covariance, multiple comparisons. Heavy emphasis on applications requires knowledge of another discipline to serve as source of current problems and data. Computer used for calculations. *Prerequisite*: 192 or 292, elementary computer programming ability. Three hours. Staff.

295 MEASURE THEORY Sets and classes, inner and outer measure, Lebesgue-Stieltjes measure, measurable functions, absolute continuity, Radon-Nikodym theorem, convergences, and applications in theoretical probability. *Prerequisite*: 208. Three hours. Staff.

298 APPLIED STOCHASTIC PROCESSES Random walk models, Markov chains, Poisson process, Brownian motion, probability generating functions, discrete branching processes, homogeneous birth and death processes, diffusion processes, and first passage times. *Prerequisite:* 291, credit or concurrent enrollment in 192 or 292, and consent of instructor. Three hours. Mr. Sylwester.

341, 342 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. *Prerequisite*: 242; 341 for 342. 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.

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.

| Numb | per 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 |
| SI42 | Fundamental Concepts of Algebra | 3 |
| S144 | Statistics and Probability | 3 |
| S205 | The Development of Mathematics | 3 |

Medical Technology

DIVISION OF HEALTH SCIENCES

Professors: Coon (Chairman, Department of Pathology); Instructors: Barron, Breen, Kleiler, Wise, Wood

Note: All Courses limited to students of Medical Technology except by permission of the Departmental Chairman.

DYNAMICS OF HEALTH CARE

I-2 DYNAMICS OF HEALTH CARE Introduction to the whole pattern of comprehensive health care. Fall semester. One hour. Dr. Coon, Miss Breen.

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. Coon, 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 Wood 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 Barron and staff.

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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. Staff.

111-112 BIOCHEMISTRY Human physiological chemistry; structure, metabolism and regulatory mechanisms. Laboratory: biological reactions, preparation of reagents, instrumentation. Application of sound quantitative principles to analysis of body constituents. Lectures, conferences and laboratory. Limited to students of medical technology except by permission of departmental chairman. Four hours each semester. Miss LaGrange (Taught by the Dept. of Medical Biochemistry). Prerequisite: Organic chemistry.

120 CLINICAL MICROBIOLOGY (3-6) Lectures and laboratory experiments in clinical aspects of microbiology. Fall semester. *Prerequisite:* Biochemistry 55. Six hours. Dr. Smith and staff. (Taught by the Dept. of Medical Microbiology).

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, Dr. Rice, 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.

Radiologic Technology

Assoc. Prof. VanBuskirk (Department of Radiology) Instructor, Izzo

1 RADIATION PHYSICS AND MATHEMATICS Study of the nature of ionizing radiation and the application to the diagnosis and treatment of disease. Four hours. Fall semester. Mr. Izzo.

2 RADIOLOGIC POSITIONING AND APPLIED ANATOMY Application of anatomy to radiologic technology, including a detailed study of surface, topographical and cross-section anatomy. Three hours. Fall semester. Mr. Izzo. Staff. 3 MEDICAL-SURGICAL DISEASES Survey of medical and surgical diseases which are diagnosed and treated by ionizing radiation. Two hours. Fall semester. Dr. VanBuskirk, staff.

4 RADIOBIOLOGY AND RADIOPATHOLOGY Study of cell-killing mechanisms and the effect of ionizing radiation on the critical structures of the human body. Three hours. Spring semester. Mr. Izzo and staff.

5 PRINCIPLES OF RADIOGRAPHIC EXPOSURE Study of the parameters involved in obtaining a radiograph. Two hours. Spring semester. Staff.

6 ADVANCED POSITIONING Study of non-routine radiographic procedures. Three hours. Spring semester. Izzo, staff.

7 SPECIAL PROCEDURES Study of techniques in pediatric radiography, neurological and cardiovascular procedures. Two hours. Spring Semester. Staff.

8 RADIOBIOLOGY Study of selected topics, including equipment maintenance, darkroom chemistry, and nursing procedures. One hour. Spring Semester. Staff.

9 NUCLEAR MEDICINE AND RADIOTHERAPY Study of the fundamentals of nuclear medicine and radiotherapy. One hour. Spring semester. VanBuskirk, Staff.

10 TREATMENT PLANNING Study of various treatment methods including portal filming, dosimetry, and rotation techniques. Three hours. Spring Semester. Izzo, Staff.

11 SPECIAL PROCEDURES IN RADIOTHERAPY Study of methods of interstitial and intracavitary therapy. Three hours. Spring semester. Mr. Izzo and staff.

12 NURSING PROCEDURES Nursing procedures relative to radiation therapy technologists. One hour. Spring semester. Staff.

13 NUCLEAR INSTRUMENTATION Study of various methods of detecting radiation, including standardization and calibration of equipment. Three hours. Spring semester. VanBuskirk, Izzo and staff.

14 RADIOPHARMACEUTICALS Study of techniques for producing radiopharmaceuticals. Two hours. Spring semester. Staff.

15 DIAGNOSTIC AND THERAPEUTIC USES OF ISOTOPES Study of various tracer techniques and therapeutic applications of radioactive nuclides. Three hours. Spring semester. VanBuskirk, Izzo and staff. Military Science

Lieutenant Colonel Oehler (Chairman); Majors Carter and Murtha; Captains Bryan and Riederer; MSG Murtiff.

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 Revolutionary War to the present; leadership laboratory and field training.

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.

COLLEGE OF ARTS AND SCIENCES

Music

Professors Lidral (Chairman), Bennett and Pappoutsakis; Associate Professors D. Kinsey, and Schultz; Assistant Professors Chapman, T. Read, and Weinrich; Part-time Instructors Anand, Auchter, Carter, Dahl, F. Kinsey, Metcalfe, 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. Read.

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MUSIC

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 and Weinrich.

105-106 THEORY II (2-3) Contrapuntal and harmonic dictation, advanced harmony, and elementary counterpoint. *Prerequisite:* 5-6, Three hours. Mr. Lidral.

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, 1970-71.

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 or the equivalent; 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. Mr. Read.

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 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, Chapman, and Weinrich; 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.

193, 194 COLLEGE HONORS

195, 196 SPECIAL TOPICS

1. Enrollment in 5 will cancel credit for 9.

2. Enrollment in 1 and 2 will cancel credit for 10.

MUSIC

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 A 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.

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 171.

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.

MUSIC

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. *Pre-requisite*: 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 Arr. 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:

| А. | Piano | (harpsichord) | G. | Clarinet (saxophone) | м. | Percussion |
|----|-------|---------------|----|----------------------|----|-------------|
| в. | Voice | | H. | Bassoon | N. | Violin |
| С. | Organ | | 1. | Horn | о. | Viola |
| D. | Harp | | J. | Trumpet | Р. | Violoncello |
| E. | Flute | | K. | Trombone (euphonium) | Q. | Bass |
| F. | Oboe | | L. | Tuba | R. | Unassigned |

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, 1971-72.

251, 252 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.

271, 272 PERFORMANCE PEDAGOGY Methods of teaching voice, strings, woodwinds, brass or keyboard instruments and advanced class instruction in them.

^{1.} Indicated courses in performance may be taken for several years, 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 (keyboard students excepted); two hours credit will be given for two private lessons per week (one hour) and twelve hours practice per week, on the same condition.

Research paper required. *Prerequisite:* performing ability, teaching experience, and consent of instructor. Two hours.¹ Staff.

DIVISION OF HEALTH SCIENCES

Professor Woodruff (Director).

Professional Nursing: Professor Woodruff (Chairman); Associate Professors R. Adams, Demers, Emerson, Folta, Milligan, Palmer, Powell, and Sawyer; Assistant Professors Barrett, Deck, Farrington, Forgione, Magee, Marsland, Rodgers, Schwalb, Thompson, and Ure; Instructors Burroughs, Celano, Joslyn, Murray, Quinn, and Scranton.

Technical Nursing: Assistant Professor Allen (Chairman); Instructors E. Adams, Foreman, and Rule.

7 HOME NURSING (0-2) Care of the family. *Prerequisite:* junior standing in home economics curriculum. One hour. Miss Milligan.

Professional Nursing

21-22 INTRODUCTORY NURSING (2-16) First semester: Development of understandings, attitudes, and skills necessary to performance of basic activities 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. Celano, Joslyn, Murray, Rodgers, Palmer, and Quinn; Misses Sawyer and Scranton.

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 Forgione 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. Celano, Joslyn, Murray, Rodgers, Palmer, and Quinn; Misses Sawyer and Scranton.

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

1. See footnote 1 on page 235.

Nursing

NURSING

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.

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 NURSING IN THE COMMUNITY (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. Misses Emerson and Farrington.

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

11-12 FUNDAMENTALS OF NURSING (2-6) A basic course in the principles of nursing care. Emphasis is placed on nursing interventions to meet the common health needs of individuals of all age groups. Concurrent experiences are planned in hospitals and community agencies. Four hours. Miss Foreman, and Mrs. Rule.

14 FUNDAMENTALS OF NURSING (four weeks summer session) Continuation of Nursing 11-12. *Prerequisite*: 11-12. Four hours. Miss Foreman, Mrs. Rule.

27-28 NURSING CARE OF CHILDREN AND ADULTS (4-15), (4-18) These courses focus on applications and adaptations of nursing principles in the care of children and adults with common major health problems. Content and related clinical experiences include maternity and infant care and the care of patients with physical and mental illnesses. *Prerequisite:* 14. 27, nine hours; 28, ten hours. Staff.

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.

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COLLEGE OF ARTS AND SCIENCES

Philosophy and Religion

Professors Dykhuizen (emeritus), Hall (Chairman), and Sadler; Associate Professor Kahn; Assistant Professors Beckett, Miller, Paden and Sobers; Instructors 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.

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 which 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.

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, Schopenhauer, 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.

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. *Pre-requisite:* 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.

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.

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.

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

PHYSICAL EDUCATION

situation. *Prerequisite:* six hours in religion, including Rel. 21; sophomore standing. Three hours. Mr. Sadler.

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, Strassburg; Instructors Carroll, Condon, Farrell, Guerette, Hayes, Kusiak, La-Casse, Lange, Nedde, Reinhardt; Part-Time Instructors Cross, Holmquist, Johanningmeier, Loche, Smith.

PHYSICAL EDUCATION Two hours weekly. One credit. Staff.

One year of physical education is required of undergraduate students (see page 67). 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

PHYSICAL EDUCATION

| Men | Men and Women | | | | | | | | |
|------------------------------------|---|--|----------------------|-----------------------------|--|--|--|--|--|
| Basic Physical Education* | | | | | | | | | |
| Handball | Badminton | Karate | Squash | Archery | | | | | |
| Paddleball | Golf | †Judo | Tennis | Bowling | | | | | |
| Wrestling | Ice Skating | Skiing | Track | Fencing Riding Rifle | | | | | |
| | †Swimming | Basketball | | Field Hockey | | | | | |
| Touch Football | Synchronized Soccer-Speedball †Life Saving Volleyball †Skin and Scuba | | Lacrosse Softball | | | | | | |
| | †Folk—Social—Squa †Modern Dance | †Folk—Social—Square Dance †Modern Dance | | | | | | | |
| Body Building Remedial Exercise | †Gymnastics—Tumbling—Apparatus †Children's Play Activities | | | Posture and Conditioning | | | | | |

find enjoyment in physical activity and lasting interest in continuing voluntary participation.

Activities

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), black leotard and black dance tights.

Every man enrolled in physical education must pay a four dollar locker-towel fee.

21 FOUNDATIONS OF PHYSICAL EDUCATION (2-2) An introduction to the scope and role of school physical education; and to the opportunities and obligations associated with physical education as a profession. Identification of present activity skill status in the light of future skill program requirements. Three hours. Miss Zimmerli or Mr. Christensen.

22 FIRST AID AND SAFETY EDUCATION (1-2) Study of safety needs at various maturity levels and in the school environment. A consideration for first aid practices for common injury situations including wounds, burns, shock, broken bones, artificial respiration, poisoning, including techniques of bandaging and transportation. Red Cross certificate through Instructor level for successful completion. Two hours. Mr. Bryant.

26 WATER SAFETY INSTRUCTOR (1-2) Knowledge and skill appropriate for teaching swimming and water safety skills through the senior life saving level. Red

* Required P.E. 1 for men.

+ Coed classes.

PHYSICAL EDUCATION

Cross Instructor certification upon successful completion. *Prerequisite:* current senior life saving certificate, two hours. Miss Farrell or Mr. Gobin.

50 INTRODUCTION TO DANCE (2-2) An introduction to the field of dance. Background in the historical and educational basis of dance. Opportunities to develop skill in the types of dances commonly taught in public schools. *Prerequisite:* skill competency and junior standing. 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) Knowledge of basic skills and techniques for organizing and administering the elementary school physical education activities program. Three hours. (Two hours, elementary education majors only). Mr. Dunkley or Miss Zimmerli.

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, common and communicable disease, drugs, and basic first aid. Three hours. (Two hours for Elementary Education majors only). Mr. Gobin.

123 COACHING BASEBALL AND FOOTBALL (2-2) Theory and technique of coaching inter-scholastic baseball and football. Includes practice, game and schedule organizations. *Prerequisite:* skill competency in baseball and football, and junior standing. Three hours. Mr. Holmquist and staff.

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 inter-scholastic soccer and basketball. Includes practice game, and schedule organization. *Prerequisite:* skill competency in soccer and basketball, and junior standing. Three hours. Staff 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 1970-71, 1972-73.

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 techniques 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.

154* INTRODUCTION TO RECREATION Recreation and recreation education; theory and practice of recreational activities for youth and adults. Two hours. Mr. Greig.

155 PHYSICAL EDUCATION IN SECONDARY SCHOOLS (2-2) Practice in activity and activity teaching methods in team, individual, dual, recreational sports and other media of physical education suitable for secondary grades. *Prerequisite:* junior standing. Three hours. Miss Zimmerli or Mr. Gobin.

156* CURRICULUM IN PHYSICAL EDUCATION A study of student developmental needs and interests, objectives, and contemporary curricular designs for implementing the physical education program. *Prerequisite:* Ed. 100 or 155. Three hours. Mr. Gobin. Alternate years: 1970-71, 1972-73.

157 CARE AND PREVENTION OF ATHLETIC INJURIES (1-2) Prevention, recognition and care of injuries related to school physical education and athletic programs. *Prerequisite:* Junior Standing. Two hours. Mr. Bryant.

158 ORGANIZATION AND ADMINISTRATION OF HEALTH AND PHYSICAL EDUCATION Organization and administration of instructional programs, intramurals, interscholastic athletics, school recreational programs, schedules, personnel, budgets, equipment, records, tests, and public relations. Three hours. Mr. Christensen or Miss Zimmerli.

166 PHYSIOLOGY OF MUSCULAR ACTIVITY (2-2) Study of physical exercise upon the circulatory, respiratory, digestive, and nervous systems. Relationship of endurance, fatigue, training and nutrition to the efficiency of physical performance. *Prerequisite:* 1 year Lab. Science. Three hours. Mr. Leggett.

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:* 1 year Lab. Sci. Three hours. Mr. Leggett.

168* TESTS AND MEASUREMENTS IN PHYSICAL EDUCATION (22) 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. 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. Mr. Gobin or Mr. Greig. Alternate years; 1969-70, 1971-72.

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:* sophomore standing. Three hours. Mr. Bryant.

* Accelerated to coordinate with student teaching.

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 relationships. Special emphasis on health appraisal of children in grades 1 through 12. *Prerequisite:* P.E. 116 (Health Education) or equivalent. Three hours. Mr. Gobin.

Physics

COLLEGE OF ARTS AND SCIENCES

Professors Crowell (Chairman), Detenbeck, Juenker, and Nyborg; Associate Professors Krizan¹, and Scarfone²; Assistant Professors Brown, Depatie, Huang, Nagy, Sachs, and Thurnauer

Physics I 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.

X 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

1. Sabbatical leave September 1, 1969 to July 1, 1970.

2. Sabbatical leave January 1970 to July 1970.

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.

4 128 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.

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; 101 for 102. Three hours. Mr. Depatie and Mr. Nagy.

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 approximational techniques, including energy diagrams, victor differential operations, moving and non-cartesian coordinate systems. *Prerequisites:* 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. Nyborg.

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.

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.

