"WHAT'S UP," a limited edition lithographed on stone by Fred Machetanz, University of Alaska Distinguished Associate in Art. From the University Museum collection of 29 prints by the artist. "Nanook," the polar bear, is the University mascot.
THE UNIVERSITY OF ALASKA
Central Campus
COLLEGE, ALASKA

BUILDINGS

(1) BROOKS BUILDING—Classrooms, offices, laboratories
(2) BUNNELL BUILDING—Administrative offices, classrooms, library, Schaible Lecture Hall, Computer Center
(3) EIELSON BUILDING—Classrooms, offices, laboratories
(4) DUCKERING BUILDING—Classrooms, offices, laboratories, Institute of Marine Science, Zoophysiology Laboratory
(5) UNIVERSITY COMMONS—New facility, Fall, 1963
(6) FACULTY HOUSING
(7) FOREST RESEARCH LABORATORY
(8) GEOPHYSICAL INSTITUTE
(9) PATTY BUILDING—Gymnasium, Swimming Pool, ROTC
(10) MUSEUM—Also houses music studios

(11) HEALTH SERVICE CENTER
(12) HESS HALL—Dormitory
(13) ICE RINK
(14) LATHROP HALL—Dormitory
(15) McINTOSH HALL—Dormitory
(16) MEMORIAL PLAZA
(17) NERLAND HALL—Dormitory
(18) STATEWIDE SERVICES BUILDING—Administrative offices and Cooperative Extension Service
University Calendar

1965 Summer Session

Short Session .................................................................................................................. June 7-June 25, 1965
Regular Session ................................................................................................................. June 28-August 6, 1965
Post Session Workshop .................................................................................................... August 8-August 13, 1965

Proposed 1965-66 Academic Year Calendar

Labor Day ................................................. Mon., Sept. 6
Residence Hall Rooms Open ......................... Noon, Sat., Sept. 4
Orientation and Guidance Testing for New Students ............................................. 8:00 a.m. to 5:00 p.m., Sat., Sept. 7
General Faculty Convocation .................................. 10:00 a.m. Wed., Sept. 8
Faculty Meetings (Academic Colleges) ................................................................. 2:30 p.m. Wed., Sept. 8
Faculty Meetings (Departmental) ......................................................... 9:30 a.m. Thurs., Sept. 9
Council of All Students by Advisers ................................................... Noon Thurs., Sept. 9

Registration

New Students .................................................. 8:00 a.m. to 5:00 p.m., Sat., Sept. 11
Returning Students ........................................... 8:00 a.m. to 5:00 p.m., Mon., Sept. 13

Note: Meal Tickets effective, Dinner Monday, Sept. 13

Instruction Begins ...................................... 8:00 a.m. Tues., Sept. 14
Registration Closes ........................................... 5:00 p.m. Mon., Sept. 21
Last Day to Withdraw without Grade .......................................................... 5:00 p.m. Mon., Sept. 22
Last Day for Making Up Incompletes .................................................. 5:00 p.m. Mon., Oct. 25
Six Week Grade Reports .................................................................. Begins 5:00 p.m., Wed., Nov. 24
Thanksgiving Recess ................................................................ 8:00 a.m. Mon., Nov. 29

Christmas Recess .................................................................. Begins 5:00 p.m. Sat. Dec. 18, 1965

Examination Study Period (No Classes) ............................................. to 8:00 a.m. Mon., Jan. 3, 1966
Semester Examinations ............................................................... 8:00 a.m. Thurs., Jan. 13
to Noon Wed., Jan. 19

Final Grades on file with Registrar ....................................................... Noon, Thurs., Jan. 20
End of Fall Semester .................................................................. 5:00 p.m. Fri., Jan. 21

1965-66 Spring Semester

Residence Hall Rooms Available .................................................. Noon, Wed., Jan. 19
Orientation and Guidance Testing for New Students .................................. 9:00 a.m. Thurs., Jan. 20
to 5:00 p.m. Fri., Jan. 21
Counselling of All Students by Advisers ................................................... Noon Thurs., Jan. 20
to 5:00 p.m. Fri., Jan. 21
Registration ........................................................................ 8:00 a.m. to 5:00 p.m., Mon., Jan. 24
Instruction Begins ................................................................ 8:00 a.m. Tues., Jan. 25
Registration Closes ............................................................... 5:00 p.m. Mon., Feb. 7
Last Day to Withdraw without Grade ................................................. 5:00 p.m. Mon., Feb. 7
Last Day for Making Up Incompletes .................................................. 5:00 p.m. Mon., Mar. 7
Six Week Grade Reports .................................................................. Begins 5:00 p.m., Wed., Mar.
Spring Recess ................................................................................. Begins 5:00 p.m., Wed., Mar.
to 8:00 a.m. Mon., Mar. 21
Last Day to Submit Graduate Thesis .................................................. 5:00 p.m. Thurs., Apr. 28
Cabinet Day .............................................................................. 8:00 a.m. Fri., Apr. 29
Governor's Day ........................................................................ 9:00 a.m. Fri., May 19
Examination Study Period (No Classes) ............................................. Thurs., May 21
Semester Examinations ............................................................... 8:00 a.m. Fri., May 21
Final Senior Grades on File with Registrar ........................................... 9:00 a.m. Fri., May 20
End of Spring Semester .................................................................. 5:00 p.m. Fri., May 20
Final Grades on File with Registrar ................................................... 5:00 p.m. Fri., May 20
Baccalaureate .............................................................................. Sun., May 22
Commencement ........................................................................... Mon., May 23

1966 Summer Session (Tentative)

Short Session ................................................................................................................. June 6-June 25, 1966
Regular Session ................................................................................................................. June 27-August 6, 1966
Post Session Workshop .................................................................................................... August 8-August 12, 1966
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### Anchorage Community College
- Director: 150 Bragaw
- Anchorage, Alaska

### Ketchikan Community College
- Director: Box 378
- Ketchikan, Alaska

### Juneau Community College
- Director: 1250 Glacier Avenue
- Juneau, Alaska

### Palmer Community College
- Director: Box 1406
- Palmer, Alaska

### Sitka Community College
- Director: Box 179
- Sitka, Alaska

### Kenai Community College
- Director: Drawer B
- Kenai, Alaska

### Mailing Address for Main Office:
- University of Alaska
- College, Alaska

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### TRANSPORTATION TO THE UNIVERSITY

The University of Alaska is located at College, Alaska, five miles from the city of Fairbanks. Bus transportation to College leaves a number of times each day from the Fairbanks Bus Depot. Taxi service is also available.

Fairbanks is served by major airlines from all main points in Alaska and from Seattle. It is also the northern terminus of the Alaska Railroad running from Anchorage. It is possible to travel by bus or automobile over the Alaska Highway.
Warm sunlight bathes the campus on a fall day as students enter the Commons dining room.
Regents

THE BOARD OF REGENTS

The Regents of the University of Alaska are appointed by the Governor and are confirmed by the Legislature.

ELMER E. RASMUSON, Anchorage, President, 1950-1969
WILLIAM A. O'NEILL, Anchorage, Vice President, 1948-1965
DOROTHY A. WREDE, Fairbanks, Secretary, 1963-1971
JOHN J. CONWAY, Sitka, 1959-1967
RUTH S. McLEAN, Nome, 1964-1967
ROBERT E. McFARLAND, Anchorage, 1963-1971
PHILIP H. MOORE, Sitka, 1954-1965
ARTHUR J. SCHAIBLE, Fairbanks, 1961-1969
WILLIAM R. WOOD, President of the University, Ex-Officio Member
CATHERINE L. BYRNE, Treasurer, non-member official

ADMINISTRATIVE COUNCIL

WILLIAM R. WOOD, Ph.D., LL.D., President
HOWARD A. CUTLER, Ph.D., Academic Vice President
KENNETH M. RAE, Ph.D., Vice President for Research and Advanced Study
HAROLD A. BYRD, B.B.A., Comptroller of the University
LEWIS E. HAINES, Ph.D., Director, Student Affairs
SYLVIA CIERNICK, Ph.D., Director, University Relations
BEN J. ATKINSON, B.S., Director, Physical Plant and Campus Planning

EMERITI AND HONORARY STAFF

ERNEST N. PATTY, President, Emeritus
(1922-1935, 1953-1960)

LYDIA JOHN-HANSEN, Associate Director of Cooperative Extension, Emeritus
Iowa State College '19, B.S.; '22, M.S. University of Alaska '59, D.Hum. (1925-1936, 1940-1959)

TERRIS MOORE, Professor of the University, Emeritus
Williams College '29, A.B. Harvard '33, M.B.A.; '37 D.Sc. (1949-1953, 1953-)

WILLIAM K. KELLER, Professor of Education, Emeritus

DOROTHY H. NOVATNEY, Professor of English, Emeritus

LOLA CREMANS TILLY, Professor of Home Economics, Emeritus

ACADEMIC FACULTY AND PROFESSIONAL STAFF 1964-1965

SYUN-ICHI AKASOFU, Professor of Geophysics
University of Tohoku '33, B.S.; '57, M.S. University of Alaska '61, Ph.D.

PAUL R. ALBEE, Senior Research Assistant in Geophysics
College of Idaho '61, B.S.

GEORGE ALLEN, Instructor of English (Ketchikan)
University of Alaska '64, B.A.; '64, M.A.
LEE ALLEN, Instructor, Alaska Agricultural Experiment Station
University of Idaho '57, B.S.

MICHAEL ALMASI, Associate Design Engineer, Geophysical Institute
University of Budapest '55, M.S. in Electrical Engineering

PHILIP ANAST, Associate Professor of Psychology
Baylor University '41, B.A. in History; '46, M.A. in History; '54, M.A. in Psychology; University of Wisconsin '60, Ph.D.

MARVIN J. ANDRESEN, Assistant Professor of Geology
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Major, U.S. Army. Texas Western College '51, B.A.

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Genesco State Teachers College '45, B.S. Syracuse University '60, M.L.S.

GUY A. GALLAWAY, Programmer, Computer Center
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University of California at Los Angeles '60, M.S.

CHARLES T. GENAUX, Assistant Professor of Zoophysiology and Chemistry
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FOYE L. GENTRY, Instructing Technician in Electronic Technology

ALFRED H. GEORGE, Assistant Comptroller for Research
Oregon State University '50, B.S.

ARTHUR E. GODDARD, Assistant Project Engineer, Geophysical Institute
Worcester Polytechnic Institute '63, B.S.E.E.

JOHN JAMES GOERING, Assistant Professor of Marine Science
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JEFFERSON J. GONOR, Assistant Professor of Marine Science
Southwestern Louisiana University '53, B.S. University of Washington '64, Ph.D.

BOB GORDON, Assistant Professor of Military Science
Captain, U. S. Army

BRUCE R. GORDON, Professor of French and Spanish, Head, Department of Linguistics and Foreign Languages
Brown University '57, A.B. New York State College for Teachers '42, M.A. Syracuse University '50, Ph.D.

DONALD D. GORDON, Assistant Supervisory Engineer, Minitrack Station

ARNOLD A. GRIESE, Assistant Professor of Education
Georgetown University '48, B.S. University of Miami '57, M.Ed. University of Arizona '60, Ph.D.

CHARLES J. GRUNEISEN, Instructor of German and Latin
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General Information

HISTORY

The University dates from 1915, when on July 4 the Hon. James Wickersham, delegate to Congress from Alaska, laid the cornerstone on land set aside by Congress, on March 14, for the support of a Territorial College and School of Mines. The Territorial Legislature by its Acts of May 3, 1917, accepted the land grant and created a corporation, "The Alaska Agricultural College and School of Mines," defining its duties and providing for a Board of Trustees consisting of eight members.

The College opened for instruction on September 18, 1922, with the Hon. Charles E. Bunnell as president. The college became the University of Alaska by Act of the Territorial Legislature, July 1, 1935; the Board of Trustees became the Board of Regents. The University offered its first summer session in 1947. In 1949, Dr. Terris Moore succeeded the late President Bunnell, who became President Emeritus.

Dr. Ernest N. Patty, member of the first faculty of the Alaska Agricultural College and School of Mines and former Dean of the College, was inaugurated as the third president of the University in 1953 and named President Emeritus upon his retirement in 1960, when Dr. William R. Wood became the fourth president.

OBJECTIVES OF THE UNIVERSITY

Truly unique among institutions of higher learning in the United States, the University of Alaska serves, within the scope of its resources, all of the public educational needs, beyond high school, of an entire state.

When the Legislature established Alaska's state university, it joined with the national government to make it also a land-grant university with a fivefold function:

To instruct youth and adults seeking higher learning in the liberal arts, the sciences and the professions;

To increase and apply, through research, knowledge of value to mankind, and particularly to the residents of the State;

To serve the people throughout the 586,400 square miles of Alaska as an intellectual, scientific, and cultural resource;

To provide and to develop competent leadership for the people of Alaska in their continued improvement of the State as a good region in which to live;

To strive above all, to develop in its students, at all levels, those qualities of mind and body which are necessary for life as a worthy human being in a democratic society.
ACCREDITATION

The University of Alaska is accredited as an institution of higher learning by the Northwest Association of Secondary and Higher Schools; belongs to the Association of American Colleges, the Association of State Universities and Land-Grant Colleges, and the National Commission of Accrediting; and has institutional membership in the American Council of Education and the American Association of Colleges for Teacher Education.

The four-year curriculums in Civil Engineering, Mining Engineering, Electrical Engineering and Geological Engineering are accredited by the Engineers' Council for Professional Development. The Council represents the principal engineering societies and examining boards of the United States and Canada.

The University of Alaska is approved by the Federal Office of Vocational Education for teacher-training in Vocational Home Economics. It is also on the approved list of colleges and universities of the American Association of University Women.

CARNEGIE CORPORATION GRANT

The Carnegie Corporation of New York has awarded the University of Alaska a grant of $150,000 for the purpose of bringing to the University outstanding visiting professors in the humanities and social sciences. This is the sixth year of the grant. The visiting professors will be specialists in such subjects as music, art, linguistics, English, philosophy, psychology, history, economics, and political science.

CAMPUS BUILDINGS AND FACILITIES AT COLLEGE, ALASKA

Administrative and Classroom Buildings—The Bunnell Memorial Building, dedicated to the late Charles E. Bunnell, former president of the University of Alaska, consists of general administrative offices, classrooms, the Computer Center, laboratories, a large lecture hall, and the library. It also includes offices of the College of Biological Sciences and Renewable Resources and offices of the College of Arts and Letters.

The Brooks Memorial Mines Building provides space for classrooms, laboratories, and offices of the College of Earth Sciences and Mineral Industry; the Alaska State Division of Mines; the United States Geological Survey, and the United States Bureau of Mines. The four-story structure is dedicated to the late Dr. Alfred H. Brooks, former chief Alaskan Geologist of the U.S. Geological Survey from 1903 to 1924.

The Eielson Memorial Building contains general classrooms, laboratories and offices of the College of Behavioral Sciences and Education and the College of Business, Economics and Government.

The William E. Duckering Building houses offices, classrooms and laboratories of the College of Mathematics, Physical Sciences and Engineering, the Zoophysiological Research Laboratory, the Institute of Marine Science, and laboratories of the State Highway Materials Division.
The Ernest N. Patty Building, dedicated to President-Emeritus Ernest N. Patty, includes a gymnasium, swimming pool, rifle range, classrooms and office facilities for the Department of Health, Physical Education and Recreation and the Department of Military Science.

The Museum exhibits more than 100,000 catalogued specimens of Eskimo and other artifacts in mineral, anthropological, ethnological, palaeontological, botanical, and natural history fields.

The Geophysical Institute is a three-story structure containing facilities for research in arctic and sub-arctic natural phenomena and for graduate instruction in geophysics.

The University Library—A variety of resources and services are available in the University Library. In addition to a good basic book collection, the library subscribes currently to approximately 1500 journals and a selection of newspapers—from Alaska, the other states and foreign countries.

Microforms, including microfilm, micro-card, and microfiche, and microform readers are housed in a separate room on the lower level of the library. Significant among the microform holdings are such items as the microfilm edition of The New York Times and the Records of the Russian-American Company, 1802-1867, and the microfiche edition of the Human Relations Area File.

Tables are also available on this level for individual listening to the non-circulating collection of phonograph records which the library maintains.

The University Library is a depository for publications of the United States Government and the Atomic Energy Commission. This extensive document collection is located on the library mezzanine.

The main floor of the library contains the special Skinner Collection of Alaskana and most of the reference collection, including important indexes.

A smoking area on this floor permits students to study or relax in comfortable, informal surroundings.

Books for which faculty may make special assignments are shelved in the Reserve Book Section which is also located on the main floor.

Interlibrary loan service for graduate students and faculty is handled from the administrative office of the library.

A subject library in the area of Geophysics, on the second floor of the Geophysical Institute Building, is open to those who have a need for such material.
ENROLLMENT SUMMARY 1964-65 First Semester

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ENROLLMENT DISTRIBUTION 1964-65 First Semester

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Four men's residence halls are pleasantly surrounded by trees.
Division of Statewide Services

The Division of Statewide Services makes available to residents of the State credit and non-credit educational programs and special services.

Community Colleges—The University of Alaska serves Alaska through six community colleges.

The 1953 Legislature authorized the University to cooperate with qualified school districts in the establishment of community colleges. The first institution, Anchorage Community College, began operation February 8, 1953. The second college at Ketchikan began operation in the fall of 1954, the third at Juneau-Douglas in the fall of 1956, the fourth at Palmer in the fall of 1961, the fifth at Sitka in the fall of 1962. A new Community College at Kenai began operation in 1964.

Through these colleges the University offers collegiate courses for academic credit. The courses and instructors are approved and supervised by the University. All University courses carry residence credit. In addition, each community college offers vocational and interest courses under the sponsorship of the local school district. These courses do not carry University credit.

Students desiring detailed information on community college programs should write to the Resident Director of the Community College in which he is interested.

Evening Classes and Correspondence Study—The Department offers residence credit courses on the main campus during the evening, at military installations, and in other locations throughout the state not served by a community college. A special catalog of the Department activities is available by writing to the Department of Evening Classes and Correspondence Study.

The Department also coordinates the grading of the United States Armed Forces Institute Correspondence Course Lessons submitted by military personnel in Alaska, and approves instructors for the Air Force Group Study Program.

A limited number of correspondence courses are available. For information and a catalog write to the Department of Evening Classes and Correspondence Study.

Summer Sessions, Conferences and Short Courses—The University holds sessions during the summer at various locations in the State. Three- and six-week sessions are offered on the University campus at College. During the six-week sessions a wide range of subjects is available with main emphasis in the field of education. Whenever possible, Alaskan aspects of subjects offered are presented. The faculty consists of regular staff members and visiting professors. Both undergraduate and graduate work are offered. A maximum of seven hours of credit may be earned during the six-week session and no more than three hours of credit during the three-week session. Room and board is available on campus for single
men and women and for married couples. An extensive recreation pro-
gram is planned during the summer. Some of the activities are trips to
Eskimo and Indian villages, gold panning expeditions, hiking, and a
riverboat trip.

Immediately following the summer session, a workshop on Alaska
is scheduled. This intensive five-day course deals with subjects such as
anthropology, education, history, literature, art, agriculture, and wildlife.

Summer Sessions programs are also offered at the Community Col-
leges as demand warrants.

The summer session bulletin, listing courses and fees is available
after March 1 from the Department of Summer Sessions, Conferences
and Short Courses.

The University, through this department, also conducts educational
conferences and short courses throughout the state.

Cooperative Extension in Agriculture and Home Economics—The pro-
gram is administered from the University campus in cooperation with the
United States Department of Agriculture. Local offices are maintained in
Fairbanks, Palmer, Anchorage, Homer, Juneau, and Nome. The program
is designed to extend the results of research to people of all ages and
needs.

District Agricultural and Home Demonstration agents work closely
with farm and rural families in fostering better living conditions and
approved farm practices, and with local groups in improving economic
conditions. Homemaker and 4-H clubs are a part of the program.

Publications on homemaking, home yard improvement, gardening,
management, agriculture and buildings are available upon request from
local and state offices. A building plan service is maintained. The Exten-
sion Service is financed through federal and land grant revenues and
state appropriations.

Mining Short Course—The mining short course consists of classes in the
practical aspects of geology, mineralogy, mineral preparation, prospecting,
exploration and mining. Each class meets once a week for nine weeks
on the campus during the fall semester. The course is open to all persons
without regard to previous training and academic qualifications.

Mining Extension Courses—Extensive courses in mining and mineral
exploration are offered each year in various communities in Alaska. These
courses are presented to give basic training in the various phases of the
mineral industry and to help prospectors to find and explore ore deposits.
An appropriate certificate is awarded to students who satisfactorily com-
plete the respective course of study.

Fisheries Extension Courses—The courses are designed to cover various
aspects of commercial fishing. They are conducted in commercial fishing
centers of the State. An appropriate certificate is awarded to students
who satisfactorily complete the course.
National Science Foundation Institutes—A summer Institute for Junior and senior high school teachers of science and mathematics is held on the campus under a grant from the National Science Foundation. This is an eight-week institute offering stipends to approximately 50 participants.

A summer science training program for secondary school students, sponsored by the National Science Foundation, is held for six weeks on the campus during the summer.

Audio-Visual Communications—The Department has a large collection of 16-millimeter sound movies which are available to groups and schools throughout the State. Requests for the film catalog should be mailed to the Department of Audio-Visual Communications.

The Student Union Building is historic Constitution Hall, where the constitution of the State of Alaska was written.
Graduate students are trained in research, a creative search for new knowledge.
Research and Advanced Study

The research programs of the University of Alaska take advantage of its unique location; that is, its position in the sub-arctic of interior Alaska, but with easy accessibility to the oceans from the Pacific to the Arctic; its accessibility to glaciers and permafrost areas; and its location near the auroral zone, the region in which maximum effects are seen from the bombardment of the earth by charged particles from the sun.

In addition to research which is carried out in the academic departments, the University has several institutes and associated activities.

**Alaska Agricultural Experiment Station**—The University of Alaska and the United States Department of Agriculture conduct a joint agricultural research program in the State. A joint Director administers the program from the Experiment Station headquarters at Palmer in the Matanuska Valley.

Field research is concentrated at the Matanuska Experiment Farm seven miles west of Palmer and at the Fairbanks Experiment Farm a mile west of the University. A fur experiment farm is also operated near Petersburg in southeastern Alaska. Because of varied environments found in Alaska, many plant and soil studies are scattered throughout the potential farming area, where the work is accomplished in cooperation with farmers and homesteaders.

**Alaska Cooperative Wildlife Research Unit**—The Unit is one of several located at land grant colleges and universities. The Alaska unit is jointly sponsored and financed by the University of Alaska, the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, and the Wildlife Management Institute. The Unit provides technical and professional training in wildlife management, research, education, and administration; investigates wildlife problems in Alaska; makes the results of these researches available through publication, radio, and personal contacts; and provides technical assistance to agencies concerned with wildlife management.

Graduate work leading to the M.S. degree in wildlife management may be performed at the Unit in cooperation with the Department of Wildlife Management.

**Geophysical Institute**—The Institute was formally established on July 1, 1949, as a department of the University of Alaska. The 79th Congress of the United States had established the Institute, and the 80th Congress appropriated funds for the construction of the present laboratory and associated houses. The Geophysical Institute has grown from a modest program commenced in 1929 by means of a grant from the Rockefeller Foundation for auroral height measurements, through a steadily develop-
ing series of basic studies, to its present activities embracing many fields of arctic and sub-arctic research.

The purpose of the Geophysical Institute is to advance knowledge of the earth and its environment in space. Emphasis is placed on studies of the upper atmosphere and the solar-terrestrial relationship. Programs are also established in meteorology, glaciology, and seismology. In addition to the main office building located on the campus, the Institute operates a number of field sites in Alaska and elsewhere, and participates in Antarctic research. The present staff numbers approximately 170, including some 30 graduate students in physics and geophysics who obtain their research training at the Institute.

The Director of the Geophysical Institute is chosen by the Board of Regents upon the recommendation of the President of the University, subject to approval by the president of the National Academy of Sciences.

Institute of Arctic Biology—Pursuing recommendations as to its prospective national and local value by a committee of eminent biologists, the Institute of Arctic Biology was established by action of the Alaska Legislature in 1963 for studies of life in the extreme climatic changes of arctic and subarctic regions. Temporarily housed in the Duckering Building, it will occupy substantial quarters in the new Biological Sciences Building under construction in the research area on the west ridge of the main campus.

The first component of the Institute, the Laboratory of Zoophysiology, began operation in October 1962. Three additional laboratories are projected for studies of man, animals, and plants in arctic and subarctic environments. Visiting scientists are received in the laboratories to which their investigations pertain. Opportunities for pre- and post-doctoral studies are provided.

Institute of Marine Sciences—The Institute was authorized in 1960 by the State Legislature. The purpose of the Institute is the advancement of knowledge of the sea, with particular emphasis on problems of the northern regions. A program of education and research in biological, physical and chemical oceanography are all included within this broad scope. Sea-going and laboratory facilities are available at the Douglas Marine Station, situated some five miles from Juneau. Campus activities are centered in a new laboratory, completed in January, 1963. The Institute operates the 80-foot Research Vessel Acona. Scientists are invited to request permission to work in residence.

Institute of Business, Economic and Government Research—The Institute of Business, Economic and Government Research was authorized by the State Legislature in 1961. The purpose of the Institute is to contribute to an advancement of knowledge in the fields of business, economics, and government with particular emphasis on conditions in Alaska and the northern part of North America.

Mineral Industry Research Laboratory—The 1963 Alaska State Legislature authorized the establishment of a mineral industry research program at the University of Alaska. The purpose of the Laboratory is to conduct
appropriate applied and basic research in various areas of the mineral industry that will aid in the further utilization of Alaska's mineral resources. Research is conducted in facilities of the College and coordinated with graduate student academic programs.

Naval Arctic Research Laboratory, Point Barrow—The University has contracted with the Office of Naval Research to operate the Point Barrow Arctic Research Laboratory. Laboratory facilities are maintained, and scientific teams from other universities and organizations carry on arctic research problems there.

More than 300 scientists from many of the leading universities of the world made use of the extensive facilities of the Arctic Research Laboratory during the past year.

Alaska Water Pollution Control Laboratory—One of nine water pollution laboratories being built in the U.S. by the U.S. Department of Health, Education, and Welfare, it is the first building in the University's new Arctic Research Center.

STATE AND FEDERAL AGENCIES ON CAMPUS—ASSOCIATED WITH THE UNIVERSITY OF ALASKA

Alaskan Geology Branch of the U.S. Geological Survey—This branch conducts a program of geological exploration and research in Alaska. Some of the functions are areal geologic mapping; studies and evaluation of metallic, nonmetallic, coal, and oil deposits; regional studies of structure and stratigraphy; detailed studies of selected type-areas; application of geology to engineering and related problems; and research in the use of new geologic methods. The Alaskan Geology Branch office has a complete file of Alaskan maps and geological reports available to the public for use in the Office, and maintains a stock of Alaskan topographical maps for sale.

Alaska Department of Fish and Game—The purpose of the Alaska Department of Fish and Game is to assist in fish and game protection, research, restoration, propagation, and increase in the State of Alaska. Until recently several biologists of the Department were stationed on the campus and it is hoped that suitable facilities will again be available for their use as a result of the current building program.

There is close collaboration between the University and the Department both in research and teaching (see Alaska Cooperative Wildlife Research Unit).

State Highway Testing Laboratory—The Alaska State Division of Highways operates a road materials laboratory in conjunction in the Department of Civil Engineering. The State provides equipment and personnel for routine testing of highway materials and for highway research.

U.S. Coast and Geodetic Survey—Instruments for the continuous registration of magnetic elements, installed originally by the Carnegie Institute of Washington, were turned over to the U.S. Coast and Geodetic Survey
in 1948 and moved to the observatory which had been constructed for the purpose on the University campus in 1947. A net set of the latest type magnetic variometers with automatic recording equipment was installed at the observatory early in 1949.

The seismograph installation for the continuous registration of earth tremors was completed November 17, 1935, and has been in continuous operation ever since. The station has been moved to a new twin seismograph vault built by the U.S. Coast and Geodetic Survey in 1949.

**United States Forest Service**—The Northern Forest Experiment Station has established a branch laboratory on the campus. A growing research staff is conducting investigations on forest management, fire, entomology, and other aspects of subarctic forest ecology. This laboratory is to be the center for the Station's activities in interior and northern Alaska; although field work is conducted throughout the region, many investigations will be centered on the Bonanza Creek Experimental Forest about 35 miles from campus.

The overall purpose of the research conducted by the Forest Experiment Stations is to supply the land manager with the most efficient means of growing, protecting and harvesting timber crops in a manner most compatible with other land uses.
Financial Information

FEES AND EXPENSES

Summary of Semester Charges

Full-time Students

Residents:

University Fee .................................................. $ 82.50
Campus Activity Fee .......................................... 21.00
Health Services Fee ........................................... 15.00

118.50

Dormitory Rent (double room) .................................. $160.00
Meal Tickets (@ $95.00 per full mo.) (2nd sem. $354) 344.00

Residents Total Fees ........................................... $622.50

Non-Residents:

All regular resident fees ..................................... $622.50
Tuition ............................................................... 150.00

Non-Residents Total Fees ..................................... $772.50

All semester charges are payable each semester upon registration.

Students normally will pay approximately the sums set forth above at semester registration time. However, those taking less than 7 semester credit hours pay no tuition and pay $15.00 per credit hour in lieu of the University Fee, and are not eligible for dormitory occupancy.

It should be observed that other expenses at registration time may require extra funds for less predictable amounts. These include personal and social expenses, text books, meals needed before meal tickets become effective, bus fare, and any athletic equipment, musical instruments and other specialized classroom supplies which certain students may need.

TUITION

Residents—Tuition is free to residents of Alaska. A resident is a person 19 years or older who has established residence in the State for at least a year prior to the date set for registration for any semester. The legal residence of those who are not 19 years old is the residence of the parents or legal guardian. The residence of all military personnel is Washington, D.C., with the exception of those whose parents are legal
residents of the State or those who were inducted into the Armed Forces through a State Induction Center while they were legal residents of the State. Children of military personnel who have been stationed in Alaska for more than one year are granted resident status. Students from the Yukon Territory may register on the same basis as Alaskan students.

Non-residents—Tuition shall be charged non-resident students carrying seven or more semester credit hours, at $150.00 per semester.

University Fee—Students registering for seven or more semester credit hours shall be charged a fee of $82.50 per semester. (No course fees or deposits shall be charged, except for individual instruction in music.) Residents and non-residents alike shall pay this fee.

Students registering for less than seven semester credit hours shall be charged a fee of $15.00 per credit hour.

Fee rates apply to students auditing any course in the same manner as for those taking it for credit.

MISCELLANEOUS FEES

Late Registration Penalty—Students registering later than the day designated for that purpose shall pay a late registration fine of $5.00 for the first day, plus $2.00 for each succeeding day allowed for late registration (excluding Saturday and Sunday).

Change of Registration—A penalty fee of $1.00 shall be paid for each course added or dropped after the third day following the scheduled date for registration. Changes necessitated by University cancellation or rescheduling of classes are not subject to penalty.

Examination Fee—A minimum charge of $3.00 shall be made for each examination required for removal of an incomplete, clearance of an entrance deficiency or credit by examination, plus an additional $1.00 for each credit over three.

Late Placement and Guidance Test—A charge of $5.00 shall be made for a placement and guidance test taken at a time other than the scheduled time.

Transcript Fees—One certified transcript is issued free. A charge of $1.00 shall be made for each additional transcript.

Graduate Placement Fee—The University charges $10.00 for filing of credentials and one year of service. Thereafter, $5.00 is charged for each year the file is used. There is no filing fee for students who file before graduation.

Program Plan—The Registrar's Office will provide without charge one plan for a schedule of courses leading to a degree. A fee of $5.00 will be charged for each subsequent alternate plan.
Music Course Fees—All music fees shall be waived for students enrolled for seven or more credit hours and taking a major or minor in Music or Music Education, as certified by the department chairman.

Mining Short Course Fee—A single fee of $5.00 per non-credit unit shall be charged for registration in the mining short course.