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. Brown.

193, 194 College Honors:

195, 196 Special Topics

1. May be replaced by physics 5, 6 with departmental permission.

246

197, 198 SENIOR RESEARCH (0.4, 0-8) The student works on a theoretical or experimental project under direction. Written and oral reports are submitted. 191, two hours; 192, 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; 203 for 204. Three hours. Mr. Nyborg and Mr. Detenbeck.

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.

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:* 173, or chemistry 142, mathematics 212 and departmental permission. Credit as arranged. Messrs. Crowell and Juenker. Offered as occasion warrants.

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. Brown.

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. Brown.

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. Thurnauer.

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. Thurnauer.

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. *Prerequisites:* 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 quasi-particles, 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. Scarfone.

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. Huang.

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. Huang.

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.

Plant and Soil Science

250

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Professors Wiggans (Chairman), Bartlett, and Hopp; Associate Professors Mac-Collom, McIntosh, and Wood; Assistant Professors Boyce, Flanagan, and Pellett; Lecturers Calahan, Benoit, 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 (3-2) Principles and practices involved in the culture, management, and utilization of plants and plant products with emphasis on economically important horticultural and agronomic crops. Four hours. Mr. Boyce.

61 INTRODUCTION TO 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.

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, 1970-71.

108 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.

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.

123 VEGETABLE CROPS (2-3) Origin and improvement of vegetable crops, including cultural practices and principles involved in modern vegetable pro-

PLANT AND SOIL SCIENCE

duction. Review of recent experimental work. *Prerequisite:* 11. Three hours. Mr. Hopp. 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. Staff. Alternate years, 1970-71.

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, 1970-71.

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, 1970-71.

197, 198 SENIOR RESEARCH Work on a research problem under the supervision of a senior staff member. Findings submitted in written form as prescribed by the department. *Prerequisite*: senior standing. 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. Wiggans. 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. Messrs. Bartlett and Klein and botany, forestry, and plant and soil science staff. Alternate years, 1971-72.

207 WATER RELATIONS OF PLANTS (See forestry 207) Three hours. Mr. Post and botany and plant and soil science staff. Alternate years, 1970-71.

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 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.

Political Science

COLLEGE OF ARTS AND SCIENCES

Professors Dellin, Gould (Chairman), Haugen, Hilberg, Little and Nuquist; Associate Professors Berbano¹, Staron; Assistant Professors Knoller, Pacy, Simon, Warner, and Wertheimer; Instructors Brubaker, Eastman, Flanders, Monahan, and Nelson

1. Visiting, 1969-1970.

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. 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. *Pre-requisite:* 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.

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. Mr. Little.

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. Little.

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, in-

terim 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. Staron.

277 Soviet Politics See History 277. Three hours. Mr. Daniels.

278 FOREIGN POLICY OF THE U.S.S.R. See History 278. Three hours. Mr. Daniels.

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 Forgays (Chairman); Associate Professors Burchard, Lawson, Leitenberg, Patterson, and Perrine; Assistant Professors Does, Ferguson, Gordon, Howell, Joffe, Kessler, Musty, Pratt, and Rolf.

256

1 GENERAL PSYCHOLOGY Introduction to the entire field, emphasizing the normal adult human being. Three hours. Messrs. Forgays, Musty and Patterson.

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. Mr. Howell.

100 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. Mr. Leitenberg.

105 CHILD PSYCHOLOGY Development of the individual from birth to adolescence. Prerequisite: 1. Three hours. Staff.

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. Staff.

109 EXPERIMENTAL PSYCHOLOGY I 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 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. Musty.

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. Perrine.

123 SYSTEMATIC PSYCHOLOGY A comparative study of the leading contemporary schools of psychological thought. *Prerequisite:* 1. sophomore standing. Three hours. Mr. Chaplin.

193, 194 College Honors

195, 196 Special Topics

197, 198 RESEARCH Individual research under staff direction. Prerequisite: departmental permission. Three or six hours. Staff.

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. Mr. Leitenberg.

221 PHYSIOLOGICAL PSYCHOLOGY The structure and function of the mammalian nervous system, with emphasis upon neurological correlates of behavior and receptor mechanisms. Individual laboratory experience in electro-physiological 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. *Prerequi*site: 110, 123, 221. Mr. Musty.

225-226 PsychologICAL TESTS (2-2) 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. Mr. Ansbacher.

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. Mayhew.

232 EXPERIMENTAL SOCIAL PSYCHOLOGY (2-2) 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. Chaplin.

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. Mr. Mayhew.

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.

303-3041 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.

305-306¹ ADVANCED STATISCAL METHODS Study of statistical methods as aids for understanding and evaluating psychological data. Critical study of such topics as sampling theory, statistical estimation, simple and complex analysis of variance, non-parametric methods, simple and complex correlative techniques. Three hours. Mr. Howell.

3071 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. Mr. Perrine.

309¹ 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. Mr. Patterson and Staff.

311¹ 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. Mayhew.

312¹ 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.

314¹ 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. Forgays.

315 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. Staff.

^{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.

319 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. Mr. Patterson and Mr. Lawson.

320 SENSORY PROCESSES: MECHANICAL AND CHEMICAL SENSES A study of selected topics from the mechanical senses (somesthesis and kinesthesis) 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.

321 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.

322 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.

323 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.

324 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.

325 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.

328¹ 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.

330¹ 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.

3311 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.

371,1 372,1 373¹ CONTEMPORARY TOPICS Designed to cover selected topics in depth. The major emphasis will be on intensive and critical analysis of original literature in a given area. Suitable topics include: Visual Perception, Accident Research, Memory, Fear and Frustration, Adlerian Theory, Behavior

1. See footnote 1 on page 259.

Therapy, Behavioral Pharmacology, Information Theory, Instinct, Propaganda and Attitude Formation, Psycholinguistics. Three hours. Staff.

381 through 383 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.

1. See footnote 1 on page 259.

Romance Languages

COLLEGE OF ARTS AND SCIENCES

Professors Daggett and Johnston; Associate Professors Julow (Chairman), Parker, Ugalde and Weiger; Assistant Professors Chinchón, Kohler, Wesseling and Willis; Instructors Allen, Branden, Chesny, Crichfield, Geno M., Geno T., Lascoumes, Lehovich, Rivera, Serra, Whitebook, Wiley and Zumbo.

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. Mr. Kohler 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. Crichfield 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 recommended 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' explications. *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, 1970-71.

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, 1970-71.

261 FRENCH LITERATURE OF THE BAROQUE ACE Selected works of the period from Montaigne to Pascal with emphasis on d'Aubigné, Jean de Sponde, Malherbe, Hardy, Mairet, 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, 1970-71.

262 FRENCH LITERATURE: 17TH CENTURY Selected works of the century with emphasis on Corneille, Racine, and Molière. *Prerequisite*: Any French literature

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course numbered 100 or above, or permission of department. Three hours. Mr. Julow. Alternate years, 1970-71.

267, 268 FRENCH LITERATURE: 18TH CENTURY 267: Study of the principal *philosphes* 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, 1970-71.

273, 274 19TH CENTURY NOVEL 273: 1800 to 1850, development of novel in Constant, Senancour, Madame de Stäel, 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, 1971-72.

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, 1970-71.

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, 1970-71.

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.

264

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. Wesseling.

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. Chinchón.

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. Chinchón.

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. Ugalde.

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. Weiger. Alternate years, 1970-71.

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. Weiger. 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, 1970-71.

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, Azorin, 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.

RUSSIAN

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. Chinchón.

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. Chinchón.

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. Weiger.

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. Weiger.

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.

COLLEGE OF ARTS AND SCIENCES

Associate Professor Paganuzzi:

Russian

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.

Sociology and Anthropology

COLLEGE OF ARTS AND SCIENCES

Professors Dobriner and Lewis (Chairman); Associate Professors Folta, Haviland, Mabry, Stanfield; Assistant Professors Deck, Steffenhagen; Instructor Basa

Anthropology

21 THE CULTURES OF MAN The culture concept; its use in perceiving and understanding behavioral regularity and the diversity of social systems. The lifeways of non-Western societies of varying social complexity. Three hours. I, II. 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).

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. Staff.

193, 194 College Honors

195, 196 Special Topics

197, 198 READINGS AND RESEARCH

221 CULTURE AND PERSONALITY (See sociology 221)

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 or 165. Mr. Haviland.

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, or 165. Three hours. Mr. Haviland.

262 CULTURAL GEOGRAPHY (Same as geography 262)

283 APPLIED ANTHROPOLOGY A descriptive and analytical presentation of the place of anthropology in the modern world. Study of the human problems resulting from attempts to direct cultural change in subindustrial societies. *Prerequisite*: 21, and 161, 162, 163, or 165. Three hours. Staff.

290 SEMINAR Prerequisite: twelve hours of anthropology and senior standing. Three hours.

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 larger 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. Staff.

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. Lewis.

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. Dobriner.

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 Relationship of socialization to the sociocultural 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, 22 and one 100 level course in sociology or anthropology. Three hours. Mr. Steffenhagen.

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 become 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. Dobriner.

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. Staff.

251 SOCIAL RESEARCH METHODS The logic and techniques of sociological inquiry. *Prerequisite*: 250, psychology 5. Three hours. Staff.

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. Dobriner.

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. Staff.

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-coliar crimes. *Pre-requisite:* 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:

H.E. 166 SOCIAL WELFARE AS A SOCIAL INSTITUTION

H.E. 167 SOCIAL WORK AS A PROFESSION

H.E. 168 SOCIAL WORK IN THE COMMUNITY

Speech

COLLEGE OF ARTS AND SCIENCES

Professors Huber, Lewis, and Luse; Associate Professors Feidner, Lane, London (Chairman), and Woolf; Assistant Professors Ellenwood, Miles, Schenk, Simpson, Thomsen, Wilson, and Yadav; Instructors Cooper, Houghton, Jarvis, MacDonald, Rudd, Schmider, Waite, and Wilkes; Lecturer 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. 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. London 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.

111 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 Mr. Wilkes.

112 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.

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, 1970-71.

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. Lewis.

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:* 112, nine hours of related courses including 111 or 112 or 113. Three hours. Mr. London.

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.

272

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.

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 all 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.

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.

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. Lewis. Alternate years, 1970-71.

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. MacDonald.

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. Simpson.

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. MacDonald.

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. MacDonald 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. Yadav 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. *Pre-requisite*: Twelve hours in speech and hearing science courses, including Speech 271 or 272; departmental permission. Credit as arranged. Mr. Ellenwood, Miss Miles, 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 languagelearning difficulties. Some participation in diagnostic and therapeutic sessions may be arranged. *Prerequisite:* Twelve hours in speech, psychology, or education. Three hours. Miss Miles.

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. Schenk and Thomsen.

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.

ZOOLOGY

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. Thomsen.

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.

Zoology

COLLEGE OF ARTS AND SCIENCES

Professors Glade (Chairman), Lochhead, Moody, and Potash; Associate Professors Bell, Henson, Davison, Rothstein, and Stevens; Assistant Professors Brammer, Landesman, and Nolfi.

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.

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 See page 81. For Information About Vocational, Technical and Extension Education, major and minor options.

Vocational, Technical and Extension Education

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

Associate Professors Fuller (Chairman), Ross; Assistant Professor Kelly; Mr. Davison; Mr. Spaven; Mrs. Malone.

102 EXTENSION METHODS (1-2) Methods and techniques of extension teaching. Prerequisite: junior standing. Two hours. Mr. Davison. Alternate years, 1970-71.

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. Credit will be given upon completion of all requirements in the industrial education curriculum. Thirty hours. Staff.

152 INTRODUCTION TO VOCATIONAL AND TECHNICAL EDUCATION (1-2) 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. Two hours. Mr. Fuller.

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

276 B VOCATIONAL, TECHNICAL AND EXTENSION EDUCATION

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. Ross.

173 COMMUNICATION METHODS (see Home Economics 173). Prerequisite: junior standing. Three hours. Miss Osborn and Mr. Spaven.

197, 198 SENIOR RESEARCH Work on a research problem under the direction of a staff member. Findings submitted in written form as prescribed by the department. *Prerequisite:* senior standing. Three hours. Staff.

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:* 152 and concurrent enrollment in 155. Three hours. Mr. Fuller and Mr. Ross.

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, 296 SPECIAL TOPICS IN VOCATIONAL, TECHNICAL AND EXTENSION EDUCA-TION 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. *Prerequisites:* senior standing or departmental permission. Credit as arranged. Staff.

301, 302, 303, 304 RESEARCH IN VOCATIONAL, TECHNICAL AND EXTENSION EDU-CATION Investigation of a research topic under the direction of an assigned staff member. Credit as arranged. Staff.

See page 81 For INFORMATION ABOUT VOCATIONAL, TECHNICAL AND EXTEN-SION EDUCATION, major and minor options.

ZOOLOGY

students in the Nursing and Dental Hygiene curricula, elective to others.¹ Three hours. Mr. Stevens.

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 (3-8) 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. Davison 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. 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.

112 COMPARATIVE HISTOLOGY (2-4) Microscopic anatomy of invertebrate and vertebrate tissues. Basic tissue similarities and specializations in relation to function. *Prerequisite:* 104, junior standing. Four hours. Mr. Glade. Alternate years, 1971-72.

150 INVERTEBRATE ZOOLOGY (2-4) Anatomy, physiology, and life histories of representatives of the more important invertebrate phyla. Required of all students concentrating in zoology. *Prerequisite:* 104, junior standing. Four hours. I. Mr. Lochhead.

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

^{1.} May be taken for credit in the College of Arts and Sciences but does not satisfy the requirement of a course in laboratory science for students concentrating in nonscience fields, nor 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.
ZOOLOGY

discussion. Three hours. Prerequisites: Zoology 101, 211, and Chemistry 131, 132. Mr. Davison.

203 POPULATION ECOLOGY Dynamics, composition, and density regulation of animal populations. *Prerequisite:* 102. Four hours. Mr. Potash. Alternate years, 1970-71.

207 VERTEBRATES (3-3) Classification, ecology, behavior, evolution, and distribution of vertebrates other than birds. *Prerequisite*: 104. Four hours. Mr. Bell. Alternate years, 1970-71.

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.

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.

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, 1970-71.

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.

255 COMPARATIVE ANIMAL PHYSIOLOGY (2-6) General principles of function in invertebrates and vertebrates. *Prerequisite:* 231 or departmental permission and Chemistry 131, 132. Four hours. II. Mr. Rothstein.

267 GENETICS OF DEVELOPMENT (2-4) Problems of differentiation and morphogenesis approached from the viewpoint of gene action and biosynthesis;

278

ZOOLOGY

influence of hereditary material during ontogeny. *Prerequisite:* 101, 104, and departmental permission. Four hours. Staff. Alternate years, 1971-72.

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. Required of graduate students and seniors in zoological research programs. 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.

The Alumni Council

Under an alumni reorganization plan approved at the June 1964 meeting of the Council the purposes were defined as follows: 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 vicepresident 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.

Officers of the Alumni Council:

Bingham J. Humphrey, '27, President, 680 Evergreen Ave., Mt. Carmel, Conn. Samuel W. Fishman, '34, Vice President, 60 Green Street, Vergennes, Vt. Willett S. Foster IV, '69, Secretary, Alumni House, University of Vt. George N. Clerkin, Treasurer, Treasurer's Office, University of Vt.

Honorary:

Lyman S. Rowell, '25, President of the University of Vermont Mrs. Isabelle Y. Gallup, Honorary Lifetime Member, 530 North St., Burlington, Vt.

Members-at-Large

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Club or Regional:

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- Lawrence H. Averill, '27, Chairman, Fund Committee, Washington Towers, Apt. 801, Gaithersburg, Md.
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- Francis E. Beer, '31, 27 Case Pkwy., Burlington, Vt.
- Charles F. Black, Jr., '52, Stowe, Vt.
- Donald B. Carpenter, '38, Box 87, Mendocino, Calif.

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Robert D. Paterson, '42, 110 Summit St., Burlington, Vt.

George E. Little, Ir., '43, 255 S. Prospect St., Burlington, Vt.

Joseph E. Corbett, '43, 28 Overlake Pk., Burlington, Vt.

Paul R. Walgren, Jr., '44, 650 Sherman Ave., Hamden, Conn.