CAMPUS ACTIVITY FEE

Undergraduate students carrying twelve (12) or more semester credit hours or equivalent, under twenty-six (26) years of age, shall be charged a Campus Activity Fee of $21.00 per semester.*

Proceeds of this fee are to be dedicated to the financing of student recreational, social, athletic, publications, and student self-government activities.

The recreational swimming, and athletic activities program are under the supervision of the Director of Health, Physical Education and Recreation.

The social, publications and student self-government activities are under the supervision of the elected and appointed officials of the student organization recognized and chartered by the Board of Regents. These activities include social events, campus self-government administration, year book, student paper, intramural competition and the "A" Book.

STUDENT HEALTH SERVICE FEE

Undergraduate students under twenty-six (26) years of age, carrying twelve (12) or more semester credit hours or equivalent shall be charged a Student Health Service Fee of $15.00 per semester.* Such students, if in military service or military dependents, shall be exempt from payment of this fee upon presentation of satisfactory evidence that adjacent military hospital and medical facilities are available to them and will be utilized by them.

The student health program is administered by the Health Center under the direction of the Director of Student Affairs and the University Nurse. Hospital and medical treatment for common illnesses and injuries are provided, upon the authorization by the University Nurse, under limits of coverage set forth in the Student Health Plan. Each student will be supplied with a set of regulations outlining this plan.

Married students may secure additional coverage for spouse and children if desired. Rates for such coverage will be quoted at registration time.

* (Other students may pay this fee voluntarily to receive all benefits except voting and holding student offices.)

* (Other students, under 35 years of age, may pay this fee voluntarily.)
DORMITORY AND DINING HALL CHARGES

Dormitory Deposits—A $25.00 dormitory application, reservation and damage deposit is required with the student application blank, and is retained throughout the period of residence.

Dormitory Rent—
On Double Room: $160.00 per semester
On Single Room: $185.00 per semester

This rental covers all lounge, recreation room, storage room, laundry room and telephone privileges. Toll calls may not be made over floor phones in dormitories.

Meal Tickets—When registering, each dormitory occupant is required to buy a semester meal ticket for cafeteria meals. The rate is $95.00 per full month:

First Semester Meal Ticket ........................................ $344.00
Second Semester Meal Ticket ................................. 354.00

Meal tickets become effective at dinner, September 13 and dinner, January 24. Refunds are granted only with approval of the Director of Student Affairs upon formal withdrawal, for absence on University activities, or for extreme personal emergencies.

Semester meal tickets do not include vacation periods. Special meal tickets may be purchased before specified dates for:

Orientation Week ..................................................... $21.00
Thanksgiving Recess .............................................. 15.00
Christmas Recess .................................................. 50.00
Semester “Break” ................................................... 11.00
Spring Recess ....................................................... 12.00

Those not possessing Special Meal Tickets may buy meals during vacation periods at ala carte prices.

PAYMENT OF FEES

All charges, deposits, rent and meals for the semester are payable in full in the second day following registration. Late settlement of fees is subject to a fine of $2.00 for each day following the day on which they first become payable. An installment contract may be arranged under which a 25 per cent payment is due upon registration and additional installments are payable monthly for the remainder in excess of institutional scholarships. The installment contract service fee is $2.00 for the contract and $2.00 for each additional payment. Delinquent payment of installments is subject to a $2.00 fine for each occurrence.

Refundable Charges—Refunds of the university fee, tuition fee, music course fees and campus activities fee, shall be made to withdrawing students upon formal withdrawal by or for the student, according to the following schedule:

Withdrawal within the first week—90 percent refund
Withdrawal within the first 1/3 of term—50 percent refund
Withdrawal after first 1/3 of term or semester—no refund
Health Services and Miscellaneous fees shall not be subject to refund.

Board—The unused portion of a meal ticket, less a service charge equal to five days' meals, shall be refunded upon formal withdrawal.

Rent—Room rent is refundable, upon recommendation of the Director of the Office of Student Affairs, only in emergency cases, such as illness.

Financial Obligations—The University withholds delinquent students' diplomas pending their final payment of debts owed to the University. The Registrar also withholds grade reports and transcripts until debts to the University have been paid. No student owing the University money can receive honorable dismissal.

TRANSPORTATION TO THE UNIVERSITY

The Alaska Railroad gives qualified University students a round-trip ticket for the price of a one-way ticket. This applies to Summer Session and Home Economics Short Course students, as well as those attending regular sessions. The return ticket may be used only after completion of one semester's work or after full attendance at the Summer Session or Home Economics Short Course. The student must request the special rate when purchasing his first ticket. Upon arrival at the University, he should deposit the proper ticket receipts with the Registrar for safekeeping and certification.
Dozens of barbecued chickens with all the trimmings are required to feed hungry freshmen on a September outing.
Academic Regulations

Each student will be held responsible for the regulations of the University as they apply to him.

Orientation and Placement Testing—All entering undergraduate students are required to participate in the orientation program conducted just before fall and spring semester registration. The purpose of this program is two-fold: to acquaint the new student with the history, the customs, and the campus of the University of Alaska, and to aid him in the planning of a profitable college career.

Many entering freshmen will have taken the examination of the American College Testing Program during their senior year in high school. Those entering freshmen for whom the University has received ACT scores will not be required (or permitted) to repeat the examination during Orientation Week. However, all new students who are entering the University with fewer than 30 hours of acceptable transfer credit and for whom the University has not received ACT scores will be required to take the test during orientation week and to pay a $5.00 testing fee. The ACT and other placement and guidance tests must be taken before a new student with less than sophomore standing may complete his registration. On the basis of test scores, a student whose background of training appears to be deficient in areas such as English and mathematics may be required to take English A or Math A or both. In such cases, the student will be unable to complete the requirements of most curriculums in the minimum time.

An additional fee of $5.00 will be charged to students who take the placement and guidance tests at other than the scheduled times during orientation week.

Although transfer students are required to participate in the orientation program, they are not required to take the placement and guidance tests if they have at least sophomore standing. However, for the assistance which test scores may give the transfer student and his advisers in planning his educational program, it is recommended that he take the placement and guidance tests at the time they are administered to entering freshmen.

Attendance—Regular attendance is expected in all classes because experience has shown that absences tend to lower grades. Unexcused absences may result in a student's being dropped from the course with a failing grade. It is the responsibility of the student to establish to the instructor's satisfaction the validity of an excuse for absence and to work out with the instructor acceptable arrangements for making up missed work.
Class Standing—Class standing is determined on the basis of total credits earned.

Students are classified as:

<table>
<thead>
<tr>
<th>Class</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshmen</td>
<td>0-29 credits</td>
</tr>
<tr>
<td>Sophomore</td>
<td>30-59 credits</td>
</tr>
<tr>
<td>Junior</td>
<td>60-94 credits</td>
</tr>
<tr>
<td>Senior</td>
<td>95 credits</td>
</tr>
</tbody>
</table>

Transfer students will be given class standing on the basis of the number of credits accepted by the University. Special students are registered without class standing.

Study Load—Students normally may register for 18 semester hours of credit; for 19-20 semester hours with the approval of the dean of the college; for 21 semester hours provided the student's grade point average with a full time study load for the past two semesters is 2.75, or more, and a petition to carry this maximum load is approved by the Council of Academic Deans.

For the purpose of computing study loads, non-credit courses are rated the same as credit courses.

No student who has failed in any work may register for more than the number of credits tabulated in his curriculum until he has carried that number successfully for one semester.

A full-time student is one who enrolls for 12 or more semester hours of credit. Any student who qualifies for entrance and registers for fewer than 12 will be classified as "part-time" regardless of his previous standing.

Any student registered in 12 or more credits must fulfill the requirements in military science or physical education.

Any student who does not follow a prescribed course of study or curriculum leading to a specific degree will be enrolled as "interim," whether he be a full-time or a part-time student.

All "special" students are considered to be "interim" without class standing.

Credit by Examination—An enrolled student is eligible to petition for permission to receive credit by examination if he can provide evidence of sufficient experience or previous study pertaining to the course in question. When permission is granted, the student is required to register immediately and pay the fees of the course which has been officially approved. A course in which a student has been registered as an auditor may not be completed for credit by examination.

Change of Curriculum—A student desiring to change his curriculum may do so only at the beginning of a semester, and must obtain the written consent of the heads of the departments concerned.

Change of Registration—A student is expected to complete the courses in which he is enrolled. He may, if circumstances warrant, withdraw without penalty during the first two weeks of the course; after that time a grade of "WP" is given only if he is doing passing work and a grade of "WF" is given if he is doing failing work. After the first month of the
course, a student who wishes to withdraw must submit his request by petition, which shall include the reason for the request. Student initiated withdrawals are not permitted during the last month of the semester. Elective and non-sequence courses should be dropped first; withdrawals from deficiency courses or English 101-102 may be made only upon petition. The fee for changing courses is $1.00 per course. A Change of Registration card must be obtained from the Registrar.

Grading System—Only letter grades appear on the student's record and transcript. Attention is called to the following analysis:

A—An honor grade; indicates originality and independent work, a thorough mastery of the subject, and the satisfactory completion of more work than is regularly required.

B—Indicates outstanding ability, and a performance definitely above the average.

C—Indicates a satisfactory and average response to assignments.

D—The lowest passing grade; indicates work of poor quality and does not entitle the student to the recommendation of the University.

P—Indicates passing work and carries no grade points.

F—Indicates failure.

S—Indicates satisfactory completion, is used only for graduate theses, and carries no grade points.

I—Given only in cases where additional work is necessary for the satisfactory completion of the course; not given unless the work already performed in Grade C or better; may be given for unavoidable absence.

The grade for work that is incomplete (I) becomes a failure (F) if the work is not completed by the end of the sixth week following the student's next registration. At the option of the instructor and head of the department offering the course, the removal of the incomplete may be postponed until the next semester in which the course is regularly given.

Def—Indicates that for good cause, as determined by the instructor, the grade in certain courses, such as thesis, may be withheld, without penalty, until the requirements of the course are met within an approved time.

WP—Given when a student makes a regular withdrawal from a course while doing passing work.

WF—Given when a student makes a regular withdrawal from a course while doing failing work. It indicates failure and is so computed in the grade point average.

Grade Points—For the computation of grade points, each credit is multiplied by a grade factor: Grade A by 4, grade B by 3, grade C by 2, grade D by 1, and grade F or WF by 0. The record and transcript of the student show all grades received, together with all rulings on special petitions or authorized substitutions. A grade point average of 2.00 is required for good scholastic standing.

Probation and Academic Disqualification—At the end of any semester of attendance a student failing to earn or maintain a grade point average of 2.00 may be placed on academic probation. Students who fail to raise their scholastic average after being placed on probation may be academically disqualified and not permitted to re-enroll at any units of the
University for one or more semesters. Completion of two or more college level courses with a grade of C or higher at another accredited institution or by correspondence is the recommended and preferred requisite for re-admission to the University.

Dismissal—A student may be dismissed for cause at any time by the President of the University.

Honor Rolls—Students who earn at least a 3.5 semester grade point average for no less than 12 credit hours are listed by the Academic Vice President on the University's Honor Roll.

Graduation—The responsibility for meeting all requirements for graduation rests upon the student.

Graduation with Honors—Students who obtain a grade point average of 3.5 will be graduated *cum laude*; 3.8 *magna cum laude*; and 4.0 *summa cum laude*, provided they meet the honors as well as the general residence requirements.

In order to graduate with honors, students transferring from other institutions must have been in attendance at the University of Alaska for at least four semesters with a minimum of twelve credits each semester.

AWARDS

Listed below are awards which have been established for students who demonstrate outstanding achievement in various fields and activities. Information concerning awards may be obtained from the Office of Student Affairs, from the Department of Military Science, or from the Department of Health, physical education, and Recreation.

American Institute of Mining and Metallurgical Engineers, Alaska Section
American Society of Civil Engineers, Fairbanks Sub-Section of the Alaska Section
Athletic Letters and Awards
Boswell Memorial Award, Marion Frances
Chemistry Department Outstanding Freshman
Druska Carr Schaible Memorial Award
Fairbanks Garden Club Conservation Award
Fairbanks Weavers Guild
McLaughlin Memorial, George M.
Shiels Prize, Archie W.
Sigma Xi Club, University of Alaska
Steese Prize, General James
Office of Student Affairs

GENERAL RESPONSIBILITIES

The University of Alaska provides services intended to assist students in making their educational careers more profitable and meaningful. While the principal function of the University is to foster the intellectual growth of the student, it is recognized that the social, moral, physical, and spiritual development of the individual also are of prime importance. Mindful of its obligation to assist the total development of the student, the University continues to expand its student personnel facilities to meet the need for individualization in the educational process.

The Office of Student Affairs, through its staff, is responsible for coordinating and extending personnel services such as the following: a) orientation activities to help new students to adjust to the privileges and responsibilities of membership in the University community; b) psychological testing to help students to find out more about their academic and vocational potentialities and capabilities; c) counseling with students relative to their personal or educational problems; d) financial assistance for students through the administration of scholarships, loans, and part-time jobs; e) medical attention for students with health problems; f) the assignment to, and the supervision of, student residence halls; g) the guidance of student cocurricular activities and organizations; and h) the promotion of high standards of student conduct.

COUNSELING AND TESTING

The Office of Student Affairs provides professional counseling services and specialized testing services for all regularly enrolled students.

Educational Counseling—Each student who has declared a major is assigned a faculty adviser who assumes special responsibility for the student's welfare and helps him plan his academic program. The student who is uncertain of his choice of an academic major is assigned an interim adviser until a definite academic goal is chosen. Students who wish information or help with regard to the selection of a major academic field should avail themselves of the counseling and testing services offered by the University.

The Department of Counseling and Testing stands ready to assist students who fail to meet the scholarship standards of the University, who need help to discover academic weaknesses, and who may need help in planning remedial programs.

Vocational Counseling—The counseling and testing staff assists students in self-appraisal of their unique interests and aptitudes and in their search for a vocational goal. Psychological and vocational interest tests are used as needed. A library of vocational information is maintained and each academic department has additional information pertinent to its field.
Personal Counseling—The student may meet with professionally trained and experienced counselors to discuss adjustment problems of a personal nature. All interviews are private and the discussions are kept confidential. The student may apply in person for such services as he deems necessary. Student contacts with the counseling service are usually voluntary, although individuals may be referred to the office by faculty and other University personnel.

Testing—Some tests are required of all new students with less than sophomore standing. The required tests include the test battery prepared by the American College Testing Program, the English and Mathematics placement tests, the library skills test and the reading survey tests.

To assist students in their self-appraisal, a number of other instruments are provided. Vocational interest inventories, scholastic aptitude tests, achievement tests, and personality inventories are available with interpretation given by members of the counseling staff.

In addition to the above services, special nationwide testing programs are administered by the Department of Counseling and Testing. Students who have intentions of proceeding with advanced study and who are required to take the Graduate Record Examination, the Law Schools Admission Test, the Medical Schools Admission Test or similar tests may arrange for these tests in the Office of Student Affairs.

STUDENT HOUSING AND FOOD SERVICE

Because the physical environment of the student during his college years is an important part of his educational experience, the University of Alaska takes pride in providing the student with carefully planned and supervised modern facilities which help promote maximum educational and social development.

Harriet Hess Hall, constructed in 1938, provides single and double room accommodations for single faculty members, graduate students, and upper classmen with approved G.P.A.'s. The residence is named for the late Harriet Hess, secretary of the Board of Regents for many years.

Andrew Nerland Hall houses 100 men in double and single rooms on its four floors. First occupied in 1953, Nerland Hall is named for a pioneer Fairbanks merchant, long-time member of the Board of Regents, and president of the Board from 1935 until his death in 1956.

John E. McIntosh Hall, completed in 1956, has double and single rooms for 100 men. This four-story building is named for a former president of the Board of Regents.

Wickersham Hall, completed in 1957, is a three-story residence for 100 women. It has 20 single rooms and 20 suites. Four women share each suite, which consists of two sleeping rooms, a study room, and a lavatory. It is named for the late Judge and Mrs. James Wickersham. Judge Wickersham introduced the bill into Congress that created the University of Alaska, and Mrs. Wickersham served on the Board of Regents.
Morton Stevens Hall, completed in the fall of 1958, is a four-story structure with accommodations for 102 men in double and single rooms. It is named for Morton Stevens, who was president of the Board of Regents from 1921 until 1932.

Austin E. Lathrop Hall, the largest of the University's residence halls, houses 144 men in double and single rooms on its five floors. The building is named for a prominent Fairbanks businessman whose interests throughout Alaska were many and varied. Mr. Lathrop served as a member and later as vice-president of the Board of Regents during the period from 1932 until his death in 1950.

A new residence hall, completed in the fall of 1964, provides double and single room accommodations for 138 women. The study-bedrooms are located around a central core area containing lounge, sewing rooms, ironing rooms, T.V. lounge and shower facilities. It is the first of a 450-student residence and dining hall complex to be located west of the President's Residence.

Married student housing is provided in several areas. Walsh Hall, completed in 1959, has accommodations for couples with not more than one child. This spacious building contains 12 furnished apartments consisting of a living room-kitchen, bedroom, and bath. The building is named for the late Michael Walsh of Nome who was a long-time member of the Board of Regents.

Stuart Hall, an apartment building similar to Walsh Hall, is available to faculty members and graduate students. Stuart Hall was completed in 1955 and was named after the late Walter T. Stuart, former member and vice-president of the Board of Regents.

Completed in the spring of 1964 are two apartment buildings which will house an additional 38 married student couples or families. All apartments are furnished except for personal items such as dishes, utensils and bedding. Several two-bedroom apartments are available for families with two or three children. One-bedroom apartments similar to those at Walsh and Stuart Halls are assigned to couples without children, or with not more than one child. Still other quarters, without a separate bedroom, are assigned to couples without children.

The University Commons, completed during the summer of 1963, provides beautiful and functional dining, food preparation, and lounge facilities for all students living in residence halls. Although most meals are served cafeteria style, table service for as many as 570 students is provided on special occasions.

The Residence Halls—All student rooms are trim, light, and of ample size. Each student has his own bed, desk, chair, tackboard, mirror, and drawer and closet space; it is his responsibility to provide all other furnishings, including bedding, pillow, and towels. Sleeping bags may not be used in residence halls.

The residence halls have attractive social rooms and recreational facilities. Regular maid service is provided in common areas such as corridors, lounges, and bathrooms. The student is responsible for keeping his own room clean and orderly.
All women students must live on campus unless they are 21 years old, or married, or live at home. All single men who are less than 21 and who do not live at home must live in a University residence hall during their freshman year. Exceptions to these regulations may be approved for good reason by the Office of Student Affairs before the beginning of any semester. Men students of sophomore standing or higher may live in one of the halls if space permits. Full-time students will be given preference over part-time students in the assignment of hall accommodations.

All residents are required to contract for their meals by the semester at the University Commons. Breakfast, luncheon, and dinner are served daily throughout the school year. Although meal service continues during the Thanksgiving and Christmas recesses for the benefit of those students who remain on the campus at those times, the cost of meals during such periods is not included in the board contract.

In order to provide students with meals of high quality at minimum cost, it is essential that the staff be able to plan its food purchases and preparations for relatively constant numbers. Therefore, it is not possible to provide special diets or to give refunds for meals missed. If, for reasons such as illness, a student who has contracted for meals is unable to report for them for more than three consecutive days, a refund for the fourth and subsequent days may be recommended by the Office of Student Affairs. Refunds are also granted to students participating in authorized University functions where meals are not provided.

**Application Procedures**—Application for residence halls should be made at the same time as the application for admission to the University is submitted. Application blanks are available upon request from the Registrar and should be returned to that office. The actual assignment of rooms is the responsibility of the Housing Director and staff. A residence hall reservation will not be confirmed until a student’s application for admission to the University has been approved. A $25.00 deposit must accompany the Residence Hall application. This deposit is refundable only if 1) admission to the University is denied; 2) cancellation of a dormitory reservation is made by August 1 for the fall semester, by December 15 for the spring semester, or by May 1 for the summer session; or 3) the student remains in occupancy throughout the period covered in his reservation less any damages or unpaid accounts. Unless written notification of late arrival is received by the Housing Director from a student for whom space is reserved not later than the first day of classes in any semester, the reservation will be canceled and the space assigned to a waiting list applicant.

Students are required to sign a contract for this entire period of time, subject to terms indicated thereon. Students are expected to pay for the entire semester during registration; however, installment payments may be arranged.

Rent for double room approximates $160.00 per semester and for a single room $185.00 per semester. This rental covers all lounge, recreation room, storage room, laundry room and local telephone privileges.

**Meal Tickets**—Each residence hall occupant is required to buy a meal ticket for cafeteria meals. The rate is $95.00 per full month.
Meal tickets do not include vacation periods which occur during the semester. Full payment for a semester's meal ticket is required in advance. The first meal covered by meal tickets is the first day of upper class registration.

**STUDENT HEALTH SERVICE**

Preventive and educational as well as protective health services are the concern of the University, and are administered by the Student Health Service. Supervision and limited treatment are the responsibility of the University Registered Nurse at the University Infirmary. Physicians are available on campus two hours daily Monday through Friday for more extensive treatment. However, the Health Center does not attempt to provide complete medical care nor does it operate as an emergency medical center.

Specifically, the center reviews mandatory health examinations for new students, administers and reads T.B. Tine tests at the beginning of each semester and provides limited out-patient service during the day.

Full-time students receive special rates for mandatory health insurance which provides hospital, medical, and surgical benefits. The coverage is extensive and inexpensive. It is designed to supplement but not replace Health Service care. Brochures containing details of the policy are available at the Health Service.

**FINANCIAL AIDS**

**Scholarships**—At the present time, scholarships are awarded only to Alaska high school seniors and currently-enrolled University of Alaska students. Non-residents must successfully complete at least one semester of academic work at the University of Alaska before they become eligible to apply for scholarship assistance. Students who are enrolled in any of the University's Community Colleges and who plan to continue their study on the main campus at College are invited to apply.

Applications from currently enrolled students are accepted twice each year before March 15 and November 15. Applications from Alaska high school seniors are accepted once each year before March 15 and are reviewed only after the applicant's admission to the University has been approved and after his American College Test scores have been forwarded to the Office of Student Affairs. All applicants use the same standard form; they do not apply for specific scholarships.

Scholarship recipients at the University of Alaska forfeit entire scholarships which are to become effective in a forthcoming semester if they earn below a 2.0 grade point average in the current semester. Scholarships are automatically forfeited by recipients who do not enroll during a semester in which the scholarship is in effect, who enroll for less than a full-time program of studies without special arrangement with the scholarship program coordinator, who are placed on disciplinary probation or who are suspended from the University for disciplinary reasons.
Questions concerning application forms, specific scholarships, or selection procedures should be directed to the Office of Student Affairs.

Although numerous scholarships are awarded annually to students at the University of Alaska by various individuals and organizations, the list below includes only those scholarships which were administered by the University’s Scholarship Committee during the 1964-65 school year:

<table>
<thead>
<tr>
<th>Name of Scholarship</th>
<th>Number</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIME, Southwestern Alaska Section</td>
<td>One</td>
<td>$ 400</td>
</tr>
<tr>
<td>Alaska Insurance Agency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Major George Albrecht Memorial”</td>
<td>One</td>
<td>100</td>
</tr>
<tr>
<td>Alaska National Guard Officers Association</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>Alaska Native Scholarships</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaska State Employees Association</td>
<td>Varies</td>
<td>15,750</td>
</tr>
<tr>
<td>“President John F. Kennedy Memorial”</td>
<td>One</td>
<td>250</td>
</tr>
<tr>
<td>American Legion Auxiliary</td>
<td>One</td>
<td>250</td>
</tr>
<tr>
<td>Dorman H. Baker Unit No. 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairbanks Kiwanis Club “Andy Anderson Memorial”</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>Fairbanks Kiwanis Club “Foreign Student Scholarship”</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>First National Bank of Fairbanks</td>
<td>Two</td>
<td>1,000</td>
</tr>
<tr>
<td>General Electric “College Bowl”</td>
<td>Several</td>
<td>500</td>
</tr>
<tr>
<td>General Motors</td>
<td>Five</td>
<td>Varies</td>
</tr>
<tr>
<td>Henderson Estate, John B.</td>
<td>Four</td>
<td>1,600</td>
</tr>
<tr>
<td>Hess Estate, Harriett</td>
<td>Two</td>
<td>880</td>
</tr>
<tr>
<td>Hess Estate, Luther</td>
<td>Three</td>
<td>1,200</td>
</tr>
<tr>
<td>Hoffer Glass Company</td>
<td>One</td>
<td>125</td>
</tr>
<tr>
<td>Hoitt, Grace</td>
<td>One private music lesson per week</td>
<td></td>
</tr>
<tr>
<td>Kennecott Copper Corporation</td>
<td>One</td>
<td>1,000</td>
</tr>
<tr>
<td>Ketchikan Pulp Company</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>Lathrop Estate, Austin E.</td>
<td>Varies</td>
<td>11,000</td>
</tr>
<tr>
<td>Lewis Fund, Charles W. and Hortense W.</td>
<td>Several</td>
<td>500</td>
</tr>
<tr>
<td>McIntosh Estate, Jessie O’Bryan</td>
<td>Varies</td>
<td>13,200</td>
</tr>
<tr>
<td>Mikami Memorial, George and Mine</td>
<td>One</td>
<td>300</td>
</tr>
<tr>
<td>Mortar Board Alumnae of Aeclett</td>
<td>One</td>
<td>300</td>
</tr>
<tr>
<td>National Bank of Alaska</td>
<td>Several</td>
<td>1,000</td>
</tr>
<tr>
<td>National Electrical Contractors Association, Inc.</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>New England Fish Company (Dr. W. L. Rogers)</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>Northern Commercial Company</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>Phipps, Margaret R.</td>
<td>Four</td>
<td>600</td>
</tr>
<tr>
<td>Pioneers of Alaska Memorial, Igloo #4</td>
<td>One</td>
<td>300</td>
</tr>
<tr>
<td>Radio Corporation of America</td>
<td>One</td>
<td>800</td>
</tr>
<tr>
<td>Ralston-Purina Company</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>Richfield Oil Corporation</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>“Clarence J. Rhodes Memorial”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sears-Roebuck Foundation</td>
<td>Four</td>
<td>1,200</td>
</tr>
<tr>
<td>Sheppard Trading Company, Inc.</td>
<td>One</td>
<td>500</td>
</tr>
<tr>
<td>State Room Scholarships</td>
<td>Varies</td>
<td>14,500</td>
</tr>
<tr>
<td>Texaco, Inc.</td>
<td>One</td>
<td>1,000</td>
</tr>
<tr>
<td>Unalakleet PTA “Senator William E. Beltz Memorial”</td>
<td>One</td>
<td>100</td>
</tr>
<tr>
<td>United States Smelting, Refining and Mining Company</td>
<td>One</td>
<td>250</td>
</tr>
<tr>
<td>University of Alaska Alumni Association</td>
<td>One</td>
<td>300</td>
</tr>
</tbody>
</table>
Student Loan Funds—No student should enroll without sufficient funds to defray the expenses of one entire academic year. Occasionally, however, a student's estimate of his year's expenses proves inadequate, and he needs financial assistance to complete the term. The University has several loan funds for this purpose.

The Student Loan Fund represents the pooled resources of several separate loan funds given to the University over a period of many years:

- Anchorage Women's Club (1926)
- Lawrence C. Phipps (1930)
- Fairbanks High School Alumni (1932)
- Sheils-Timson (1936)
- Leopold F. Schmidt (1938)
- Palmer Associated Students (1941)
- Frank Slaven (1944)
- First National Bank (1945)
- James E. Nankervis Memorial (1961)
- Phi Tau Gamma (1953)
- Palmer Community (1953)
- Glenn Carrington (1953)
- Larry Doheny (1953)
- Pioneer Women of Alaska (1954)
- Women's Auxiliary #4, Pioneers of Alaska (1957)
- Dave M. Dishaw (1958)
- Anchorage High School (1958)
- Anchorage High School PTA (1959)
- Mr. & Mrs. Walter G. Culver (1959)
- Verne E. Roberts Memorial (1960)
- James Stanley Rodbaugh Memorial (1960)
- Herman Turner Memorial (1961)
- Rotary Club of Fairbanks (1963)
- Southern California Alumni (1963)
- Arthur A. and Anne Shonbeck Memorial (1964)

The interest rate on money borrowed from the Student Fund is 4 per cent per annum. Loans are limited to $500 and are payable prior to the forthcoming September first. Any regularly enrolled student who has successfully completed at least one semester as a full-time student at the University of Alaska may apply for aid. The loans require an approved surety and will be made for University expenses only, such as room, board, fees, and books.

The Emergency Loan Fund—(comprised of the following separate funds: Fairbanks Rotary Club Bernie Carr Memorial, University of Alaska Alumni Association, Allen McDaniel Memorial, Summit Publication, Mildred Herman Project, Pappy Walker Memorial and John M. Hilpert donation) is available to all regularly-enrolled full-time students whose financial need is modest and temporary. The Emergency Loan requires no surety, is limited to $100 for not more than 30 days, and the interest is in the form of a flat service charge of $2 per loan (or 50c. if repayment is made within ten days of the date of borrowing).

Through the National Defense Education Act of 1958, federal aid was made available to the University of Alaska and other institutions to assist in the establishment of long-term, low-interest loan funds from which a limited number of needy and qualified students may borrow money to pursue their college education. Applicants who intend to teach in the elementary or secondary school and/or who have demonstrated ability in mathematics, science, engineering, or a modern foreign language will be given preference. Information about this program may be obtained from the Office of Student Affairs.
The Seward Business and Professional Women's Club has a $500 loan fund on deposit with the University of Alaska for the use of Seward High School graduates who have completed satisfactorily at least one semester's work at the University of Alaska.

The Clarence J. Rhode Memorial Scholarship Loan Fund was initiated by the Territorial Sportsmen, Inc. of Juneau. Junior, Senior and Graduate students in Wildlife Management are eligible for loans up to $300.00, under terms similar to those of the Student Loan Fund. The head of the Department of Wildlife Management administers these funds.

Mr. Ralph R. Stefano, Consulting Engineer of Fairbanks, has established a fund for the purpose of furthering instruction in Mechanical Engineering. Loans may be made from this money to deserving students in Mechanical Engineering. The dean of the College of Mathematics, Physical Sciences and Engineering administers these student loans.

Part-Time Employment—Part-time employment is available to those students wishing to underwrite some of their expenses. Applications for part-time employment are accepted in the Office of Student Affairs after students have completed registration for classes. A few of these jobs are steady part-time both on and off campus. The majority are of short duration and are of an unskilled nature. Employers both on and off campus are invited to list openings with the office.

CO-CURRICULAR ACTIVITIES

All University students are encouraged to participate in at least some of a wide range of co-curricular activities. Many of them, such as the student government, the choral groups, band, dramatics, student newspaper, yearbook, radio station, and intercollegiate and intramural athletics are open to academically qualified students regardless of their field of study. Others are activities or organizations in which participation is dependent upon enrollment in a particular curriculum. All make meaningful contributions to the student's educational experience.

To encourage students to maintain proper balance between their curricular and co-curricular activities, and to protect the best interests of the University, the following code which determines eligibility for participation in all co-curricular activities and organizations has been adopted:

1. All members of University organizations must be bona fide students of the University.
2. Students who participate in an activity which necessitates absence from regularly scheduled classes must not be on academic or disciplinary probation.
3. Special eligibility regulations for members and officers in University organizations and co-curricular departmental activities may be established by the organization or department. Copies of these regulations shall be kept on file with the Office of Student Affairs. The responsibility for enforcing special eligibility regulations shall rest with the organization or department.
4. The Academic Vice President and the Director of Student Affairs shall review special cases or unusual circumstances regarding
eligibility regulations and, with the approval of the President of the University, may modify the above regulations.

**Student Union Building**—Dining, recreational, and co-curricular facilities are contained in Constitution Hall, the official name of the Student Union Building, which was completed in 1955. It was the site of the convention of Territorial delegates which drafted the Constitution for the State of Alaska. This modern, well-equipped building provides facilities for a variety of student services and activities. On the ground and main floors are a book store, game room, barber shop, coat room, and a spacious lounge with television and hi-fi sets. The Snack Bar, which serves all members of the University community, occupies the entire second floor of Constitution Hall. Located on the third floor are offices of the student government, the student publications, the director of student activities, employment and housing, and the speech, radio and drama facilities.