Mrs. Harriet Pearl Grant, '45, 59 Alder Ln., Burlington, Vt.

Mrs. Mary Robinson Adsit, '46, 695 S. Prospect St. Ext., Burlington, Vt.

Houghton D. Pearl, '47, 50 Norman St., Marblehead, Mass.

Torrey C. Carpenter, '48, 55 Cliff St., Burlington, Vt.

Philip E. Robinson, '48, 49 Nearwater Ave., Massapequa, L. L., N. Y.

Malcolm F. Severance, '49, Colchester, Vt.

Ellwyn F. Hayslip, '50, R.F.D. No. 1, Littleton, N. H.

Peter M. Haslam, '51, 24 Liberty St., Montpelier, Vt.

Frank E. Dion, '52, 23 Woodridge Dr., Burlington, Vt.

Clark W. Hinsdale, Jr., '53, Charlotte, Vt.

Mrs. Martha Marvin Kelley, '54, RD 1, Forest Road, Essex Junction, Vt.

Clinton H. Thompson, '55, Gold Brook, Stowe, Vt.

Edward A. Kupic, M.D., '56, 33 Ledgemere St., Burlington, Vt.

John A. Burgess, '57, P. O. Box 766, Montpelier, Vt.

Martin R. Johnson, '58, 13 Knight St., Falmouth, Me.

Ray W. Allen, '59, South Hero, Vt.

Roy J. Greene, '60, 10706 Jordan Rd., Carmel, Ind.

Frederick L. Lewis, '61, R.F.D. No. 1, Hullcrest Rd., Burlington, Vt.

Charles W. Marsh, Jr., '62, 803-C Rosedale Ave., Albany, Ga.

David H. Nichols, '63, 145 East 74th St., Apt. 11-B, New York, N. Y.

Ronald A. Guttman, '64, 14 Horatio St., New York, N. Y.

Samuel J. Laufer, '65, 141 N. Manassas St., Apt. 10-A, Memphis, Tenn.

Arthur M. Brink, Jr., '66, 2300 Antietam St., Fort Irwin, Calif.

Gary V. Lawson, '67, Wallingford, Vt. Paul T. Malone, '68, 101 Oak Lane #1, Brockton, Mass.

Stephen L. Kunken, '69, 3178 Ocean Harbor Dr., Oceanside, N. Y.

Alumni Representatives on the University Athletic Council:

Albert C. Spaulding, Jr., '38, 27 Kingsland Ter., Burlington, Vt. H. B. Levine, M.D., B.S. '30, M.D. '39, 231 Maple St., Burlington, Vt. Roy E. Alberghini, '43, 222 Loomis St., Burlington, Vt. Joseph F. Wark, '53, 64 Colchester Ave., Burlington, Vt.

Enrollment Statistics

Summary of Resident Enrollment

Fall Semester 1969-70

| Undergraduate Colleges & Schools | (4-Yr.) | | | Mer | ı | Women | Total |
|----------------------------------|----------|----------|----------|------------|--------------|-------|-------|
| Arts & Sciences | | | | 190 |)3 | 1030 | 2933 |
| Education | | | | 15 | 56 | 657 | 813 |
| Technology | | | | 64 | 15 | 53 | 698 |
| Agriculture & Home Economi | CS | | | 29 | 91 | 307 | 598 |
| Nursing | | | | | 0 | 221 | 221 |
| Allied Health Sciences | | | | | 4 | 102 | 106 |
| | | | SUBTOTAL | 299 | 99 | 2370 | 5369 |
| College of Medicine | | | | 24 | 10 | 12 | 252 |
| Graduate-Matriculated | | | | 37 | 72 | 178 | 550 |
| Non-Matriculated-Graduate | | | | 13 | 10 | 52 | 162 |
| Undergraduate | | | | 14 | 12 | 173 | 315 |
| Division of Health Sciences (2-Y | r. Progr | ams) | | | 1 | 96 | 97 |
| | | | TOTAL | 386 | 54 | 2881 | 6745 |
| Undergraduate Colleges by Classe | 8 | | | Mer | ı . | Women | Total |
| Senior | | | | 68 | 35 | 490 | 1175 |
| Junior | | | | 62 | 22 | 491 | 1113 |
| Sophomore | | | | 78 | 31 | 550 | 1331 |
| Freshman | | | | 91 | 1 | 839 | 1750 |
| | | | TOTAL | 299 | 99 | 2370 | 5369 |
| | | In-State | | | Out-of-State | | |
| | М | F | T | M | F | T | |
| Arts & Sciences | 1025 | 660 | 1685 | 878 | 370 | 1248 | 2933 |
| Technology | 393 | 12 | 405 | 252 | 41 | 293 | 698 |
| Education | 101 | 412 | 513 | 5 5 | 245 | 300 | 813 |
| Agrículture & Home Economics | 148 | 164 | 312 | 143 | 143 | 286 | 598 |
| Nursing-4-Year | 0 | 150 | 150 | 0 | 71 | 71 | 221 |
| Allied Health Sciences (4-Yr.) | 2 | 40 | 42 | 2 | 62 | 64 | 106 |
| Graduate-Matriculated | 170 | 99 | 269 | 202 | 79 | 281 | 550 |
| Non-Matriculated-Graduate | 107 | 51 | 158 | 3 | 1 | - 4 | 162 |
| Undergraduate | 129 | 154 | 283 | 13 | 19 | 32 | 315 |
| Medicine | 66 | 6 | 72 | 174 | 6 | 180 | 252 |
| Allied Health Sciences (2-Yr.) | 0 | 38 | 38 | 0 | 18 | 18 | 56 |
| Nursing—2 Year | 1 | 38 | 39 | 0 | 2 | 2 | 41 |
| | 2142 | 1824 | 3966 | 1722 | 1057 | 2779 | 6745 |

GRAND TOTAL—FALL SEMESTER, 1969-6745

Enrollment by Divisions

| I. | COLLEGE | OF | ARTS | & | SCIENCES |
|----|---------|-----|-------|---|-----------|
| ** | CODDOOD | ••• | TTTTT | ~ | 001010000 |

| | | In-State | | | Out-of-State | | |
|---------------|---------|----------|------|-------------|--------------|------|----------|
| | M | F | Т | М | F | Т | In & Out |
| Class of 1970 | 273 | 141 | 414 | 194 | 81 | 275 | 689 |
| Class of 1971 | 242 | 145 | 387 | 197 | 77 | 274 | 661 |
| Class of 1972 | 255 | 160 | 415 | 218 | 63 | 281 | 696 |
| Class of 1973 | 255 | 214 | 469 | 26 9 | 149 | 418 | 887 |
| | | | | | | | |
| | 1025 | 660 | 1685 | 878 | 370 | 1248 | 2933 |
| | | | | | | | |

283

| п. | College of Technology | | | | | Total | | |
|---------------|----------------------------|----------|---------------|--------|--------------|----------------|---------|----------|
| | | | In-State | ; T | м | ui-0j-310 F | ue T | In & Out |
| | C1 C 1050 | 109 | <i>r</i> , | 104 | 45 | - 9 | 47 | 151 |
| | Class of 1970 | 105 | 1 | 77 | -15 | 9 | 87 | 114 |
| , | Class of 1971 | 75 | 2 7 | 100 | 55 65 | 19 | 77 | 100 |
| 1 | Class of 1972 | 115 | 1 | 122 | 107 | 14 | 199 | 994 |
| 1 | Class of 1973 | 100 | z | 102 | | | | |
| | | 393 | 12 | 405 | 252 | 41 | 293 | 698 |
| III. | COLLEGE OF EDUCATION | | To State | | | Dut of St | nte | Total |
| | | м | In-State E | , T | м | F F | "т | In & Out |
| | C1 C 1000 | | r 96 | 107 | 5 | 40 | 45 | 152 |
| | Class of 1970 | 21 | 110 | 167 | 5 4 | 22 | 87 | 187 |
| | Class of 1971 | 51 | 119 | 115 | 91 | 65 | 86 | 201 |
| | Class of 1972 | 44 95 | 116 | 141 | 21 | 107 | 132 | 273 |
| | Class of 1975 | | | | | | | |
| | | 101 | 412 | 513 | 55 | 245 | 300 | 813 |
| IV. | College of Agriculture & H | OME ECON | IOMICS | | | Date of St | nte | Total |
| | | | TH-SIUN T | т Т | 7.4 | F F | т Т | In & Out |
| | or (1050 | 1/1 | Г 94 · | 65 | 19 | 97 | 20 | 104 |
| | Class of 1970 | 21 | 24 40 | 05 | 14 | 14 | 98 | 03 |
| | Class of 1971 | 20 | 44 | 05 | 24 | 26 | 70 | 155 |
| | Class of 1972 | 41 | 50 | 07 | 88 | 66 | 140 | 246 |
| Class of 1973 | 47 | 50 | 97 | | | | | |
| | | 148 | 164 | 312 | 143 | 143 | 286 | 598 |
| v. | SCHOOL OF NURSING | * | | | Out-of-State | | | Total |
| | | | In-State | e T | M (| F F | T | In & Out |
| , | | 111 | r | 1 | 181 | τ. | | 1110 040 |
| 4- | Year | 0 | \$ 7 | 27 | 0 | 15 | 15 | 52 |
| | Class of 1970 | 0 | 31 94 | 34 | ů | 7 | 7 | 41 |
| | Class of 1971 | 0 | 40 | 40 | ő | 15 | 15 | 55 |
| | Class of 1972 | 0 | 20 | 90 | ů | 84 | 34 | 73 |
| | Glass of 1975 | <u>,</u> | | | | | | |
| _ | | 0 | 150 | 150 | 0 | 71 | 71 | 221 |
| 2- | Year | , | 90 | 80 | 0 | 9 | 9 | 41 |
| | First Year | 1 | 50 | 59 | v | - | ~ | ~* |
| VI. | SCHOOL OF ALLIED HEALTH S | CIENCES | In-Stat | e | Out-of-State | | | Total |
| | | М | F | T | М | F | T | In & Out |
| 4- | Year | | | | | ~ * | | 0.54 |
| | Class of 1970 | 1 | 5 | 6 | 0 | 21 | 21 | 27* |
| | Class of 1971 | 0 | 8 | 8 | 1 | 8 | 9 | 17 |
| | Class of 1972 | 1 | 12 | 13 | 1 | 11 | 12 | 25 |
| | Class of 1973 | 0 | 15 | 15 | | | | 37 |
| | | 2 | 40 | 42 | 2 | 62 | 64 | 106 |
| 2- | Year | Δ | 16 | 16 | 0 | 8 | 8 | 24 |
| | Second Year | 0 | 00 | 99 | ñ | 10 | 10 | 32 |
| | First Year | | | | | | | |
| | | 0 | 38 | 38 | 0 | 18 | 18 | 56 |

* INCLUDES 3 UNH AND 6 TRINITY STUDENTS (9 OUT-OF-STATE FEMALE)

ENROLLMENT STATISTICS

| VII. COLLEGE OF MEDICINE | | | | | | | |
|--------------------------|----------|-----------------------|-----|--------------|--------------|-------|----------|
| | In-State | | | Out-of-State | | | Total |
| | M | F | Т | М | F | Т | In & Out |
| Class of 1970 | 14 | 1 | 15 | 42 | 2 | 44 | 59 |
| Class of 1971 | 6 | 1 | 7 | 37 | 1 | 38 | 45 |
| Class of 1972 | 19 | 1 | 20 | 50 | 3 | 53 | 73 |
| Class of 1973 | 27 | 3 | 30 | 45 | 0 | 45 | 75 |
| | 66 | 6 | 72 | 174 | 6 | 180 | 252 |
| VIII. GRADUATE COLLEGE | | | | | | | |
| | | In-State | e | 0 | Out-of-State | | |
| | М | F | T | M | F | Т | In & Out |
| Degree Program | 170 | 99 | 269 | 202 | 79 | 281 | 550 |
| Non-Matriculated | 107 | 51 | 158 | 3 | 1 | 4 | 162 |
| | 277 | 150 | 427 | 205 | 80 | 285 | 712 |
| IX. NON-MATRICULATED | | | | | | | |
| | | In-State Out-of-State | | | | Total | |
| | М | F | T | M | F | T | In & Out |
| Arts & Sciences | 58 | 90 | 148 | 7 | 15 | 22 | 170 |
| Education | 15 | 40 | 55 | 5 | 3 | 8 | 63 |
| Technology | 47 | 3 | 50 | 1 | 0 | 1 | 51 |
| Agric. & Home Ec. | 8 | 16 | 24 | 0 | 0 | 0 | 24 |
| Allied Health | 1 | 1 | 2 | 0 | 1 | 1 | 3 |
| Nursing | 0 | 4 | 4 | 0 | 0 | 0 | 4 |
| Graduate | 107 | 51 | 158 | 3 | 1 | 4 | 162 |
| | 236 | 205 | 441 | 16 | 20 | 36 | 477 |

Degrees Granted

School of Allied Health Sciences

Associate in Health Sciences

Catherine Joanne Barlow, Hightstown, N.J. Rhonda Mae Beebee, Woodstock Lois Ann Bennett, Albion, N.Y. MaryAnn Bingham, West Burke Carol Leslie Bosworth, Randolph Lorene Ann Chickering, Hinesburg Carol Ann Devost, Burlington Jennie Ann Fitzsimonds, East Hartford, Conn. Patricia Ann Fontaine, Bellows Falls Susan Louise Heininger, Burlington Carol Rita Lafayette, Burlington Doris Belle Royea, Barre Deborah Jeanne Twiss, Vergennes Janice Ruth Upton, Midland, Mich.

Bachelor of Science in Medical Technology

Marie Bressel Ballard, Syosset, N.Y. Constance Moore Beliveau, St. Johnsbury Esterina Valleroli Bergendahl, Rutland Sandra Renee Blackstone, West Newton, Mass. Geraldine Ann Bowen, West Hartford, Conn. Faith Landon Conant, Dedham, Mass. Tod Robert Fairbanks, Brattleboro Edward Alan Knopf, Canton, Mass. Nancy Mary Leach, Burlington, cum laude Nancy Partridge Lezer, Melrose, Mass. Nancy Ann Moore, Fayetteville, N.Y. tSylvia Ann Sessions, Essex Junction Linda Ruth Simmons, Framingham, Mass. Margaret Heyer Strouse, Rochester, N.Y. Anne Elizabeth Taylor, Syracuse, N.Y. Lynda Riley Thomas, North Bennington Martha Susan Wright, Colchester

Bachelor of Science in Nursing

Dale Ann Aher, Lebanon, N.H. Linda Stewart Andrews, Middlebury Nancy Elaine Bibeau, Keene, N.H. +Susan Diane Browne, Lynn, Mass. Mary Lucile Caccavo, Burlington Carolyn Chandler, Amherst, N.H. Elizabeth Bancroft Cole, Arlington, Mass. Patricia Lee Cone, Middlebury Marilyn Rae Crow, Middlebury Elizabeth Ann Cunningham, Burlington Sandra Lynn Drury, Gardner, Mass. Nancy Caroline Eddy, Chester Judith Louise Foster, Middlebury Colleen Angela French, Hyde Park Janet MacBain Gordon, Brockton, Mass. Mary Louise Guyette, Rutland Cynthia Maureen Harrington, McLean, Va. Linda Lee Jauck, Wantagh, N.Y. Sara Judd, Enosburg Falls Anita Lewis, Hartford, Conn.

Amy Susan Looloian, White House Station, N.J., cum laude Anne Marie Malley, Bellows Falls Jeanne Louise Mullen, Burlington Virginia Ann Ouellette, Burlington Rosemary Manning Payne, Bridport Nancy Michelle Peacos, Princeton, N.J. Dawn Clark Plante, Colchester Sarah McKlow Postance, Wolfeboro, N.H., cum laude Barbara Jane Potter, East Montpelier Janet Irene Ricketson, Stowe Mariorie Ann Sisson, Wayne, Ill. Gratia Ellen Smead, Rochester Jill Hedwig Smith, Bloomfield, N.J. Patricia Helen Tabler, Milltown, N.J., cum laude Martha Whittaker, Concord, N.H. Margaret Louise Wilson, Greensboro Rosalie Helen Young, Pawlet

College of Education

Bachelor of Science in Music Education

Susan May Abair, South Burlington †Frederick Allen Beck, Burlington, cum laude Thomas Bengston French, Burlington Andrea Baldwin Gevry, Hinesburg Edward Harl Hoffman, Hingham, Mass. Gail DeForge O'Brien, Burtington

+ As of February 1969.