**STUDENT BEHAVIOR STANDARDS**

Education at the University of Alaska is conceived as training for citizenship as well as for personal self-improvement and development. When a student enrolls in the University, he acquires a special status and prestige and assumes commensurate responsibility as a citizen in the University community. As long as he remains a student, he represents the University—whether on or off the campus.

It is the University of Alaska’s policy to give its students as much freedom of individual expression and action as is consistent with their maximum growth and with the welfare of the University. Students are expected, individually and collectively, to maintain this freedom by the exercise of that self-discipline which is imposed by a sense of social responsibility. Most students find it relatively easy to adjust to the privileges and responsibilities of the University citizenship. For those who find this process more difficult, the University attempts to provide such counsel as the student needs to gain insight and confidence in adjusting to his new environment. In some cases, when a student is unable or unwilling to assume his social responsibilities as a citizen in the University community, the institution may terminate his enrollment.

In order that new students become fully informed on the University’s expectations, specific rules and regulations will be announced during the orientation sessions preceding registration for each semester. Printed copies of these rules and regulations are available for the guidance of all students in the Office of Student Affairs. To those who live in University residence halls, manuals containing housing regulations will be distributed at the time rooms are occupied.

University regulations try to help the student work efficiently in his courses and develop a high standard of character and citizenship. They are not designed to ignore individuality, but rather encourage students to formulate rules for their own guidance and develop methods for enforcing the rules.
Admission of Non-High School Graduates—Mature students, at least 21 years of age, residing in Alaska, who have not graduated from high school, or been awarded a high school diploma on the basis of GED military tests, or have not completed any previous college level work, may be admitted. Such students may be converted to “regular” student status and become baccalaureate degree candidates after completion of not less than 30 collegiate semester hours of credit with at least a “C” average (2.00).

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ALUMNI SERVICES

The University of Alaska Alumni Association promotes interest in the University and acquaintanceship among former students of the University in an effort to encourage continuing education among alumni; to advance the scholastic standing and the physical plant of the institution; and to preserve its history and traditions. There are branch chapters in Juneau, Seward, Anchorage, Fairbanks, the Matanuska Valley, California and Washington. The Association has an office on campus to which all correspondence should be addressed: Executive Secretary, College, Alaska.

Former students who have taken credit courses at the University of Alaska, including any of its Community Colleges or other Centers, are eligible to belong to the Association. Dues are $1 annually, plus chapter dues for those who are such members. The Association publishes the Alaska Alumni quarterly.

Graduate Placement Service is a division of the Office of Alumni Services. The essential aims of the office are to bring together in the most efficient manner employers and qualified applicants and to give the student encouragement and guidance in job selection and analysis.

All graduates of the University of Alaska are eligible for graduate placement services. Seniors and graduate students who expect to complete work for degrees during the academic year are urged to visit the Placement Service and obtain registration forms at least one semester prior to graduation.

Refer to Graduate Placement Fee for cost of placement services.

R.O.T.C. AWARDS

Alaska Sons of American Revolution Award
Armed Forces Communications and Electronics Association Gold Medal Award
Association of the United States Army Medal
Best Basic Cadet Ribbon
Charles J. Keim Freshman Marksmanship Award
Dorman H. Baker Gold Medal Award
Gold Rifle, Marksmanship Award
Governor's ROTC Gold Medal
Honor Cadet Medal (Military Order of World Wars)
Legion of Valor
NRA Marksmanship Awards
Rifle Team Participation Ribbons
Tanana Valley Rifle and Pistol Club Marksmanship Award
United States Army Superior Cadet Ribbon
University President's Award Medal
Veterans of Foreign Wars Silver Medal
Admissions

ADMISSION OF HIGH SCHOOL GRADUATES

Residents—An Alaskan high school graduate with an academic average of "C", or higher, is eligible for admission. An Alaskan whose high school grades averaged less than "C" will be considered for admission to the University only if his performance on a qualifying test demonstrates that he has the capacity to undertake successfully college academic work. The test required in such cases is prepared by the American College Testing Program. The ACT test is administered at testing centers throughout the country in November, February, April and June of each year. Most Alaska high schools serve as ACT testing centers in November and/or February. Arrangements for taking the ACT test may be made through each high school's principal or guidance officer. The cost of the test to the student is $4.00.

Non-residents—A non-resident high school graduate with an academic average of "B", or higher, is eligible for admission. A non-resident whose high school grades averaged less than "B" will be considered for admission to the University only if his performance on a qualifying test demonstrates that he has the capacity to undertake successfully college academic work. The test required in such cases is prepared by the American College Testing Program. Information concerning ACT testing centers and dates may be obtained from most high schools throughout the nation and from the American College Testing Program, Post Office Box 168, Iowa City, Iowa. If the student resides in a part of the country where the ACT may not be administered, the University will accept College Entrance Examination Board scores in lieu of ACT scores.

A high school graduate offering the following pattern of studies will have no deficiencies in any program that he enters.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics:</td>
<td></td>
</tr>
<tr>
<td>Algebra</td>
<td>2</td>
</tr>
<tr>
<td>Geometry</td>
<td>1</td>
</tr>
<tr>
<td>Trigonometry</td>
<td>½</td>
</tr>
<tr>
<td>One Foreign Language</td>
<td>2</td>
</tr>
<tr>
<td>United States History</td>
<td>1</td>
</tr>
<tr>
<td>Physics or Chemistry</td>
<td>1</td>
</tr>
<tr>
<td>Natural or Social Science</td>
<td>1</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>15½</td>
</tr>
</tbody>
</table>
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A course in which a student registered as an auditor may not be completed for credit by examination at a later date.
HIGH SCHOOL SUBJECT ENTRANCE REQUIREMENTS

The specific entrance requirements of the six Colleges of the University are given below.

<table>
<thead>
<tr>
<th>College</th>
<th>English</th>
<th>Mathematics</th>
<th><strong>Foreign Language</strong></th>
<th>U.S. History</th>
<th>Natural or Social Science</th>
<th>Academic and Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Arts and Letters</td>
<td>3</td>
<td>Algebra-I</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Geom.-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Behavioral Sciences and Education: Anthropology and Geography, Psychology and Sociology Education and Home Economics</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>5</td>
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<tr>
<td></td>
<td></td>
<td>*2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>College of Biological Sciences and Renewable Resources</td>
<td>3</td>
<td>Algebra-2</td>
<td>0</td>
<td>1</td>
<td>Physics or Chemistry-1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Geom.-1</td>
<td></td>
<td></td>
<td>Biology or Elective-1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Trigonom.-½</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Business, Economics and Government Business Administration Economics, History and Political Science</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>7</td>
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<tr>
<td></td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>5</td>
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<tr>
<td>(Two years of French, German, or Russian language highly recommended. See departmental curricula.)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Earth Sciences and Mineral Industry</td>
<td>3</td>
<td>Algebra-2</td>
<td>0</td>
<td>1</td>
<td>Physics or Chemistry-1</td>
<td>7½</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Geom.-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trigonom.-½</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Mathematics, Physical Sciences and Engineering</td>
<td>3</td>
<td>Algebra-2</td>
<td>0</td>
<td>1</td>
<td>Physics or Chemistry-1</td>
<td>7½</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Geom.-1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Trigonom.-½</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Plane Geometry required of Education students who intend to select teaching majors and/or minors in mathematics, chemistry, and/or physics.

** Students who offer 2 units of a high school foreign language will enroll in second year language, and no credit will be allowed for first-year college courses in the same language.

† 1 year of algebra and 1 year of geometry will be acceptable for students in Agriculture and Biological Sciences not wishing to continue with advanced studies, such as graduate work, medicine, etc.

Entering freshmen whose background of training in English and mathematics appears to be deficient when measured by placements tests may be required to take English A or Math A or both. Achievement of a certain level of excellence in these subjects is essential to success in other areas of study. These basic English and mathematics courses are especially designed to assist the student in achieving these competencies.

Courses completed at the junior high school level and certified on the official high school transcript by secondary school officials as being
equivalent to courses normally offered at the high school level will be accepted as meeting college entrance requirements.

When a student is deficient in specific subjects, but offers a satisfactory general record, he may enter with an entrance deficiency. The student must remove deficiencies during the freshman year. All courses taken to remove deficiencies must satisfy the department head concerned, and must be in the subject in which the student is deficient.

Admission of Post Graduate Students—Students who hold a bachelor's degree but who have not defined their graduate program or declared the subject in which they wish to pursue their studies toward a higher degree may be admitted as "Post Graduates." Registering as a post graduate is satisfactory for those who hold a bachelor's degree and who have the following or similar purposes:

1. Students who plan to take "interest" courses.
2. Students completing work for a teaching certificate.
3. Students completing a second undergraduate major and/or a second bachelor's degree.
4. Students strengthening their preparation in order to be admitted to graduate study.
5. Transient students expecting to be at the University only briefly.
6. Students awaiting action on applications for graduate status.

Admission of Graduate Students—See page 65.

Admission to College Classes While Attending High School—To facilitate the transition and adjustment from high school to college the University has made special provisions for students of varied background and ability. Qualified Alaskan high school seniors of advanced academic standing and ability are permitted to enroll, while attending high school, in certain University of Alaska classes taught by University of Alaska faculty and to enroll in college courses which may be offered at authorized high schools. To qualify for admission to college classes while still attending high school, a high school senior must have the recommendation of his high school principal, the approval of his parents, and a satisfactory score on the usual testing program required for entering students. Credits earned in such college classes may not be applied to high school graduation, but will apply toward graduation from the University and may be transferred to other universities following graduation from high school, provided the grades earned are satisfactory. Seniors who are interested in participating in this program should contact their high school principal.

After enrollment at the University, a student may receive credit in CEEB Advanced Placement Tests, or the equivalent, when test scores warrant it and may receive course credit by examination upon presentation of adequate justification.

How to Apply for Admission—Students who wish to attend the University of Alaska should write to the Director of Admissions and Registrar and request Application For Admission Forms. Students who expect to attend full time must present the following credentials, with the exception of the health form, before August 15 for the fall semester and January 1 for
the spring semester. Applications received after these closing dates may be considered for the following semester.

1. Application for admission.

2. Scholastic records. A secondary school record form completed by the high school where the applicant finished his high school work should be mailed by the high school. Applicants are required to submit complete official transcripts of all high school and college credits. If the work has been taken at two or more collegiate institutions, an original transcript from each college attended is required. These transcripts should be sent directly from the Registrar of the college where the work was taken to the Director of Admissions and Registrar at the University of Alaska. A catalog or set of course descriptions should accompany the transcripts. The applicant is responsible for securing these scholastic records. An application for admission is not processed until all such records are on file. Any person who willfully refrains from transferring all of his scholastic records or giving full information concerning previous attendance at other institutions will not knowingly be accepted or retained as a student.

3. Medical and physical examinations. Admission to the University also is dependent upon the applicant's having had a recent physical examination which will confirm that his health is sufficient to enable him to successfully undertake the course of study for which he is applying. This requirement applies to all new students and to all former students returning to the University after an absence of one year or more. The applicant's health record and examination report from the physician of his choice must be received by the University Nurse before the student's acceptance may be assured. The report of a physical examination taken more than five months prior to the applicant's intended enrollment will be unacceptable to the University. Certification of immunity to or recent vaccination for smallpox must be included. At the time of registration, a tuberculin test is administered by the University Nurse.

4. Photograph. All candidates for admission should furnish a clear snapshot or photo, approximately two by three inches.

5. Room reservations. Students desiring dormitory rooms should complete the dormitory application form and return it and a $25 room deposit with their application for admission form.

6. ACT results. Candidates for admission should have their ACT results sent to the University. If the candidate did not indicate the University of Alaska as an institution to receive the results when the candidate took the test he should write the American College Testing Program and have the results forwarded to the University. The request should be addressed to the American College Testing Program, P.O. Box 168, Iowa City, Iowa.

Admission to the University for the purpose of earning scholastic credits becomes complete only when all credentials have been accepted.
Under the watchful eye of an Eskimo oil painting students take an examination.
Degrees

DEGREES OFFERED

The University of Alaska offers programs leading to the following:

Undergraduate Degrees
- Associate of Arts, A.A.
- Associate of Business Administration, A.B.A.
- Associate of Engineering, A.E. (Electronic Technology)
- Associate of Science, A.S.
- Bachelor of Arts, B.A.
- Bachelor of Business Administration, B.B.A.
- Bachelor of Education, B.Ed.
- Bachelor of Engineering, B.E. (5 years)
- Bachelor of Science, B.S.

Professional Degrees
- Engineer of Mines, E.M.

Graduate Degrees
- Master of Arts, M.A.
- Master of Education, M.Ed.
- Master of Science, M.S.
- Doctor of Philosophy, Ph.D.

GENERAL REQUIREMENTS FOR UNDERGRADUATE DEGREES

To receive a degree from the University, a student must have earned the required number of credits as well as satisfied the special requirements of his curriculum.

The student must attain an average grade of 2.00 (C) in all work, as well as in the major field and minor fields; transfer students must maintain a 2.00 (C) average in all work at the University of Alaska.

Students must be in residence during the year preceding graduation. Students must earn twenty-four credits in the required upper division subjects.

A maximum of 32 semester hours of work completed by correspondence may be accepted toward a degree.

An upper division student showing a marked English deficiency may have to pass a remedial course in English.

All regularly enrolled, physically fit male students without military training who are citizens of the United States, under 24 years, must complete the Basic Course, R.O.T.C. (See under Military Science).

All physically qualified women students under 24 years and all physically qualified men students under 24 years who are exempt from military training, entering the University for the first time, must enroll in physical
education. Such students must complete two years of physical education, preferable during the first two years of attendance at the University.

Transfer students must meet the requirements of the University of Alaska with respect to military science or physical education, unless they have completed the requirements of the schools previously attended.

A student may elect to graduate under the catalog which is in force during the year of his graduation or the previous year.

**GENERAL REQUIREMENTS FOR A B.A. DEGREE**

English Composition and Literature, including Engl. 101-2 ........................................ 12 credits
Foreign Language—Two years of collegiate work in one language. Students 12-16
offering 2 units of one language from a secondary school will enter the
second year or begin a new language. 12 credits fulfill the requirement
if all are above the 100 level.
Social Science, including Hist. 117-8 and work in two other fields ......................... 15
Mathematics and/or Natural Science, Math. 101-2 or a year sequence in a
laboratory science plus enough credits to total 12.
Major Specialty—(See Departmental Sections for specific requirements.) If the
major specialty is a natural or social science, electives in English or foreign
language may be substituted for the general degree requirements, if the
program includes a major and at least one minor in these areas.
Minor Specialties—2 of 12-18 credits each, or a second major to be approved 23-34
by petition.
Physical Education or Military Science ................................................................. 4-6
Electives—To bring total credits to 130 credits.

**MAJOR SPECIALTIES AVAILABLE FOR B.A. DEGREE**—Anthropology, Art, Biological
Sciences, Botany, Chemistry, Economics, English, French, Geography, Geology, German,
History, Linguistics, Mathematics, Music, Physics, Political Science, Psychology, Russian,
Speech, Sociology, Zoology.

**MINOR SPECIALTIES AVAILABLE FOR B.A. DEGREE**—Anthropology, Art, Biological
Sciences, Botany, Chemistry, Classics (Greek, Latin), Economics, Secondary Education,
English, French, Geography, Geology, German, Home Economics, History, Journalism,
Linguistics, Mathematics, Military Science, Music, Philosophy, Physics, Political Science,
Psychology, Russian, Sociology, Spanish, Speech, Zoology.

**GENERAL REQUIREMENTS FOR A B.B.A. DEGREE**

English Composition and Literature, including Engl. 101-2, 213, 328 or 336, 15 credits
and 3 credits in another Literature Course.
Behavioral Science—All in Psychology or All in Sociology/Anthropology .................. 9
History and Political Science, including Hist. 231-2, P.S. 101-2 .............................. 15
Economics, including Econ. 121-2, 327, 323, 350, 425, 429 .............................. 21
Mathematics, including Math. 121, 122, and 204 .............................................. 14
Biological Science 105-106 or Chemistry 101-102 or Physics 103-104 .............. 10
Military Science/PE ................................................. 4-6
General Requirements, including:
Acc. 215-216—Principles of Accounting ............................................................... 6
B.A. 331-332—Business Law ................................................................. 6
Major Specialty (See Departmental Sections for Specific Requirements) .............. 12-18
Approved Electives (8-20 credits) to total 130 credits.

**GENERAL REQUIREMENTS FOR A B.Ed. DEGREE**

For requirements for a B.Ed. in Elementary Education, see page 78.
For requirements for a B.Ed. in Secondary Education, see page 79.

**GENERAL REQUIREMENTS FOR A B.S. DEGREE (ENGINEERING SCIENCE)**

English Composition and Literature, including Engl. 101, 102, 313 .......................... 12 credits
Social Science, including Econ. 121 ................................................................. 9
Engineering Science, including E.S. 101, 102, 111, 112, 207, 208, 331, 341, 346 ..... 27
Mathematics, including Math. 101, 102, 201, 202, 302, 312 .............................. 22
Chemistry, including Chem. 201, 202 ............................................................... 8
Physics, including Phys. 211, 212 ................................................................. 8
Military Science or Physical Education .............................................................. 6-4
Departmental Requirements and Electives to bring total credits to 130.
MAJOR SPECIALTIES AVAILABLE FOR B.S. (ENGINEERING SCIENCE) DEGREE—
Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering.

GENERAL REQUIREMENTS FOR A B.S. DEGREE

English Composition and Literature, including Engl. 101-2 ........................................ 12 credits
Foreign Language—A first year (101-102) or a second year (201-202) of a 0-10
Language approved by the Department Head. Students with two or three
years of study of an approved language may petition to have this require-
ment removed by examination.
Social Science ....................................................................................................................... 9
Mathematics ......................................................................................................................... 9
Physics ........................................................................................................................................ 8
Chemistry or Biology ............................................................................................................ 8
Major Specialty (See Departmental Sections for specific requirements)
Physical Education or Military Science ................................................................................ 4-6
Departmental Requirements, Minor Specialties, and/or Electives—To bring
overall total to 130 credits.

MAJOR SPECIALTIES AVAILABLE FOR A B.S. DEGREE—Anthropology, Biological
Sciences, Botany, Chemistry, Fisheries Biology, General Science, Geography, Geology,
Geological Engineering, Home Economics, Mathematics, Medical Technology, Mining
Engineering, Physics, Wildlife Management, Zoology.

MINOR SPECIALTIES AVAILABLE FOR A B.S. DEGREE—Refer to Departmental
Section since some B.S. degree programs do not require minor specialties.

GENERAL REQUIREMENTS FOR GRADUATE STUDY

Graduate study seeks to prepare the student for creative work—for
all work that extends the bounds of knowledge, that cherishes and trans-
mits knowledge, and that applies knowledge for the benefit of man. It
seeks to give the student deeper insights and better understandings of
fundamental principles. The graduate program is shaped to the needs
of the individual student and is developed in terms of his experience,
academic background, and aspirations. Earning an advanced degree
entails more than the satisfactory completion of specified courses; the
student must show promise and performance in productive scholarship.

MASTER'S DEGREES

As will be seen under departmental listings, programs leading to
master's degrees are offered in the areas of botany, chemistry, civil engi-
neering, creative writing, education, engineering management, English,
fisheries, biology, general science, geology, geophysics, mathematics,
mineral industry management, mineral preparation engineering, physics,
wildlife management, and zoology. Students wishing to enroll for graduate
study in any of these fields should obtain an application form from the
Director of Admissions and Registrar's Office. The completed form and
official transcripts of all previous college or university work should be
returned to that office.

However, programs leading to master's degrees may be arranged on
request in certain aspects of other subjects; for example, anthropology,
business, economics, history, linguistics, etc. Students interested in pur-
suing studies in one of these or any other discipline not listed should
write directly to the Vice President for Research and Advanced Study.

In general, a student may be admitted if he has a bachelor's degree
from an accredited institution with at least a "B" average in his major
and if his major is deemed suitable for continuation of studies in the field of his choice.

Department heads in fields of interest will determine the adequacy of the student's preparation and whether or not departmental facilities are sufficient for the student's aims. Applications from students whose projected programs do not fall within a department will be reviewed by a Committee for Admissions. Departmental or Committee recommendations will be transmitted to the student by the Director of Admissions.

As soon as the student is accepted, an Advisory Committee of not fewer than three faculty members will be set up to assist the student in planning and carrying out his program.

The requirement for a master's degree is a minimum of thirty semester credits, of which a maximum of twelve may be devoted to the thesis. At least nine semester credits, in addition to those earned for the thesis, must be at the 600 level. No lower division courses (100 or 200) are applicable. A maximum of nine semester credits from another institution may be transferred to the University of Alaska and applied toward a degree if approved by the student's advisory committee and by the dean of the college in which the student is enrolled.

B is a minimum passing grade in courses not primarily for graduate students (300 or 400); C will be accepted in courses primarily for graduate students (500, 600, and 700) provided a B average is obtained in graduate courses. Such standards are requisite for continuing study towards a master's degree.

A student may be admitted to candidacy for a specific master's degree after he has satisfied all the following requirements: 1) completed at least 8 credits of graduate study at the University of Alaska; 2) demonstrated a reading ability of a foreign language, if required; 3) received approval by the dean, if he is enrolled in a college, or by the Vice President for Research and Advanced Study, if not, of the provisional title of his thesis, if a thesis is required, and of his program of studies.

The candidate must pass a final examination, either written or oral; if a thesis is required, the examination will include a defense of the thesis. The Examining Committee shall consist of a candidate's Advisory Committee and one member of the faculty from a different college appointed by the Vice President for Research and Advanced Study.

All work toward the fulfillment of the requirements of a master's degree must be completed within seven years.

**DOCTOR OF PHILOSOPHY DEGREE**

No restrictions are placed on the disciplines that may be studied by students seeking doctoral degrees. There are established doctoral programs in certain aspects of geology, geophysics, oceanography, physics, and zoophysiology.

Prospective candidates in these, or other topics, should write to the Vice President for Research and Advanced Study outlining in some detail their previous training and interests for future study. Each application
is reviewed by an Admissions Committee both in light of the applicant's qualifications and the faculty and facilities available on the campus relevant to the field of projected study.

The degree of Doctor of Philosophy is granted for proven ability and scholarly attainment. There are no fixed credit requirements for this degree at the University of Alaska. It is not the policy to confer this degree upon anyone whose entire academic experience has been at this University.

The student chooses a major line of study and, with the advice of his Advisory Committee, such lines of study in related fields as are necessary for achievement of a thorough and scholarly knowledge of his subject. With approval of his Advisory Committee, the student prepares a program for the degree, which, including applicable and acceptable work transferred from other institutions, shall represent approximately three full years of study beyond the bachelor's degree.

A grade average of B must be maintained in graduate course work. Reading ability in two foreign languages is required for the doctorate. German, French, or Russian are usually taken, but alternatives may be substituted upon petition.

Admission to graduate study does not imply admission to candidacy for a degree. The student should seek admission to candidacy approximately one year before he, in consultation with his Advisory Committee, deems that he will have completed the requirements for his doctorate. A student may be accepted as a candidate by his Advisory Committee after 1) completing the equivalent of two academic years of graduate study, 2) completing at least one semester in residence at the University of Alaska, 3) meeting his foreign language requirement, 4) obtaining approval by his Advisory Committee of the title and synopsis of his dissertation, and 5) passing a qualifying examination set by his Advisory Committee.

The dissertation, which is expected to represent the equivalent of at least one full academic year's work at the University of Alaska, must be a contribution to knowledge.

After submitting the dissertation, the candidate must pass an oral examination supporting his dissertation. The examining committee will consist of a minimum of five members: the candidate's Advisory Committee supplemented by additional members appointed by the dean, when the student is enrolled in a college, and by the Vice President for Research and Advanced Study.

All work toward the fulfillment of a doctor's degree must be completed within ten years.

**THESIS AND DISSERTATIONS**

Two copies of the thesis or dissertation, typed and bound (original and first carbon), must be filed in the University Library. Departments may require additional copies. All records of work done in connection with the preparation of theses and dissertations are the property of the University and can be released with the permission of the head of the department and the Vice President for Research and Advanced Study after having been reproduced by the University.
EXTENDED REGISTRATION FOR GRADUATE STUDENTS

A student who is working towards a higher degree must be registered. A student whose only remaining requirement is the removal of a deferred grade in Thesis or Special Topics must request the Registrar to allow him Extended Registration, at no cost, at the beginning of each semester until the deferred grade is removed. With the request, the student must state the approximate time at which he expects to complete the work. Upon receipt of such a request, the Registrar refers the request to the Chairman of the student’s Advisory Committee. With his approval, the student is considered as enrolled in the current semester.
Colleges of the University

Arts and Letters

Behavioral Sciences and Education

Biological Sciences and Renewable Resources

Business, Economics and Government

Earth Sciences and Mineral Industry

Mathematics, Physical Sciences and Engineering
Drama takes the form of plays and musicals throughout the year.
The Humanities diversify the quest for knowledge in an era of specialization. Examining what men have thought and expressed, they keep knowledge current, expanding and general. Technique distinguishes them from subjects primarily using the empirical method of science, for there are truths which transcend verification. The study of languages breaks cultural fetters, directed reading builds appreciation, exposure to the fine arts quickens sensibility; and all, language, literature, and the arts, collaborate to make knowledge prevail and discovery imminent.

UNDERGRADUATE DEGREES—The College of Arts and Letters offers a Bachelor of Arts degree with majors in Art, English, French, German, Linguistics, Music, Russian, and Speech (options in Public Address, Drama, and Broadcasting). The College offers minors for the Bachelor of Arts in these subjects and in Classics (Greek, Latin), Journalism, Philosophy, and Spanish.

GRADUATE DEGREES—The College of Arts and Letters offers a Master's Degree in English. Students also may earn an advanced degree in Creative Writing. See page 65.

ART DEPARTMENT

HELMUT G. VAN FLEIN—DEPARTMENT HEAD

DEGREE—BACHELOR OF ARTS

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

The program of the Art Department recognizes the responsibility of the Fine Arts within the Humanities. Courses in Art further and encourage independent, original and creative thinking. The language of art is universal and through it man's creative and intellectual endeavors become more meaningful.

REQUIREMENTS FOR A B.A. DEGREE WITH AN ART MAJOR

1. Complete general requirements for a B.A. degree as listed on page 65.
2. Complete a minimum of 30 hours of credit in Art courses. A maximum of 54 hours of credit in Art courses may be counted toward the degree.
3. Complete the following courses in Art:

   Art 105-106—First Year Freeland Drawing ........................................ 4 credits
   Art 207-208—First Year Printmaking ................................................. 4
   Art 211-212—First Year Sculpture ..................................................... 6
   Art 213-214—First Year Oil Painting ................................................ 6
   Art 261-262—History of World Art ..................................................... 6
   Art 307—Second Year Printmaking ..................................................... 2
   Art 311—Second Year Sculpture ......................................................... 3
   Art 313—Second Year Oil Painting ..................................................... 2
   and
   Art 407-408—Advanced Printmaking .................................................. 4
   or
   Art 411-412—Advanced Sculpture ....................................................... 6
   or
   Art 413-414—Advanced Oil Painting .................................................. 4

4. Transfer students who are candidates for the B.A. Degree with a major in Art must complete a minimum of 18 hours of credits in Art courses while in residence.
5. The Department of Art advises Art students to use French or German to meet their foreign language requirements.

A minor in Art requires 12 hours of approved Art courses.

ART PROGRAM FOR TEACHERS

Students who are preparing to teach Art must complete the requirements for an Education minor as required by the Department of Education.

For course descriptions, see page 125.
ENGLISH DEPARTMENT

ARTHUR WILLIS—DEPARTMENT HEAD

DEGREES—BACHELOR OF ARTS AND MASTER OF ARTS

MINIMUM REQUIREMENTS FOR DEGREE: B.A.—130 CREDITS
M.A.—30 ADDITIONAL CREDITS

Writing and reading distribute ideas and make them available to all. Courses in the writing of English perfect expression, encourage creativity; the study of literature both delights and builds a regard for scholarship. Through its writing courses, its courses in language and literature, the department offers much to developing minds.

REQUIREMENTS FOR A B.A. DEGREE WITH AN ENGLISH MAJOR

1. Complete general requirements for a B.A. degree as listed on page 65.
2. Complete 33 credits in English beyond English 101 and 102, including:
   - Engl. 239—Form and Technique of Poetry ................................................. 3 credits
   or
   - Engl. 240—Form and Technique of Fiction ................................................. 3
   Not required of Junior and Senior transfer majors
   - Engl. 423—Elizabethan Drama ................................................................. 3
   or
   - Engl. 424—Shakespeare .............................................................................. 3
   - Engl. 421—Chaucer ................................................................................... 3
   - Engl. 472—History of the English Language ............................................... 3

A minor in English requires 18 credits beyond English 101 and 102, including:
   - Engl. 421—Chaucer ................................................................................. 3 credits
   or
   - Engl. 472—History of the English Language ............................................... 3
   - Engl. 423—Elizabethan Drama ................................................................. 3
   or
   - Engl. 424—Shakespeare ............................................................................ 3

For course descriptions, see page 143.

REQUIREMENTS FOR A M.A. DEGREE IN ENGLISH

1. A minimum of 30 credits of approved courses including English 697-698, Thesis, 6 credits.
2. Completion of the general graduate degree requirements listed on page 65.

For course descriptions, see page 143.

Students also may earn an advanced degree in Creative Writing. See page 65.

JOURNALISM DEPARTMENT

WERNER J. SEVERIN—DEPARTMENT HEAD

The complex world of today demands a tremendous corps of people with diverse backgrounds to write the material which appears in the rapidly expanding media of communication. Such writers inform, interpret, entertain and guide. The student may select courses which will enable them to communicate more effectively with the written word.

The first two years of the curriculum in English, including the minor consisting of 12 credits in Journalism, embody the essentials of the first two years of a curriculum in Journalism.

The Journalism and Creative Writing Department offers elective courses leading to a minor in Journalism.

For course descriptions, see page 153.

LINGUISTICS AND FOREIGN LANGUAGES DEPARTMENT

BRUCE R. GORDON—DEPARTMENT HEAD

DEGREE—BACHELOR OF ARTS

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

In a shrinking world Americans increasingly need to communicate directly with other peoples in order to achieve mutual understanding. Whether it be Eskimo or English, the language of a people embodies its unique culture and way of thinking and feeling. Therefore, to know only one language is to think in only one way.

Linguistics is the science of language. The study of linguistics and foreign languages and literatures liberates the student from the confines of his own culture and also makes his own culture more meaningful to him.
ARTS AND LETTERS 73

REQUIREMENTS FOR A B.A. DEGREE WITH A FOREIGN LANGUAGE OR
LINGUISTICS MAJOR OR MINOR

Majors are offered in French, German, Linguistics and Russian.
1. Complete general requirements for a B.A. degree as listed on page 65, including foreign language requirement.
2. Complete 26 credits beyond first year in the major language.
3. Complete 3 credits in a Linguistics course.
   A minor in a foreign language requires four semesters (12 credits) of study in that language beyond the 102 level.

For a major in Linguistics:
1. Complete general requirements for a B.A. degree as listed on page 65, including foreign language requirement.
2. Complete 4 semesters (12-16 credits) in language other than that offered as fulfillment of foreign language requirements towards the B.A. degree. Both languages must be chosen from French (or Latin or Spanish), Greek, German, or Russian.
3. Complete 15 credits in Linguistics courses.
   A minor in Linguistics requires 12 credits in Linguistics.

MUSIC DEPARTMENT

CHARLES W. DAVIS—DEPARTMENT HEAD

DEGREE—BACHELOR OF ARTS

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

The curriculums are designed to satisfy two principal objectives:

Culturally, to teach musical skills, knowledge, appreciations, and attitudes that in combination with the other arts and humanities contribute to an enriched life.

Professionally, to prepare teachers and musicians who, in addition to the above, are proficient in professional leadership. In the teaching of students as public school music teachers, the necessary specialization in the fields of music and education is adequately provided for in the curriculums leading to the B.A. degree.

The various concert organizations maintained by the Music Department offer participation experiences for students in all colleges of the University.

For course descriptions, see page 161.

REQUIREMENTS FOR A B.A. DEGREE WITH A MAJOR IN MUSIC
OR MUSIC EDUCATION

For a major in Music:
1. Complete general requirements for a B.A. degree listed on page 65.
2. Complete 40 credits in Music including:
   - Music 131-132—Basic Theory .................................................. 6 credits
   - Music 231-232—Advanced Theory .............................................. 6
   - Music 321-322—History of Music ............................................... 6
   - Music 331-332—Form and Analysis ............................................. 4
   - Music 491 or 492—Senior Seminar ........................................... 2
   - Applied Music, to include 8 credits of private lessons
   - 8 credits of ensemble participation ........................................ 16
3. Prior to graduation, satisfy an examination in piano proficiency.

For a major in Music Education:
1. Complete general requirements for a B.A. degree listed on page 65.
2. Complete 40 credits in Music including:
   - Music 131-132—Basic Theory .................................................. 6 credits
   - Music 231-232—Advanced Theory .............................................. 6
   - Music 321-322—Music History .................................................. 6
   - At least 6 credits from:
     - Music 315-316—Instrumental Methods ..................................... 6
     - Music 415-416—Instrumental Methods ..................................... 6
   - Applied Music, to include 6 credits of private lessons and 10 credits of ensemble participation, to include 2 semesters of a vocal ensemble ..... 16
3. Complete a minor in Education, including either Music 343 or Music 344.
4. Prior to graduation, satisfy an examination in piano proficiency.
   A minor in Music requires 12 credits in Music beyond Freshman courses.
### MUSIC CURRICULUM

#### FALL SEMESTER

**FIRST YEAR**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 101—Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language 101 or 201</td>
<td>3-5</td>
</tr>
<tr>
<td>History 117</td>
<td>3</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>I or 1½</td>
</tr>
<tr>
<td>Applied Music (Ensemble)</td>
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</tr>
<tr>
<td>Applied Music (Private Lesson)</td>
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<tr>
<td>Music 131—Basic Theory</td>
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**SECOND YEAR**

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<th>Course</th>
<th>Credits</th>
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<tr>
<td>English</td>
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</tr>
<tr>
<td>Foreign Language 201 or 493</td>
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</tr>
<tr>
<td>Lab. Science or Math. 101</td>
<td>4-5</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>I or 1½</td>
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<td>Applied Music (Ensemble)</td>
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<tr>
<td>Applied Music (Private Lesson)</td>
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<tr>
<td>Music 231—Advanced Theory</td>
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**THIRD YEAR**

<table>
<thead>
<tr>
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<tr>
<td>Humanities</td>
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<td>Applied Music (Ensemble)</td>
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</tr>
<tr>
<td>Applied Music (Private Lesson)</td>
<td>1</td>
</tr>
<tr>
<td>Music 321—Music History</td>
<td>3</td>
</tr>
<tr>
<td>Music 307—Chamber Music</td>
<td>1</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>Music 313—Opera Workshop</td>
<td>I-2</td>
</tr>
<tr>
<td>Elective (1st Minor)</td>
<td>3</td>
</tr>
<tr>
<td>Elective (2nd Minor)</td>
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**FOURTH YEAR**

<table>
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<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Music 322—Form and Analysis</td>
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<tr>
<td>Music 491—Senior Seminar</td>
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<tr>
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<tr>
<td>Applied Music (Private Lesson)</td>
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<tr>
<td>Music 307—Chamber Music</td>
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</tr>
<tr>
<td>Music 317—Collegium Musium</td>
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<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>Music 313—Opera Workshop</td>
<td>2-3</td>
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<td>Elective (Social Science)</td>
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#### SPRING SEMESTER

**FIRST YEAR**

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<td>Foreign Language 102 or 202</td>
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<tr>
<td>History 118</td>
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<tr>
<td>P.E. or Mil. Sci.</td>
<td>I or 1½</td>
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<td>Applied Music (Private Lesson)</td>
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<tr>
<td>Music 132—Basic Theory</td>
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**SECOND YEAR**

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<td>English</td>
<td>3</td>
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<tr>
<td>Foreign Language 201 or 494</td>
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<tr>
<td>Lab. Science or Math. 102</td>
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<tr>
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<td>Applied Music (Private Lesson)</td>
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<td>Music 232—Advanced Theory</td>
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<th>Course</th>
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<td>Humanities</td>
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<td>Applied Music (Private Lesson)</td>
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<td>Music 322—Music History</td>
<td>3</td>
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<td>Music 307—Chamber Music</td>
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<td>or</td>
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<td>Elective (2nd Minor)</td>
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<tr>
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<td>Elective (2nd Minor)</td>
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<tr>
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### MUSIC EDUCATION CURRICULUM

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<tr>
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</table>

Note: Music Education Majors who are instrumentalists must take at least two semesters of a vocal ensemble.
<table>
<thead>
<tr>
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<td>Psy. 101—Intro. to Psychology</td>
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<td>Psy. 301—Psych. of Adolescence</td>
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<td>P.E. or Mill. Sci.</td>
<td>1 or 1½</td>
<td>P.E. or Mill. Sci.</td>
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<tr>
<td>Applied Music (Ensemble)</td>
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<tr>
<td>Applied Music (Private Lesson)</td>
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<tr>
<td>Music 231—Advanced Theory</td>
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<tr>
<th>THIRD YEAR</th>
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<td>Humanities</td>
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<td>Ed. 313—Educational Psych.</td>
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<td>Ed. 322—Tests &amp; Measurements</td>
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<td>Lab. Science or Math. 101</td>
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<td>Lab. Science or Math. 102</td>
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<td>Music 315—Instrumental Methods</td>
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<td>*Music 344—Music Education</td>
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<td>Music 321—Music History</td>
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<td>Ed. 452—Directed Teaching</td>
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<td>Ed. 421—Secondary School</td>
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<td>Music 316—Instrumental Methods</td>
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<td>Music 415—Instrumental Methods</td>
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<td>Music 307—Chamber Music</td>
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<td>Music 317—Collegium Musicum</td>
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<td>or Music 313—Opera Workshop</td>
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<td>or Music 313—Opera Workshop</td>
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<td>Elective (Social Science)</td>
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</tbody>
</table>

* Although the Music Department does not require that students include both Music 343 and 344 in the curriculum, both are recommended.

**PHILOSOPHY DEPARTMENT**

**RUDOLPH W. KREJCI—DEPARTMENT HEAD**

The courses in Philosophy are designed to confront the student with the fundamental problems of Western philosophical heritage and introduce him to independent reflection on them, thus broadening his perspectives for the various areas of specialization in science, the social sciences and humanities. Students who wish a minor in Philosophy must take courses approved in advance by the Head of the Department of Philosophy. A minor in Philosophy requires 15 credits.

For course descriptions, see page 163.

**SPEECH, DRAMA, AND RADIO DEPARTMENT**

**LEE H. SALISBURY—DEPARTMENT HEAD**

**DEGREE—BACHELOR OF ARTS**

**MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS**

Throughout the ages man has made his thoughts and feelings known to others through the spoken word. At this time, perhaps more than ever before, it is recognized that if man is to take an active part in his society he must express himself clearly and effectively. The course offerings in Public Speaking are a means to this end.

The media of Theatre and Broadcasting provide a more dramatic framework through which ideas and feelings may be expressed. Performance is the central means of study; individual development takes place within the framework of group activity.

The Speech, Drama, and Radio Department offers elective courses leading to a major or minor in Speech with options in Public Address, Drama, and Broadcasting.
REQUIREMENTS FOR A B.A. DEGREE WITH A SPEECH MAJOR

1. Complete general requirements for B.A. degree listed on page 65.
2. Complete 24 credits in Speech beyond Speech 211, including:
   - Speech 221—Introduction to Theater .................................................. 3 credits
   - Speech 231—Introduction to Broadcasting ........................................... 3
   - Speech 315—Phonetics ........................................................................ 2
   - Speech 316—Voice and Diction .............................................................. 2

3. A Speech major may elect to take an option in Public Address by adding the following courses to those specifically required in 2. [Above]
   - Speech 212—Public Speaking II ............................................................ 2
   - Speech 313—Argumentation and Debate .............................................. 2
   - Speech 314—Discussion ...................................................................... 2
   - Speech 317—Oral Interpretation ........................................................... 3

4. A Speech major may elect to take an option in Drama by adding the following courses to those specifically required in 2. [Above]
   - Speech 223—Acting I ......................................................................... 3
   - Speech 325—Theater Production .......................................................... 2
   - Speech 327—Makeup for Theater .........................................................
   - Speech 425—Directing
   or
   - Speech 323—Acting II ......................................................................... 3
   - Psychology 101—Introduction to Psychology ........................................ 3

5. A Speech major may elect to take an option in Broadcasting by adding the following courses to those specifically required in 2. [Above]
   - Speech 237—Announcing ................................................................... 2
   - Speech 333—Writing for Radio and Television ...................................... 3
   - Speech 334—Radio-Television Advertising
   or
   - Speech 433—Radio-Television News ..................................................... 3
   - Speech 335—Broadcast Production ..................................................... 3

6. A minor in Speech requires 12 credits of approved Speech electives.
   For course descriptions, see page 174.
The College of Behavioral Sciences and Education provides students an opportunity to develop an understanding of man in relation to his social, psychological and cultural background. Such knowledge serves to broaden the student's concept of life and conditions of society and to provide a foundation for service in specific professional fields.

UNDERGRADUATE DEGREES—The College has programs that lead to Bachelor of Arts degrees in Anthropology, Geography, Psychology, and Sociology. The Bachelor of Education degree is awarded to students majoring in Education.

GRADUATE DEGREES—A program leading to the Master of Education degree is offered to qualified students.

ANTHROPOLOGY AND GEOGRAPHY DEPARTMENT

IVAR SKARLAND—DEPARTMENT HEAD

DEGREES—BACHELOR OF ARTS AND BACHELOR OF SCIENCE

GRADUATE STUDY

See page 65.

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

The Department offers undergraduate level courses in Anthropology and Geography, and opportunities for research. A major can be obtained in both fields. Anthropology and Geography contribute to an understanding of the complex problems of human behavior, cultural and social organization and the relationship of man to the various environments. Archaeological and human ecological research carried out in the field and library provides information about past and present modes of living and of origins and distribution of peoples and cultures.

REQUIREMENTS FOR A B.A. DEGREE OR A B.S. DEGREE WITH AN ANTHROPOLOGY MAJOR

1. Complete general requirements for a B.A. or B.S. degree as listed on page 64.

2. Complete 20 credits beyond Anthropology 101 and 212, including:
   Anth. 304—Africa .......................................................... 3 credits
   Anth. 312—North American Archaeology ........................................ 3
   Anth. 331—Primitive Religion .................................................. 3
   Anth. 335—North American Ethnology ......................................... 3
   Anth. 336—Central and South American Ethnology .......................... 3
   Anth. 342—Alaska Natives ....................................................... 3
   Anth. 423—Social Anthropology ................................................ 3

3. Complete the following:
   Soc. 101—Introduction to Sociology ........................................... 3
   Psy. 101—Introduction to Psychology .......................................... 3
   Geog. 201—Elements of Physical Geography .................................. 3
   Geog. 316—Pleistocene Environment ............................................ 3
   Geog. 402—Man and Nature ...................................................... 3

A minor in Anthropology requires 12 hours of approved Anthropology courses.

For course descriptions, see page 124.
REQUIREMENTS FOR A B.A. DEGREE OR B.S. DEGREE WITH A GEOGRAPHY MAJOR

1. Complete general requirements for a B.A. or B.S. degree as listed on page 64.

2. Complete 20 credits in geography beyond Geography 101, including:
   - Geog. 201—Elements of Physical Geography ........................................ 3 credits
   - Geog. 216—Pleistocene Environment .................................................... 3
   - Geog. 327—Cold Lands ......................................................................... 3
   - Geog. 401—Weather and Climate ....................................................... 3
   - Geog. 402—Man and Nature ............................................................... 3
   - Geog. 491—Seminar ........................................................................... 3

3. Complete the following:
   - W.M. 102—Conservation of Natural Resources .................................. 2
   - Biol. 303—Principles of Ecology ...................................................... 3
   - Geol. 201—General Geology .............................................................. 4
   - Geol. 202—Historical Geology ......................................................... 4
   - Anth. 101—Introduction to the Study of Man .................................... 3
   - Anth. 212—Human Origins ................................................................ 3

   Plus one Anthropology elective

   A minor in Geography requires 12 hours of approved Geography courses.
   For course descriptions, see page 146.

EDUCATION DEPARTMENT

CHESTER E. YOUNGBLOOD—DEPARTMENT HEAD

DEGREES—BACHELOR OF EDUCATION AND MASTER OF EDUCATION

MINIMUM REQUIREMENTS FOR DEGREE: B.Ed.—130 CREDITS

M.Ed.—30 ADDITIONAL CREDITS

The Education Department offers curricula designed to prepare personnel for teaching in elementary and secondary schools. Students are introduced to fundamental problems of education in the contemporary world through courses designed to develop perspective and understanding of the relations of education to society. Courses provide information and practice in the development of instructional materials and the understanding of methods of instruction.

CERTIFICATION—Students may qualify for teaching certificates in various states only by planning their programs to meet specific requirements. Certificates are issued by the appropriate state departments of education. In Alaska, certificates are granted by the Alaska Department of Education in Juneau. Students who obtain the Bachelor of Education Degree will be qualified to meet Alaska's requirements. Students seeking a minor in Education should consult the Department Head for specific requirements.

REQUIREMENTS FOR THE B.Ed. DEGREE WITH AN ELEMENTARY EDUCATION MAJOR

1. Military Science or Physical Education (2 years) ................................... 6-4 credits

2. Humanities (Art, Classics, English, Languages, Linguistics, Music, Philosophy, Speech) ................................................................. 20
   a. Required Courses:
      - English 101 and 102—Composition & Modes of Literature .......... 6
   b. Recommended Courses:
      - English 213—Advanced Exposition ........................................... 3
      - Music 243—Education Music for the Classroom Teacher ............. 3
      - Speech 251—Public Speaking 1 OR Speech 254—Voice and Diction .. 2
      - Philosophy 201—Introduction to Philosophy ............................. 3

3. Social Sciences (Anthropology, Economics, Geography, History, Political Science, Psychology, Sociology) ........................................ 24
   a. Required Courses:
      - History 117-118—European History OR Hist. 131-132—History of the U.S. 6
      - Psychology 101—Introduction to Psychology ............................ 3
      - Psychology 251—Child Development ......................................... 3
      - Political Science 101-102—American Government .................... 6
   b. Recommended Courses:
      - Anth. 101—Introduction to the Study of Man ............................ 3
      - Anth. 342—Alaska Natives ...................................................... 3
      - Economics 121-122—Principles of Economics ............................ 6
      - Geography 101—Introduction to Geography ................................ 3
      - Sociology 101-102—Introduction to Sociology .......................... 6
      - History 341—History of Alaska .............................................. 3
4. Mathematics  
   The two following courses:  
   Math. 205—Mathematics for Teachers  
5. Physical and/or Biological Sciences (includes Geography 201 and 401)  
   Six credits from the following courses:  
   Chem. 103-104—Introductory Chem.-Physical Science  
   Geog. 201—Elements of Physical Geog.  
   Geog. 401—Weather and Climate  
6. Education (Students must maintain a 2.00 average in all education courses)  
   a. Required Courses:  
      Ed. 313—Educational Psychology  
      Ed. 332—Tests and Measurements  
      Ed. 409—The Teaching of Reading  
      *Ed. 452—Directed Teaching  
      *Candidates who have taught successfully three years in the public elementary schools may be excused from Ed. 452.  
   b. Nine credits from the following courses:  
      Ed. 202—Audio-Visual Education  
      Ed. 206—Teaching of Arithmetic  
      Ed. 301—Social Studies  
      Ed. 302—Language Arts  
      Ed. 304—Literature for Children  
      Ed. 306—Teaching of Science in Elementary Schools  
      Ed. 323—Small Schools  
   c. Six credits from the following courses:  
      *Ed. 121—Introduction to Education  
      Ed. 345—Sociology of Education  
      Ed. 348—History of Education in the United States  
      Ed. 422—Philosophy of Education  
      Ed. 426—Principles and Practices of Guidance  
      Ed. 441—School Law  
      *Students who took Ed. 121 before it was eliminated need only three other credits from (c.) above.  
7. A total of 36 credits (including 12 upper division credits) in any two of the following fields, with a minimum of 12 credits in either field:  
   Anthropology  
   Art  
   Biological Sciences  
   *Chemistry  
   Classics  
   Economics  
   English  
   French  
   Geography  
   Geology  
   German  
   History  
   Linguistics  
   Mathematics  
   Music  
   *Philosophy  
   Physics  
   Political Science  
   Psychology  
   Russian  
   Spanish  
   Speech  
   Sociology  
   *Approved for a maximum of 18 credits.  
   Credits earned in fulfillment of (2), (3), (4), and (5) above may be applied toward courses listed in (7) above.  
8. Forty-eight credits of upper division courses, twenty-four of which must be completed at the University of Alaska.  
9. Sufficient free electives to total 130 credits.  

**REQUIREMENTS FOR THE B.ED. DEGREE WITH A SECONDARY EDUCATION MAJOR**  
1. Military Science or Physical Education (2 years)  
2. Humanities (Art, Classics, English, Languages, Linguistics, Music, Philosophy, Speech)  
   a. Required Courses:  
      English 101 and 102—Composition & Modes of Literature  
   b. Recommended Courses:  
      English 213—Advanced Exposition  
      Speech 251—Public Speaking I OR Speech 254—Voice and Diction  
      Philosophy 201—Introduction to Philosophy
3. Social Sciences (Anthropology, Economics, Geography, History, Political Science, Psychology, Sociology) ........................................................... 24
   a. Required Courses:
      History 117-118—European History OR History 131-132—History of the U.S. ................................................................. 6
      Psychology 101—Introduction to Psychology .................................. 3
      Psychology 252—Psychology of Adolescence ............................... 3
      Political Science 101 and 102—American Government ................... 6
   b. Recommended Courses:
      Anth. 101—Introduction to the Study of Man ................................ 3
      Anth. 342—Alaska Natives ............................................................. 3
      Economics 121 and 122—Principles of Economics ......................... 6
      Sociology 101 and 102—Introduction to Sociology ......................... 6
      History 341—History of Alaska .................................................... 3

4. Mathematics, Biological Sciences, and Physical Sciences
   Eight credits from the following courses:
   Biology 105 and 106—Fundamentals of Biology ................................. 8
   Chem. 103 and 104—Introductory Chemico-Physical Science .............. 8-8
   Math. 103-104—Survey of College Mathematics .................................. 6
   Math. 115—Foundations of Mathematics ........................................... 4

5. Education (students must maintain at least a 2.00 average in all education courses) .......................................................... 24
   a. Required Courses:
      Ed. 313—Educational Psychology .................................................. 3
      Ed. 322—Tests and Measurements ................................................. 3
      Ed. 402 or 404 or 405 or 407 or 408—Methods ........................... 3
      *Ed. 452—Directed Teaching ....................................................... 6
      * Candidates who have taught successfully three years in the public secondary schools may be excused from Education 452.
   b. Six credits from the following courses:
      *Ed. 121—Introduction to Education ............................................. 2
      Ed. 345—Sociology of Education .................................................... 3
      Ed. 348—History of Education in the U.S. ................................... 3
      Ed. 421—Secondary Education ..................................................... 3
      Ed. 422—Philosophy of Education ............................................... 3
      * Students who took Ed. 121 before it was eliminated need only three other credits from (b.) above.
   c. Three units of education electives selected from the following:
      Ed. 202—Audio-Visual Education .................................................. 2
      Ed. 323—Small Schools .................................................................. 2
      Ed. 426—Principles and Practices of Guidance ................................ 2
      Ed. 432—Curriculum Development ............................................... 3
      Ed. 441—School Law ..................................................................... 2

6. Teaching Majors and Minors (students must maintain at least a 2.00 average in their teaching majors).
   Option A.
   Complete a teaching major of 24 to 36 credits and a teaching minor of 12 to 24 credits for a total of 48 credits of which at least 18 must be upper division.
   Option B.
   Complete an integrated teaching major-minor of 48 credits. See advisor.

Teaching majors and teaching minors may be completed in any of the following subjects or teaching fields:

**MAJOR OR MINOR (Option A)  MINOR ONLY (Option A)  INTEGRATED MAJOR-MINOR (Option B)

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<tr>
<th>Subject</th>
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<tr>
<td>Art</td>
<td>Classics</td>
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<td>Biological Sciences</td>
<td>Economics</td>
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<td>Business Educ.</td>
<td>*Geography</td>
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<td>Chemistry</td>
<td>*Journalism</td>
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<tr>
<td>English (not Including Engl. 101, 102)</td>
<td>*Political Science</td>
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<td>**Foreign Language</td>
<td>*Sociology</td>
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<td>Social Science</td>
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<td>Music</td>
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<tr>
<td>***Physical Education</td>
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<td>Physics</td>
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<tr>
<td>Speech</td>
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*Approved for History Major only.
**Confer with Head of the Department of Education.
***See page 82 for requirements for B.Ed. Degree with a major in Physical Education.
Credits earned in fulfillment of (2), (3), and (4) above may be applied toward the teaching major or teaching minor. The student is responsible for obtaining and keeping current his copy of the courses required for his teaching major and minor. Any deviations from the specified courses must be approved by written petition to the Head of the Education Department.

7. Forty-eight credits of upper division courses, twenty-four of which must be completed at the University of Alaska.

8. Sufficient free electives to total 130 credits.

SECONDARY TEACHING CERTIFICATES FOR MAJORS IN OTHER DEPARTMENTS

All majors in other departments who wish to obtain an Alaskan secondary teaching certificate should confer with the Head of the Education Department in their freshman year. It is essential that the student have the necessary prerequisites for placement in student teaching in the public schools. The following courses should be taken at the indicated times:

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<tr>
<th>FALL SEMESTER</th>
<th>SPRING SEMESTER</th>
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<tr>
<td>Sophomore</td>
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<td>Junior</td>
<td>*Ed. 313</td>
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<tr>
<td>Senior</td>
<td>*Ed. 421</td>
</tr>
<tr>
<td></td>
<td>*Ed. 402 or 405 or 406 or 407 or 408.</td>
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</tbody>
</table>
* Students must maintain a 2.00 average in these education courses.

REQUIREMENTS FOR ADMISSION TO STUDENT TEACHING

1. Elementary School—Kindergarten through Eighth Grade:
   a. Completion of 100 collegiate credits leading to a Bachelors' degree with a minimum grade point average of 2.00. The maximum load during student teaching is 12 units of which student teaching is 6.
   b. Completion of a minimum of 12 credits in professional education courses including Ed. 313, Ed. 332, and Ed. 409.
   c. Recommendation of the Head of the Department of Education. A grade of less than C in Psy. 251, Ed. 313, Ed. 332, or Ed. 409 also may result in the student's not being approved by the Head of the Education Department.

2. Secondary Schools—Seventh Grade through Twelfth Grade:
   a. Completion of 100 collegiate credits leading to a Bachelor's degree with a minimum grade point average of 2.00. The maximum load during student teaching is 12 units of which student teaching is 6.
   b. Completion of a minimum of 24 credits in an approved teaching major—i.e., a subject that is actually taught in the secondary schools of Alaska—with a minimum grade point average of 2.00.
   c. Completion of Psy. 101, Psy. 252, Ed. 313, Ed. 332, and 3 additional credits of education.
   d. Recommendation of the Head of the Department of Education. A grade of less than C of Psy. 101, Psy. 252, Ed. 313, Ed. 332, Ed. 402 (or 405 or 406 or 407 or 408), or any course in the elementary teaching major also may result in the student's not being approved by the Head of the Education Department.

REQUIREMENTS FOR A M.ED. DEGREE IN EDUCATION

1. A minimum of 30 credits of approved courses, including methods of educational research and an independent project or thesis.
2. One year of satisfactory teaching or administrative experience, or reasonable equivalency.
3. The equivalent of an undergraduate major in Education.
4. Completion of the general graduate degree requirements listed on page 65. For course descriptions, see page 136.

HEALTH, PHYSICAL EDUCATION AND RECREATION DEPARTMENT

FRANCIS PYNE—DEPARTMENT HEAD

The professional curriculum in physical education is designed to prepare qualified students to teach physical education, to coach athletic teams, and to direct recreational programs according to the needs of the State of Alaska. The curriculum provides for either a major or a minor in physical education to be coupled with the requirements of the Department of Education's teacher education program.
REQUIREMENTS FOR A B.Ed. DEGREE WITH A PHYSICAL EDUCATION MAJOR

1. Complete the general requirements for a B.Ed. degree as follows:
   a. Military Science: 6 credits
   b. Physical Education:
      Women majoring in P.E. will complete P.E. 101 and P.E. 102.
      Men majoring in P.E. are exempt from required physical education (P.E. 105, 106, 205, 206).
   c. Humanities: 13 credits
      Art 261 or Music 121, 122; English 101, 102; Philosophy 201; Speech 251.
   d. Social Sciences: 18 credits
      Anthropology 342; Economics 121; History 341; Psychology 101, 252; Sociology 101.
   e. Mathematics, Natural Science, Physical Science: 16 credits
      Biology 105, 106; Chemistry 104; Mathematics 115.
   f. Education: 18 credits
      Education 313, 332, 406, 426, 452.

2. Complete the following required professional courses:
   P.E. 111—Principles of Physical Education .................................................. 4 credits
   P.E. 142—Personal and Community Health .................................................. 3
   P.E. 146—First Aid ......................................................................................... 2
   P.E. 220—Physical Education for the Elementary School .............................. 3
   P.E. 331—Sports Officiating ........................................................................... 2
   P.E. 358—History of Physical Education ...................................................... 3
   P.E. 425—Organization and Administration of Physical Education ............. 3
   P.E. 440—Prevention and Care of Athletic Injuries .................................... 2
   P.E. 103—Fundamentals of Sports—Tennis and Badminton ....................... 1
   P.E. 211—Fundamentals of Sports—Volleyball and Soccer .......................... 1
   P.E. 212—Fundamentals of Sports—Recreational Activities .......................... 1
   P.E. 213—Fundamentals of Sports—Swimming ............................................. 1
   P.E. 214—Fundamentals of Sports—Skiing ................................................. 1
   P.E. 215—Fundamentals of Sports—Tumbling and Gymnastics .................... 1
   P.E. 216—Fundamentals of Sports—Rhythms ............................................ 1
   P.E. 301—Techniques in Physical Education—Basketball (Men) ................... 2
   P.E. 302—Techniques in Physical Education—Track & Field ...................... 2
   P.E. 303—Techniques in Physical Education—Team Sports (Women) ........... 2
   P.E. 400—Techniques in Physical Education—Tumbling and Gymnastics ........ 2
   P.E. 401—Techniques in Physical Education—Aquatics and Rhythms ........... 2

3. Teaching minor (see individual departmental requirements).

4. Electives to total 130 credits.
   Completion of the following courses is required for a MINOR in Physical Education.
   P.E. 111—Principles of Physical Education .................................................. 4 credits
   P.E. 146—First Aid ......................................................................................... 2
   P.E. 425—Organization and Administration of Physical Education ............. 3
   P.E. 440—Prevention and Care of Athletic Injuries—Required for MEN only .......................... 2
   P.E. 103—Fundamentals of Sports—Tennis and Badminton .......................... 1
   P.E. 211—Fundamentals of Sports—Volleyball and Soccer .......................... 1
   P.E. 214—Fundamentals of Sports—Skiing ................................................. 1
   P.E. 215—Fundamentals of Sports—Tumbling and Gymnastics .................... 1
   P.E. 216—Fundamentals of Sports—Rhythms ............................................ 1
   P.E. 301—Techniques in Physical Education—Basketball (Men) ................... 2
   P.E. 302—Techniques in Physical Education—Track & Field ...................... 2
   P.E. 303—Techniques in Physical Education—Team Sports (Women) ........... 2

HOME ECONOMICS DEPARTMENT

LUCILE TROST—DEPARTMENT HEAD

DEGREE—BACHELOR OF SCIENCE

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

This curriculum strives to provide for preparation in professional careers in Home Economics and to offer students a sound background in nutrition, textiles, child development, foods and clothing as well as experience in the liberal arts.
### HOME ECONOMICS CURRICULUM

#### FALL SEMESTER

<table>
<thead>
<tr>
<th>CREDITS</th>
<th>FIRST YEAR</th>
<th>16</th>
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<tr>
<td></td>
<td>Engl. 101—Comp. &amp; Modes of Lit.</td>
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<td>H.E. 102—Meal Management</td>
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<td>Psy. 101—Intro. to Psy.</td>
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<td>H.E. 211—Textiles</td>
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<td>H.E. 312—Adv. Clothing</td>
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<td>H.E. 445—Home Mgt.</td>
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#### SPRING SEMESTER

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<td>H.E. 113—Cloth. Const. &amp; Sel.</td>
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<td>P.E. 102—Phys. Ed.</td>
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<td>H.E. 236—Marriage &amp; Fam. Life</td>
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<td>P.E. 202—Phys. Ed.</td>
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<td>H.E. 201—Advanced Foods</td>
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<td>Speech 251—Public Speaking</td>
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<td>H.E. 446—House Plan. &amp; Furn.</td>
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<td>Electives</td>
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- **Science Requirement**: A minimum of 12 credits in Natural or Physical Sciences is required.
- **Teaching Certificates**: Home Economics graduates may qualify for teaching Vocational Home Economics. They may obtain an Alaskan teaching certificate by completing Education 407, Methods of Teaching Home Economics, and meeting the other requirements of the State Department of Education.
- A minor in Home Economics requires a minimum of 12 approved credits in Home Economics.
- For course descriptions, see page 151.

### MILITARY SCIENCE DEPARTMENT

#### LIEUTENANT COLONEL JOHN B. DeMARCUS—DEPARTMENT HEAD

The mission of the Reserve Officers Training Corps is to produce junior officers who by their education, training, and inherent qualities are suitable for continued development as officers in the United States Army; to give students such basic military training as will be of benefit to themselves and to the military service; and to assist in qualifying students for positions of leadership in industries and professional careers.

The program of instruction prescribed by the Department of the Army for Senior Division R.O.T.C. is divided into the Basic Course for freshmen and sophomores, and the Advanced Course for juniors and seniors.

**Basic Course**—Required. All regularly enrolled, physically fit male students, without previous military training, who are citizens of the United States and are between the ages of 14 and 23 years, are required to satisfactorily complete the Basic Course R.O.T.C. unless exempted by the Professor of Military Science.

**Advanced Course**—Elective. Those students who successfully complete the Basic Course may apply for enrollment in the Advanced Course. Candidates must be physically qualified, recommended by the PMS and approved by the University President. Veterans may be allowed credit for prior active Federal Service in lieu of the Basic Course for the purpose of admission into the Advanced Course.

A contract, signed by the students who enroll in the Advanced R.O.T.C. courses, makes satisfactory completion of these courses a prerequisite for graduation.
FLIGHT TRAINING—Department of the Army sponsors an Army Flight Training program for senior R.O.T.C. cadets at the University of Alaska. This training program consists of 73 hours of instruction at a civilian flying school in the Fairbanks area. Successful completion of the course qualifies the student for a private pilot’s license. Prerequisites: Completion of the Junior year of R.O.T.C. and approval of the PMS and Academic Vice-President. Applicants must also pass the Army Flight Training physical examination and aptitude test.

Necessary texts, flying clothes, cost of lessons and transportation are furnished by the Department of the Army.

UNIFORMS AND EQUIPMENT—Members of the Basic and Advanced Course are furnished uniforms and texts by the United States Army.

Regulation gymnasium shoes, available through the University Book Store, are required to be worn during Leadership Laboratory (drill). These shoes must be purchased by the individual student.

ALLOWANCE—Advanced Course students receive a subsistence payment that amounts to approximately $300.00 for the two year period.

ACADEMIC MINOR—Eighteen credits in Military Science may be accepted by an academic advisor as fulfilling the graduation requirements for a minor.