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Bachelor of Science in Education

Susan Diane Abston, Roslyn, L.I., N.Y. Patricia Frances Albert, Montpelier Joan Phoebe Anderson, Millburn, N.J. Mary Ellen Anderson, South Burlington Toni Frances Avrutine, Scarsdale, N.Y. Judy Preston Bamman, Stamford *Marion Conger Barton, Waitsfield Jane Ellen Bayer, Scarsdale, N.Y. Bonnie Dorae Bender, Rutland, cum laude Cynthia Jane Bigelow, Randolph Center Ellen Wing Bookstaver, Pittsburgh, Pa. Hugh Auchincloss Brown, III, Glen Cove, N.Y. Mary Ann Campbell, Morrisville, magna cum laude Regina Annette Campbell, Lyndonville Roger Owen Campbell, Essex Junction Linda Jane Chapman, Brattleboro, magna cum laude Doris Gamelin Chicoine, Winooski, cum laude Diane Linda Clark, Barre Elizabeth Clair Clark, Fairfax Charles Henry Coburn, Barre Constance Helen Cochones, Burlington Jaclyn Michelle Conley, Derby Barbara Madill Conrow, Sulphur Springs, N.Y., summa cum laude Sharon Janice Cook, Wilder Richard Brian Corcoran, Swampscott, Mass. Cathy Pamela Corsones, Kingston, N.Y. +Nancy Gervais Crockett, Manchester, Conn. +David Charles Cronin, Burlington Susan May Crosby, St. Johnsbury Allen Victor Amos Currier, Newport +Sandra Ann Fuller Day, South Royalton Deborah Sherman DeCoster, Rochester †Kathy West Dickson, North Adams. Mass. Janice Ellen Doolittle, Springfield Steven Frederick Douglas, Lyndonville Sharon Jean Duranty, Springfield Linda Jean Ellingwood, St. Johnsbury Jean Lucille Feulner, St. Albans Karen Lynell Fitzgerald, Rutland Nancy Ann Fitzgerald, Rutland Barbara Frail, Hartland Paul Truman Galusha, Shaftsbury Lorna Louise Godsill, Woodstock Wilma Gosliga, Vergennes, magna cum laude Helen Anne Greenbaum, Teaneck, N.J. Rebecca Jean Hazen, South Hero Pauline Sue Hickson, Norwich Katherine Jean Hill, Williston Joann Elizabeth Hurley, Northfield +Carol Watkins Jensen, Bloomfield, Conn., magna cum laude Lorraine Ellen Jerry, Northfield Karen Ann Jessop, Malone, N.Y. Sandra Elizabeth Johnson, Southbridge, Mass. Patricia Ann Jones, Wapping, Conn.

Michael Paul King, Fairfax Elizabeth Lynn Lacillade, Williamstown +Sandra Wynne Laible, Livingston, N.I. Priscilla Clough Lambert, Bartonsville Lee Ann Lannon, Ludlow †Pamela Leaman, Haddonfield, N.J. Ann Lois Leipman, Rutland *Jacqueline Paul Lewis, Rochester, N.Y. Laura Louise Luneau, St. Albans Barbara Bigelow Maddocks, New Vernon, N.J. Mary Elsie McEnany, Fairfield Mary Rupprecht McGinn, Brattleboro Michael James McMorrow, Poultney Joan Alina Milkey, Brattleboro Judith Miller, Newbury, Mass. Rhoda Manchester Mingledorf, Johnson Linda Mary Morse, South Burlington, cum laude Bruce Harold Nelson, Ryegate Susan Margaret Norton, Union, N.J. Mary Isabelle Paterson, Burlington *Edith Arlene Pattee, Georgia Martha Jeanne Pattee, Newport Janice Ross Pember, Butler, N.I. Tamara Perelman, Burlington Linda Zimmer Phillips, Hoosick Falls, N.Y. Keith Anthony Pillsbury, Shelburne Patricia Marie Pockette, Rutland, magna cum laude Thomas A. Pombar. Burlington [†]Daryl Grant Puryee, Toms River, N.I. Jeanne Marie Renc, Pearl River, N.Y. Joy Frances Reynolds, Middlebury *Charlotte Hammond Richardson, Waterbury Carol Jeanette Robblee, Bellows Falls Kendra Jane Robinson, Springfield Mary Lou Robinson, Rutland Francine Ellen Rome, Barre Susan Katherine Saunders, Manchester Center Barbara Hazen Scott, Swanton Janet Theresa Shadroui, Barre, cum laude Judith Anne Smith, Stowe Sherry Spaulding, Montpelier Susan Marie Stanley, Andover, Mass. Marilyn Ruth Stoddard, Lyndon Center Andrea Kay Stokes, Burlington Terry Alan Tatro, Alburg Katherine Ann Tepper, Florence, Mass. *Elaine Frances Thomas, Northfield Jean LaBounty Tinney, South Hero Ann Lynch Tuxbury, Burlington *Doris Mildred Underwood, St. Albans John Paul Varricchione, Burlington Beverly Dexter Vaughan, Thetford Jo Anne Vaughan, Hampton, N.H. Mary Ann Weller, New London, Conn. Joyce Westcott, Blandford, Mass. Lillian Elizabeth White, Norwich Jane Ellen Wilbur, Rutland, cum laude

* As of October 1968. + As of February 1969. Alice Ann Kany, Westport, Conn. †Donald Barry Katz, Edgewater, N.J. Nicholas Kay, Jr., Plaistow, N.H.

College of Technology

Bachelor of Science in Chemistry

Leonard Stephen Alter, Newton, Mass. Charles Francis Boudreau, St. Albans Ralph Edward Edelman, Boonton Manor, N.J. Joseph Ronald Grenon, Barre Wilmont Frederick Howard, Jr., Brattleboro Gary William Lyman, St. Albans Mary Hall Skelly, Colchester

Bachelor of Science in Civil Engineering

Walter MacEwan Adams, Jr., Burlington †Paul Bruce Aldinger, Jericho John Richard Bessette, Pittsford John Ralph Burnett, Jr., Burlington Nathan Robert Danforth, Milton James Paul Durochia, Essex Junction James Alfred Fontanella, Norwich, Conn. Robert Joseph Frechette, Williston John Terrance Gervais, Burlington Richard David Hosking, Burlington *William Douglas Krebs, IV, Hartford, Conn. Edward Lamphere Leonard, East Calais *Roger Fernand Masson, Norton *Hugh Scobie McLeod, III, Rutland *Richard Howard Miller, Falmouth, Mass. Robert Bruce Montgomery, Colchester, magna cum laude Stephen Grout Parker, Johnson, cum laude Gary Stanford Rogers, Tunbridge David Allen Ross, Burlington Russell Howard Snow, Waterbury Center Benjamin Newhall Stark, Burlington *Richard Paul Trudell, South Burlington

Bachelor of Science in Electrical Engineering

Maurice Richard Blais, Derby Line, cum laude Raymond Francis Cardinal, Winooski Terry Grant Cecchini, Montpelier John Luther Chatfield, Burlington, cum laude Philip Lee Corrow, St. Johnsbury Charles Allen Elliott, Morgan Center Jean Elizabeth Harper, Rutland James Robert Howell, Glenham, N.Y. John Charles Koziol, Bennington Benjamin Ellis Lamb, Essex Junction

*Carl Andrew Mazzini, Windsor, N.Y. Almon Roderic Moses, Burlington Ronald Bernard Rice, Burlington Philip Stanley Stevens, Richmond

Bachelor of Science in Management Engineering

John Alan Fothergill, Burlington James Patrick Gordon, Colchester James Alan Harrison, North Woodmere, N.Y. *Earl Raymond Olsen, East Corinth Frank Peter Pravata, Staten Island, N.Y. †David John Salls, St. Albans †Robert Lowell Zeliff, East Middlebury

Bachelor of Science in Mathematics

Richard Kenneth Beck, Scarsdale, N.Y. Russell Lloyd Donovan, Burlington William Winter Geller, Keene, N.H. Phyllis Leslie Jayson, Hastings-on-Hudson, N.Y. Daniel Michael O'Brien, Fairlee *Kathleen Mary O'Halloran, Burlington Thomas Francis Pomer, Jr., Proctorsville William Parsons Reed, Montpelier Dianne Moulton Rolfe, Montpelier Jon Gregory Rusk, Pittsfield, Mass. Lynne Ann VanSant, Alexandria, Va. Robert Frank Walker, Bennington, cum laude Susan Kay Weiss, Newburgh, N.Y.

Bachelor of Science in Mechanical Engineering

Richard Wayne Camara, Colchester Robert Lewis Cheever, Burlington Francis Herbert Danico, Bellows Falls +Robert William McDowell, Montpelier Douglas Craig Mills, Burlington John Denmark Morris, Colchester

* As of October 1968. † As of February 1969.

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John Henry Gaye, Shaftsbury +Franklin Theodore Harden, Scotia, N.Y. John Richard Hoadley, Winooski Robert William Huebner, Jr., Burlington Robert Bristol Jerard, Brattleboro *Muriel Jane Low, Barre Robert Harold Penniman, Burlington Timothy Sutherlin Smith, Craftsbury David Flint Stender, Jr., Williston David Morris Striker, Cohoes, N.Y. Robert George Titemore, St. Albans

Bachelor of Science in Physics

Malcolm Elden Brown, Burlington *William Sherman Byford-Brown, Bronxville, N.Y. †Paul Arthur Hyde, East Bethel Craig Charles Cook, Burlington Richard Janney Miller, Burlington, cum laude

Bachelor of Science in Forestry

Dixon Park Ballard, St. Albans Edward Livingston Barnard, Shoreham Colin Gilbert Billings, Randolph David Roy Buchanan, Fayetteville, N.Y. Ray Gordon Colton, Pittsfield Nicholas Karl Fon Eisen, West Hartford, Conn. Lewis Mixier French, West Newbury Sidney Johnson Hinman, Wells River Joseph Donald Maillet, Bennington Gary Maynard Osborne, Island Pond Donald Lucien Pouliot, Westford Allan Leigh Pratt, Brattleboro David Armand Richards, Wallingford Allen Gilbert Root, Williston Stephen Stanley Slayton, Hardwick Gary Scott Smith, West Simsbury, Conn. Timothy Brian Stanley, Rutland Larry James Stowell, Brattleboro John Richard Strifert, Fort Lauderdale, Fla. Gregory Vance Towne, Milton Paul Michael Woodward, Bennington

College of Agriculture and Home Economics

Bachelor of Science in Agriculture

- *Daniel Edward Aher, Jr., Hartford Joanna Clausen Bristol, Ithaca, N.Y. †Kenneth Harold Carson, Newbury Ralph Edwin Coleman, South Londonderry Douglas Scott Cummings, Dennisport, Mass. †Richard Walter Dexter, Monroe, Conn. Thomas Charles Dexter, East Braintree, Mass. †Richard Michael Diemer, Philadelphia, Pa. Theodore Douglas Foster, Middlebury Susan Carol Gates, Cambridge Marc Fenton Gould, Worcester, Mass. Stephen Emerson Hoke, Garden City, N.Y.
- +Phillips Cornell Hurd, Clintondale, N.Y. John Thomas Ivers, Meriden, Conn. John Griffith Kinsey, Moorestown, N.J. Robert Alois Klandl, Burlington

Beth Jane Bergman, Old Bethpage, N.Y.

*Carolyn Brown Buchanan, Bedford, Mass.

Jean Carolyn Hansen, New Providence, N.J.

Cynthia Bertrand Cahill, Brownsville

*Margaret Rose Drescher, Burlington

+Janet Ann Elliott, East Middlebury

Mary Edith Houghton, Woodstock

Martha Evelyn Knapp, Allendale, N.J.

Cathie Layman Leete, Norwalk, Conn.

Anita Mae Danforth, Concord

†Nancy Tribler Lent, Wilder

Jean Carol Lyman, Chelsea

Patricia Ann Lyman, Brattleboro

- Neil Arthur Knapp, Arlington *Patricia Joan Lane, Rutland
- †Robert Kenneth Mitchell, Plattsburgh, N.Y.
- †Lawrence Brown Myott, Milton
- +Ray Henry Palmer, South Ryegate
 - Roger Andrew Payer, Nashua, N.H. Leslie Calvin Pike, Stowe
- †Richard Wilbur Pratt, Vergennes
- Jeffrey Douglas Quittner, Starksboro
- †Stephen Frederick Sacks, Collegeville, Pa.
- John Keil Scott, Essex Junction
- Stephen A. Skou, Shoreham
- Douglas Elliot Watkin, Bennington
- Stewart Edward White, Ryegate
- Busbee Jewel Williams, Jr., North Adams, Mass.

Bachelor of Science in Home Economics

Judith Ann Mills, Burlington, magna cum laude Mary Joan Moninger, Bennington

Margaret Edythe Morin, Lyndonville

Mary Ann Nadeau, South Burlington

Susan Ritchie Pasell, East Burke

- †Maxine Osborne Proctor, Burlington
- Sharon Louise Prue, Newport
- Alice Helen Renaud, Winooski
- +Kathleen Anne Rowley, Williston
- Constance Lee Shannon, Burlington
- Elizabeth Mildred Somers, Barnet
- Suzanne Louise Spelbrink, Rochester, N.Y., cum laude

- * As of October 1968.
- + As of February 1969.

*Davideen Ruth Mace, Burlington Pamela Noble Marvinney, Short Hills, N.J. Judith Burgess McClellan, Underhill Center Marion Elaine McNall, Fairfax Faye Messner, Bayside, N.Y. Louella Madine Steadman, Westford Mark Allan Strassburg, Essex Junction Nancy Jean Sweeney, Burlington Marcia Jean Taylor, Burlington Linda Jean Weniger, Rochester, N.Y.

+Eugene Robert Manfredi, Burlington

College of Arts and Sciences

Bachelor of Science in Commerce and Economics *Denis Neil Chadwick, Springfield

Bachelor of Science in Business Administration

†Richard Allen Albertelli, St. Albans Steven Michael Bell, Newton Centre, Mass. Pamela Drew Keith Blondin, Burlington +Reginald George Boutwell, East Middlebury †Denis Roger Brochu, East Hardwick John Herbert Bush, Springfield William Edward Cain, Burlington Donald Nelson Campbell, Staten Island, N.Y. *Stephen Chester Caswell, Grand Isle †Eben Choate Clark, Jr., Dover, Mass. *Robert Raymond Coburn, Waterville Phillip William Craig, Peacham +Edward Robert Danks, Ithaca, N.Y. Abbott Hubbard Davis, III, Orange, Conn. David Alan Desautels, Burlington Normand Albert Desrochers, St. Johnsbury +James Edward Dick, Bennington Dennis Neal Dodge, Grand Isle Donald James Eckley, Keene Valley, N.Y. William Jay Fairchild, St. Albans William Jay Furman, New York, N.Y. Danny Louis Gomez, Williamstown Steven Jay Greenfield, Burlington John Frederick Hains, River Edge, N.J. Robert Thomas Hayden, Rutland James Edward Hill, South Burlington Alan Eugene Houghton, Glens Falls, N.Y. Bryce Howells, Atlanta, Ga. Richard Lawrence Jonis, Derby Line James Richard Kinne, Newport Center +Bruce Harold LaPoint, Cuttingsville James Vincent Leonesio, North Adams, Mass. Bruce Lisman, Burlington +Lyndol George Lyon, Barre Peter Ernest Lyon, Groton

William Richard Mait, New York, N.Y.