AWARDS—Awards are made annually for outstanding achievement in R.O.T.C. band, drill team, rifle team, ski team; for best individual, squad, and platoon in drill; to the outstanding cadet in each class.

R.O.T.C. RIFLE TEAM—The R.O.T.C. rifle team competes in shoulder matches with both civilian and military teams in the state. Each year the team fires an Intercollegiate Match in competition with west coast schools. Postal matches are fired against university and college teams throughout the United States. The finest target rifles, shooting coats and gloves, targets, and ammunition are available to all R.O.T.C. cadets at no cost. Varsity letters are awarded.

R.O.T.C. BAND AND DRILL TEAM—The R.O.T.C. band and drill team participate in the Annual Winter Carnival in Fairbanks, at formations of the R.O.T.C. Cadet Corps, and at functions on campus.

TRANSFER STUDENTS—Transfer students with less than sophomore standing are required to enroll in Military Science unless excused by the Professor of Military Science.

EXEMPTIONS FROM BASIC COURSE—Students who petition the Professor of Military Science for exemption from military training must enroll in the prescribed course and pursue the work of the course until they have been formally notified that they are exempt. Such petition must be filed with the Professor of Military Science not later than two weeks following date of registration.

DEFERMENT FROM DRAFT—Students, upon successful completion of the first semester Basic Course, and continued enrollment in R.O.T.C., may be deferred from induction under the provisions of the Universal Military Training and Service Act.

For course descriptions, see page 158.

PSYCHOLOGY AND SOCIOLOGY DEPARTMENT

SARKIS ATAMIAN—DEPARTMENT HEAD

DEGREE—BACHELOR OF ARTS

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

Psychology seeks to guide the student in an understanding of himself and of others in the area of experience and reaction to the milieu.

The field of Psychology has relevance for students preparing for careers in law, medicine, social work, education, industrial relations, and government service.

Psychology majors are specifically prepared for graduate work in major universities throughout the United States.

Sociology is a field in social science concerned with the behavior of people in groups, particularly societies, culture, and institutional arrangements under which people live. It is concerned with contemporary civilization.
REQUIREMENTS FOR A B.A. DEGREE WITH A PSYCHOLOGY MAJOR

1. Complete general requirements for a B.A. degree as listed on page 64.

2. Complete 24 credits in psychology beyond Psy. 101, 102, including:
   - Psy. 205—Statistics for the Behavioral Science ........................................ 3 credits
   - Psy. 213, 214—Experimental Psychology ..................................................... 6
   - Psy. 304—Abnormal Psychology or
   - Psy. 209—Social Psychology ........................................................................ 3
   - Psy. 491—Seminar in Human Behavior ......................................................... 2

3. A minor in Psychology requires 12 approved credits in Psychology.

REQUIREMENTS FOR A B.A. DEGREE WITH A SOCIOLOGY MAJOR

1. Complete general requirements for a B.A. degree as listed on page 64.

2. Complete 24 credits in Sociology beyond Sociology 101, 102, eighteen units
   of which must be upper division and must include:
   - Soc. 434—Social Science Research Methods ............................................... 3 credits
   - Soc. 491—Seminar in Human Behavior ......................................................... 2

3. Complete nine units chosen from the following:
   - Psy. 209—Social Psychology ......................................................................... 3
   - Soc. 304—Culture and Personality ................................................................ 3
   - Soc. 410—Social Theory ............................................................................... 3
   - Soc. 209—Urban Sociology ........................................................................... 3
   - Soc. 232—Family and Society ...................................................................... 3
   - Soc. 205—Group Processes .......................................................................... 3

4. Complete the following:
   - Anth. 101—Introduction to the Study of Man ............................................. 3

A minor in Sociology requires 12 elective credits in Sociology.
For course descriptions, see page 173.
College of Biological Sciences and Renewable Resources

BRINA KESSEL—DEAN

Biology is an area of science in which many disciplines come to bear; in fact, biology is in large part the summation of these various disciplines. A thorough knowledge of biology, in both its pure and applied phases, is fundamental to the welfare of mankind. With these axioms in mind, the programs in the College of Biological Sciences and Renewable Resources are designed to give students an introduction to the humanities and social sciences, a background in mathematics and the physical sciences, a firm foundation in basic biological sciences, and advanced training in specialized fields. For more details, students should read descriptive materials in the departmental sections below—Agricultural Science Department, Biological Sciences Department, and Wildlife Management Department.

DEGREES—Bachelor of Arts in Biological Sciences, Botany, Zoology; Bachelor of Science in Biological Sciences, Botany, Fisheries Biology, Medical Technology, Wildlife Management, Zoology; Master of Science in Botany, Fisheries Biology, Wildlife Management, Zoology.

AGRICULTURAL SCIENCE DEPARTMENT

ARTHUR S. BUSWELL—DEPARTMENT HEAD

The curriculum for the first two years is designed to provide the basic science foundation on which agricultural courses are based. The curriculum is intended for students who expect to prepare for farming, teaching, or business related to agriculture, or who expect to specialize in a graduate study program. Some upper division courses are offered as demand warrants.

The Agricultural Experiment Station provides an opportunity for summer employment where students can work under the supervision of skilled technicians.

AGRICULTURAL SCIENCE CURRICULUM

<table>
<thead>
<tr>
<th>FALL SEMESTER</th>
<th>SPRING SEMESTER</th>
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<tbody>
<tr>
<td>FIRST YEAR</td>
<td>16 or 16½ CREDITS</td>
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<tr>
<td>Eng. 101—Comp. &amp; Modes of Lit.</td>
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<tr>
<td>Biol. 105—Fund. of Biology</td>
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<tr>
<td>Mathematics</td>
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<tr>
<td>Chem. 101—General Chem.</td>
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<tr>
<td>P.E. or Mill. Sci.</td>
<td>1 or 1½</td>
</tr>
<tr>
<td>SECOND YEAR</td>
<td>17 or 17½ CREDITS</td>
</tr>
<tr>
<td>Phys. 103—Coll. Physics</td>
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</tr>
<tr>
<td>Geol. 201—Gen. Geology</td>
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</tr>
<tr>
<td>Soc. Sci. Elective</td>
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<tr>
<td>Eng. 213—Adv. Comp.</td>
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<td>P.E. or Mill. Sci.</td>
<td>1 or 1½</td>
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<tr>
<td>Phys. 104—Coll. Physics</td>
<td>4</td>
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<tr>
<td>Biol. 234—Plant Morph.</td>
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<tr>
<td>or Biol. 302—Genetics</td>
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<td>Eng. Elective</td>
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<td>P.E. or Mill. Sci.</td>
<td>1 or 1½</td>
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BIODELICAL SCIENCES DEPARTMENT
BRINA KESEL-DEPARTMENT HEAD

DEGREES—BACHELOR OF ARTS, BACHELOR OF SCIENCE, MASTER OF SCIENCE

MINIMUM REQUIREMENTS FOR DEGREE: B.A.—130 CREDITS
B.S.—130 CREDITS
M.S.—30 ADDITIONAL CREDITS

The curricula in the Biological Sciences Department are designed to give the student a broad education as well as a sound foundation in the basic principles of biology. Students pursing either a B.A. or a B.S. degree may have majors in botany, zoology, or biological sciences. A major in medical technology is also available for B.S. degree candidates. The B.A. degree requirements include fewer credits in the major field, but give greater emphasis in the fields of social sciences and humanities and allow a greater breadth of subject matter in the curricula. The requirements for the B.S. degree include a foundation in the basic sciences as well as a stronger major within the Biological Sciences Department. Candidates for a B.S. degree may select either the general biology program (Program I), a more specialized option in Zoology, Vertebrate Zoology, or Botany (Program II), or a major in Medical Technology. Candidates who expect to teach in public secondary schools must be sure that Education requirements are met.

REQUIREMENTS FOR A B.A. DEGREE WITH A MAJOR IN BIOLOGICAL SCIENCES
1. Complete general requirements for a B.A. degree as listed on page 64.
2. Complete the following foundation courses:
   - Biol. 105-106—Fund. of Biol................................................................. 8 credits
   - Mathematics, an approved year's sequence ........................................ 6
3. Complete the following required courses:
   - Biol. 317-318—Comp. and Dev. Anatomy ............................................. 10 credits
   - Biol. 413—Cell. Physiol., or Biol. 414—Comp. Physiol., or Biol. 416—Plant Physiol. ................................................................. 3-4
   - Biol. 302—Genetics ............................................................................ 3
   - Biol. 303—Ecology, or one of the following:
     - Biol. 305—Invert. Zool. ...................................................................... 3
     - Biol. 331—Sys. Botany ..................................................................... 3-4

4. Complete requirements for an Education minor as required by the Department of Education.
A minor in Biological Sciences requires 14 credits, consisting of Biol. 105-106, 302, and 303.

REQUIREMENTS FOR A B.A. DEGREE WITH A MAJOR IN BOTANY
1. Complete the general requirements for a B.A. degree as listed on page 64.
2. Complete the following foundation courses:
   - Biol. 105-106—Fund. of Biol................................................................. 8 credits
   - Chem. 101-102—General Chemistry .................................................... 8 credits
   - Mathematics, an approved year's sequence ........................................ 6
3. Complete 22 credits in Biology, including:
   - Biol. 234—Morph. and Anat. Vase. Plants ........................................... 4
   - Biol. 302—Genetics ............................................................................ 3
   - Biol. 303—Ecology ............................................................................. 3
   - Biol. 331—SYSTEMATIC BOTANY ..................................................... 4
   - Biol. 416—Plant Physiol. .................................................................... 3

A minor in Botany requires Biol. 105-106 and 8 credits in Botany.

REQUIREMENTS FOR A B.A. DEGREE WITH A MAJOR IN ZOOLOGY
1. Complete the general requirements for a B.A. degree as listed on page 64.
2. Complete the following foundation courses:
   - Biol. 105-106—Fund. of Biol................................................................. 8 credits
   - Chem. 101-102—General Chemistry .................................................... 8 credits
   - Mathematics, an approved year's sequence ........................................ 6
3. Complete 21 credits in Biology, including:
   - Biol. 302—Genetics ............................................................................ 3
   - Biol. 317-318—Comp. and Dev. Anatomy ............................................ 10
   - Biol. 413—Cell. Physiol.
     or
   - Biol. 305—Invert. Zool. ...................................................................... 3-4
   - Biol. 414—Comp. Physiol. ................................................................... 4

A minor in Zoology requires Biol. 105-106 and 8 credits in Zoology.
## REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE WITH MAJORS IN BIOLOGICAL SCIENCES, BOTANY, OR ZOOLOGY

### FALL SEMESTER
**FIRST YEAR** 16 or 16½ CREDITS

- Engl. 101—Comp. & Modes of Lit. 3
- Biol. 105—Fund. of Biology 4
- *Mathematics* 4
- Chem. 101—General Chem. 4
- P.E. or Mil. Sci. 1 or 1½

### SECOND YEAR 17 or 18½ CREDITS

- Phys. 103—Coll. Physics 4
- Program I or II Requirement 4 or 5
- Foreign Language 101 5
- Soc. Sci. Elective 3
- P.E. or Mil. Sci. 1 or 1½

### SPRING SEMESTER
16 or 16½ CREDITS

- Engl. 102—Comp. & Modes of Lit. 3
- Biol. 106—Fund. of Biology 4
- *Mathematics* 4
- Chem. 102—General Chem. 4
- P.E. or Mil. Sci. 1 or 1½

### SECOND YEAR 17 or 18½ CREDITS

- Phys. 104—Coll. Physics 4
- Program I or II Requirement 4 or 5
- Foreign Language 102 5
- Soc. Sci. Elective 3
- P.E. or Mil. Sci. 1 or 1½

* Acceptable mathematics sequences include Math. 121-122; Math. 101-102; Math. 103-104 and Math. 107 or Math. 204; Math. 107-108-109.

A proficiency equivalent to two college years of a foreign language is required for graduation. Students with two to four years of an approved language in high school may enter the third or fourth semester of a language or have the requirement waived, whichever is appropriate.

### THIRD & FOURTH YEARS 67 CREDITS

- Foreign Language 201 3
- Geol. 201—General Geology 4
- Engl. Elective 3
- Soc. Sci. Elective 3
- Biol. 491 1

**PROGRAM I REQUIREMENTS FOR A B.S. DEGREE WITH A MAJOR IN BIOLOGICAL SCIENCES**

1. Biol. 302—Genetics 3 credits
2. Biol. 303—Ecology 3
3. Biol. 305—Invertebrate Zoology 4
4. Biol. 413—Cell. Physiol. 3
5. Biol. 414—Comp. Physiol. or Biol. 416—Plant Physiol. 4-3
6. Biol. 317-318—Comp. and Dev. Anatomy 10 credits
7. Nine hours from the following:
   - Biol. 233—Morph. of Nonvase. Plants
   - Biol. 234—Morph. and Anat. of Vase. Plants
   - Biol. 307—Parasitology
   - Biol. 323—Mammalogy
   - Biol. 324—Ornithology
   - Biol. 326—Ichthyology
   - Biol. 331—Systematic Botany
   - Geol. 413—Vertebrate Paleontology 9

Program I must include a minimum of 6 hours each of botany and zoology, excluding Biol. 302, 303, and 413.

**PROGRAM II REQUIREMENTS FOR A B.S. DEGREE WITH OPTIONS LEADING TO MAJORS IN ZOOLOGY, VERTEBRATE ZOOLOGY, AND BOTANY**

Program II is designed for students desiring greater specialization in their junior and senior years.
REQUIREMENTS FOR AN OPTION IN ZOOLOGY
(Math. 101-102 or Math. 121-122 must be completed to meet the mathematics requirement.)

<table>
<thead>
<tr>
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<th>Credits</th>
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<tr>
<td>Biol. 302—Genetics</td>
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<tr>
<td>or</td>
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<tr>
<td>Biol. 307—Parasitology</td>
<td>4-3</td>
</tr>
<tr>
<td>Biol. 317-318—Comp. and Dev. Anatomy</td>
<td>10</td>
</tr>
<tr>
<td>Biol. 413—Cell. Physiol.</td>
<td>3</td>
</tr>
<tr>
<td>Biol. 414—Comp. Physiol.</td>
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<tr>
<td>Chem. 212—Quantitative Analysis</td>
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<td>Chem. 321-322—Organic Chem.</td>
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REQUIREMENTS FOR AN OPTION IN VERTEBRATE ZOOLOGY

<table>
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<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Biol. 302—Genetics</td>
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</tr>
<tr>
<td>Biol. 303—Ecology</td>
<td>3</td>
</tr>
<tr>
<td>Biol. 305—Invert. Zool.</td>
<td>4</td>
</tr>
<tr>
<td>Biol. 317-318—Comp. and Dev. Anatomy</td>
<td>10</td>
</tr>
<tr>
<td>Biol. 414—Comp. Physiol.</td>
<td>4</td>
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<tr>
<td>Biol. 322—Mammalogy</td>
<td>3</td>
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<tr>
<td>Biol. 324—Ornithology</td>
<td>3</td>
</tr>
<tr>
<td>Biol. 326—Ichthyology</td>
<td>3</td>
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<tr>
<td>Biol. 331—Systematic Botany</td>
<td>4</td>
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<tr>
<td>Chem. 223—Organic Chem.</td>
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<td>or</td>
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<tr>
<td>Biol. 413—Cell. Physiol.</td>
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REQUIREMENTS FOR AN OPTION IN BOTANY

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>Biol. 233—Morph. Non-vascular Plants</td>
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</tr>
<tr>
<td>Biol. 302—Genetics</td>
<td>3</td>
</tr>
<tr>
<td>Biol. 303—Ecology</td>
<td>3</td>
</tr>
<tr>
<td>Biol. 331—Systematic Botany</td>
<td>4</td>
</tr>
<tr>
<td>Biol. 413—Cell. Physiol.</td>
<td>3</td>
</tr>
<tr>
<td>Biol. 416—Plant Physiology</td>
<td>3</td>
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<tr>
<td>Upper division biology or chemistry course</td>
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<tr>
<td>Chem. 321-322—Organic Chem.</td>
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</table>

REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE WITH A MAJOR IN MEDICAL TECHNOLOGY

To receive a Bachelor of Science Degree in Medical Technology, a student must have six semesters of collegiate training at an accredited college or university, three of which must be at the University of Alaska with a G.P.A. of at least 2.0, and he must fulfill all requirements of the University for the Bachelor of Science degree, plus the basic requirements as set forth by the Registry of Medical Technologists. The student then becomes a candidate for entry at St. Luke’s Hospital School of Medical Technology (non-denominational) at Spokane, Washington, and if accepted, spends a 12-month internship at St. Luke’s. Upon satisfactory completion of the course at St. Luke’s, 30 semester hours of credit are granted by the University of Alaska which makes the student eligible to receive a Bachelor of Science degree. He also is eligible to take the registry examination as a Medical Technologist under standards set by the Board of Registry of the American Society of Clinical Pathologists. Upon registration, the graduate is privileged to add the initials M.T. (ASCP) after his name.

**FALL SEMESTER 15 or 15½ CREDITS**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 101—Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Math. 103—Surv. Coll. Math.</td>
<td>3</td>
</tr>
<tr>
<td>Chem. 101—General Chem.</td>
<td>4</td>
</tr>
<tr>
<td>Biol. 105—Fund. of Biology</td>
<td>4</td>
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<tr>
<td>P.E. or Mill. Sci.</td>
<td>1 or ½</td>
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</tbody>
</table>

**SECOND YEAR 16 or 15½ CREDITS**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Biol. 317—Comp. &amp; Dev. Anatomy</td>
<td>5</td>
</tr>
<tr>
<td>Engl. 213—Adv. Comp.</td>
<td>3</td>
</tr>
<tr>
<td>Soc. Sci. Electives</td>
<td>3</td>
</tr>
<tr>
<td>*Approved Chem. Elective</td>
<td>4</td>
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<tr>
<td>P.E. or Mill. Sci.</td>
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**SPRING SEMESTER 15 or 15½ CREDITS**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Engl. 102—Comp. &amp; Modes of Lit.</td>
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</tr>
<tr>
<td>Math. 104—Surv. Coll. Math.</td>
<td>3</td>
</tr>
<tr>
<td>Chem. 102—General Chem.</td>
<td>4</td>
</tr>
<tr>
<td>Biol. 106—Fund. of Biology</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mill. Sci.</td>
<td>1 or ½</td>
</tr>
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</table>

**SECOND YEAR 17 or 17½ CREDITS**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biol. 318—Comp. &amp; Dev. Anatomy</td>
<td>5</td>
</tr>
<tr>
<td>Chem. 212—Quant. Anal.</td>
<td>4</td>
</tr>
<tr>
<td>Biol. 214—Bacteriology</td>
<td>4</td>
</tr>
<tr>
<td>Soc. Sci. Elective</td>
<td>3</td>
</tr>
<tr>
<td>P.E. or Mill. Sci.</td>
<td>1 or ½</td>
</tr>
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</table>
Biological Sciences

THIRD YEAR  

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Phys. 103—Coll. Physics</td>
<td>4</td>
</tr>
<tr>
<td>Biol. 207—Parasitology</td>
<td></td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>Biol. 413—Coll. Physiology</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language 101</td>
<td>5</td>
</tr>
<tr>
<td>Biol. 491—Seminar</td>
<td>1½</td>
</tr>
<tr>
<td>Engl. Elective</td>
<td>3</td>
</tr>
<tr>
<td>Soc. Sci. Elective</td>
<td>3</td>
</tr>
</tbody>
</table>


FOURTH YEAR  30 CREDITS

Twelve-month Internship In Medical Technology at St. Luke’s Hospital School of Medical technology.

PREPARATORY CURRICULA—MEDICINE, DENTISTRY, NURSING, VETERINARY MEDICINE

Students planning to become medical doctors, dentists, nurses, or veterinarians may enroll in the Biological Sciences Department. Most of the professional schools in these fields require one to three or four years of collegiate work before a student will be admitted. These years of preliminary academic work are offered by the Biological Sciences Department, where the student will follow a sequence of courses planned to meet the requirements of the particular professional field in which he is interested.

Most pre-medical students plan on four preliminary years. Usually these students follow a curriculum leading to a Bachelor of Arts degree with a major in Zoology and/or Chemistry or a curriculum leading to a Bachelor of Science degree with a major in Zoology or Chemistry, earning a bachelor’s degree at the end of four years. Adjustments may be made to meet varying requirements. Pre-medical students who are accepted in medical school prior to finishing their bachelor’s requirements and who have earned at least 100 hours of pre-professional work with a G.P.A. of 3.0 or better, may, upon the completion of certain course requirements, and upon the satisfactory completion of a year of medical school, petition to receive a bachelor’s degree from the University of Alaska.

Pre-nursing students register as non-majors in the College of Biological Sciences and Renewable Resources. Course work is selected to meet the specific needs of individual students. In general, high school students interested in nursing should apply directly to an institution offering a full curriculum in nursing; those wishing to attend the University of Alaska should plan to transfer to an institution with a nursing program after one year.

STUDENTS FROM OTHER DEPARTMENTS

Students who wish a minor in the Department of Biological Sciences must have courses approved in advance by the Head of the Department of Biological Sciences. A minor will normally have requirements similar to those listed on page 64 for the B.A. degree.

Candidates for the Bachelor of Science degree in General Science wishing a major in Zoology, Botany or Biological Sciences must satisfy both the requirements of their major curriculum and those listed for B.A. degree majors on page 64.

REQUIREMENTS FOR A M.S. DEGREE WITH A BOTANY OR ZOOLOGY MAJOR

1. A minimum of 30 credits of approved courses, including Biol. 697-698, Thesis.
2. An examination attesting a reading knowledge of French, German, or Russian.
3. Completion of the general requirements for a graduate degree as listed on page 65.

For course descriptions, see page 127.

WILDLIFE MANAGEMENT DEPARTMENT

FREDERICK C. DEAN—DEPARTMENT HEAD

DEGREES—BACHELOR OF SCIENCE AND MASTER OF SCIENCE

MINIMUM REQUIREMENTS FOR DEGREE: B.S.—135 CREDITS

M.S.—30 ADDITIONAL CREDITS

Both the wildlife management and fisheries biology curriculums in the undergraduate program in the Department of Wildlife Management are intended to provide a broad basic education and training. Holders of the bachelor’s degree will be qualified to enter the management, law enforcement, and public information-education phases of wildlife work. Students contemplating careers in research, administration, advanced management work or teaching will find the bachelor’s curriculums solid foundations for graduate study. A program for teachers interested in conservation education is also available.
The geographic location of the University is particularly advantageous for the study of wildlife management. Spruce forest, aspen-birch forest, alpine tundra, bogs, and several types of aquatic habitats are within easy reach. Studies can be made in many other habitats ranging from the dense forests of Southeastern Alaska to the Arctic Coast.

Adequate study collections of plants and animals are available, and a 2,000-acre study area is near the campus. Undergraduates have ample opportunity for close association with the personnel of the Alaska Cooperative Wildlife Research Unit and the several local offices of the federal and state conservation agencies. These agencies usually hire a number of students for summer field work. Thus, an unusually good opportunity is available for students to gain experience and to make job connections. Wildlife plays an extremely important part in the economy and recreation of Alaskans. Because of this, some courses in the department will be of interest to non-major students.

UNDERGRADUATE DEGREES—The Department of Wildlife Management offers a Bachelor of Science Degree with majors in Wildlife Management and Fisheries Biology.

GRADUATE DEGREES—The Department of Wildlife Management offers a Master of Science Degree in Wildlife Management and in Fisheries Biology.

REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE WITH MAJORS IN WILDLIFE MANAGEMENT AND FISHERIES BIOLOGY

<table>
<thead>
<tr>
<th>FALL SEMESTER</th>
<th>SPRING SEMESTER</th>
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<tbody>
<tr>
<td>FIRST YEAR</td>
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<tr>
<td>16 or 16 1/2 CREDITS</td>
<td>16 or 16 1/2 CREDITS</td>
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<tr>
<td>Biol. 105—Fund. of Biology</td>
<td>4</td>
</tr>
<tr>
<td>Chem. 101—General Chem.</td>
<td>4</td>
</tr>
<tr>
<td>Engl. 101—Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Math. 121—Intro. Algebra and Analy.</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1 1/2</td>
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<tr>
<td>SECOND YEAR</td>
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<tr>
<td>16 or 16 1/2 CREDITS</td>
<td>16 or 16 1/2 CREDITS</td>
</tr>
<tr>
<td>W.M. 102—Cons. Natural Res.</td>
<td>2</td>
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<tr>
<td>Biol. 317—Comp. &amp; Dev. Anatomy</td>
<td>5</td>
</tr>
<tr>
<td>Phys. 103—College Physics</td>
<td>4</td>
</tr>
<tr>
<td>Chem. 223—Intro. Organic Chem.</td>
<td>4</td>
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<tr>
<td>(Fisheries Major)</td>
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<tr>
<td>or Geol. 201—Gen. Geology</td>
<td>4</td>
</tr>
<tr>
<td>(Wildlife Major)</td>
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<tr>
<td>P.E. or Mil. Sci.</td>
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MAJOR IN FISHERIES BIOLOGY

<table>
<thead>
<tr>
<th>THIRD YEAR</th>
<th>17 or 18 CREDITS</th>
<th>17 CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biol. 303—Ecology</td>
<td>3</td>
<td>W.M. 304—Wildlife Mgmt. Prin.</td>
</tr>
<tr>
<td>Biol. 326—Ichthyology</td>
<td>3</td>
<td>Biol. 302—Genetics</td>
</tr>
<tr>
<td>Botany or General Elective</td>
<td>3 or 4</td>
<td>*General or Botany Elective</td>
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<tr>
<td>Foreign Language 101</td>
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<td>Foreign Language 102</td>
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FOURTH YEAR

<table>
<thead>
<tr>
<th>17 CREDITS</th>
<th>18 CREDITS</th>
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<tbody>
<tr>
<td>W.M. 421—Hydrobiology</td>
<td>3</td>
</tr>
<tr>
<td>W.M. 491—Seminar</td>
<td>3</td>
</tr>
<tr>
<td>or W.M. 493—Special Topics</td>
<td>1</td>
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<tr>
<td>Biol. 305—Invert. Zool.</td>
<td>4</td>
</tr>
<tr>
<td>Econ. 121—Prin. of Economics</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language 201</td>
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<td>Elective</td>
<td>3</td>
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</tbody>
</table>

* The botany elective must be chosen from Biol. 233, Biol. 331, or Biol. 416.
### Biological Sciences 93

#### MAJOR IN WILDLIFE MANAGEMENT

<table>
<thead>
<tr>
<th>THIRD YEAR</th>
<th>17 CREDITS</th>
<th>17 CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biol. 303—Ecology</td>
<td>3</td>
<td>W.M. 304—Wildlife Mgt. Prin.</td>
</tr>
<tr>
<td>Biol. 322—Mammalogy</td>
<td>3</td>
<td>Biol. 324—Ornithology</td>
</tr>
<tr>
<td>Biol. 331—Systematic Botany</td>
<td></td>
<td>C.e. 116—Mapping</td>
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<tr>
<td>or</td>
<td></td>
<td>Econ. 121—Prin. of Economics</td>
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<tr>
<td>Ag. 311—Soils</td>
<td>4 or 3</td>
<td>Foreign Language 102</td>
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<tr>
<td>Sp. 251—Public Speaking</td>
<td>2</td>
<td></td>
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<tr>
<td>Foreign Language 101</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>0 or 1</td>
<td></td>
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<table>
<thead>
<tr>
<th>FOURTH YEAR</th>
<th>18 CREDITS</th>
<th>17 CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.M. 421—Hydrobiology</td>
<td>3</td>
<td>W.M. 410—Wildlife Techniques</td>
</tr>
<tr>
<td>Biol. 326—Ichthyology</td>
<td>3</td>
<td>W.M. 424—Ecology of Fishes</td>
</tr>
<tr>
<td>Biol. 331—Systematic Botany</td>
<td></td>
<td>W.M. 492—Seminar</td>
</tr>
<tr>
<td>or</td>
<td></td>
<td>W.M. 494—Special Topics</td>
</tr>
<tr>
<td>Ag. 311—Soils</td>
<td>4 or 3</td>
<td>Biol. 414—Comp. Physiol.</td>
</tr>
<tr>
<td>Elective</td>
<td>2 or 3</td>
<td>Engl. 314—Research Writ.</td>
</tr>
<tr>
<td>Soc. Sci. Electives</td>
<td>6</td>
<td>Elective</td>
</tr>
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</table>

All electives must be approved by the Head of the Department of Wildlife Management.

A minimum of two months must be spent in the employ of an approved conservation agency before a student will be eligible for a bachelor’s degree. Two typewritten copies of a report on the work done and the experience gained during this time must be approved by the Head of the Department.

Demonstration of proficiency in swimming is required for graduation.

### REQUIREMENTS FOR A M.S. DEGREE WITH A MAJOR IN WILDLIFE MANAGEMENT OR FISHERIES BIOLOGY

1. A minimum of 30 credits of approved courses, including Wildlife Management 697-698. Thesis in the field of Fisheries Biology or Wildlife Management.
2. For Fisheries Biology, an examination attesting a reading knowledge of French, German, or Russian.
3. Complete general requirements for a graduate degree as listed on page 65.

For course descriptions, see page 176.

### GRADUATE STUDY IN WILDLIFE MANAGEMENT

The Department of Wildlife Management and the Alaska Cooperative Wildlife Research Unit cooperate in offering graduate work leading to the Master of Science degree. Thesis work can be done in either Fisheries or Wildlife Management. Persons desiring detailed information on the graduate program in Wildlife Management may obtain this from the Head, Department of Wildlife Management. The procedure to be followed in applying for admission to graduate study is outlined in the section on Admission to Graduate Study in this catalog.

The Alaska Cooperative Wildlife Research Unit offers a limited number of research assistantships; information on these and the Unit’s program can be obtained from the Leader, Alaska Cooperative Wildlife Research Unit, University of Alaska, College, Alaska. Applications for these assistantships should be sent to the Unit Leader; such applications are supplementary to the application for admission to graduate study.
College of Business, Economics and Government

WILLIAM M. DICKSON—DEAN

The primary objective of the College is to provide courses of study which will prepare young men and women for careers of responsibility in private and public organizations and which will acquaint them with the kind of society in which they will live and work when they leave the University.

Specifically, the aims of the College are: (1) To educate students for positions in industry, government and other organizations which require analytical ability; (2) to provide those who wish to prepare themselves for positions of responsibility in industry and government with a basic understanding of the economic, political and social environment; (3) to offer courses in the fields of business, economics, history and political science which meet the needs of students who wish to major in any of these disciplines with the intention of preparing themselves for advanced study or entering the teaching profession; (4) to acquaint the students with the problems of economic, political and social development in Alaska and in the Northern region of which it is a part; and (5) to instruct students in social science research techniques.

DEGREES—The College offers the following degrees: Bachelor of Business Administration, Associate in Business Administration, and Bachelor of Arts.

GRADUATE STUDY

See page 65.

ACCOUNTING DEPARTMENT

HORACE W. DOMIGAN—DEPARTMENT HEAD

DEGREE—BACHELOR OF BUSINESS ADMINISTRATION WITH A MAJOR IN ACCOUNTING

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

The Accounting Department offers an extensive program for those interested in the field of general accounting, auditing and governmental accounting. The objective of the program is to train the individual so that he may assume accounting responsibilities in private, public, or governmental organizations.

GRADUATE STUDY

See page 65.

REQUIREMENTS FOR A B.B.A. DEGREE WITH A MAJOR IN ACCOUNTING

1. Complete requirements for a B.B.A. Degree listed on page 64.
2. Complete the following required courses:
   - Acc. 315—Intermediate Accounting .................................................. 3 credits
   - Acc. 316—Analysis of Financial Statements .......................................... 3
   - Acc. 415—Federal and State Tax Accounting ....................................... 3
   - Acc. 416—Advanced Accounting ......................................................... 3
   - Acc. 417—Cost Accounting ................................................................. 3
   - Acc. 418—Auditing .............................................................................. 3
   - Approved upper division electives ...................................................... 8-10
BUSINESS ADMINISTRATION DEPARTMENT

ROBERT C. HARING—DEPARTMENT HEAD

DEGREES—BACHELOR OF BUSINESS ADMINISTRATION WITH A MAJOR IN ADMINISTRATION
BACHELOR OF BUSINESS ADMINISTRATION WITH A MAJOR IN MARKETING
BACHELOR OF BUSINESS ADMINISTRATION WITH A MAJOR IN FINANCE

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

The Business Administration Department offers professional training in the fields of administration, finance, and marketing to those individuals interested in entering industry or government upon graduation. The objective of the program is to prepare men and women to meet the complex problems of the political, economic, and social environment and to enable them to give efficient service to industry and government on the basis of their academic training.