William Burk Mantel, Jr., Newfane Joseph Bernard Mintzer, Burlington George Gray Nelson, Ryegate Lorilee Ann Noyes, Barnet James Patrick O'Neil, Jr., Arlington John Albert Osmond, Stillwater, N.Y. Burton Alfred Paquin, Jr., Burlington Jay Harris Pasackow, Burlington *John Frederick Paul, Jr., Rochester Brian Charles Pease, Liverpool, N.Y. Frank Peter Pravata, Staten Island, N.Y. William David Raban, Hamden, Conn. John Sinclair Reynolds, Skaneateles, N.Y. *Elbert James Roberts, Jr., Brattleboro Kenneth Michael Sager, Levittown, N.Y., summa cum laude Frank Alan Schultheis, Short Hills, N.I. *John Frederick Schwartz, Springfield +Albert William Smith, Northboro, Mass. Donald Allan Smith, Paramus, N.J. Harold Charles Spector, Bronx, N.Y. Michael John Talaska, New City, N.Y., magna cum laude Charles Ogden Tappan, Owego, N.Y. Karen Eileen Taylor, Montpelier Donald Craig Teeters, Tenafly, N.J. +Bernard Phillip Villemaire, Winooski Neal Cadmus Vreeland, Wellsville, N.Y., magna cum laude Robert Paul Wexler, Newton Centre, Mass. Robert Morse Williams, II, Morris Plains, N.J. Steven Howard Wayne Winter, Woodmere, N.Y. William Stewart Wolff, Stamford, Conn.

William Norton Zais, Burlington

Paul Jerome Guay, Winooski

*Reading Darby Hall, Derby Barbara Knapp Hamblett, Shelburne

Sandra Reva Grossman, Medford, Mass.

Edward Haimowitz, Brooklyn, N.Y.

†Duncan Gerald Hannah, Poultney

Glen Norman Gurwit, Hartsdale, N.Y., cum laude

Bachelor of Arts

Christopher Robert Abel, Wenham, Mass.

John Arnold Ackerly, Clifton, N.J.

Marjorie Whall Adams, Riverside, Conn.,

summa cum laude

Richard Randall Adams, Framingham, Mass., magna cum laude

Thomas Jerome Adler, Fort Lauderdale, Fla.

* As of October 1968.

Barbara Lou Aiken. South Burlington Greer Lois Ainsworth, Hardwick Michael Theodore Alexander, Northampton, Mass. Crystal Kent Allan, Essex Junction, cum laude Ronald Morgan Allen, Quincy, Mass. *Emily Buckold Andelman, Glen Cove, N.Y. *Marilyn Waris Anderson, Exeter, N.H. Jennifer Mary Andrews, Richmond, cum laude Sally Kaye Andrews, Demarest, N.J., cum laude David James Angus, Flemington, N.J. Barry Stuart Anton, Deal Park, N.J. Patrick Prior Arkinson, St. Albans *Allan Reger Armstrong, Burlington John Place Arnold, Wellesley Hills, Mass. Jeffrey Barnett Aronson, Sharon, Mass. Valerie Anne Audette, Burlington, summa cum laude Nancy Thayer Babcock, Batavia, N.Y. Frank Philip Baker, Brighton, Mass. Richard Hugh Baker, Star Lake, N.Y. Ruth Ann Ballam, Norwich Gregory James Bapp, Burlington David Talbot Bard, Bennington John Barile, Hollis, N.Y. [Jeffrey Harris Barnes, Andover, Mass. William Donald Barrett, Burlington, magna cum laude Kent Evan Bath, Holden, Mass. Nancy Elaine Bathgate, Springfield +Ronald Bathgate, Springfield +Sandra Beaty, Burlington +Richard Hans Becken, Glen Rock, N.J. Vera Helen Beckerhoff, Stowe Raymond Clyde Benedict, Montpelier Marshall K. Berger, Jr., Brockton, Mass. John Ehresman Berry, Albany, N.Y. John Francis Berry, Jr., South Burlington Joseph Augustus Besso, Jr., Burlington James Marinos Betts, Bennington Richard Wallace Bird, Pownal +John Frederic Bischoff, Westport, Conn. *Barbara Coral Bissell, Windsor †Sandra Lee Blackstone, Burlington Linda Margaret Blais, Swanton Millard Phillip Blanchard, Rutland Harriet Bloomberg, Burlington Paul Solomon Blum, Woodmere, N.Y. Esther MacDonald Bohne, Burlington Raymond Grant Bolton, South Burlington Stephen Grosvenor Booth, Falmouth, Me. +Robert John Borger, Eastchester, N.Y. Lee Moulton Brewster, Barre †Henry Charles Brislin, Rutland Jeffrey Barnett Brown, Woodbury, N.Y., cum laude Charles Joseph Brucato, Jr., Milford, Mass. Charles Patrick Buckley, Jr., Wells LydiaJo Burdick, New York, N.Y.

Paul William Butterfield, Burlington

Pamela Randolph Hardesty, Larchmont, N.Y. Brian Alan Haskell, Bellows Falls Catherine Grace Hawthorne, Springfield *Christopher Michael Hayes, Grafton Barbara Ailleen Hempey, St. Albans Scott Earland Hendrickson, Rutland Keith Ray Hilliker, Orleans Eleanor Marie Hobbs, Burlington Martin Nathaniel Hoffman, Ludlow Diane Marie Holman, Randolph John Martin Horne, Burlington +John Gifford Horton, Concord, Mass. +Harold Frances Howard, Jr., East Montpelier James Gregory Howe, Newport Charles Gadue Hubbell, Burlington Peter Collins Huber, Flemington, N.I. David Howard Humphreys, Bennington James Nathaniel Hunt, Jr., Winooski Thomas Frederick Hunt, South Burlington Craig Desmond Hunter, Derby Line tColin Plummer Hurd, Lovell, Me. Lawrence Colwyn Hurst, Lenox, Mass., magna cum laude David Robert Hutchinson, Morrisville Ann Marie Hyatt, Syracuse, N.Y. Barbara Jean Hyjek, West Rutland, cum laude Sarah Stewart Hynes, Barre Virginia Anne Illick, Middlebury Russell Andrew Irving, Waldwick, N.J. Barry Martin Iselin, Troy, N.Y. +Ruth Bicknell Isham, Montpelier Dana Bacon Jacobs, Morrisville Lee David Jacobs, St. Albans +Leland Jacobs, Larchmont, N.Y., cum laude Robert Stanley Jacobs, Sag Harbor, N.Y. +Leslie Mark Jacobson, New York, N.Y. Linda Florence Jamieson, East Weymouth, Mass. Susan Carol January, Colchester, magna cum laude Paul Donald Jarvis, Essex Junction, cum laude *Barbara Jean Johnson, Townshend *Jay Richard Johnson, Jr., South Royalton Richard Ben Kabat, Great Neck, N.Y. +Karl David Kaessler, Bronxville, N.Y. Jean Marie Kaufman, Burlington *Linda Marie Firliet Keating, Rutland John Guthrie Kearton, Rutland Patrick Francis Keenan, Rutland Marc Ira Keller, Pawtucket, R.I. Richard Edmond Kellogg, Jackson Heights, N.Y. *Steven Otto Kellogg, South Royalton Allan Howard Kerner, Essex Junction Phillips Hill Kerr, Burlington Brock Treverton Ketcham, Whiting, cum laude +Heather Ruth Kirk, Burlington Ellen Jane Kleinman, Newark, N.J. Patricia Carson Koerner, Shelburne Darwin Ray Kuhlmann, South Burlington Paul Michael Kuk, Claremont, N.H. Stephen Lewis Kunken, Oceanside, N.Y. *Diane Alice Lajoie, Burlington

* As of October 1968. † As of February 1969.

Michael Gent Cain, Winnetka, Ill. Katherine Lyons Candon, Proctor Patricia Ann Capron, Greenfield, Mass. Glen Sherman Carlson, North Poultney, cum laude †Teresa Ann Casey, Hamden, Conn. Stephen John Chamberlin, Andover, N.H. Reed Cherington, Calais Thomas Dean Chiota, Fairfield, Conn. Larry Clark Chiott, Burlington Lynne Loraine Ulrich Chronister, South Burlington William George Cinnamond, East Ryegate †Margaret Christine Clarino, Rutland †Anne Clark, Burlington Judith Ann Moran Clark, Barre Deborah Sue Clayton, Burlington *David Allan Cobb, Middlebury Steven Alan Cobb, Montpelier, magna cum laude Anne Carol Cohen, Burlington, summa cum laude Judith Alice Collins, Barre tRodney Wendell Cook, Burlington †John Edward Cornish, St. Johnsbury James Barry Coughlin, Rumford, Me. Stephen Harold Couture, Burlington Sheila Mae Crosby, Burlington Stephen Lee Cutaia, Montclair, N.J. Joan Elaine Looker Dacy, Salem, Mass. Andre Joseph Dagenais, New Haven Thomas Alden Daggett, Manchester, Me. Sarah Lucy Dana, Bellows Falls Gregory Edward Darling, East Barnet Barbara Brock D'Arthenay, Montpelier Kathleen Joyce Dugan Dates, Danby Janine Lea Davidson, Springfield Marc Bertrand d'Avignon, Manchester, Conn. Leslie Ellen Wernick Davison, Essex Junction Joan Carolyn Dennis, Trumbull, Conn. Dennis Henry Desautels, Burlington Alan James Desilets, Montpelier Sharon Esther Dondes, Burlington †Peter Munson Doremus, Stowe Brian Ralph Doubleday, South Woodstock Gwendolen Binford Doyle, Charleston, S.C. Peter William Doyle, Montpelier †Richard Paul Doyle, Springfield David Stearns Dunsmore, Swanton Geraldine Alice Dupratt, Winooski *Earl Alan Durand, Burlington James Perry Durand, Bennington Janet Carole Dutton, Brandon Dale Scott Easter, Vergennes Clarence Joseph Eckl, Forest Hills, N.Y. Lyman Stanley Edds, Burlington Carole Alice Newell Elwell, Bellows Falls Margaret Dana Emmons, Woodstock Merrill Hugh Epstein, Burlington summa cum laude

Nancy Carole Lamont, Burlington Edward Allan LaMoy, Highgate Center Robert Keith Landers, Williston Leslie Elizabeth Lanou, South Burlington Marilyn Anne Lanou, Burlington Beverly Anne Lanpher, Essex Junction Leona Jane Lansing, Wilmington *Reginald Jon Lavoie, Brattleboro +Gordon Robert Lawrence, Burlington William Badger Lawrence, III, Rowayton, Conn. +Daniel Lewis LeBarron, Shaftsbury *Malcolm Stuart Lee, Springfield Sue Lynne Leibowitz, Brattleboro +Victor David L'Esperance, Burlington Steven Allan Leveston, West Hartford, Conn. **†Franklin Bruce Levine, Burlington** Robert Jay Levine, Brockton, Mass. +John Chesley Lewis, Norwich Cynthia Ann Liss, Lee, Mass. Donna Jean Loizeaux, Whiting Bruce Robert Lombard, Windsor Saverio James Longo, Milldale, Conn. Richard Whitney Look, St. Albans Ashley Jack Louis, New York, N.Y. Patricia Anne Lowell, Brandon Mark Jack Lowenstein, West Roxbury, Mass. Joan McGuirk Lull, Windsor Deborah Lyman, Burlington Thomas Neil Lyman, Burlington Hugh Duncan MacArthur, North Haven, Conn. Andrew Charles Mack, East Aurora, N.Y. *Paul Francis Magda, Brooklyn, N.Y. Dawn Marie MacKenzie, Chester Laurel Carter Mallett, St. Albans, summa cum laude Thomas Francis Malone, Colchester Jana Edythe Manbeck, Schenectady, N.Y. Sheila Ann Mangum, Burlington Ronald Alvery Marcotte, St. Johnsbury *Jeffrey Bruce Marsh, Rochester, N.Y. William Ramsay Marsland, Burlington David Edward Martin, Swanton David George Martin, Malverne, N.Y. Barry Thomas Martinetti, Schenectady, N.Y. James Wallace Marvin, Jr., South Burlington Bernadette Mary Masi, Barre Joanna Mather, Burlington Michael Joseph Mathon, South Burlington, cum laude Winthrop Frederick Mayo, Leominster, Mass. David Stephen Mazza, Burlington *Jane Anne McAlea, Norwich +Levering McCormick, Manchester Lawrence Edward McCready, Barre Whitney Allen McIntyre, Wallingford *Nancy Sue McKenzie, Burlington Harriet Eva McLeod, Montpelier John Yates McMullen, Schenectady, N.Y.

+Richard Edward McNamara, East Hartford, Conn. Julie Elaine McVeigh. Rutland

* As of October 1968.

Barbara Alice Estey, Springfield Jonas Ettlinger, Oneonta, N.Y. Christopher John Evans, White Plains, N.Y. Lee Andrew Evslin, New Rochelle, N.Y. Richard Alan Fain, South Orange, N.J. Lawrence Anthony Faretta, Haverhill, Mass. John Bruce Fay, Dorset Frederick Joseph Favette, Jr., South Burlington *Suzanne Forest Ferland, Burlington Harvey Roger Findling, New Rochelle, N.Y. Mary Herrick Finks, Portland, Me. Lynda June Fitzgerald, Andover, Mass. Jonathan Edward Flanders, Montpelier Charles Frederick Fleming, Manchester Diane Marguerite Cota Fortune, Orleans Willett Sherman Foster, IV, Burlington Richard Foye, Topsfield, Mass. Carol Ann French, Winooski +Gregory Atkins Friedman, Northfield Patricia Kay Fuller, Wilder Steven Cobb Fuller, Bellows Falls *Judith Ann Funk, Westfield, N.J. +Michael Raymond Gadue, South Burlington Thomas James Gagnier, Springfield Monica Camilla Gamby, New Rochelle, N.Y. Gordon William Garrison, Jr., Bennington Deborah Anne Gates, White River Junction Douglas Kent Gauvreau, Lewiston, Me. Albert Louis Gay, Winooski Stephen Emilio Gianarelli, Barre Mary Alice Giannoni, Barre Patricia Ann Giardi, West Hartford, Conn. +John Bindley Gillespie, Stamford, Conn. Barbara Ellen Gilman, Bethel Heidi Faith Ginsburg, Burlington Ramona jean Goddard, Orwell Victor Bruce Goddard, Cincinnati, Ohio William Edward Goldsbury, St. Albans James Robert Good, Montpelier Susan Ellen Mock Goodrich, Burlington Robert David Gordon, Burlington Stephen Lauren Gove, Moretown, summa cum laude Charles Henry Goyette, III, Nashua, N.H. Daniel Ambrose Green, Kingston, Pa. †Marjorie Lynn Gregory, Wilmington, Del. Patricia Sue Gross, Northfield *Peter Michael Nowlan, Windsor Margaret Frances Nutt, Etna, N.H. Robert Alan O'Bryan, Bristol Mark Oland, Cedarhurst, N.Y. +John David Olshan, Rochester, N.Y. Lance Fredric Ortman, Buffalo, N.Y. Milton Lewis Ostrofsky, Easton, Conn. †Nancy Ward Page, Hyde Park Horace Abiah Palmer, III, Bradford Irvin Louis Paradis, Fort Kent, Me. Joseph Michael Paresky, Bennington Sheryl Louise Parker, Springfield Stephan Owen Parnes, Baldwin, N.Y., cum laude

Diane Sue Meaker, Barre

- Thomas Wells Meaker, Waterbury
- Barbara Kay Merriam, Rutland
- *Robert Fairbanks Merriam, Rutland
- Daniel Wayne Merrill, Jr., Rutland
- Norman Williams Merrill, Woodstock,
- magna cum laude Kathryn Brennan Meyer, King of Prussia, Pa.
- Peter Bardill Meyer, Summit, N.J.
- Maria Meymarian, Burlington
- Allan Anthony Michaud, Hardwick, cum laude
- Theodore Charles Michel, Highland Falls, N.Y.
- Susan Elizabeth Michniewich, Springfield
- Elise Cornelia Clapp Miles, Wellesley, Mass.
- †Richard Kirby Miles, III, Arlington Alan Lloyd Miller, Short Hills, N.J. Jane Marylin Gorman Minaert, Danbury, Conn. Lawrence Henry Minogue, Rutland,
 - magna cum laude
- *John Steven Mitchelides, Brattleboro
- Robert Clarence Moeller, II, Hanover, Mass. Raymond Michel Mooney, Rutland
- John Steele Moore, St. Johnsbury
- John Steele Moore, St. Johnsta
- John Foster Moriarty, Rutland William Arthur Morring, Burlington,
- magna cum laude
- tKenneth Harold Mosedale, East Longmeadow, Mass.
- Elizabeth Ann Morris Moses, Montpelier
- *Frances Joan Moses, Burlington
- Alan Paul Moss, Bennington, magna cum laude Constance Ruth Munn, Brattleboro
- Ronald Alan Murphy, Wells River
- *Alan Barry Myers, Rutland
- James Robert Myers, Burlington
- *Patricia Anne Myers, Winooski
- Linda Joyce Nastou, Brattleboro
- Martha Louise Newell, Woodbury, Conn.
- +Kenneth James Newman, Eastchester, N.Y.
- Pamela Tucker Nichols, Needham, Mass., cum laude
- Jane Anne Noble, Jeffersonville
- Marc Noel Sherman, Dover, N.J., summa cum laude
- Priscilla Short, Brandon, cum laude
- Paul Clarence Simpson, St. Johnsbury
- Sandra Michele Sisselman, Pittsfield, Mass.
- bundra michele bisseiman, rittshelu, mass
- Ellen Lenore Skapski, Lagos, Nigeria Linda Anne Vanesse Slayton, Stowe
- Robert Gary Slayton, Moscow
- Kobert Gary Slayton, Mostor
- Nancy Smart, Scarsdale, N.Y.
- Karen Patricia Smith, Burlington
- Martha Elizabeth Smith, Proctor
- Ruth Evelyn Smith, Colchester
- Gregory Charles Stern, Waldwick, N.J.
- David Laing Stewart, Stowe
- William Smead Stone, Concord, N.H.
- †Marie Adeline Martin Sugar, New Rochelle, N.Y.
- Thurston Bradford Sumner, Jr., Orange, Conn.
- Robert Alan Switzer, Bellows Falls
- Bradley Raymond Talbot, Brattleboro

* As of October 1968.

Alison Edith Partridge, Northford, Conn. *David Anthony Pascucci, Meriden, Conn. Michael Baker Patterson, Springfield Peter Michael Patterson, Rutland Richard Eberhardt Paulus, Burlington +Frederick John Peasenelli, Stamford, Conn. Norman Vaness Peatman, Jr., Johnson Stanley John Pekala, Jr., Pittsfield, Mass. Jeffrey Warren Perl, West Hartford, Conn. Crystal Diane Perrier, Bristol, Conn., cum laude William Perry, Los Angeles, Calif. Linn Francis Peterson, Poultney *Sidney Cadwell Peterson, Burlington Kenneth Allen Pick, Fitchburg, Mass. John Edwin Pierce, Franklin Victor Joseph Pisanelli, Jr., Rutland Polly Campbell Pitney, Stamford, Conn. Michael Harold Plumb, Denville, N.J. Bret Parker, Powell, South Burlington, magna cum laude Ann Mary Powers, Rutland William Sanford Preston, III, Burlington Edna Ann Proulx, Burlington, cum laude Ronald Joseph Proulx, Burlington Linda Louise Ravlin Provencher, Burlington Joseph Regis Quinn, Rutland Frank Robert Alan Resnick, West Hartford, Conn. Robert Isaac Richter, Great Neck, N.Y., magna cum laude *Steven Michael Rising, Milton Susan Elizabeth Robbins, St. Johnsbury †Ralph Leon Roberts, III, Burlington Elizabeth Agnew Rogers, McDonald, Pa +Joseph Michael Rossi, Barre *Jay David Roth, Roslyn Heights, N.Y. Timothy Norwood Rowland, Woodstock, summa cum laude Nicholas Perry Rumsey, Buffalo, N.Y. James Edward Ryan, Mendon Theodore Gardner Ryan, Rutland *Paul Edward Sackevich, Bellows Falls *Richard Brent Safft, Great Neck, N.Y. Clifford Victor Sagendorf, Burlington Howard Stefan Samuelson, Burlington William Santi Savery, Rutland Howard Allen Savin, Bridgeport, Conn. Frederick Gage Schlapp, Andover, Mass. Steven Irving Schron, Troy, N.Y. Jonathan Abbett Schultz, Burlington, summa cum laude *Karen Eileen Schweir, South Windsor, Conn. Carol Ann Scott, Waterbury Richard Warden Sears, Jr., Natick, Mass. Richard Bennett Segal, Brooklyn, N.Y.

Diane Loretta Taylor, North Adams, Mass. Susan Jean Vanasse Teffner, Burlington Holly Eugenie Burke Thetford, Essex Junction Rekha Pravin Shah, Burlington Thomas Joseph Shailor, Colchester Judith Brown Thomas, Middlebury Barbara Louise Thompson, Caldwell, N.J., cum laude Robert Phillip Thompson, Waitsfield David Edmund Thrall, Shelburne Ronald James Tice, Toledo, Ohio Richard Alexander Todd, Springfield *Martin Valentine Torok, Pulaski, N.Y. Glenn Robert Tosi, Montpelier Robert Walter Towle, Bath, Me. Robert John Towne, Essex Junction Shirley Carolyn Davis Towne, Bellows Falls Eileen Beth Underwood, St. Albans Sherry Jean Urie, Craftsbury Common Valerie Van Houten, Short Hills, N.J. Kenneth Lee Varney, Essex Junction +Judith Bristol Visconti, Burlington, cum laude Elaine Ruth Wachs, Stratford, Conn. Philip Hamilton Warren, III, Springfield Carol Mary Waterman, Windsor Judith Slayton Watson, Belmont, Mass. William Wallace Watson, Short Hills, N.J. David Graham Webster, Chardon, Ohio *Robert Arthur Weeks, Wells River Phyllis Amanda Weil, South Burlington Laura Anne Wenz, Burlington Cecelia Mary Wesoly, New Britain, Conn. +Scott Raymond Wetherbee, Burlington Thomas Barry Wheel, Burlington James Earl Wheeler, St. Albans, summa cum laude +Georgia Page White, Middlebury Joseph Howard Whittemore, Rutland William Albert Whitten, Vergennes Roderick Earl Whittier, Burlington John Michael Willard, Burlington Elaine Frances Willey, Barre, Mass. Leslie Blake Williams, Camp Hill, Pa. Margaret Helen Williams, Burlington, cum laude Gail Elizabeth Winn, Bennington *Ronald Vinton Winsor, Concord, N.H. Susan Flora Winters. Montpelier *Robert Frank Wissinger, Burlington Dora Ellys Wodehouse, South Burlington John Vernon Woodhull, Jr., Montpelier Peter Brian Woodruff, Burlington Ruth Ann Young, New Haven, cum laude Stephen Wright Yudicky, Bedford, N.H. Lucille Marie Zelazny, Brandon Oscar Francisco Zuniga, Austin, Texas Charles Gregory Zywocinski, New Haven, Conn.

College Honors

ART

Elise Cornelia Miles "Stone Sculpture"

* As of October 1968. † As of February 1969.

CHEMISTRY

Lawrence Colwyn Hurst "Inhibition of Chymotrypsin by Sulfonyl Fluorides"

Susan Carol January "Correlation of the C-H Acidities of the Diphenylpyridylmethanes"

CLASSICS

Norman Williams Merrill "The Language of Thucydides' Speeches"

ENGLISH

Gwendolen Binford Doyle "Esther—Dickens' Grushenka"

Richard Kirby Miles "Different Beds"-Poems

Crystal Diane Perrier "On Translating Vergil: Modern Approaches"

Judith Bristol Visconti "The Crisis Theme in Robert Frost's Poetry"

GEOGRAPHY

Virginia Anne Illick

"The Role of Transporation in the Growth and Development of Middlebury, Vermont"

HISTORY

Harriet Bloomberg "Anarchy and Confusion: The Causes of the Lower Canadian Rebellions Reconsidered"

William George Cinnamond "James P. Taylor and Vermont Highway Development 1922-1949"

Martin Nathaniel Hoffman "Kurdistan: A Study of Conflict"

William Arthur Morring

"The Senate Committee on Foreign Relations and the Truman Doctrine"

Edna Ann Proulx

"The Black Abbot and the White Abbot"

Steven Irving Schron

"The Unfulfilled Alliance"

Shirley Davis Towne

"The Mormon Trek West-A Geographical Perspective"

MATHEMATICS

Ronald Joseph Proulx "A Study of the Properties of Projective Modules"

PHYSICS

Michael Joseph Mathon "Aharonov-Bohm Effect"

PSYCHOLOGY

Nancy Thayer Babcock

"The Effects of Black Prejudice on the Perception of Dichoptically Presented Facial Stimuli"

Keith Ray Hilliker

"Some Personality Variables in Risk Taking"

Brock Treverton Ketcham

"Thermal Preference Behavior in the Turtle-Pseudemys Scripta Elegans"

Ann Mary Powers

"Monoptic and Dichoptic Masking as a Function of Relative Overlap, Stimulus Presentation Order, and Interstimulus Interval Duration"

Timothy Norwood Rowland

"Two Experiments: Behavior Modification and Punishment"

ROMANCE LANGUAGES

Anne Carol Cohen

"The Influence of Nietzsche and Schopenhauer on Baroja and Unamuno"

ZOOLOGY

Richard Randall Adams

"The Applicability of *Pediastrum Duplex* as a Bioassay Organism in Primary Productivity Studies"

David James Angus

"A Study of Nervous and Hormonal Effects on In Vitro Blastema Formation in Triturus Viridescens"

Catherine Grace Hawthorne "Determination of the Isoelectric Point of a Protein Associated with Neoplasms"

Charles Gadue Hubbell

"An Investigation of the Influence of Light, Diet, and Aeration on the Ephippial Production and Population Dynamics of Daphnia Pulex"

Steven Allan Leveston

"Chemical Studies on an Unidentified Strain of Streptomyces"

FIFTH-YEAR CERTIFICATE IN EDUCATION

Norma Louise Bailey, Barre *Evelyn Engman Bannon, Lockport, Ill. *Paul J. Daigle, Jr., Madison, Mc. †Marjorie Chaffee Dewing, Franklin *Evelyn Dashner Dike, Bristol +Grace Reynolds Hazelton, Londonderry Frederick Ray Kolstrom, Springfield Sister Lucienne Couture, Chicoutimi, Que.

Graduate College

WILLIAM HOOPER MACMILLAN, Dean

Master of Business Administration

[†]Peter Foster Bailey, B.S. (Miami Univ.) 1967; Essex, in absentia Thesis: Corporate Elections under Subchapter S

Master of Education

*Elizabeth Ann Anderson, B.S. (Castleton Teachers College) 1960; Vergennes, in absentia

*Beverly Arlene Atwell, B.S. (Univ. of Vermont) 1959; Tiffin, Ohio, in absentia

*Morton John Bain, B.A. (Mount Allison Univ.) 1955; Montreal, Que., Canada, in absentia

Geraldine Diane Milhender Bloomberg, B.S. (Lesley College) 1961; Burlington

*Eric William Bursey, B.S. (Bob Jones Univ.) 1964; Everett, Mass.

*Richard Louis Cassani, B.A. (Univ. of Vermont) 1963; Barre

tWayne Murray Clifford, B.A. (Sir George Williams Univ.) 1960; Pointe Claire, Que., Canada Elizabeth Swope Collins, B.A. (Bryn Mawr College) 1950; Burlington

+Joan Watkins Dewey, B.S. (The State Univ. of Iowa) 1941; Burlington

*Dorothy Lockwood Dooley, B.A. (Smith College) 1930; Fairlee

*Delbert Wendall Dougherty, B.Ed. (McGill Univ.) 1961; Lachute, Que., Canada

Marguerite M. Fortier, c.s.c., B.A. (Notre Dame College) 1955; Manchester, N.H.

*Charles James Fox, A.B. (Colby College) 1960; Burlington

+Joseph A. Fusaro, B.A. (Rider College) 1962; Waterbury

Martha Fitzgerald Knight, B.S. (Univ. of Vermont) 1958; Burlington

Sally Ann Lester, B.S. (Johnson State College) 1965; Burlington, in absentia

* As of October 1968.

+ As of February 1969.

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*Ian Alexander MacLeay, B.A. (Sir George Williams Univ.) 1955; Lennoxville, Que., Canada

*Valerie C. Manley, B.A. (Bennington College) 1966; South Dorset

- *Mary H. McMann, B.A. (Salem College) 1956; Clarksburg, W. Va.
- *Dorothy Virginia Melville, A.B. (Ohio Univ.) 1935; Burlington
- *Gerald Bernard Miller, B.A. (Sir George Williams Univ.) 1953; Montreal, Que., Canada
- *Allen Keith Ober, A.B. (Dartmouth College) 1963; Hyde Park Phyllis Fein Perelman, A.B. (Univ. of Vermont) 1944; Burlington Madeleine Whalen Shepard, B.S. (Trinity College) 1936; Burlington, *in absentia* Caroline Ouellette Smith, B.A. (Trinity College) 1960; So. Royalton
- *Keith Robert Sutherland, B.A. (Sir George Williams Univ.) 1960; Pointe Claire, Que., Canada John David Taft, B.S. (Castleton Teachers College) 1961; Montpelier
- Lucy Barbara Zach, B.S. (Mt. Angel Women's College) 1952; Mt. Angel, Ore.

Master of Arts in Teaching

*Edna Sue Achilles, B.S. (Lyndon State College) 1965; St. Johnsbury

- *Robert E. Ashton, Jr., B.S. (Univ. of Vermont) 1961; St. Albans
- +Scott Alexander Walter Brown, B.A. (Queen's Univ.) 1944; Montreal, Que., Canada
- Mary Hubbard Dickson, B.A. (McGill Univ.) 1955; Burlington, in absentia
- Katherine Foster Marston, A.B. (Mount Holyoke College) 1943; So. Burlington
- *Matthew Anthony Pykosz, B.M. (Boston Univ.) 1957; Morrisville, in absentia
- *Anna Woodman Stalter, B.A. (Connecticut College) 1945; Springfield
- Kathleen Ruth LeBaron Strassburg, B.S. (Univ. of Vermont) 1941; Essex Jct.
- Jane Rose Taylor, B.S. (Univ. of Vermont) 1967; Burlington
- *Douglas Ira Tudhope, B.S. (Univ. of Vermont) 1950; So. Burlington
- Barbara Elizabeth Wagner, B.A. (Miami Univ.) 1964; So. Burlington, in absentia

Charmion Blood Wagner, B.S. (Springfield College) 1960; Richmond

Master of Extension Education

Gordon Volney Farr, B.S. (Univ. of Vermont) 1950; Chelsea

Master of Science

AGRICULTURAL ECONOMICS

+Barent William Stryker, III, B.S. (Univ. of Vermont) 1966; East Corinth, in absentia Thesis: Sources of Income of Open Country Residents in Low Income Areas

*Fred Everett Winch, III, B.S. (Cornell Univ.) 1964; Newfield, N.Y., in absentia Thesis: The Economics of Alternative Power Sources in African Agricultural Development

ANIMAL SCIENCES

*Peter Harden Foulkes, B.S. (Univ. of Vermont) 1966; Danvers, Mass., in absentia Thesis: Comparative Study of Skimmilk Lipids Extracted by Four Different Methods

Julia Engelhardt Nichols, B.S. (Univ. of Vermont) 1958; Underhill Thesis: A Quantitative Histologic Analysis of Selected Tissues in Growing Mice

Harmon Arthur Willey, B.S. (Univ. of Vermont) 1967; So. Londonderry Thesis: Two Types of Rancid Flavor Found While Studying Six Milk Treatments

BOTANY

*Anne C. Dalton, B.S. (Johnson State College) 1958; M.S. (State Univ. of N.Y. at Albany) 1959; St. Albans, in absentia

Thesis: The Algae of a Small Temporary Pond: A Comparison of the Natural Flora with Laboratory Cultures Derived from Soil Collections

- +Gayle Ingrid Hansen, B.S. (Univ. of Connecticut) 1966; Falls Church, Va., in absentia Thesis: Yeasts from Lake Champlain: Their Occurrence and Physiology
- +Jean Campbell McCarthy, B.A. (Univ. of Vermont) 1965; Spencer, Mass. Thesis: The Distribution of Polyphosphates and Phosphatases during Cell Division in Closterium strigosum

* As of October 1968.