GRADUATE STUDY

See page 65.

REQUIREMENTS FOR A B.B.A. DEGREE WITH A MAJOR IN ADMINISTRATION

1. Complete requirements for a B.B.A. Degree listed on page 64.
2. Complete the following required courses:
   B.A. 361—Industrial Relations ................................................................. 3 credits
   B.A. 363—Production Management ......................................................... 3
   B.A. 462—Administrative Policy ............................................................... 3
   B.A. 489—Organization Theory ............................................................... 3
   Approved Upper Division Electives .......................................................... 14-16

REQUIREMENTS FOR A B.B.A. DEGREE WITH A MAJOR IN MARKETING

1. Complete requirements for a B.B.A. Degree listed on page 64.
2. Complete the following required courses:
   B.A. 442—Marketing Systems Simulation ................................................... 3
   B.A. 443—Theories and Analysis of Market Change ..................................... 3
   Approved Upper Division Electives .......................................................... 17-19
   For course descriptions, see page 64.

REQUIREMENTS FOR A B.B.A. DEGREE WITH A MAJOR IN FINANCE

1. Complete requirements for a B.B.A. Degree listed on page 64.
2. Complete the following required courses:
   B.A. 323—Corporate Organization and Finance ......................................... 3 credits
   B.A. 422—Corporate Financial Problems .................................................. 3
   B.A. 426—Advanced Monetary Theory ..................................................... 3
   B.A. 424—Financial Administration and Management .................................. 3
   Approved Upper Division Electives .......................................................... 14-16
   For course descriptions, see page 129.

ECONOMICS DEPARTMENT

HOWARD A. CUTLER—ACTING DEPARTMENT HEAD

DEGREE—BACHELOR OF ARTS

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

Economics is the study of those social activities of man which are concerned with the production, distribution, and consumption of goods and services. In today's complex world, nearly all social phenomena and problems have economic aspects. Organized knowledge of the functioning of our economy and of its relations with other economic systems is therefore essential to an understanding of the world in which we live.

The Department considers its goal of teaching to be three-fold: (1) to provide students with basic tools of analysis; and factual, statistical and descriptive materials which will assist them in discharging their duties as citizens. (2) To introduce students majoring in economics to the various fields of economics in order to prepare them for positions in business, government and graduate study. (3) To offer a course of study suitable for a minor in economics.
GRADUATE STUDY
See page 65.

REQUIREMENTS FOR A B.A. DEGREE WITH AN ECONOMICS MAJOR

1. Complete the general requirements for a B.A. Degree listed on page 64.

2. Complete the following foundation courses:
   - Econ. 121-122—Principles of Economics ........................................ 6 credits
   - Hist. 131-132—History of the U.S. .................................................. 6 credits
   - Math. 121, 122, 204 ................................................................. 11 credits
   - P.S. 101-102—American Government ............................................. 6 credits
   - Philosophy Electives ................................................................. 6 credits
   - Behavioral Science: all in Psy. or all in Soc. .................................... 6 credits

3. Complete 27 credits of Economics as follows:
   - Econ. 321—Price and Allocation Theory ........................................ 3 credits
   - Econ. 324—Income and Employment .............................................. 3 credits
   - A student may take six credits from each of two of the following fields:
     - Economic History and Development
       - Econ. 337—Economic Development: Principles, Problems, and Policies .................................................. 6 credits
       - Econ. 432—Economic History of the United States ............................... 6 credits
       - Econ. 435—Economics of Resources .................................................. 6 credits
     - Monetary and Fiscal Economics
       - Econ. 350—Financial and Fiscal Theory and Policy .......................... 6 credits
       - Econ. 351—Public Finance and Taxation ....................................... 6 credits
       - Econ. 359—Government and Private Enterprise ............................. 6 credits
     - International Economics
       - Econ. 463—International Economics I ........................................... 6 credits
       - Econ. 464—International Economics II .......................................... 6 credits

4. Approved Upper Division Economic Electives .................................... 9 credits
   - A minor in Economics requires 15 credits of approved Economics electives.
   - For course descriptions, see page 135.

HISTORY DEPARTMENT

HERMAN E. SLOTNICK—DEPARTMENT HEAD

DEGREE—BACHELOR OF ARTS

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

The History Department seeks to make the student aware of the cultural heritage of mankind, the great problems that man has faced throughout history and how he has sought to solve them.

Through the study of history, a student may prepare himself for a career in teaching, in the public service, or for advanced work in history and the other social sciences.

GRADUATE STUDY
See page 65.

REQUIREMENTS FOR A B.A. DEGREE WITH A HISTORY MAJOR

1. Complete general requirements for a B.A. Degree listed on page 64.

2. Complete the following foundation courses:
   - Econ. 121—Principles of Economics .............................................. 3 credits
   - Hist. 117—Formation of European Civilization ................................ 3 credits
   - Hist. 118—Development of Modern Europe ..................................... 3 credits
   - Hist. 131-132—History of the U.S. ............................................... 6 credits
   - P.S. 101-102—American Government ............................................. 6 credits

3. Complete 20 credits in History, including:
   - Hist. 475—Introduction to Historical Method ................................ 3 credits
   - Approved Upper Division American History Electives ..................... 6 credits
   - Approved Upper Division European History Electives ..................... 6 credits

   - A minor in History requires 12 credits of History electives.
   - For course description, see page 149.
POLITICAL SCIENCE DEPARTMENT

DAVID E. CLARKE—DEPARTMENT HEAD

DEGREE—BACHELOR OF ARTS

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

The study of political science is the study of man's efforts to create social organizations and processes compatible with his environment. Political science is intimately related to all of the social science disciplines. It is the study of the dynamics of human behavior in the various cultural, national, and international spheres.

The student of political science may prepare for teaching or for advanced study in law and social science, or prepare himself for a career in public service. A program in international relations is offered for those interested in a career in foreign service.

GRADUATE STUDY

See page 65.

REQUIREMENTS FOR A B.A. DEGREE WITH A POLITICAL SCIENCE MAJOR

1. Complete general requirements for a B.A. Degree listed on page 64.

   Social Science requirements should include:
   
   Hist. 131-132—History of the U.S. .................................................. 6 credits
   Soc. or Psy. 101-102 ................................................................. 6
   Econ. 121-122—Principles of Economics ........................................ 6

2. Complete the following P.S. courses:
   
   P.S. 101-102—American Government .............................................. 6
   P.S. 201—Comparative Government .................................................. 3
   P.S. 203—International Relations .................................................. 3
   P.S. 359—Government and Private Enterprise .................................... 3
   P.S. 411-412—Political Theory ..................................................... 6
   P.S. 475—Methods and Problems ................................................... 3

3. Complete approved upper division electives in P.S. ...................................... 12

4. Complete Minor Requirements or an approved second major ........................ 23-24

5. Approved electives to total 130 credits.

REQUIREMENTS FOR A B.A. DEGREE WITH AN INTERNATIONAL RELATIONS OPTION IN POLITICAL SCIENCE

1. Complete general requirements for a B.A. Degree listed on page 64.

   Social Science requirements should include:
   
   Hist. 131-132—History of the U.S. .................................................. 6 credits
   Geog. 101—Introductory Geography ................................................. 3
   Anth. 101—Introduction to the Study of Man .................................... 3
   Econ. 121-122—Principles of Economics .......................................... 6

2. Complete the following P.S. courses:
   
   P.S. 101-102—American Government .............................................. 6
   P.S. 201—Comparative Government .................................................. 3
   P.S. 203—International Relations .................................................. 3
   P.S. 351—International and Regional Organization ............................ 3
   P.S. 353—International Law .......................................................... 3
   P.S. 485—Seminar in Contemporary International Relations .................... 3

3. Complete the following Econ. courses:
   
   Econ. 337—Economic Development: Principles, Problems and Policies 3
   Econ. 463-464—International Economics ........................................ 6

4. Complete 9 upper division credits from the following area studies:
   
   Anth. 304—Africa ........................................................................ 3
   Hist. 344—The Soviet Union ........................................................... 3
   Hist. 363—The Far East in Modern Times ....................................... 3
   P.S. 347—Contemporary Southeast Asia ......................................... 3
   P.S. 365—Contemporary Latin America ........................................... 3

5. Complete six upper division credits from the following:
   
   Hist. 334—Diplomatic History of the U.S. ....................................... 3
   Hist. 315—Contemporary Europe ..................................................... 3
   Hist. 450—Twentieth Century America .......................................... 3

6. Approved electives to total 130 credits.

A minor in Political Science requires 12 credits of P.S. electives which must be approved by the department.

Upper division credits in History and Economics may be applied to fulfill the requirements for both the International Relations option and minors in History and Economics.
OFFICE ADMINISTRATION DEPARTMENT

MELBA F. PELOSI—DEPARTMENT HEAD

DEGREES—BACHELOR OF ARTS WITH A MAJOR IN OFFICE ADMINISTRATION

MINIMUM REQUIREMENTS FOR DEGREE—130 CREDITS

ASSOCIATE IN BUSINESS ADMINISTRATION DEGREE WITH A MAJOR IN OFFICE ADMINISTRATION

MINIMUM REQUIREMENTS FOR ASSOCIATE DEGREE—62 CREDITS

The Department offers two courses of study in order to meet the different needs of those who plan to specialize in the field of office operations: (1) An extensive four-year program leading to the degree of Bachelor of Arts with a major in office administration. The objective of the curriculum is to provide the students with the knowledge, skills and abilities required of the efficient office administrator or executive secretary. (2) An intensive two-year program in office administration leading to an Associate in Business Administration Degree.

REQUIREMENTS FOR A B.A. DEGREE WITH A MAJOR IN OFFICE ADMINISTRATION

1. Complete requirements for the B.A. Degree listed on page 64.

2. Complete the following required courses:
   Acc. 215-216—Principles of Accounting ........................................ 6 credits
   O.A. 101-102—Shorthand ............................................................. 6
   O.A. 105—Intermediate Typewriting .............................................. 2
   O.A. 106—Advanced Typewriting ................................................... 3
   O.A. 201—Intermediate Stenography .............................................. 3
   O.A. 202—Advanced Stenography ................................................ 3
   O.A. 203—Office Machines .......................................................... 3
   O.A. 302—Secretarial Training ................................................... 3

3. Social Science must include:
   Econ. 121-122—Principles of Economics ....................................... 6 credits
   B.A. 331—Business Law ............................................................... 3

4. Approved Upper Division Electives ............................................. 8

5. The following courses are required for a minor in education:
   Psy. 101—General Psychology ..................................................... 3
   Psy. 252—Psychology of Adolescence ........................................... 3
   Ed. 313—Educational Psychology ................................................ 3
   Ed. 421—Secondary Education .................................................... 3
   Ed. 332—Tests and Measurements ............................................... 3
   Ed. 408—Methods of Teaching Business Education Subjects ................ 3
   Ed. 452—Directed Teaching ...................................................... 6

REQUIREMENTS FOR AN A.B.A. DEGREE WITH A MAJOR IN OFFICE ADMINISTRATION

1. Complete the following general requirements:
   Acc. 215-216—Principles of Accounting ....................................... 6 credits
   Econ. 121—Principles of Economics ............................................. 3
   Econ. 122 or P.S. 101 ................................................................. 3
   Engl. 101-102—Composition and Modes of Literature ....................... 6
   Math. 110—Math. of Finance ...................................................... 3
   Sp. 251—Public Speaking .......................................................... 2
   Soc. 101 or Psy. 101 ................................................................. 3
   M.S. or P.E. ................................................................................. 6-4

2. Complete the following required courses in Office Administration:
   O.A. 101-102—Shorthand (or approved electives) .............................. 6 credits
   O.A. 105—Intermediate Typewriting .............................................. 2
   O.A. 106—Advanced Typewriting ................................................. 2
   O.A. 201—Intermediate Stenography .............................................. 3
   O.A. 202—Advanced Stenography ................................................ 3
   O.A. 203—Office Machines .......................................................... 3
   O.A. 208—Specialized Secretarial Skills ..................................... 3
   O.A. 231—Business Correspondence .......................................... 3
   Approved Electives ..................................................................... 6
   Total ....................................................................................... 62-64
College of Earth Sciences and Mineral Industry

EARL H. BEISTLINE—DEAN

The objectives of the College of Earth Sciences and Mineral Industry are: to prepare students for their place in the profession, community, state, nation and world; to carry on research and development work that will add to basic knowledge as well as assist in the discovery, recovery and utilization of mineral resources, and to provide more generalized instruction to students on campus and to interested persons in various communities in Alaska.

UNDERGRADUATE DEGREES—The College has programs that lead to Bachelor of Science Degrees in Geology, Geological Engineering, and Mining Engineering. A Bachelor of Arts Degree with a major in Geology may be earned.

GRADUATE DEGREES—Programs leading to a Master of Science Degree are offered in Geology, Mineral Industry Management, and Mineral Preparation Engineering.

The professional degree Mining Engineer (E.M.) may be earned by engineering graduates of the College.

The Department of Geology offers a Ph.D.

MINERAL INDUSTRY RESEARCH LABORATORY—The 1963 Alaska State Legislature authorized the establishment of a mineral industry research program at the University of Alaska. The purpose of the Laboratory is to conduct appropriate applied and basic research in various areas of the mineral industry that will aid in the further utilization of Alaska’s mineral resources. Research is conducted in facilities of the College and coordinated with graduate student academic programs.

EARTH SCIENCES AND MINERAL INDUSTRY AGENCY—Housed in the Brooks Memorial Mines Building with the College of Earth Sciences and Mineral Industry are the College Office and Petroleum Laboratory of the Alaskan Geology Branch of the U.S. Geological Survey and a field office of the U.S. Bureau of Mines. This arrangement, leading to close association and cooperation and sharing of some facilities, tends to give harmony and efficiency to the work of all for the benefit of the mineral industries of Alaska.

GEOLOGY DEPARTMENT

TROY L. PÉWÉ—DEPARTMENT HEAD

DEGREES—BACHELOR OF ARTS, BACHELOR OF SCIENCE, MASTER OF SCIENCE AND PH.D.

MINIMUM REQUIREMENTS FOR DEGREES—

B.A. GEOLOGY MAJOR—130 CREDITS
B.S. GEOLOGY—130 CREDITS, PLUS 8 CREDIT SUMMER FIELD COURSE
M.S. GEOLOGY—30 ADDITIONAL CREDITS, INCLUDING THESIS
B.S. GEOLOGICAL ENGINEERING—135 CREDITS PLUS 8 CREDIT SUMMER FIELD COURSE
Ph.D. (OPEN)

The aims of the geology curricula are to give broad training with emphasis on fundamental science and to train students for responsible positions in the field of Earth Sciences in education, government, industry and research. Graduate training is important in all aspects of Earth Sciences, and the curricula leading to the M.S. and Ph.D. are designed to prepare the student for his future in the profession and society.
### REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE IN GEOLOGY

#### FALL SEMESTER

**FIRST YEAR** 16 or 16½ CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eng. 101—Comp. &amp; Modes of Lit</td>
<td>3</td>
</tr>
<tr>
<td>Math. 101—Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>Geol. 101—General Geology</td>
<td>4</td>
</tr>
<tr>
<td>Chem. 101—General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
</tr>
</tbody>
</table>

**SECOND YEAR** 16 or 16½ CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geol. 213—Mineralogy</td>
<td>5</td>
</tr>
<tr>
<td>Math. 201—Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 103—College Physics</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 101—Graphics</td>
<td>2</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
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</table>

**THIRD YEAR** 17 CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geology Elective</td>
<td>4</td>
</tr>
<tr>
<td>Geol. 321—Sedimentation</td>
<td>3</td>
</tr>
<tr>
<td>Geol. 401—Invertebrate Paleo</td>
<td>4</td>
</tr>
<tr>
<td>English Elective</td>
<td>3</td>
</tr>
<tr>
<td>Social Science Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**SUMMER**

Geol. 351—Field Geology, 8 Credits, 8 weeks.

**FOURTH YEAR** 15 CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Language</td>
<td>5</td>
</tr>
<tr>
<td>Geol. 400—Earth Sci. Journal Cl.</td>
<td>1</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>6</td>
</tr>
<tr>
<td>Social Science Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

From the combined total of 20 Geology and approved electives permitted, the student is required to take at least one course from each of the following three areas: Area I—Ore Deposits, Geochemistry; Area II—Map Reading, Frozen Ground; Area III—Micropaleontology, Vertebrate Paleontology.

One year of a modern foreign language is required for graduation. Students who have completed two years of formal instruction in a modern foreign language at the high school level may petition to fulfill this requirement by taking a first year college reading examination in the language concerned.

Geol. 400 (500)—Earth Sciences Journal Club is required of all upper division geology and graduate students every semester.

For course descriptions, see page 146.

### REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE IN GEOLOGICAL ENGINEERING

#### FALL SEMESTER

**FIRST YEAR** 17 or 17½ CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eng. 101—Comp. &amp; Modes of Lit</td>
<td>3</td>
</tr>
<tr>
<td>Math. 101—Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>Chem. 101—General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 101—Graphics</td>
<td>2</td>
</tr>
<tr>
<td>E.S. 111—Engr. Science</td>
<td>3</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
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</table>

**SECOND YEAR** 16 or 16½ CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Math. 201—Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Geol. 101—General Geology</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 211—Gen. Physics</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 207—Measurements</td>
<td>3</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
</tr>
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</table>

**SPRING SEMESTER**

**FIRST YEAR** 16 or 16½ CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eng. 102—Comp. &amp; Modes of Lit</td>
<td>3</td>
</tr>
<tr>
<td>Math. 102—Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>Chem. 102—General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
</tr>
</tbody>
</table>

**SECOND YEAR** 17 or 17½ CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 202—Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Geol. 102—Historical Geology</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 212—Gen. Physics</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 208—Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
</tr>
</tbody>
</table>
THIRD YEAR  18 CREDITS

Econ. 121—Prin. of Economics 3
E.S. 331—Mech. of Materials 3  
English Elective 3
Geol. 213—Mineralogy 5
Chem. 331—Physical Chem. 4

SUMMER

Geol. 351—Field Geology, 8 credits, 8 weeks.
Min. 300—Mine Rescue and First Aid, offered by the U.S. Bureau of Mines, must be completed by all Geological Engineering students (no credit).

FOURTH YEAR  18 CREDITS

Geol. 401—Invertebrate Paleo. 4
Min. Pr. 313—Mineral Prep. 3
Geol. 415—Geol. and Engr. Prob. of Frozen Ground 3
Geol. 400—Journal Club 1
E.S. 341—Fluid Mechanics 4

SHARES

Geol. 400—Earth Science Journal Club is required of all upper division Geological Engineering Majors.

For course descriptions, see page 146.

REQUIREMENTS FOR A B.A. DEGREE WITH A GEOLOGY MAJOR

1. Complete the general requirements for a B.A. Degree listed on page 64.
2. Complete required courses in Geology as planned in individual conference with the Head of the Geology Department.
   A minor in Geology requires 12-16 credits of approved Geology courses.

REQUIREMENTS FOR A M.S. DEGREE IN GEOLOGY

1. A minimum of 30 credits, including a maximum of 12 credits in Geo. 693-694, Special Topics, and Geo. 697-698, Thesis.
2. An examination to demonstrate ability to read geological literature in an approved foreign language.
3. Completion of the general requirements for a graduate degree listed on page 65.

REQUIREMENTS FOR Ph.D.

1. Program arranged by conference.
2. Completion of the general requirements for a Ph.D. listed on page 66.

MINERAL ENGINEERING DEPARTMENT

DONALD J. COOK—DEPARTMENT HEAD

DEGREES—BACHELOR OF SCIENCE, ENGINEER OF MINES, AND MASTER OF SCIENCE

MINIMUM REQUIREMENTS FOR DEGREE: B.S.—140 CREDITS
M.S.—30 ADDITIONAL CREDITS

In the Mining Engineering curriculum, particular emphasis is placed upon engineering as it applies to the development and exploitation of mineral resources and upon the economics of the business of mining. In addition, a student interested in Petroleum Engineering may complete the first two years of the Mining Engineering curriculum and then transfer to another university and complete the final two years of the curriculum without loss of time.

UNDERGRADUATE DEGREES—The Department of Mineral Engineering offers the Bachelor of Science Degree in Mining Engineering.

GRADUATE DEGREES—The graduate program allows for the awarding of Master of Science Degrees in Mineral Industry Management and Mineral Preparation Engineering. The curriculums consist of core courses in Engineering Management with electives in the field of Mineral Industries and advanced courses in Mineral Preparation, respectively. University policy pertaining to graduate study leading to a Master's Degree applies.

The graduate program also provides for the awarding of a professional degree, Mining Engineer (E.M.). This degree may be conferred upon engineering graduates who present satisfactory evidence of continuous engagement in responsible engineering work for not less than five years and a satisfactory thesis.
### REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE IN MINING ENGINEERING

#### FALL SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Engl. 101</td>
<td>Comp. &amp; Modes of Lit.</td>
<td>3</td>
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<tr>
<td>Math. 101</td>
<td>Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 101</td>
<td>Graphics</td>
<td>2</td>
</tr>
<tr>
<td>E.S. 111</td>
<td>Engineering Science</td>
<td>4</td>
</tr>
<tr>
<td>Geol. 101</td>
<td>General Geology</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
<td></td>
</tr>
</tbody>
</table>

*Course may be taken in increments, see course descriptions, page 65.*

#### SPRING SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 102</td>
<td>Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Math. 102</td>
<td>Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 102</td>
<td>Graphics</td>
<td>2</td>
</tr>
<tr>
<td>E.S. 112</td>
<td>Engineering Science</td>
<td>3</td>
</tr>
<tr>
<td>*Min. 102</td>
<td>Min. Engr. Systems</td>
<td>4</td>
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<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
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#### SECOND YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Math. 201</td>
<td>Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 211</td>
<td>General Physics</td>
<td>4</td>
</tr>
<tr>
<td>Geol. 213</td>
<td>Mineralogy</td>
<td>4</td>
</tr>
<tr>
<td>Chem. 201</td>
<td>Gen. &amp; Quant. Chem.</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
<td></td>
</tr>
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</table>

**FALL SEMESTER**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>E.S. 331</td>
<td>Mechanics of Materials</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 341</td>
<td>Fluid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>Min. 303</td>
<td>Min. Plant Engr.</td>
<td>4</td>
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</tbody>
</table>

Min. 300—Mine Rescue and First Aid, offered by the U.S. Bureau of Mines, must be completed before graduation (no credit).

#### THIRD YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem. 331</td>
<td>Phys. Chem.</td>
<td>4</td>
</tr>
<tr>
<td>Engl. Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>E.S. 331</td>
<td>Mechanics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>E.S. 341</td>
<td>Fluid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>Min. 303</td>
<td>Min. Plant Engr.</td>
<td>4</td>
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</tbody>
</table>

**SPRING SEMESTER**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Met. 304</td>
<td>Intro. to Met.</td>
<td>3</td>
</tr>
<tr>
<td>Min. 306</td>
<td>Rock Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>Econ. 121</td>
<td>Prin. of Economics</td>
<td>3</td>
</tr>
<tr>
<td>Geol. 314</td>
<td>Structural Geol.</td>
<td>3</td>
</tr>
<tr>
<td>Min. 302</td>
<td>Mine Surveying</td>
<td>3</td>
</tr>
<tr>
<td>Engl. Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Min. 300—Mine Rescue and First Aid, offered by the U.S. Bureau of Mines, must be completed before graduation (no credit).

### PETROLEUM ENGINEERING

Because of the possibility of a great petroleum industry in Alaska in the not too distant future, the Board of Regents has approved the initiation of a two-year basic program in Petroleum Engineering at the University of Alaska. Students enrolling in Petroleum Engineering will normally complete the first two years of basic engineering study listed in the mining engineering curriculum. This course of study may be altered to allow for specific requirements of individuals. Upon satisfactory completion of the two-year curriculum, students may transfer to one of a number of universities having petroleum engineering programs and complete their course of study without loss of time or course credit. Upper division courses under Special Topic numbers may be offered in Petroleum, Exploration and Development and Reservoir Engineering principles as student programs warrant.

### REQUIREMENTS FOR A M.S. DEGREE IN MINERAL INDUSTRY MANAGEMENT

Completion of the program listed below:

#### FALL SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>E.M. 611</td>
<td>Engr. Management</td>
<td>3</td>
</tr>
<tr>
<td>E.M. 605</td>
<td>Adv. Engr. Economy</td>
<td>3</td>
</tr>
<tr>
<td>Min. 697</td>
<td>Thesis</td>
<td>3</td>
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<tr>
<td>Approved Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Min. 621</td>
<td>Adv. Mineral Economics</td>
<td>3</td>
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</table>

Completion of the general requirements for a graduate degree as listed on page 65.
REQUIREMENTS FOR A M.S. DEGREE IN MINERAL PREPARATION ENGINEERING

Completion of the program listed below:

<table>
<thead>
<tr>
<th>FALL SEMESTER</th>
<th>15 CREDITS</th>
<th>SPRING SEMESTER</th>
<th>15 CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. Pr. 601—Froth Flotation</td>
<td>3</td>
<td>Min. Pr. 696—Min. Prep. Res.</td>
<td>3</td>
</tr>
<tr>
<td>Min. Pr. 695—Min. Prep. Res.</td>
<td>3</td>
<td>Min. Pr. 606—Plant Design</td>
<td>3</td>
</tr>
<tr>
<td>Min. 621—Adv. Mineral Economics</td>
<td>3</td>
<td>*Elective</td>
<td>6</td>
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<tr>
<td>*Elective</td>
<td>3</td>
<td>Min. Pr. 698—Thesis</td>
<td>3</td>
</tr>
<tr>
<td>Min. Pr. 697—Thesis</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Completion of the general requirements for a graduate degree as listed on page 65.

* Electives will be in the field of chemistry, physics and mathematics. They will include such subjects as: Chem. Engr. 587 or 588 (Advanced Unit Operations), Chemistry 635 (Chemical Spectroscopy), Physics 431 or 531 (Electricity and Magnetism) and Math. 409 or 509 (Experimental Design). These subjects will be chosen to broaden the candidate's fundamental knowledge, depending upon his specific background and interest.
College of Mathematics, Physical Sciences and Engineering

CHARLES SARGENT—DEAN

Physical science is based upon mathematical fundamentals, Engineering is founded upon mathematical and physical principles. The integration of the departments of this College provides the common ground for training in science and technology.

The primary mission of the College is to provide education to the baccalaureate level in its departments and to supplement the primary purpose with research and graduate training where necessary.

UNDERGRADUATE DEGREES—The College grants the following undergraduate degrees: Bachelor of Arts, Bachelor of Science, and Bachelor of Engineering (Chemical, Civil, Electrical, Mechanical).

GRADUATE DEGREES—The College offers the following graduate degrees: Master of Arts, Master of Science, and Doctor of Philosophy.

DEPARTMENTS—Departments in the College include: Chemistry and Chemical Engineering, Civil Engineering, Electrical Engineering, Engineering Management, Geophysics, Mathematics, Mechanical Engineering, and Physics.

The College also administers the curriculum in General Science and the Program in Electronic Technology.

ENGINEERING SCIENCE COURSES—The designation Engineering Science is given to courses which are common to all fields of Engineering. Each engineering curriculum specifies which of these courses are required and the semester in which it is advisable to take them.

FIRST-YEAR ENGINEERING STUDENTS—All first-year students intending to study engineering will be registered in Engineering Science. Before a student may be registered in a particular specialty of engineering, he must have an accumulated average of 2.00 and have completed all courses listed in the curriculum for the common first year of Engineering Science.

CHEMISTRY DEPARTMENT

GEORGE DAHLGREN—DEPARTMENT HEAD

DEGREES—BACHELOR OF ARTS, BACHELOR OF SCIENCE, MASTER OF ARTS, MASTER OF SCIENCE

MINIMUM REQUIREMENTS FOR DEGREE: B.A., B.S.—130 CREDITS
M.A., M.S.—130 ADDITIONAL CREDITS

Graduates in chemistry qualify in many fields: as teachers of chemistry, as supervisors in industry, as technical sales personnel; as research chemists in federal, state, municipal, academic or industrial laboratories, in premedicine or as laboratory technicians. The rapid introduction of chemical techniques in all branches of commerce and industry and the creation of the many synthetic products has caused phenomenal growth in the profession since World War I. Specific mention may be made of the manufacture of plastics, glass, pigments, starch, explosives, dyes, gases, petroleum products, fine and heavy chemicals, perfumes, drugs, vitamins, hormones, solvents, specialized fuels including nuclear fuels, and the various metals and alloys.
The curriculum in chemistry offers an opportunity for broad scientific study. All students specializing in chemistry will meet basic requirements in general inorganic, analytical, organic, and physical chemistry, as well as mathematics and physics. These may be supplemented by courses in biology, education, engineering, geophysics, geology, metallurgy and advanced courses in biology, chemistry, mathematics and physics, according to the interest of the individual student.

The general offerings of the Chemistry Department are arranged to allow students in less specialized programs to meet requirements for the requisite majors and minors. Such service courses and programs are an outstanding feature in the department.

The field of chemistry is highly developed. Graduate study is a necessity for the better opportunities in this field. A prospective chemist should elect additional courses in mathematics and physics. Sufficient study in two foreign languages, preferable German and French, to gain a reading knowledge is recommended.

**Requirements for a B.A. Degree with a Major in Chemistry**

1. Complete the following foundation courses:
   - Chem. 101 and 102—General Chemistry
     OR
   - Chem. 201 and 202—General and Quantitative Chemistry
     Math. 101 and 102—Introduction to analysis
     Phys. 103 and 104—College Physics
     OR
   - Phys. 211-212—Engineering Physics

2. Complete 4 credits in Chemistry, including:
   - Chem. 212—Introductory Quantitative Chemistry
   - Chem. 223—Introductory Organic Chemistry
   OR
   - Chem. 321—Organic Chemistry

A Minor in Chemistry requires Chem. 101-2 or Chem. 201-2; Chem. 212, Chem. 223 or 321.

**Requirements and Curriculum for a B.S. Degree with a Major in Chemistry**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Semester</strong></td>
<td>16 or 16½ CREDITS</td>
</tr>
<tr>
<td>FIRST YEAR</td>
<td></td>
</tr>
<tr>
<td>Chem. 101—General Chem. &amp; Intro. (Qualitative Analysis)</td>
<td>4</td>
</tr>
<tr>
<td>Math. 101—Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>Biol. 105—Fund. of Biology</td>
<td>4</td>
</tr>
<tr>
<td>Eng. 101—Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1 ½</td>
</tr>
</tbody>
</table>

| SECOND YEAR             | 16 or 16½ CREDITS |
| Chem. 321—Organic Chem. | 4 |
| Phys. 211—Gen. Physics  | 4 |
| Phys. 103—College Physics | 4 |
| Math. 201—Calculus | 4 |
| Social Science Elective | 3 |
| P.E. or Mil. Sci. | 1 or 1 ½ |

| THIRD YEAR              | 16 CREDITS |
| Chem. 331—Physical Chemistry | 4 |
| Math. or Science Elective | 3 |
| Social Science Elective | 3 |
| Elective | 6 |

| FOURTH YEAR             | 15 CREDITS |
| Chemistry Elective | 4 |
| English Elective | 3 |
| Elective | 8 |
A minor in Chemistry requires Chem. 101-2 or Chem. 201-2; Chem. 212, Chem. 223 or 321.
Chem. 201-202 may be taken instead of Chem. 101-102.
All electives must have the approval of the Head of the Department.

Students seeking a pre-professional chemistry major must complete one year of organic chemistry, organic qualitative analysis, one year of physical chemistry and one year of advanced chemistry.
E.S. 111-112 may be taken instead of Biol. 105-106.
Students who did not offer two years of a foreign language for admission, must take one year of a foreign language, preferably German.