CHEMISTRY

- +Bruce Stanley Bak, B.S. (Merrimack College) 1967; Easthampton, Mass., in absentia Thesis: Solvolytic Studies of Dispiro and Neopentyl-Type Tosylates
- Prabhaker Govind Khazanie, B.Sc. (Bombay Univ.) 1966; Merces, India *Thesis:* The Rates of Deacylation of Benzoyl Chymotrypsins and Their Correlation with the Sigma Constants

*Marina Xenia Velentgas, B.S. (Smith College) 1965; Portland, Me., in absentia Thesis: An Investigation of the Decarbethoxylation of Malonate Esters and Esters Activated in the Alpha Position

ELECTRICAL ENGINEERING

+Paul M. Austin, B.S. (Univ. of Vermont) 1961; Brattleboro Thesis: An Investigation and Analog Simulation of a Magnetic Escapement

+Mohammad Akram Khan, B.S. (Engineering College, Peshawar) 1963; Newshera Kalan, West Pakistan Thesis: A Study of the Radiation Patterns of the Injection Lasers

Robert Lloyd Lux, B.S. (Yale Univ.) 1966; Lewiston, Me. *Thesis:* A Learning Scheme for Pattern Recognition with Applications to Computer Aided Diagnosis

- †Vincent Ronald Tolmei, B.S. (New Haven College) 1965; New Haven, Conn., in absentia Thesis: Design of a Full-Color Radiographic Display
- *Robert Peter Zampieri, B.S. (Norwich Univ.) 1963; Barre, in absentia Thesis: Two Dimensional Study of Lead Fields in Heterogeneous Torso

FORESTRY

Barrett Lane Gates, B.S. (Univ. of Maine) 1960; Waterbury *Thesis:* The Influence of Light Intensity, Soil Moisture, and Water Saturation Deficits on the Photosynthesis and Transpiration of Beech Seedlings

GEOLOGY

- +Evan John Englund, B.S. (Univ. of Wisconsin) 1966; Wittenberg, Wis., in absentia Thesis: Experimental Studies of the Origin and Thermal Metamorphism of Chondrules in Chondritic Meteorites
- David Gordon Johnson, B.A. (Univ. of New Hampshire) 1963; Concord, N.H., in absentia Thesis: Ferromanganese Concretions in Lake Champlain
- *J. Robert Kasvinsky, A.B. (Middlebury College) 1961; Underhill Center, in absentia Thesis: Evaluation of Erosion Control Measures on the Lower Winooski River, Vermont

MECHANICAL ENGINEERING

- Pranab Kumar Das, B.S. (Bengal Engineering College) 1963; Calcutta, India Thesis: An Energy Absorber Utilizing Plastic Deformation of Metal
- Sunil Kumar Ghose, B.S. (Bengal Engineering College) 1962; Calcutta, India Thesis: Two-Phase Blowdown from Vessels Including Bubble Rise and Condensate Drop Dynamics
- +Suresh Makkenchery, B.S. (Madras Christian College) 1958; Kozhikkode, India Thesis: A Water Reactor Pressurizer Model with Bubble Rise and Condensate Drop Dynamics

Giustino Nicholas Mastro, B.S. (Univ. of Vermont) 1966; Schenectady, N.Y. *Thesis*: A Further Investigation to Determine an Index to Adjust Snow Ski Bindings, with Emphasis on Ski Binding Characteristics and Analysis of Ski Accident Statistics

- Michael Clifford Murphy, B.S. (Univ. of Vermont) 1967; Moretown *Thesis:* The Dependence of Glass Reinforced Resin Composite Fracture Energy on Temperature and Humidity
- Manohar Sridhar Prabhu, B.E. (Kashmir Univ.) 1966; Izatnagar, India

Thesis: The Effect of Vapor Velocity in Laminar Film Condensation on a Vertical Wall

* As of October 1968.

MEDICAL TECHNOLOGY

Mary Evelyn Breen, B.S. (Univ. of Vermont) 1947; Burlington Thesis: The Identification of "Core" Courses for Health Occupations and the Development

of a Model "Integrated Science Course"

Sarah Allene Wise, B.S. (Univ. of Colorado) 1945; Longmont, Colo.

Thesis: A Method for the Preparation of a Challenge Examination in Medical Technology

PATHOLOGY

Earl Stanley Perrigo, B.S. (Univ. of New Hampshire) 1964; Manchester, N.H. *Thesis:* A Study of Serum Lactic Dehydrogenase and Its Application to the Diagnosis and Study of Clinical Diseases

PHYSICS

Harold Maurice Frost, III, B.A. (Univ. of Vermont) 1964; Burlington Thesis: Interactions Between a Vibrating Object and the Surface of a Soft Solid

+Stephen Rae, B.S. (Stevens Institute of Technology) 1965; Stowe, in absentia Thesis: Treatment of Scattering by a Strong, Short-Range Potential Modified by a Weak, Long-Range Coulomb-Like Potential

Robert Bruce Steele, B.A. (Univ. of Vermont) 1959; Burlington Thesis: Interaction Potential Parameters of Some Inert Gases with Graphite

PHYSIOLOGY AND BIOPHYSICS

+Carole Lackey McNall, B.A. (Augustana College) 1964; Burlington, in absentia Thesis: The Effects of Temperature upon the Electrical Activity of the Turtle Ear

PLANT AND SOIL SCIENCE

- Harold Lawrence Anderson, Jr., B.S. (The Univ. of Georgia) 1966; Penn Yan, N.Y. *Thesis:* The Influence of Windbreaks on the Growth and Production of Direct Seeded Tomatoes and Snap Beans
- †Robert Carroll Brown, B.S. (Univ. of Vermont) 1963; Morrisville, in absentia Thesis: Effects of Nitrogen, Manure, Potassium and Moisture on Nutrient Uptake and Growth of Corn Seedlings
- *Dennis William Bruckel, B.S. (Cornell Univ.) 1965; Winooski *Thesis:* Effects of Certain Growth Controlling Substances on Frost Resistance of Two Cultivars of Chrysanthemum morifolium, Ramat
- Michael John Hurdzan, B.S. (The Ohio State Univ.) 1966; Columbus, Ohio Thesis: Effect of Light Intensity on Seedling Growth in Red Fescue (Festuca rubra L.)
- Hughes LeBlanc, B.S.A. (Laval Univ.) 1964; Quebec, Canada *Thesis:* Effect of Late Summer Application of Nitrogen and Potassium Fertilizers on Growth, Yield and Hardiness of Strawberries

POULTRY SCIENCE

- *Robert Clark Bayer, B.S. (Univ. of Vermont) 1966; Scarsdale, N.Y., in absentia Thesis: The Influence of Dietary Vitamin A on the Histology of the Small Intestine of the Chick
- *Spyros A. Moscholeas, B.S. (Superior College of Agriculture) 1962; Greece, in absentia Thesis: The Influence of Dietary Energy and Protein Levels on Utilization of Vitamin A by the Chick

SPEECH PATHOLOGY

*Dena Apple Bailey, B.A. (Univ. of Vermont) 1966; Rutland Thesis: Workbook as a Device for Achieving Carry-Over of Articulation Skills

*Roberta Butterfield Goldstein, Ph.B. (Univ. of Vermont) 1939; Burlington *Thesis:* A Comparative Study of the Effect of Extraneous Stimuli upon the Auditory Discrimination of Children with Inadequate and Children with Normal Articulation

* As of October 1968.

+Stephen Ray Libbey, B.S. (Univ. of Vermont) 1967; Lyndonville

- Thesis: Frequencies of Occurrence of a High and a Low Frequency Phoneme in Sentence-Completion Responses of Adults to Stimuli Overloaded with or Lacking the Two Phonemes
- Jean Priscilla Pearson, B.A. (Univ. of Vermont) 1967; Fitchburg, Mass. *Thesis:* A Study of the Effects of Presenting Stories in Spoken and Sung Fashion on the Verbal Recall of Mongoloid Children

+Blanche Rita Podhajski, B.S. (Boston Univ.) 1967; New Britain, Conn., in absentia Thesis: An Investigation of a Brief Articulation Screening Test

ZOOLOGY

- Judith Louise Allard, B.A. (Univ. of Vermont) 1967; Rutland Thesis: A New Method for Raising and Maintaining Daphnia in the Laboratory
- *Sandra Louise Lovett Gaunt, B.A. (The Univ. of Kansas) 1964; St. Charles, Ill., in absentia Thesis: Studies on the Preputial Gland as a Source of a Reproductive Pheromone in the Laboratory Mouse Mus musculus

Carl William Pagel, B.A. (Wisconsin State College) 1965; Milton Thesis: Aquatic Diptera in Lake Champlain Embayments

Master of Arts

ECONOMICS

*Alan John Charron, B.A. (Univ. of Vermont) 1960; Burlington Thesis: A Regional Configuration of the Population and Labor Force of Vermont

*Doulas Shingle McLernon, B.A. (Hobart College) 1962; Buffalo, N.Y., in absentia Thesis: Inter-Government Fiscal Relations and the Heller Plan

ENGLISH

- Susan Jane Alenick, B.A. (Univ. of Vermont) 1960; Burlington Thesis: The Natural Mysticism of John Millington Synge
- AnnaMaria Pfeiffer Barnùm, A.B. (Middlebury College) 1965; Kennebunkport, Me. Thesis: The Cabala in Yeat's Poetry
- +Jerry Howard Hill, A.B. (Franklin & Marshall College) 1963; Sunderland, in absentia Thesis: The Novels of John William DeForest
- *Andrew Carroll Kilpatrick, A.B. (Washington & Lee Univ.) 1965; Washington, D.C., in absentia Thesis: The Theme of Travel and Adventure as Found in the Heroes Homer's Odyssey, Kazantzakis's The Odyssey: A Modern Sequel, and Joyce's Ulysses
- Margaret Kent Onion, A.B. (Smith College) 1940; Castleton Thesis: Modes of Characterization in the Fiction of John Bunyan
- *Brenda Matteson Owre, B.A. (Vassar College) 1964; Bennington, in absentia Thesis: America and the Self: A Study of William Carlos Williams' Quest for Poetic Themes
- Peter Albert Sturtevant, B.A. (Rollins College) 1953; I.L.B. (George Washington Univ.) 1963; Burlington, in absentia

Thesis: Byron and the Bible

- *Frank Andrew Wilbur, A.B. (Middlebury College) 1948; Barre, in absentia Thesis: A Commentary on the Seven Deadly Sins in Langland and Chaucer with Special Reference to the Prioress
- Richard Lee Wile, B.A. (Univ. of Maine) 1965; Yarmouth, Me. *Thesis:* Voyage to Dunnet Landing: The Development of Sarah Orne Jewett's Use of Structure
- Marjorie V. Zeuch, B.A. (Boston Univ.) 1966; Burlington, in absentia Thesis: Spenser's Animalology: A Study of His Use of Animals in The Faerie Queene

* As of October 1968.

HISTORY

*Louise Huntington Allen, B.A. (Univ. of Vermont) 1965; E. Hardwick, in absentia Thesis: A Forgotten Session of the House: The Second Session of the Second Congress, 1792-1793

'Helene Crowley, B.A. (Hunter College) 1965; Middlebury Thesis: The State Boundaries and the Continental Congress

- Mary Helen Fregosi, B.S. (Univ. of Vermont) 1966; Proctor Thesis: Nicola Acciaiuoli Merchant Prince
- *Dorothy Sheila Thompson, B.A. (Univ. of Vermont) 1967; Proctor Thesis: Rhode Island and the Continental Impost

*David Adams Yount, A.B. (Lenoir-Rhyne College) 1959; B.D. (Duke Univ.) 1963; Mercersburg, Penna., in absentia

Thesis: Erastus Fairbanks: Vermont's First Civil War Governor

MATHEMATICS

- Donald Marcel Blais, B.A. (St. Michael's College) 1967; Newport, in absentia Thesis: A Study of the Proof that the Real Separable Hilbert Space is Homeomorphic to the Countably Infinite Product of Lines
- Mary Anne Capowski Freedman, A.B. (Douglas College) 1962; N. Ferrisburg Thesis: A Simulation Study of Factor Analysis Applied to Multivariate Bernoulli Data
- John Henry Knox, B.S. (Norwich Univ.) 1963; Northfield *Thesis:* A Theoretical Application of the Concept of Interval Arithmetic to Certain Selected Topics of Numerical Analysis
- Didier Reymond, A.B. (Middlebury College) 1966; Scarsdale, N.Y., in absentia Thesis: On Uniqueness of Adjoinable Solutions for First-Order Differential Equations
- +William Michael Wagner, B.S. (The Citadel) 1967; Haddonfield, N.J., in absentia Thesis: A Study of Differential Equations in the Neighborhood of Singular Points

MUSIC

+William Edgar Copeland, B.M.E. (American Conservatory of Music) 1954; Clinton, Mich., in absentia

Thesis: A Survey and Critique of Attitudes toward William Billings

Richard Royce Dodd, B.M. (Huron College) 1964; Wells, in absentia

Thesis: A Study of the Counterpoint of Gustav Mahler

Roger Mitchell Dodge, B.M. (Eastman School of Music of the Univ. of Rochester) 1960; Essex Junction

Thesis: An Analysis of the Piano Fantasy by Aaron Copland

Susan Marie Hickok, B.S. (Univ. of Connecticut) 1968; Scituate, Mass.

Thesis: An Analysis of Pour Le Piano

Joyce Elaine Torns, B.A. (Huron College) 1965; Huron, S.D. Thesis: An Analysis of Mozart's Clarinet Concerto in A Major K 622

POLITICAL SCIENCE

*Abbott Allen Brayton, B.A. (University of Vermont) 1964; Stowe, in absentia Thesis: A Functional Analysis of Reserve Components in the Political System

*Robert William Goddard, B.A. (Susquehanna Univ.) 1966; Barbados, W.I. Thesis: An Inquiry into the Failure of the Federation of the West Indies

*Daniel C. Moseley, Jr., B.A. (Univ. of Vermont) 1964; Burlington Thesis: Soviet Agriculture: The Permanent Problem

PSYCHOLOGY

William Francis Frey, B.A. (Villanova Univ.) 1967; Westfield, N.J., in absentia Thesis: The Effects of Sensory Isolation upon Stereoscopic Size and Distance

Ronald Terry Greene, B.A. (Univ. of Delaware) 1967; Deptford Twp., N.J., in absentia Thesis: The Effects of the Ponzo Wedge upon Stereoscopic Distance and Size

* As of October 1968.

Teresa Anne Nellans, B.A. (Lawrence Univ.) 1966; Houlton, Me., in absentia Thesis: The Perception of Musical Dyads

Robert John Pandina, B.A. (Hartwick College) 1967; Rochester, N.Y., in absentia Thesis: The Panum Phenomenon and Brightness Disparity

Helen Valery Hungerford Smith, A.B. (Smith College) 1965; Woodstock Thesis: Effects of Interracial Contact on the Modification of Prejudice

Laurence Edgar Thomson, Jr., A.B. (Boston College) 1966; Boston, Mass., in absentia Thesis: The Use of Reinforcement and Feedback in the Modification of Neurotic Behavior

Joseph Anthony Trzasko, B.A. (Univ. of New Hampshire) 1967; Long Island, Jamaica, in absentia Thesis: The Effect of Syntactic Cues on Ordered Recall

Division of Health Sciences

College of Medicine

EDWARD CLINTON ANDREWS, Dean

DOCTOR OF MEDICINE

- John Christian Abajian, B.A., South Burlington Bruce Douglas Baird, B.S., Claremont, N.H.
- [†]Stephanie Ann Barnes, B.A., Montpelier, cum laude

George Paul Baron, B.S., Manchester, N.H.

Lawrence Paul Bratt, B.A., M.S., Grand Forks, N.D.

David Armstrong Byrne, B.A., Hatfield, Mass.

Richard Redman Byrne, A.B., Hatfield, Mass.

James David Cahill, A.B., Worcester, Mass.

Bernard Michael Casey, A.B., Rochester, N.H.

Daniel Bukar Clarke, B.S., Randolph, N.H., cum laude

Frederick Seymour Cramer, B.S., South Burlington

William Stephen Dempsey, Jr., A.B., St. Albans

William Joseph Driscoll, B.S., Florence, Mass.

Ronald James Faille, A.B., Holyoke, Mass.

Peter Abbey Felder, A.B., Burlington

Steven Neal Firestone, B.A., Great Neck, N.Y. Henry John Fisk, B.A., Winooski

John Francis Healy, B.S., Milton Mass.

David Peter Hebert, B.A., St. Albans

Charles Bion Howard, A.B., Beverly, Mass.

David George King, B.A., North Springfield

Robert Scott Kramer, B.A., Plymouth, Mass.

Dennis Stanley Kuk, B.A., Claremont, N.H.

Robert Elliot Leader, B.A., Rye, N.Y.

Joseph Matthew Lenehan, B.S., North Scituate, Steven James Lowy, B.S., Forest Hills, N.Y.

- Malcolm Waterman MacDonald, B.S., A.A., Rutland
- Raymond Alexander Maddocks, A.B., Burlington

James Arthur McCarthy, B.S., Peabody, Mass.

Moussa Youssef Menasha, B.S., Providence, R.I., cum laude

James Royal Milne, B.S., Barre

Stephen Wesley Munson, B.A., Shrewsbury, Mass.

Earl Stanley Perrigo, B.S., Manchester, N.H.

Wilfred Louis Pilette, B.A., Barre

- Roger Keith Pitman, A.B., Port Washington, N.Y.
- Susan Wesoly Pitman, B.A., New Britain, Conn., cum laude
- Duane Calvin Record, B.A., Livermore Falls, Me. David Whitney Rowe, B.A., Wells River

[†]Jonelle Carey Rowe, A.B., M.A., Kingston, Pa.

- Harry Eaton Short, B.S., North Adams, Mass. Arthur Bradley Soule, III, B.A., Shelburne, cum laude
- Bruce Parker Swinyer, B.A., Poultney
- Charles Samuel Tara, B.S., Brockton, Mass.
- William Newman Thibault, B.A., Worcester, Mass.
- John Wesley Thompson, Jr., B.S., M.S., Burlington
- William Harrison Thurlow, IV, A.B., Brunswick, Me.

William Joseph Watson, B.S., Belmont, Mass. Ronald Nelson White, B.A., Springfield, Mass.

+ As of February 1969.

R.I.

Gilbert Lewis Ricard, Jr., B.A. (Wake Forest College) 1965; Wilmington, Del., in absentia Thesis: The Effect of Hypothermia on the Auditory Sensitivity of the Turtle (Pseudemys scripta elegans)

Graduate College

WILLIAM HOOPER MACMILLAN, Dean

Doctor of Philosophy

BIOCHEMISTRY

Peter Edward Voytek, B.A. (Univ. of Vermont) 1963; St. Albans Thesis: Isolation and Studies of an Anionic Trypsinogen

CHEMISTRY

 Kenneth Joseph Dominique Allard, B.S. (Worcester Polytechnic Institute) 1964;
Southbridge, Mass., in absentia Thesis: A Study of Absorption and Diffusion Behavior of Hydrogen in Palladium Alloy

Thesis: A Study of Absorption and Diffusion Benavior of Hydrogen in Palladium Alloy Systems

+James Albert Nelson, B.A. (Univ. of Vermont) 1962; St. Johnsbury, in absentia Thesis: A Total Stereospecific Synthesis of dl-O-Methylpodocarponitrile

*Ronald H. Provost, A.B. (St. Michael's College) 1964; Newport Thesis: The Thermodynamics of the System CdO/Cd (OH)₂/H₂O

Patrick J. Sheeran, B.S. (Bellarmine College) 1963; Flaherty, Ky., in absentia Thesis: Reactions of Ynamines

+James Francis Sullivan, B.S. (Providence College) 1964; Providence, R.I. Thesis: The Mechanism of the Rearrangement of Arylsulfonamides of Substituted N-Methylanilines

PHARMACOLOGY

*William Bruce Wastila, B.A. (Clark Univ.) 1960; Leicester, Mass., in absentia Thesis: The Effect of Selected Drugs which Alter Sympathetic Nervous Function and Norepinephrine Content of the Left Ventricle on the Systematic Circulation of the Anesthetized Dog

+Lowell David Waterbury, B.S. (Univ. of Michigan) 1964; Lansing, Mich., in absentia Thesis: Comparative Metabolic Studies of the Hypoglycemic Drugs-Methylglyoxal-Bis-(Guanyl-hydrazone), Phenformin, and Insulin in the Rat

PHYSICS

Glidden Lantry Brooks, Jr., B.A. (Brown Univ.) 1964; Burlington Thesis: Multiple-Time-Scale Perturbation Theory in Quantum Mechanics

PHYSIOLOGY AND BIOPHYSICS

 Owino Okongo, B.Sc. (Prelim) (Makerere College) 1960; B.A. (Brandeis Univ.) 1964; M.A. (Putney-Antioc Grad. School) 1964; M.A. (Boston Univ.) 1966; Mariwa, Kenya Thesis: Determination of the Active State Curve of Skeletal Muscle

+Ronald Michael Schnitzler, A.B., Sc.B. (Brown Univ.) 1962; M.S. (Univ. of Vermont) 1964; Burlington

Thesis: The Effect of Highly Localized Ultrasonic Vibration on Skeletal Muscle

PSYCHOLOGY

David Harrison Barlow, B.A. (Univ. of Notre Dame) 1964; M.A. (Boston College) 1966; Needham, Mass.

Thesis: A Comparison of Systematic Desensitization and Positive Reinforcement of Graded Approach Behavior in the Treatment of Maladaptive Avoidance Behavior

*Kenneth Donald Marum, A.B. (Fresno State College) 1957; M.A. (Brown Univ.) 1963; Fall River, Mass., in absentia

Thesis: The Perception of Time under Conditions of Sensory Isolation

* As of October 1968.

ZOOLOGY

Thomas N. Legge, B.S. (Edinboro State Teachers College) 1959; M.A.T. (Miami Univ.) 1962; Erie, Penna.

Thesis: A Study of the Seasonal Abundance and Distribution of Clanoid Copepods in Burlington Bay, Lake Champlain

*Timothy Allen Stabler, B.A. (Drew Univ.) 1962; M.A. (Depauw Univ.) 1964; Port Jervis, N.Y., in absentia

Thesis: The Naturally Occurring Adrenal Corticoids of the Newt, Notophthalmus Viridescens, and a Re-evaluation of Their Possible Role in Limb Regeneration

Gary Stephen Stein, B.A., M.A. (Hofstra Univ.) 1965, 1966; Seaford, N.Y.

Thesis: The Role of the DNA Template in Mitotic Activation of Lens Epithelial Cells

*Ellen V. Vopicka, A.B. (Cedar Crest College) 1963; M.A. (Wake Forest College) 1965;

Rumson, N.J., in absentia

Thesis: Influences of Temperature Gradients on the Establishment of the Dorso-Ventral Axis in Xenopus laevis

DEGREES HONORIS CAUSA

Robert S. Babcock Doctor of Laws **Burlington**, Vermont Presented by Professor Edwin C. Schneider Father Gerald E. DuPont Doctor of Laws Winooski, Vermont Presented by Dr. Clinton D. Cook Alfred H. Heininger Doctor of Laws Burlington, Vermont Presented by Professor Andrew E. Nuquist Winston L. Prouty Doctor of Laws Newport, Vermont Presented by Dr. Robert B. Huber Rabbi Max B. Wall Doctor of Humanities Burlington, Vermont Presented by Dean William H. Macmillan Rev. Joseph R. Washington, Jr. Doctor of Divinity Albion, Michigan Presented by Professor Gordon Lewis

RETIRING FACULTY

Reginald Venn Milbank, Professor of Civil Engineering; Chairman of the Department from 1954-12/31/1968; member of the College of Technology since 1946.

Archibald Thomson Post, Associate Professor of Physical Education for Men; Director of Physical Education from 1935-1961; member of the College of Education since 1929.

Phyllis Melville Quinby, Associate Professor of Dental Hygiene; Assistant Director since 1952; member of the School of Dental Hygiene since 1950.

Arthur Bradley Soule, Jr., Professor of Radiology, Chairman of the Department from 1957; member of the College of Medicine since 1929.

Walter Alva Stultz, Professor of Anatomy, member of the College of Medicine since 1937.

Elizabeth K. Zimmerli, Associate Professor of Physical Education for Women; Chairman of the Department since 1967; member of the College of Education since 1967.

* As of October 1968.

DEPARTMENT OF MILITARY SCIENCE

COMMISSIONED SECOND LIEUTENANT, UNITED STATES ARMY

*William Edward Cain, Infantry

*Neal Cadmus Vreeland, Signal Corps *Thomas Barry Wheel, Air Defense Artillery

Robert Bristol Jerard, Infantry

COMMISSIONED SECOND LIEUTENANT, UNITED STATES ARMY RESERVE

John Ehresmann Berry, Jr., Air Defense Artillery

*David George Martin, Air Defense Artillery *Jon Gregory Rusk, Air Defense Artillery

Raymond Grant Bolton, Infantry Hugh Auchincloss Brown, III, Field Artillery Malcolm Elden Brown, Infantry John Ralph Burnett, Jr., Field Artillery Donald Nelson Cambbell, Infantry

Ralph Edwin Coleman, Field Artillery

Richard Brian Corcoran, Infantry

Stephen Harold Couture, Air Defense Artillery

Stephen Lee Cutaia, Infantry

Thomas Alden Daggett, Infantry

Alan James Desilets, Field Artillery

Normand Albert Desrochers, Field Artillery

Russell Lloyd Donovan, Air Defense Artillery

Clarence Joseph Eckl, Armor

Nicholas Karl Fon Eisen, Infantry

*James Alfred Fontanella, Adjutant General's Corps

Theodore Douglas Foster, Infantry Robert Joseph Frechette, Air Defense Artillery Douglas Kent Gauvreau, Quartermaster Corps John Richard Hoadley, Field Artillery *Craig Desmond Hunter, Military Police Corps *John Griffith Kinsey, Air Defense Artillery *Stephen Lewis Kunken, Field Artillery Saverio James Longo, Field Artillery Hugh Duncan MacArthur, Medical Service Corps Theodore Charles Michel, Infantry Richard Janney Miller, Infantry Daniel Michael O'Brien, Air Defense Artillery James Patrick O'Neil, Armor *Gary Maynard Osborne, Air Defense Artillery Burton Alfred Paquin, Jr., Corps of Engineers Stephen Grout Parker, Field Artillery *Leslie Calvin Pike, Military Police Corps Keith Anthony Pillsbury, Transportation Corps Bret Parker Powell, Infantry William David Raban, Field Artillery William Parsons Reed, Field Artillery Gary Stanford Rogers, Field Artillery Thomas Joseph Shailor, Transportation Corps Stephen Stanley Slayton, Corps of Engineers David Flint Stender, Jr., Corps of Engineers

Robert Walter Towle, Air Defense Artillery

COMMISSION OF SECOND LIEUTENANT, UNITED STATES ARMY RESERVE, UPON COMPLETION OF ROTC CAMP

Charles Joseph Brucato, Jr., Field Artillery Donald James Eckley, Field Artillery Michael Raymond Gadue, Infantry

Peter Bardill Meyer, Military Intelligence Roderick Earl Whittier, Signal Corps

Phillips Hill Kerr, Infantry

COMMISSION OF SECOND LIEUTENANT, UNITED STATES ARMY RESERVE, UPON COMPLETION OF SUMMER SCHOOL Harry Dante Bossi, II, Signal Corps Douglas Earl Coolidge, Armor * Robert Ernest Cavoretto, Corps of Engineers

* 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 Scaland 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 A. 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. JEUDEVINE 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 Lunenberg, 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 1938, for Vermont students.

RIXFORD MANUFACTURING COMPANY For students from Highgate.

Financial Aid by Academic Areas

College of Agriculture and Home Economics

Scholarship Funds

- 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.

ERICK P. HOLZER \$1500, restricted to agricultural students.

- DR. CHARLES H. HOOD Given by the Charles H. Hood Dairy Foundation. Five \$500 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 Six scholarships of \$300 each awarded annually on the basis of need, scholarship and farm origin; three to entering students in agriculture, two to entering students in home economics, and one to a sophomore in agriculture.
- VERMONT HOME DEMONSTRATION COUNCIL SCHOLARSHIPS Two scholarships of \$200 awarded to Vermont girls who are enrolled in and have completed at least one year of Home Economics at the University of Vermont.

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.

SOURCES OF FINANCIAL AID

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.

SOURCES OF FINANCIAL AID

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.

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SOURCES OF FINANCIAL AID

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 EN-GLAND, 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 grantin-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 66.

Prizes and Awards

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.
- EMMÂA FREDERÎCK 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 chemisty.
- WILLIAM EUSTIS BROWN ALUMNI PRIZE to a graduating student on the basis of broad cultural interests and loyalty to the College of Medicine.
- 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 member of the varsity tennis squad who has demonstrated the greatest degree of progress in tennis proficiency during the season.

PRIZES AND AWARDS

- 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.

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- 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.
- HELAINE 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 SOCIETE 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, leader-ship 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.
- 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.

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Academic Calendar

Spring Semester 1970

| January | 13 | Tuesday | Registration |
|------------|----------------|---------------------|---|
| January | 14 | Wednesday | Classes begin, 8:00 a.m. |
| February | 1314 | Friday-Saturday | Festival Recess |
| March | 7 | Saturday | Grade Reports |
| March | 16, Mo | onday through | |
| | Ma | rch 20, Friday | |
| | and | l March 30, Monday, | |
| | thr | ough April 10, | Enrollment for Fall Semester |
| | Fri | day | |
| March | 23 | Monday | Spring Recess begins, 8:00 a.m. |
| March | 30 | Monday | Classes resume, 8:00 a.m. |
| April | 13 | Monday | Honors Day, no classes 10:00 a.m. to 1:00 p.m. |
| May | 2 | Saturday | Classes end |
| May | 6 | Wednesday | Examinations begin |
| May | 12 | Tuesday | Examinations end |
| May | 17 | Sunday | Commencement |
| | | Summer Se | ssion 1970 |
| June | 22 | Monday | Eight-week session begins |
| July | 6 | Monday | Six-week session begins |
| August | 14 | Friday | Six-week and eight-week sessions end |
| | | Fall Seme | ster 1970 |
| September | 1 | Tuesday | Registration |
| September | 2 | Wednesday | Classes begin |
| September | 7 | Monday | Labor Day, no classes |
| Oct. 10-12 | | Saturday-Monday | Columbus Day Recess |
| October | 24 | Saturday | Grade Reports |
| October | 26, Mo | nday, through | - |
| | No | vember 13, Friday | Enrollment for Spring Semester |
| November | 2 6–2 8 | Thursday-Saturday | Thanksgiving Recess |
| December | 12 | Saturday | Classes end |
| December | 15 | Tuesday | Examinations begin |
| December | 21 | Monday | Examinations end |

ACADEMIC CALENDAR

Spring Semester 1971

| January | 19 | Tuesday | Registration |
|----------|---------|-------------------|--|
| January | 20 | Wednesday | Classes begin, 8:00 a.m. |
| February | 19-20 | Friday-Saturday | Festival Recess |
| March | 6 | Saturday | Grade Reports |
| March | 22, Mon | day, through | • |
| | Marc | ch 26, Friday and | |
| | Apri | 1 5, Monday, | |
| | throu | igh April 16, | |
| | Frida | IV I | Enrollment for Fall Semester |
| March | 29 | Monday | Spring Recess begins, 8:00 a.m. |
| April | 5 | Monday | Classes resume, 8:00 a.m. |
| April | 21 | Wednesday | Honors Day, no classes 10:00 a.m. to 1:00 p.m. |
| May | 8 | Saturday | Classes end |
| May | 12 | Wednesday | Examinations begin |
| May | 18 | Tuesday | Examinations end |
| May | 23 | Sunday | Commencement |

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CALENDAR

1970

| JANUARY | | | | | FEBRUARY | | | | | | MARCH | | | | | | | | | |
|---------|-----|----------|-----|------|----------|-----|-----|--------|-----|------|-------|-----|-----|-----------|-----|----|--------|-----|-----|------------|
| S | М | Т | W | Т | F | S | S | М | т | W | т | F | S | S | М | т | W | т | F | S |
| • • | • • | • • | • • | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | | | | • • | | •• | | 29 | 30 | 31 | • • | • • | • • | |
| APRIL | | | | MAY | | | | | | JUNE | | | | | | | | | | |
| | | | 1 | 2 | 3 | 4 | | | | | | 1 | 2 | | 1 | 2 | 3 | 4 | 5 | 6 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 7 | 8 | 9 | 10 | 11 | 12 | 18 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
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