REQUIRED FOR A M.A. OR M.S. DEGREE IN CHEMISTRY
1. A minimum of 30 credits of approved courses, including Chemistry 697, Thesis.
2. Completion of the general graduate degree requirements listed on page 65.

Graduate students seeking a Master's Degree with a major in chemistry must develop a program in one of the four general divisions of chemistry: analytical, inorganic, organic or physical. A student entering without preparation to take these courses may require additional time to earn his degree.

For course descriptions, see page 131.

CHEMICAL ENGINEERING DEPARTMENT

GEORGE DAHLGREN—DEPARTMENT HEAD

DEGREES—BACHELOR OF SCIENCE (ENGINEERING SCIENCE) AND BACHELOR OF ENGINEERING (CHEMICAL)

MINIMUM REQUIREMENTS FOR DEGREE: B.S.—130 CREDITS
B.E.—162 CREDITS

Chemical Engineering is concerned with the development and application of manufacturing processes in which physical or chemical changes of materials are involved. The chemical engineer is primarily concerned with the development, design, and operation of equipment and processes for bringing about those desired changes on an industrial scale and at a profit. Chemical engineers find opportunities with manufacturers of all of the numerous chemical products of commerce such as the heavy and fine chemicals, pulp and paper, plastics, drugs, dyes, soap, and mineral products; with the atomic energy, missile and satellite programs; with petroleum refineries; with the mineral industry; with the food industries and with many other industries. These opportunities may involve research, design, control, operation and technical sales.

The curriculum provides a good foundation in basic chemical engineering and chemistry with a broad knowledge of general engineering. It provides an adequate foundation for graduate work or for entering specialized fields.

REQUIRED AND CURRICULUM FOR A B.S. DEGREE (ENGINEERING SCIENCE)
WITH A MAJOR IN CHEMICAL ENGINEERING

<table>
<thead>
<tr>
<th>FALL SEMESTER</th>
<th>16½ CREDITS</th>
<th>SPRING SEMESTER</th>
<th>16½ CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eng. 101—Comp. &amp; Modes of Lit.</td>
<td>3</td>
<td>Eng. 102—Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Math. 101—Intro. to Analysis</td>
<td>4</td>
<td>Math. 102—Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 101—Graphics</td>
<td>2</td>
<td>E.S. 102—Graphics</td>
<td>2</td>
</tr>
<tr>
<td>Econ. 121—Prin. of Econ.</td>
<td>3</td>
<td>Soc. Sci. or Humanities</td>
<td>3</td>
</tr>
<tr>
<td>M.S. 101—Mil. Sci.</td>
<td>1½</td>
<td>Mil. Sci.</td>
<td>1½</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECOND YEAR</th>
<th>16½ CREDITS</th>
<th>17½ CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 201—Calculus</td>
<td>4</td>
<td>Math. 202—Calculus</td>
</tr>
<tr>
<td>E.S. 207—Measurements</td>
<td>3</td>
<td>E.S. 208—Mechanics</td>
</tr>
<tr>
<td>M.S. 201—Mil. Sci.</td>
<td>1½</td>
<td>M.S. 202—Mil. Sci.</td>
</tr>
</tbody>
</table>
### Third Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.S. 331</td>
<td>Mech. of Materials</td>
<td>3</td>
</tr>
<tr>
<td>Math. 302</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>Chem. 321</td>
<td>Organic Chem.</td>
<td>4</td>
</tr>
<tr>
<td>Chem. 331</td>
<td>Physical Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>E.E. 313</td>
<td>Elements of Elect. Engr.</td>
<td>3</td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.S. 341</td>
<td>Fluid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>C.E. 441</td>
<td>Sanitary Engr.</td>
<td>3</td>
</tr>
<tr>
<td>Ch. E. 477</td>
<td>Unit Operations</td>
<td>3</td>
</tr>
<tr>
<td>Ch. E. 479</td>
<td>Unit Operations Lab.</td>
<td>1</td>
</tr>
<tr>
<td>Humanities</td>
<td>or Social Science</td>
<td>3</td>
</tr>
</tbody>
</table>

### Requirements for a B.E. Degree (Chemical)

1. Complete a four-year program for B.S. Degree.
2. Complete the following program of courses:

#### Fifth Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 405</td>
<td>Math. of Phys. &amp; Engr.</td>
<td>3</td>
</tr>
<tr>
<td>Ch.E. 433</td>
<td>Applied Chem. Kinetics</td>
<td>3</td>
</tr>
<tr>
<td>Ch.E. 487</td>
<td>Adv. Unit Operations</td>
<td>3</td>
</tr>
<tr>
<td>Ch.E. 493</td>
<td>Special Topics</td>
<td>1</td>
</tr>
<tr>
<td>Engineering</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Approved</td>
<td>Elec. in Chem., Phys., Engineering or</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Metallurgy</td>
<td></td>
</tr>
</tbody>
</table>

For course descriptions, see page 130.

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### Civil Engineering Department

**E. F. Rice—Department Head**

**Degrees—Bachelor of Science (Engineering Science), Bachelor of Engineering (Civil), and Master of Science**

**Minimum Requirements for Degrees:**
- **B.S.**—130 Credits
- **M.S.**—30 Additional Credits
- **B.E.**—162 Credits

Engineering embraces the wide range of cultural and professional subjects having to do with the design and construction of works necessary for civilization. Civil Engineering in particular deals with environmental control: bridges, buildings, dams, and harbor facilities; water resource development, and waste disposal; water power, irrigation works, and drainage; air, water, highway and railway transportation; construction and management; topographic surveying and geodesy; city management and developmental planning.

Candidates for the Bachelor of Science Degree will pass a comprehensive examination in their general field.

Students will enter the fifth year in one of two programs: 1) Those who plan to suspend formal education at the end of the fifth year will enter the curriculum Bachelor of Engineering (Civil). 2) Students who plan academic work beyond the fifth year, and who are accepted for graduate study, will work toward the degree of Master of Science (Civil Engineering) or the degree Master of Science (Engineering Management) (page 142).

The first four years are common to each of these programs.

**Requirements and Curriculum for a B.S. Degree (Engineering Science) with a Major in Civil Engineering**

**Fall Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 101</td>
<td>Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Math. 101</td>
<td>Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 101</td>
<td>Graphics</td>
<td>2</td>
</tr>
<tr>
<td>E.S. 111</td>
<td>Engr. Science</td>
<td>3</td>
</tr>
<tr>
<td>Econ. 121</td>
<td>Prim. of Econ.</td>
<td>3</td>
</tr>
<tr>
<td>M.S. 101</td>
<td>Mil. Sc.</td>
<td>1½</td>
</tr>
</tbody>
</table>

**Spring Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 102</td>
<td>Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Math. 102</td>
<td>Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 102</td>
<td>Graphics</td>
<td>2</td>
</tr>
<tr>
<td>E.S. 112</td>
<td>Engr. Science</td>
<td>3</td>
</tr>
<tr>
<td>Soc. Sc. or Humanities</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>M.S. 102</td>
<td>Mil. Sc.</td>
<td>1½</td>
</tr>
<tr>
<td>SECOND YEAR</td>
<td>16½ CREDITS</td>
<td>17½ CREDITS</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Math. 201—Calculus</td>
<td>4</td>
<td>Math. 202—Calculus</td>
</tr>
<tr>
<td>E.S. 207—Measurements</td>
<td>3</td>
<td>E.S. 208—Mechanics</td>
</tr>
<tr>
<td>Chem. 201—Gen. &amp; Quant. Chem.</td>
<td>4</td>
<td>Chem. 202—Gen. &amp; Quant. Chem.</td>
</tr>
<tr>
<td>MS. 201—Ml. Sci.</td>
<td>1½</td>
<td>M.S. 202—Ml. Sci.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>THIRD YEAR</th>
<th>17 CREDITS</th>
<th>17 CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.S. 331—Mech. of Materials</td>
<td>3</td>
<td>C.E. 334—Phys. Prop. of Materials</td>
</tr>
<tr>
<td>Math. 302—Differential Equations</td>
<td>3</td>
<td>E.S. 346—Basic Thermodynamics</td>
</tr>
<tr>
<td>E.S. 341—Fluid Mechanics</td>
<td>4</td>
<td>E.E. 314—Elem. of Elect. Engr.</td>
</tr>
<tr>
<td>Eng. 213—Advanced Exposition</td>
<td>3</td>
<td>C.E. 344—Hydrology</td>
</tr>
<tr>
<td>Geol. 101—General Geology</td>
<td>4</td>
<td>Math. 312—Numerical Methods for Engineers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FOURTH YEAR</th>
<th>16 CREDITS</th>
<th>14 CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.E. 435—Soil Mechanics</td>
<td>3</td>
<td>E.S. 450—Engr. Mgt. &amp; Oper.</td>
</tr>
<tr>
<td>C.E. 441—Sanitary Engr.</td>
<td>3</td>
<td>C.E. 432—Structural Design</td>
</tr>
<tr>
<td>C.E. 431—Structural Analysis</td>
<td>4</td>
<td>C.E. 402—Transportation Engr.</td>
</tr>
<tr>
<td>C.E. 415—Surveying</td>
<td>3</td>
<td>C.E. 422—Foundation Engr.</td>
</tr>
<tr>
<td>Sp. 251—Public Speaking</td>
<td>3</td>
<td>Soc. Sci. or Humanities</td>
</tr>
</tbody>
</table>

**REQUIREMENTS FOR A B.E. DEGREE (CIVIL)**

Each fifth-year student under this program shall be guided by a personal advisor and will meet these requirements:

4 or more semester hours of Advanced Structural Analysis and/or Advanced Structural Design, plus 2 or more hours in Advanced Sanitary Engineering, and 3 hours of Engineering Management, plus 21 hours of approved courses for a total of at least 32 semester hours.

**REQUIREMENTS FOR A M.S. DEGREE IN CIVIL ENGINEERING**

A student selecting this program or the program for Master of Science (Engineering Management) will meet the general requirements for the Master’s degree (page 66) plus the following:

32 semester hours of credit approved by his graduate committee, of which 6 to 12 semester hours will be C.E. 697, 698, Thesis. No credit is given for foreign language; however, reading knowledge of French, German or Russian is encouraged. Competence in English is to be demonstrated.

**ELECTRICAL ENGINEERING DEPARTMENT**

**JOHN G. TRYON—DEPARTMENT HEAD**

**DEGREES—BACHELOR OF SCIENCE (ENGINEERING SCIENCE) AND BACHELOR OF ENGINEERING (ELECTRICAL)**

**MINIMUM REQUIREMENTS FOR DEGREES: B.S.—130 CREDITS**

B.E.—162 CREDITS

Electrical Engineering treats of the useful applications of electricity and magnetism. Electrical engineers develop, design, and operate equipment for generating and utilizing power, for communication, for automatic control, and for information processing.

The program emphasizes the study of electronic devices and circuits, with particular reference to communication. Due attention is given to power, control, and information processing. A student who completes the B.E. is ready to work in industry or continue with graduate study.

In recognition of readiness for professional responsibility, the Bachelor of Engineering is accredited by the Engineers’ Council for Professional Development.

The curriculum of the Bachelor of Science (Engineering Science) is preparation for graduate study. It is not a complete program for professional responsibilities and the B.S. (E.S.) is not accredited by the E.C.P.D.
# REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE (ENGINEERING SCIENCE) WITH A MAJOR IN ELECTRICAL ENGINEERING

## FALL SEMESTER
### FIRST YEAR 16 or 16½ CREDITS
- **Engl. 101**—Comp. & Modes of Lit. ........ 3
- **Math. 101**—Intro. to Analysis .................. 4
- **E.S. 101**—Graphics .................................. 2
- **E.S. 111**—Engineering Science .................. 3
- **Econ. 121**—Prin. of Econ. ......................... 3
- **P.E. or Mil. Sci.** ..................................... 1 or 1½

## SPRING SEMESTER 16 or 16½ CREDITS
- **Engl. 102**—Comp. & Modes of Lit. ........ 3
- **Math. 102**—Intro. to Analysis .................. 4
- **E.S. 102**—Graphics .................................. 2
- **E.S. 112**—Engineering Science .................. 3
- **Econom. or Humanities** ........................... 3
- **P.E. or Mil. Sci.** ..................................... 1 or 1½

## SECOND YEAR 16 or 16½ CREDITS
- **Math. 201**—Calculus .................................. 4
- **Phys. 211**—Gen. Physics ............................ 4
- **E.E. 203**—Fund. of Elect. Engr. .................. 4
- **E.S. 207**—Measurements .............................. 3
- **P.E. or Mil. Sci.** ..................................... 1 or 1½

## SPRING SEMESTER 17 or 17½ CREDITS
- **Math. 202**—Calculus .................................. 4
- **Phys. 212**—Gen. Physics ............................ 4
- **E.E. 204**—Fund. of Elect. Engr. .................. 4
- **E.S. 208**—Mechanics .................................. 4
- **P.E. or Mil. Sci.** ..................................... 1 or 1½

## THIRD YEAR 17 CREDITS
- **Math. 302**—Diff. Equations ....................... 3
- **Chem. 201**—Gen. & Quant. Chem. ................. 4
- **E.S. 331**—Mechanics of Materials ................ 3
- **E.E. 333**—Electronics .................................. 4
- **Soc. Sci. or Humanities** ........................... 3

## SPRING SEMESTER 16 CREDITS
- **Math. 312**—Numerical Methods for Engineers .... 3
- **Chem. 202**—Gen. & Quant. Chem. ................. 4
- **Engl. 213**—Advanced Exposition .................. 3
- **E.E. 334**—Electronics .................................. 4
- **Elective** ................................................. 2

## FOURTH YEAR 15 or 16 CREDITS
- **E.S. 341**—Fluid Mechanics ....................... 4
- **E.E. 403**—Machines & Power ....................... 4
- **E.E. 453**—Circuit Theory ............................ 4
- **E.S. 331**—Elect. & Magnetism ..................... 3
- **Electives** ................................................. 3 or 4

## SPRING SEMESTER 15 or 16 CREDITS
- **E.S. 346**—Basic Thermodynamics .................. 3
- **E.E. 404**—Machines & Power ....................... 4
- **E.E. 454**—Circuit Theory ............................ 4
- **E.E. 432**—Fields, Lines, Antenna ................ 4
- **E.S. 492**—Engr. Seminar ............................ 3
- **Soc. Sci. or Humanities** ........................... 3
- **Elective** ................................................. 2

## FIFTH YEAR 16 CREDITS
- **E.S. 346**—Basic Thermodynamics .................. 3
- **E.E. 404**—Machines & Power ....................... 4
- **E.E. 454**—Circuit Theory ............................ 4
- **E.S. 432**—Fields, Lines, Antennas ................ 4
- **E.E. 462**—Communication Systems .................. 4
- **E.S. 450**—Engineering Mgt. .......................... 3
- **Elective** ................................................. 2

Electives must have the approval of the department.

* Interchange of upper division courses that are not normally offered every year will be made by the department.

## REQUIREMENTS FOR A B.S. DEGREE (ENGINEERING SCIENCE) WITH A MAJOR IN ELECTRICAL ENGINEERING

Complete the first four years of the B.E. curriculum. Basic sciences or mathematics may be substituted for engineering courses if the department and University approve.

For course descriptions, see page 140.
ENGINEERING MANAGEMENT

JOHN HILPERT—DEPARTMENT HEAD

DEGREE—MASTER OF SCIENCE

MINIMUM REQUIREMENTS FOR DEGREE—30 CREDITS (beyond a Bachelor's degree in one of the recognized branches of Engineering)

The Engineering Management curriculum is designed for graduate engineers who will hold executive or managerial positions in engineering, construction, or industrial organizations. It includes financial, legal, human relations, economic, and technical subjects which are useful to solve problems of management.

The curriculum will include graduate level core courses, business law, and additional course work either directed toward special problems such as Arctic Engineering, or work in one of the more general fields of engineering through projects or research in the application of engineering management principles.

FALL SEMESTER 15 CREDITS SPRING SEMESTER 15 CREDITS

B.A. 331—Business Law .......................... 3 B.A. 332—Business Law .......................... 3
E.M. 611—Engineering Mgt. ........................ 3 E.M. 612—Engineering Mgt. ........................ 3
Electives ........................................... 6 Project or Research ............................. 3
Elective ............................................ 3

Other courses may be substituted for Business Law if a student shows evidence of satisfactory completion of subject matter of B.A. 331 and 332 at the B grade level.

For course descriptions, see page 142.

Electives must have the approval of the department.

GEOPHYSICS DEPARTMENT

The Geophysics Department has been combined with the Physics Department. See page 117.

GENERAL SCIENCE CURRICULUM

GENERAL SCIENCE CURRICULUM

WILLIAM S. WILSON—DEPARTMENT HEAD

DEGREES—BACHELOR OF SCIENCE AND MASTER OF SCIENCE

MINIMUM REQUIREMENTS FOR DEGREES: B.S.—130 CREDITS M.S.—30 ADDITIONAL CREDITS

Man's insatiable curiosity and his desire to understand the world about him has led him to the study of natural science and to the scientific method. Progress in this study has been fruitful and so rapid now that the new discoveries in science are affecting our everyday lives, and most certainly will continue to do so in our lifetime. Consequently, every educated citizen needs a knowledge and appreciation of the philosophy and structure of science. It is generally agreed that the best method for achieving this is by direct study of a natural science, and all the curricula at the University of Alaska reflect this fact in their requirements.

Traditionally, the role of mathematics has been to simplify, interpret, and extend the boundaries of science. The fact that mathematics still includes, as well as transcends, this function makes it a necessary study.

The major in General Science has been designed, as its name indicates, to provide an opportunity to become familiar with a considerable number of natural sciences and thus provide a firm background for specialization in any one of them as well as in certain technical professions. The fields lying on the border between the older sciences provide excellent opportunity for research. An acquaintance with the fundamentals of all of the natural sciences is of value in teaching science in high school and college and also in preparing for specialization in certain of the social sciences.
REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE WITH A MAJOR IN GENERAL SCIENCE

FALL SEMESTER

FIRST YEAR 16 or 16½ CREDITS
Engl. 101—Comp. & Modes of Lit. ............. 3
Biol. 105—Fund. of Biology ................... 4
Math. 101—Intro. to Analysis .................. 4
Chem. 101—General Chem. ........................ or
Phys. 103—Coll. Physics ........................... 4
P.E. or Mil. Sci. ................................. 1 or 1½

SECOND YEAR 17 to 18½ CREDITS
Econ. 121—Prin. of Economics ................... 3
Phys. 103—Coll. Physics ........................... or
Chem. 101—General Chem. ........................ 4
Geol. 101—Gen. Geology ........................... 4
For. Lang. or Dept. Elec. ........................ 6 or 5
P.E. or Mil. Sci. ................................. 1 or 1½

THIRD AND FOURTH YEARS

By the beginning of his junior year each student in General Science must decide upon his major field and, with the assistance of the person in charge of administering the curriculum in General Science, make out a program for his third and fourth years of study.

Directions for making out the program:

1. Include the following courses:

   Dept. Elec. or For. Lang. ................. 5
   Eng. 213—Adv. Exposition or
   selected literature .......................... 3
   Social Science Elective ........................ 3

2. The major field must comprise a minimum of 20 credits above the foundation courses included in this curriculum. The courses scheduled must be approved in writing by the head of the major department. A major may be elected in Anthropology, Biological Science (Zoology or Botany), Chemistry, Geology, Geophysics, Mathematics, or Physics.

3. The electives must include either two minors of at least 12 credits each above the foundation courses included in this curriculum, or a second major. Minors may be selected in any of the major departments listed or in the fields of Economics, Education (minimum 16 credits), English, French, German, Russian, History, or Political Science.

4. All prerequisites of courses elected must be met, preferably by inclusion in a major.

5. One year of German, French, or Russian is required in the General Science curriculum.

   If the foreign language is postponed to the third year, the program described under Third and Fourth Year must be made out at the beginning of the Second Year.

6. Advanced Exposition is required unless written work in all courses indicates a good writing technique.

7. Courses selected to complete the requirement in the social sciences must be chosen from the following: Anth. 212, 321, 324, 325, 331, 342, 423; Soc. 101, 102; any History; any Political Science.

REQUIREMENTS FOR A M.S. DEGREE IN GENERAL SCIENCE

1. A minimum of 30 credits of approved courses.

2. Completion of the general graduate degree requirements listed on page 65.

   The Departments of Mathematics, Physics, Chemistry, Biology, and Geology offer work toward the degree of Master of Science with a major in General Science. This degree may be described as a "breadth" rather than "depth" degree, and a candidate is ordinarily pursuing a course of study in which one of these departments is cooperating with at least one other department within the University. A prospective candidate must meet the general requirements for admission and for the awarding of the degree. At least 21 credits must be earned in science and mathematics. At least 12 credits must be earned in the department giving the degree. A thesis (maximum of three credits) or project (no credit) must be completed in the major department. It is not intended that the individual courses merely satisfy the credit requirements, but each course should contribute to the specific aim of the candidate, and the thesis or project should reflect this aim.
### Mathematics, Physical Sciences and Engineering 115

#### MATHEMATICS DEPARTMENT

**RUSSELL E. CARR—DEPARTMENT HEAD**

### DEGREES—BACHELOR OF ARTS, BACHELOR OF SCIENCE, AND MASTER OF SCIENCE

### MINIMUM REQUIREMENTS FOR DEGREES: B.A.—130 CREDITS

<table>
<thead>
<tr>
<th>B.S.—130 CREDITS</th>
<th>M.S.—30 ADDITIONAL CREDITS</th>
</tr>
</thead>
</table>

The Department of Mathematics offers service courses to all the colleges of the University. In addition, the Department offers courses for students who major in mathematics. The number of positions available for trained mathematicians grows annually, and currently exceeds the supply.

A digital computer, installed in October, 1961, has improved the department's capacity to train mathematicians, scientists, and engineers.

In addition to meeting all the general requirements for the specific degree, certain mathematics courses are required of all mathematics majors. All electives must be approved by the Mathematics Department. Students preparing to teach mathematics in secondary schools must take the education courses necessary to obtain an Alaska Teaching Certificate.

### REQUIREMENTS FOR THE BACHELOR'S DEGREE WITH A MAJOR IN MATHEMATICS

Complete the following courses beyond Math. 202:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 302</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>Math. 303</td>
<td>Introduction to Modern Algebra</td>
<td>3</td>
</tr>
<tr>
<td>Math. 308</td>
<td>Higher Geometry</td>
<td>3</td>
</tr>
<tr>
<td>Math. 314</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>Math. 371</td>
<td>Probability</td>
<td>3</td>
</tr>
<tr>
<td>Math. 401</td>
<td>Advanced Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Math. 402</td>
<td>Advanced Calculus</td>
<td>3</td>
</tr>
</tbody>
</table>

The B.A. degree requires completion of the above major requirements as well as the general requirements for the B.A. degree as listed on page 64.

A minor in Mathematics requires completion of Math. 200, Math. 201, Math. 202, and six additional credits in Mathematics at the 300 level or above.

### REQUIREMENTS AND CURRICULUM FOR A B.S. WITH A MAJOR IN MATHEMATICS

#### FALL SEMESTER 16 or 16½ CREDITS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 101</td>
<td>Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>E.S. 111</td>
<td>Engr. Sci.</td>
<td>3</td>
</tr>
<tr>
<td>*Math. 101</td>
<td>Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td></td>
<td>1 or 1½</td>
</tr>
<tr>
<td>Foreign Language</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

#### SPRING SEMESTER 16 or 16½ CREDITS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 102</td>
<td>Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>E.S. 112</td>
<td>Engr. Sci.</td>
<td>3</td>
</tr>
<tr>
<td>*Math. 102</td>
<td>Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td></td>
<td>1 or 1½</td>
</tr>
<tr>
<td>Foreign Language</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

#### SECOND YEAR 16 or 16½ CREDITS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 201</td>
<td>Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 211</td>
<td>General Physics</td>
<td>4</td>
</tr>
<tr>
<td>Approved Electives</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Chem. 201</td>
<td>Gen. Chem. &amp; Quant. Chem.</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td></td>
<td>1 or 1½</td>
</tr>
</tbody>
</table>

#### SPRING SEMESTER 16 or 16½ CREDITS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 202</td>
<td>Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 212</td>
<td>General Physics</td>
<td>4</td>
</tr>
<tr>
<td>Approved Electives</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Chem. 202</td>
<td>Gen. Chem. &amp; Quant. Chem.</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td></td>
<td>1 or 1½</td>
</tr>
</tbody>
</table>

#### THIRD YEAR 17 CREDITS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 302</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>Math. 303</td>
<td>Intro. to Modern Alg.</td>
<td>3</td>
</tr>
<tr>
<td>Math. 371</td>
<td>Probability</td>
<td>3</td>
</tr>
<tr>
<td>English Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Approved Electives</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

#### SPRING SEMESTER 17 CREDITS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 308</td>
<td>Higher Geometry</td>
<td>3</td>
</tr>
<tr>
<td>Math. 314</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>Econ. 121</td>
<td>Prin. of Economics</td>
<td>3</td>
</tr>
<tr>
<td>English Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Approved Electives</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

#### FOURTH YEAR 17 CREDITS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 401</td>
<td>Advanced Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Social Sci. Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Approved Electives</td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

*Math. 101-102 may be replaced by Math. 200 if the student has adequate preparation.*
### REQUIREMENTS FOR A M.S. DEGREE IN MATHEMATICS

1. A minimum of 30 credits of approved courses.
2. Satisfactory result of the final examination, including either the defense of a thesis if the candidate has elected to write one or a demonstration by other means by the candidate of proficiency at the graduate level in mathematics.
3. Completion of the general requirements for a graduate degree listed on page 65.
   For course descriptions, see page 154.

### MECHANICAL ENGINEERING DEPARTMENT

E. F. RICE—DEPARTMENT HEAD

DEGREES—BACHELOR OF SCIENCE (ENGINEERING SCIENCE) AND BACHELOR OF ENGINEERING (MECHANICAL)

MINIMUM REQUIREMENTS FOR DEGREES: B.S.—130 CREDITS
B.E.—162 CREDITS

Mechanical Engineering embraces professional work having reference to the design and the supervision of the manufacture of machines and devices of industry. At the University of Alaska, emphasis will be placed upon those phases of mechanical engineering which deal with heating, ventilating and the extractive industries, as it is in those fields that Alaska most needs members of the Mechanical Engineering profession.

### REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE (ENGINEERING SCIENCE) WITH A MAJOR IN MECHANICAL ENGINEERING

#### FALL SEMESTER 16½ CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 101—Comp. &amp; Modes of Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Math. 101—Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 101—Graphics</td>
<td>2</td>
</tr>
<tr>
<td>E.S. 111—Engr. Science</td>
<td>3</td>
</tr>
<tr>
<td>Econ. 121—Prin. of Econ.</td>
<td>3</td>
</tr>
<tr>
<td>M.S. 101—Mil. Sci.</td>
<td>1½</td>
</tr>
</tbody>
</table>

#### SECOND YEAR 16½ CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math. 201—Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 211—Gen. Physics</td>
<td>4</td>
</tr>
<tr>
<td>E.S. 207—Measurements</td>
<td>3</td>
</tr>
<tr>
<td>Chem. 201—Gen. &amp; Quant. Chem.</td>
<td>4</td>
</tr>
<tr>
<td>M.S. 201—Mil. Sci.</td>
<td>1½</td>
</tr>
</tbody>
</table>

#### THIRD YEAR 16 CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.E. 313—Elem. of Elect. Engr.</td>
<td>3</td>
</tr>
<tr>
<td>Math. 302—Diff. Equations</td>
<td>3</td>
</tr>
<tr>
<td>E.S. 331—Mech. of Materials</td>
<td>3</td>
</tr>
<tr>
<td>E.S. 341—Fluid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>M.E. 301—Kinematics of Machines</td>
<td>3</td>
</tr>
</tbody>
</table>

#### FOURTH YEAR 16 CREDITS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.E. 401—Machine Design</td>
<td>4</td>
</tr>
<tr>
<td>M.E. 411—Space Conditioning</td>
<td>3</td>
</tr>
<tr>
<td>M.E. 413—M.E. Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>Soc. Sci. or Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Met. 304—Intro. to Metallurgy</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.E. 418—Power Analysis</td>
<td>4</td>
</tr>
<tr>
<td>M.E. 420—Industrial Processes</td>
<td>3</td>
</tr>
<tr>
<td>M.E. 430—Instr. &amp; Controls</td>
<td>3</td>
</tr>
<tr>
<td>E.S. 450—Engr. Mgt. &amp; Oper.</td>
<td>3</td>
</tr>
<tr>
<td>M.E. 440—M.E. Lab.</td>
<td>1</td>
</tr>
<tr>
<td>E.S. 492—Engr. Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

For course descriptions, see page 157.
PHYSICS DEPARTMENT

LEIF OWREN—DEPARTMENT HEAD

DEGREES—BACHELOR OF ART, BACHELOR OF SCIENCE, MASTER OF SCIENCE, AND DOCTOR OF PHILOSOPHY

MINIMUM REQUIREMENTS FOR DEGREES: B.A.—130 CREDITS  
B.S.—130 CREDITS  
M.S.—30 ADDITIONAL CREDITS  
Ph.D.—NO FIXED CREDITS

The science of physics is concerned with the nature of matter and energy and encompasses all phenomena in the physical world from elementary particles to the structure and origin of the universe. Physics provides, together with mathematics and chemistry, the foundation for work in all fields of physical science and engineering, and contributes to other fields such as biology, geology and marine science.

UNDERGRADUATE PROGRAM—The undergraduate curriculum aims at a good foundation in general physics with emphasis on the experimental aspects. It provides opportunities for careers in education and industry, and opens the door to advanced work in physics and related sciences.

GRADUATE PROGRAM—The graduate work is intimately connected with the research activities of the GEOPHYSICAL INSTITUTE which offer ample thesis material in the fields of the atmospheric and space sciences and in solid earth physics. The research program of the Geophysical Institute currently emphasizes investigations of auroral and ionospheric physics, geomagnetism and earth currents, radio wave propagation and scattering, solar radio astronomy and solar-terrestrial relations, polar meteorology and glaciology, seismology and solid earth physics. A graduate student may designate his major field as physics or geophysics. He will pursue his studies under the supervision of an Advisory Committee consisting of his major professor (chairman), two approved faculty members, and the department head (ex officio). The Committee advises on the course of study to be followed and determines the background courses (mathematics, physics, astronomy, chemistry, geophysics) necessary to support the major field.

The graduate course offerings include the basic material generally required for research and teaching in physics or related fields, and specialized courses in the research areas mentioned above.

REQUIREMENTS FOR A B.A. DEGREE WITH A MAJOR IN PHYSICS

1. Complete the general requirements for a B.A. Degree listed on page 64.
2. Complete the following foundation courses:
   Phys. 103-104—College Physics ................................................................. 8 credits
3. Complete a minor in Mathematics, which includes Math. 101, 102, 303 or Math. 103, 104, 204 and 303.
4. Complete 20 credits of approved courses in Physics.
   A minor in Physics requires 12-16 credits; or Physics 103, 104, 301 and 302.

REQUIREMENTS AND CURRICULUM FOR A B.S. DEGREE WITH A MAJOR IN PHYSICS

<table>
<thead>
<tr>
<th>FALL SEMESTER</th>
<th>SPRING SEMESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRST YEAR</td>
<td></td>
</tr>
<tr>
<td>15 or 15½ CREDITS</td>
<td>15 or 15½ CREDITS</td>
</tr>
<tr>
<td>Engl. 101—Comp. &amp; Modes of Llt.</td>
<td>3</td>
</tr>
<tr>
<td>Phys. 111—General Physics</td>
<td>3</td>
</tr>
<tr>
<td>Math. 101—Intro. to Analysis</td>
<td>4</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
</tr>
<tr>
<td>*Approved Electives</td>
<td>4</td>
</tr>
<tr>
<td>SECOND YEAR</td>
<td></td>
</tr>
<tr>
<td>16 or 16½ CREDITS</td>
<td>16 or 16½ CREDITS</td>
</tr>
<tr>
<td>Math. 201—Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 211—General Physics</td>
<td>4</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>3 or 5</td>
</tr>
<tr>
<td>P.E. or Mil. Sci.</td>
<td>1 or 1½</td>
</tr>
<tr>
<td>*Approved Electives</td>
<td>4 or 2</td>
</tr>
<tr>
<td>THIRD YEAR</td>
<td></td>
</tr>
<tr>
<td>17 CREDITS</td>
<td>17 CREDITS</td>
</tr>
<tr>
<td>Phys. 311—Classical Physics</td>
<td>4</td>
</tr>
<tr>
<td>Phys. 331—Electricity &amp; Magnetism</td>
<td>3</td>
</tr>
<tr>
<td>*Approved Electives</td>
<td>5</td>
</tr>
</tbody>
</table>
FOURTH YEAR 17 CREDITS

Math. 401—Advanced Calculus .................................................. 3
Phys. 411—Modern Physics ...................................................... 4
Phys. 481—Advanced Physics Lab. ........................................... 2
*Approved Electives ............................................................. 8

Math. 402—Advanced Calculus .................................................. 3
Phys. 412—Modern Physics ...................................................... 4
Phys. 482—Advanced Physics Lab. ........................................... 2
Phys. 486—Experimental Phys. or
Phys. 494—Special Topics ..................................................... 3
*Approved Electives ............................................................. 5

* 9 Credits of electives must be Social Science and 6 must be English.

REQUIREMENTS FOR A M.S. DEGREE IN PHYSICS OR GEOPHYSICS

1. A minimum of 30 credits of approved courses, including Phys. 697 or 698, Thesis.
2. Completion of the general requirements for a graduate degree listed on page 65.

REQUIREMENTS FOR A PH.D. DEGREE IN PHYSICS OR GEOPHYSICS

1. Completion of the requirements for the doctoral degree set forth on page 66.
   For course descriptions, see page 166.

ELECTRONIC TECHNOLOGY PROGRAM

JOHN G. TRYON—PROGRAM HEAD

DEGREE—ASSOCIATE IN ELECTRONIC TECHNOLOGY

MINIMUM REQUIREMENTS FOR DEGREE: A.E.T.—65 CREDITS

The program in electronic technology prepares people to maintain, install, and operate
complex electronic equipment, such as broadcast transmitters, airways beacons, carrier tele-
phone systems, radars. The program is not introductory electrical engineering, which
emphasizes design; it is electronic technology, which emphasizes maintenance.

To enter this curriculum, a person must have completed high school.

REQUIREMENTS AND CURRICULUM FOR AN ASSOCIATE DEGREE IN
ELECTRONIC TECHNOLOGY

FIRST SEMESTER 16 CREDITS

E.T. 51—Basic Concepts and D.C. Circuits .................................... 4
E.T. 52—Fund. of A.C. Circuits .............................................. 4
E.T. 55—Shop Practice & Fund. I .......................................... 3
E.T. 59—Math. for Electronic Tech. ........................................ 5

SECOND SEMESTER 17 CREDITS

E.T. 51—Basic Concepts and D.C. Circuits .................................... 4
E.T. 61—V.T. and Semicond. Fund. ....................................... 4
E.T. 62—Basic Electronic Circuits ....................................... 3
E.T. 63—Basic Electronic Systems ....................................... 4
E.T. 65—Shop Practice & Fund. II ..................................... 3
Engl. 68—Communication for Technicians .................................. 3

THIRD SEMESTER 17 CREDITS

E.T. 71—Adv. Electronic Circuits I ........................................ 5
E.T. 72—Adv. Electronic Circuits II ...................................... 4
E.T. 75—Microwave Electronics ........................................... 4
E.T. 77—System Maintenance ................................................ 4

FOURTH SEMESTER 16 CREDITS

E.T. 71—Adv. Electronic Circuits I ........................................ 5
E.T. 82—Industrial Electronics ............................................. 3
B.A. 66—Bus. Adm. for Tech. ............................................. 4
P.S. 68—Soc. Sci. for Tech. ............................................... 4

For course descriptions, see page 141.

ELECTRONIC TECHNOLOGY CURRICULUM

JOHN G. TRYON—PROGRAM HEAD

DEGREE—ASSOCIATE IN ELECTRONIC TECHNOLOGY

MINIMUM REQUIREMENT FOR DEGREE: A.E.T.—65 CREDITS

The program in electronic technology prepares people to maintain, install, and operate
electronic equipment such as broadcast transmitters, airways beacons, and carrier telephone
systems. The program is not introductory electrical engineering, which emphasizes design;
it is electronic technology, which emphasizes maintenance.

To enter, a person must have completed high school.
## Mathematics, Physical Sciences and Engineering 119

### CURRICULUM FOR AN A.E.T. DEGREE

#### FALL SEMESTER  
**FIRST YEAR**  
16 CREDITS  
- E.T. 51—DC Circuits  
- E.T. 52—AC Circuits  
- E.T. 55—Electronics Practice I  
- E.T. 59—Math. for Electronics  

#### SECOND YEAR  
17 CREDITS  
- E.T. 71—Electronic Circuits II  
- E.T. 72—Electronic Circuits III  
- E.T. 75—Microwave Electronics  
- E.T. 77—System Maintenance  

#### SPRING SEMESTER  
**FIRST YEAR**  
17 CREDITS  
- E.T. 61— Tubes & Semiconductors  
- E.T. 62—Electronic Circuits I  
- E.T. 63—Electronic Systems I  
- E.T. 66—Electronics Practice II  
- Eng. 168—Communication for Tech.  

#### SECOND YEAR  
16 CREDITS  
- E.T. 81—Industrial Electr.  
- E.T. 84—Electronic Systems II  
- B.A. 66—B.A. for Technicians  

For course descriptions, see page 141.
Course Descriptions

Courses offered by the University are listed alphabetically by department.

**COURSE NUMBERS**—The first numeral of a course numbered in the hundreds indicates the year in which the course is normally offered in its own department. Odd numbers are assigned to courses given in the fall semester and even numbers to courses given in the spring semester. For example, English 101 is given for first-year students in the first or fall semester. English 342 is given for third-year students in the second or spring semester.

"1-49—Non-credit courses.

"50-99—Courses designed for associate degree or a technical certificate credit; they are not applicable to the baccalaureate requirements.

"100-499—Upper division courses. Freshmen and sophomores must petition the Academic Council for permission to take these groupings unless such courses are required in the first two years of their curriculum as printed in this catalog. When marked with an asterisk (*321, *492) such courses may be applied as graduate credit after approval by the head of the department offering the course and by the student's advisory committee.

"600-699—Graduate courses to which a few well qualified undergraduates may be admitted with the permission of the head of the department in which the course is offered.

"491-492 and 691-692 indicate Seminars, 493-494 and 693-694 indicate Special Topics, and 697-698 indicate Thesis or Dissertation in those departments where listed."

**COURSE CREDITS**—One credit (or one hour) represents satisfactory completion of one hour of work a week for one semester. This requirement may be met by attendance at one lecture, or by three fifty-minute periods of laboratory work a week, or the equivalent.

Following the title of each course, the figures in parentheses indicate the number of lecture and laboratory hours the class meets, the first figure indicating lecture hours; the second, laboratory. For example (2+3) indicates that a class has 2 hours of lecture and 3 of laboratory work.

The number of credits listed is for each semester. Thus "Three Credits—Fall Semester" means three credits may be earned and the course is given in the fall or first semester.

**COURSE CLASSIFICATIONS**—Subjects and courses are classified as follows:

- **Natural Sciences**
- Anthropology 302
- Biological Sciences
- Chemistry
- Geography 201, 401
- Geology
- Mathematics
- Physics

- **Social Sciences**
- Anthropology
- Economics
- Geography
- History
- Home Economics 236, 301
- Law
- Political Science
- Psychology
- Sociology

- **Humanities**
- Art
- English
- Foreign Language and Literature

- **Interdisciplinary**
- Journalism
- Linguistics
- Music
- Philosophy
- Speech and Drama

**ACCOUNTING**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acc. 215</td>
<td>Accounting Principles (0+6)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>216</td>
<td></td>
<td>3</td>
<td>Spring</td>
</tr>
</tbody>
</table>

Accounting as a factor in business management and control.

**Fall semester:** Accounting principles as they apply to the organization and conduct of business.

**Spring semester:** Application of accounting principles and practices to business situations; preparation of financial statements.

**Prerequisite:** Acc. 215—Sophomore standing or permission of the instructor for Acc. 216—Accounting 215 or equivalent.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acc. 218</td>
<td>Accounting Survey (0+4)</td>
<td>2</td>
<td>Spring</td>
</tr>
</tbody>
</table>

An intensive course designed to meet needs of students not intending to take further accounting. Emphasizes principles and interpretative aspects of accounting. **Prerequisite:** None.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acc. 315</td>
<td>Intermediate Accounting (0+6)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Advanced principles and techniques. Relation of accounting to business management and control, accounting practices and procedures designed to reflect the financial position of a business and the results of its operations. Prerequisite: 216 or equivalent.</td>
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<td></td>
</tr>
<tr>
<td>Acc. 316</td>
<td>Analysis of Financial Statements (0+6)</td>
<td>3</td>
<td>Spring</td>
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<tr>
<td></td>
<td>Continuation of Acc. 315 Interpretation of financial statements and analysis of accounting data for investment and evaluation purposes. Prerequisite: Acc. 315 or equivalent.</td>
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<tr>
<td>Acc. 318</td>
<td>Accounting Systems (0+6)</td>
<td>3</td>
<td>Spring</td>
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<td></td>
<td>Function of commercially developed accounting systems; study and solution of procedural problems at the working level; use and adaptation of bookkeeping machines and electronic data processing to cash control, customer billings, payables, payrolls and payroll taxes, sales analyses and inventory and cost control. Prerequisite: 315 or equivalent.</td>
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<tr>
<td>Acc. 415</td>
<td>Federal and State Tax Accounting (0+6)</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td></td>
<td>Basic rules and procedures involving Federal income tax and State income tax as they affect individuals, partnerships, and corporations. Prerequisite: Acc. 315.</td>
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<tr>
<td>Acc. 416</td>
<td>Advanced Accounting (0+6)</td>
<td>3</td>
<td>Spring</td>
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<tr>
<td></td>
<td>Accounting problems involved in creation, operation and liquidation of business entities. Consideration of accounting problems most frequently encountered in partnerships, corporations, estates, trusts and receiverships. Prerequisite: Acc. 315 or equivalent.</td>
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<tr>
<td>Acc. 417</td>
<td>Cost Accounting (3+0)</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td></td>
<td>Principles and procedures for determining production and operating costs; factors in reducing costs; interpretation and analysis of cost data. Prerequisite: Acc. 315 or equivalent.</td>
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<tr>
<td>Acc. 418</td>
<td>Auditing (3+0)</td>
<td>3</td>
<td>Spring</td>
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<td></td>
<td>Principles, standards and working procedures of audit verification and analysis; functions of public accountants and internal auditors. Prerequisite: Acc. 315 or equivalent.</td>
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<tr>
<td>Acc. 493</td>
<td>Special Topics</td>
<td>Credits Arr.</td>
<td>Fall</td>
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<tr>
<td></td>
<td>An area in which the student has a special interest. Independent research, outside reading, and periodic reports are included. Admission by arrangement.</td>
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<tr>
<td>Acc. 613</td>
<td>Accounting for Specific Industries</td>
<td>Credits Arr.</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>For students wishing to make an intensive study of an industry, and who have access to sufficient private accounting data to form the basis of analytical research; and written permission to use the data. Material developed cannot be used to fulfill the requirements to Acc. 697 or 698. Prerequisite: Graduate standing and 15 hours of accounting including Acc. 416, 417 and 418 or equivalent.</td>
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<tr>
<td>Acc. 616</td>
<td>Advanced Tax Problems</td>
<td>Credits Arr.</td>
<td>Spring</td>
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<tr>
<td></td>
<td>Problems in complex areas of Federal income tax including partnerships, corporations, fiduciaries, contractors, pensions, annuities, reorganizations and non-taxable exchanges. Prerequisite: Graduate standing and 15 hours of accounting including Acc. 415 and 416, or equivalent.</td>
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<tr>
<td>Acc. 617</td>
<td>Advanced Auditing</td>
<td>Credits Arr.</td>
<td>Fall</td>
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<td></td>
<td>Advanced aspects of auditing including requirements of the Securities and Exchange Commission, state regulatory bodies, bank and credit requirements, stock exchanges and the American Institutes of Certified Public Accountants; will use an illustrative audit wherein working papers and a typical audit report must be prepared. Prerequisite: Graduate standing and 15 hours of accounting including Acc. 416 and 418, or equivalent.</td>
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<tr>
<td>Acc. 618</td>
<td>Advanced Cost Accounting</td>
<td>Credits Arr.</td>
<td>Spring</td>
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<td></td>
<td>More complex areas of cost accounting, including standard costs, cost variations, analysis of manufacturing costs, and techniques and procedures of affecting economies in production and distribution. Prerequisite: Graduate standing and 15 hours of accounting including Acc. 417 and 418, or equivalent.</td>
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<tr>
<td>Acc. 621</td>
<td>Advanced Accounting Problems (0+6)</td>
<td>3</td>
<td>Fall</td>
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<td></td>
<td>Analytical study of material covered in recent C.P.A. examinations and professional writings on accounting subjects. Working problems under examination conditions; discussion of points involved. Prerequisite: Graduate standing and 15 hours of accounting including Acc. 416, 417 and 418, or equivalent.</td>
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</tbody>
</table>
Course Descriptions

Acc. 627 Professional Accounting (0-6) 1, 2 or 3 Credits  Fall
Professional accounting, its application to specific areas of practice. Budgeting, controllership and public accounting are studied equally. Prerequisite: Senior standing and 15 hours of accounting.

Acc. 628 Governmental and Institutional Accounting  Credits Arr.  Spring
Procedures and systems employed by states, municipalities and other governmental units. Offered as demand warrants. Prerequisite: Senior standing and 15 hours of accounting.

Acc. 629 Accounting Theory (3-0) 2 Credits  Fall
Emphasis on current proposals and developments, to meet the needs of those preparing to take the C.P.A. examination or who expect to teach accounting. Offered as demand warrants. Prerequisite: Senior standing or permission of instructor.

Acc. 630 Accounting Seminar (3-0) 2 Credits  Fall
Discussion of areas such as new developments and proposals, problems in public practice, inter-professional relationships and similar topics. Offered as demand warrants. Prerequisite: Graduate standing or permission of instructor.

Acc. 631 Internship  Credits Arr.  Fall
For students with employment experience beyond the clerical level. Independent research and reading is required which will supplement knowledge and experience gained from the employment internship. Credit is not given for material used in Acc. 613. The work in this course may partially fulfill requirements for Acc. 697-698. Prerequisite: Graduate standing, advance approval of the instructor and written permission of the employer that the private accounting material may be used for class purposes.

Acc. 693 & 694 Special Topics  Credits Arr. Fall & Spring
Prerequisite: Graduate standing and permission of the Instructor.

Acc. 697 Thesis  Credits Arr.  Fall
Research and development of an accounting topic with a high level of accomplishment that will meet the thesis requirement for the degree of Master of Science in Business Administration.

AGRICULTURAL SCIENCE

Ag. 301 Agricultural Prices (3-0) 3 Credits  Fall
Analysis and interpretation of factors affecting agricultural prices; study of price movements; price policy. Prerequisites: Econ. 121 and 122. Offered as demand warrants.

Ag. 310 Animal Husbandry (2-3) 3 Credits  Spring
Origin, history and economic significance of major breeds of dairy and beef cattle, swine, sheep and poultry. Introduction to management, with special reference to Alaska. Offered as demand warrants.

Ag. 311 Soils (2-3) 3 Credits  Fall
Origin and development, weathering, classification, terminology; physical and chemical properties, biology, aeration and moisture; reaction and liming; manures and fertilizers; management; problems in Alaska. Prerequisite: Chem. 101. Offered alternate years; Next offered 1966-67.

Ag. 332 Horticulture (2-3) 3 Credits  Spring
Survey; principles of propagation, culture and use; soil, light and water requirements; planting and harvesting; insect, weed and disease control. Prerequisite: Biol. 103. Offered as demand warrants.

Ag. 404 Agricultural Marketing (3-0) 3 Credits  Spring
Principles and practices of agricultural marketing; prices and costs; case studies. Prerequisites: Econ. 121. Offered as demand warrants.

Ag. 491 Seminar (Arrange)  Credits Arr.  Fall
Unique problems in agricultural development of Alaska, the role of agriculture in Alaska's economy, and recent research advances in the State. Subject matter fields: Economics, agronomy, animal industry, soils, horticulture and agricultural engineering. Offered as demand warrants.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits Arr.</th>
<th>Fall or Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anth. 101</td>
<td>The Study of Man (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>Anth. 202</td>
<td>Cultural Anthropology (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>Anth. 212</td>
<td>Human Origins (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Anth. 302</td>
<td>Physical Anthropology (2+3)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Anth. 304</td>
<td>Africa (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>Anth. 306</td>
<td>Oceania (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Anth. 312</td>
<td>North American Archaeology (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>Anth. 313</td>
<td>Archaeology of Central and South America (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
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<tr>
<td>Anth. 325</td>
<td>Peoples of the Arctic (3+0)</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td>Anth. 329</td>
<td>Peoples of Central and Northern Asia (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Anth. 331</td>
<td>Primitive Religion (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Anth. 335</td>
<td>North American Ethnology (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Anth. 336</td>
<td>Ethnology of Central and South America (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Anth. 342</td>
<td>Alaska Natives (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Anth. 351</td>
<td>Primitive Technology (2+3)</td>
<td>3</td>
<td>Fall</td>
</tr>
</tbody>
</table>

Various subjects studied principally through directed reading and supervised projects. Offered as demand warrants.

**ANTHROPOLOGY**

**Anth. 101** The Study of Man (3+0)
Introductory anthropological and geographical studies, including a survey of the origin and development of culture, a study of human behavior and mechanics of cultural and social change.

**Anth. 202** Cultural Anthropology (3+0)
Ways of living among peoples of the world; includes basic theories and concepts of current cultural anthropology. Prerequisite: Anth. 101 or by permission.

**Anth. 212** Human Origins (3+0)
Old World prehistory from the Lower Paleolithic to historical times.

**Anth. 302** Physical Anthropology (2+3)
Basic physical and constitutional anthropology, designed for students preparing for medical school or professional work in anthropology. Prerequisite: Anth. 101, 212 or Biol. 105, 106.

**Anth. 304** Africa (3+0)
Peoples and cultures of Africa. Prerequisite: Anth. 101.

**Anth. 306** Oceania (3+0)
Ethnic groups and cultures of Indonesia, Micronesia, Melanesia, Polynesia and Australia. Prerequisite: Anth. 101.

**Anth. 312** North American Archaeology (3+0)
Prehistoric cultures north of Mexico. Archaeological methods peculiar to America and problems related to the prehistory of the Arctic regions. Prerequisite: Anth. 212.

**Anth. 313** Archaeology of Central and South America (3+0)Continuation of Anthropology 312. Development of civilization in the Valley of Mexico and in the Mayan and Andean areas. Prerequisite: Anth. 312 or permission.

**Anth. 325** Peoples of the Arctic (3+0)
Ethnic groups and cultures in circumpolar lands. Prerequisite: Anth. 101 or 212.

**Anth. 329** Peoples of Central and Northern Asia (3+0)
Native peoples of Siberia and adjoining regions. Prerequisite: Anth. 101.

**Anth. 331** Primitive Religion (3+0)
Comparing selected primitive religions and mythologies; their function in the cultural context. For advanced students in liberal arts and social sciences. Prerequisite: Anth. 304 or 306 or Junior standing or by permission.

**Anth. 335** North American Ethnology (3+0)

**Anth. 336** Ethnology of Central and South America (3+0)
Racial distribution, material and social cultures of peoples of Central and South America. Prerequisite: Anth. 101.

**Anth. 342** Alaska Natives (3+0)

**Anth. 351** Primitive Technology (2+3)
Material culture of primitive man with emphasis upon aspects of economic importance. (The laboratory will allow students to practice techniques, examine specimens, etc.) Prerequisite: Anth. 101 and Anth. 312.
Course Descriptions 125

*Anth. 411 Arctic Archaeology (2+3) 3 Credits Fall
Research problems of Arctic prehistory. Limited to students interested in archaeological materials in the University museum representing early culture in Arctic America. Prerequisite: Anth. 312.

*Anth. 412 Arctic Archaeology (2+3) 3 Credits Spring
Continuation of Anthropology 411, including a practical study of methods of field and laboratory research with emphasis on Eskimo prehistory. Prerequisite: Anth. 312 and 411.

Anth. 423 Social Anthropology (3+0) 3 Credits Fall
Basic course stressing social structure, acculturation, religion, and folklore of Arctic America. Prerequisite: Anth. survey course on 300 level and Junior standing or permission.

Anth. 430 Anthropological Field Methods (1+3) 2 Credits Spring
Laboratory and demonstration to prepare the student for field work and inform him of recently developed techniques of collecting field data. Concentration on one of following: Archaeology, ethnography, physical anthropology. Prerequisite: Junior standing and permission of instructor.

*Anth. 491 Seminar in American Archaeology (2+0) 2 Credits Fall or Spring
Archaeological problems in America and prescribed research utilizing current literature. Prerequisite: Anth. 312.

*Anth. 492 Seminar in American Ethnology (2+0) 2 Credits Fall or Spring
Anthropological literature and research in selected problems. Prerequisite: Anth. 333, 423, or permission.

Anth. 493 Special Topics Credits Arr. Fall
Various subjects studied in special fields in anthropology. Prerequisite: Senior standing or permission.

Anth. 497 Thesis or Project Credits Arr. Fall
Credits Arr. Spring
Advanced students who have shown special aptitude for individual study or research may elect thesis or project work, on approval of the Head of the Department.

Anth. 691 Seminar Credits Arr. Fall
Credits Arr. Spring
Topics include physical and social anthropology, comparative archaeology, ethnological theory. Admission by arrangement.

Anth. 692 Seminar Credits Arr. Fall
Credits Arr. Spring
Topics include physical and social anthropology, comparative archaeology, ethnological theory. Admission by arrangement.

Anth. 693 Special Topics Credits Arr. Fall
Credits Arr. Spring
Various subjects studied, principally by directed study, discussion and research. Admission by arrangement.

ART

Art 105 Freehand Drawing (0+4) 2 Credits Fall
106 2 Credits Spring
Pictorial design, life drawing, landscape drawing, using varied techniques and media.

Art 161 Design and Color Theory (1+3) 2 Credits Fall
162 2 Credits Spring
Creative designing and rendering. Emphasis on mass-space relationships and composition, value transitions and hues, colorwheel, color and intensity movements.

Art 205 Life Drawing and Composition 2 Credits Fall
206 2 Credits Spring
Problems in drawing from life, exploring possibilities in pictorial design and composition, still life, anatomy and perspective. Prerequisite: Art 105 or permission.

Art 207 Beginning Printmaking (0+4) 2 Credits Fall
208 2 Credits Spring
Various intaglio and relief printing media, engraving, etching, woodcut and other graphic media. Prerequisite: Art 106 or permission.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>Art 209</td>
<td>Beginning Metalcraft (0+4)</td>
<td>2</td>
<td>Fall</td>
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<td>Spring</td>
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<tr>
<td></td>
<td>Material processes and techniques for silver jewelry and silversmithing. Prerequisite: Art 161 or permission.</td>
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<tr>
<td>Art 211</td>
<td>Beginning Sculpture (0+6)</td>
<td>3</td>
<td>Fall</td>
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<td>Spring</td>
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<tr>
<td></td>
<td>Original, creative studies in clay, wood and stone sculpture. Emphasis on mastery of techniques and material processes.</td>
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<tr>
<td>Art 213</td>
<td>Beginning Oil Painting (0+6)</td>
<td>3</td>
<td>Fall</td>
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<td>Spring</td>
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<td></td>
<td>Basic investigation of materials and their use in expressing the students' ideas. Prerequisite: Art 106 and 163 or permission.</td>
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<tr>
<td>Art 261</td>
<td>History of World Art (3+0)</td>
<td>3</td>
<td>Fall</td>
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<td>Spring</td>
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<td></td>
<td>Origins of art and its progressive development from the beginning to contemporary art; emphasis on change and progress. Prerequisite: Sophomore standing. Term paper required each semester.</td>
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<tr>
<td>Art 305</td>
<td>Advanced Life Drawing and Anatomy (0+4)</td>
<td>2</td>
<td>Fall</td>
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<td>Spring</td>
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<td>Creative approach, including a comprehensive study of functional human anatomy, with the human figure as an art motif. Prerequisite: Art 206 or permission.</td>
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<tr>
<td>Art 307</td>
<td>Intermediate Printmaking (0+4)</td>
<td>2</td>
<td>Fall</td>
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<td>Spring</td>
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<td></td>
<td>Additional study and experimentation in intaglio, relief and planographic print techniques, including lithography, serigraphy and color printing. Prerequisite: Art 208 or permission.</td>
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<tr>
<td>Art 309</td>
<td>Intermediate Metalcraft (0+4)</td>
<td>2</td>
<td>Fall</td>
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<td>Spring</td>
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<tr>
<td></td>
<td>Material processes and techniques for silver jewelry and silversmithing; creating problems in artistic design. Prerequisite: Art 210 or permission.</td>
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<tr>
<td>Art 311</td>
<td>Intermediate Sculpture (0+6)</td>
<td>3</td>
<td>Fall</td>
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<td>Spring</td>
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<td></td>
<td>Creative studies in welding, plaster casting, concrete casting, sandcasting, clay modeling, wood carving and stone carving. Prerequisite: Art 212 or permission.</td>
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<tr>
<td>Art 313</td>
<td>Intermediate Oil Painting (0+4)</td>
<td>2</td>
<td>Fall</td>
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<td>Spring</td>
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<td></td>
<td>Creating pictorial problems in oil painting techniques, still life, composition, and figure painting. Prerequisite: Art 214 or permission.</td>
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<tr>
<td>Art 407</td>
<td>Advanced Printmaking (0+4)</td>
<td>2</td>
<td>Fall</td>
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<td>Spring</td>
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<tr>
<td></td>
<td>Advanced study in all printing media. Prerequisite: Art 308 or permission.</td>
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<tr>
<td>Art 409</td>
<td>Advanced Metalcraft (0+4)</td>
<td>2</td>
<td>Fall</td>
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<td>2</td>
<td>Spring</td>
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<tr>
<td></td>
<td>Continued investigation and experimentation of Intermediate Metalcraft. Prerequisite: Art 310 or permission.</td>
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<tr>
<td>Art 411</td>
<td>Advanced Sculpture (0+6)</td>
<td>3</td>
<td>Fall</td>
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<td>3</td>
<td>Spring</td>
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<tr>
<td></td>
<td>Styro-foam burn-out, aluminum, bronze casting, steel welding, repousse sculpture, plastics, inlay, and architectural sculpture. Prerequisite: Art 312 or permission.</td>
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<tr>
<td>Art 413</td>
<td>Advanced Oil Painting (0+4)</td>
<td>2</td>
<td>Fall</td>
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<td>Spring</td>
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<tr>
<td></td>
<td>Exploration and development of the creative approach to various techniques involved in figure, landscape, abstract and non-objective painting and pictorial design. Prerequisite: Art 314 or permission.</td>
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</tr>
</tbody>
</table>
## Art 415  History of Modern Art (2+0)
- 2 Credits  Fall
- 2 Credits  Spring

The five major art movements of the 19th century and the major leaders of art movements in the 20th century.

## Art 419  History of Northern Renaissance Art (2+0)
- 2 Credits  Fall
- 2 Credits  Spring

Pre-Renaissance painting, sculpture, architecture and minor arts of the Netherlands through the Northern Renaissance; Renaissance painting in France and Germany; the humanist and reformatory influences on artistic developments.

## Art 493  Special Topics
- Credits Arr.  Fall
- Credits Arr.  Spring

Various subjects in art. *Admission by arrangement.*

### BIOLOGICAL SCIENCES

#### Biol. 103  Fundamentals of Biology (3+3)
- 4 Credits  Fall
- 4 Credits  Spring

Principles of living systems as illustrated in unicellular and multicellular organisms; mechanisms of growth, development, heredity and evolution; introduction to plant and animal kingdoms. An introductory course open to students in all curricula. *Prerequisite for Biol. 106: Biol. 103 or permission.*

*Fall semester:* Origin of life, structures and functions of cells, cumulative development of structures and functions in the plant kingdom.

*Spring semester:* Genetics, ecology, cumulative development of structures and functions in the animal kingdom. An introductory course open to students in all curricula.

#### Biol. 208  Organic Evolution (2+0)
- 2 Credits  Spring

Evidences, mechanisms, and directive forces. *Prerequisite: Biol. 105, 106. Offered alternate years; next offered 1965-66.*

#### Biol. 214  Microbiology (2+6)
- 4 Credits  Spring

General microbiology. Micro-organisms, classification, morphology and physiology. Disease, sources and modes of infection, sterilization. Laboratory includes preparation of culture media; examinations of milk, water, air and soil. *Prerequisite: Chem. 102, a laboratory course in elementary biology, or by permission.*

#### Biol. 233  Morphology of Nonvascular Plants (2+3)
- 3 Credits  Fall

Comparative study of the structure, reproduction, development, and phylogenetic relationships of the major groups of nonvascular plants. *Prerequisite: Biol. 105. Offered alternate years; next offered 1966-67.*

#### Biol. 234  Morphology and Anatomy of Vascular Plants (3+3)
- 4 Credits  Spring

Comparative study of morphology, developmental anatomy, phylogenetic trends, and life histories of the major groups of vascular plants. *Prerequisite: Biol. 105. Offered alternate years; next offered 1966-67.*

*Bio. 302  Genetics (3+0)
- 3 Credits  Spring

Principles of inheritance in plants and animals; the physico-chemical properties of genetic systems. *Prerequisite: Biol. 105, 106.*

*Bio. 303  Principles of Ecology (3+0)
- 3 Credits  Fall

Relationships between organisms and their environments. Communities, environmental factors affecting plants and animals, population structure, and reaction of organisms. Several all-day field trips. *Prerequisite: Biol. 105, 106, or permission.*

*Bio. 305  Invertebrate Zoology (3+3)
- 4 Credits  Fall

Structure, function, classification, evolution, and life histories of invertebrate animals. Several all day field trips. *Prerequisite: Biol. 105, 106.*

*Bio. 307  Parasitology (2+3)
- 3 Credits  Fall

Classification, morphology, life history, and ecology of parasites of animals. *Prerequisite: Biol. 105, 106. Offered alternate years; next offered 1965-66.*
and biological factors controlling plant power of cellular, organism, population, and community levels. 

Spatial and temporal geography of plant and animal groups; emphasis on environmental and historical factors controlling present patterns of distribution. Offered alternate years; next offered 1965-66.

Biol 627 Physiological Ecology (2+3) 3 Credits Fall

Interaction between organisms and their environment with emphasis on the function of the organism as affected by physical stimuli such as light, heat, water, ions, and biome stimuli such as competition. Each environmental factor is considered at the molecular, cellular, organismic, population, and community levels. Offered alternate years; next offered 1965-66.
Course Descriptions

Biol. 637 Modern Evolutionary Theory (2+0) 2 Credits Fall
Contemporary ideas and problems of the mechanics of evolution. Offered as demand warrants.

Biol. 691 Seminar Credits Arr. Fall
Biol. 692 Credits Arr. Spring
Topics in Biological Sciences. Offered as demand warrants.

Biol. 693 Special Topics Credits Arr. Fall
Biol. 694 Credits Arr. Spring
Various subjects, including advanced studies in ecology, evolution, taxonomy, biogeography, physiology, animal behavior, etc. Admission by arrangement.

Biol. 695 Research Credits Arr. Fall
Biol. 696 Credits Arr. Spring
Investigation, either field or laboratory, of a problem of lesser scope than the thesis, or supplementary to the thesis. Admission by arrangement.

Biol. 697 Thesis Credits Arr. Fall
Biol. 698 Credits Arr. Spring
Admission by arrangement.

BUSINESS ADMINISTRATION

B.A. 323 Corporate Organization and Finance (3+0) 3 Credits Fall
Principles in organizing and capitalizing a modern American business. Legal formation of corporations; factors determining capital requirements; various methods used in providing corporate capital.

B.A. 331 Business Law (3+0) 3 Credits Fall
B.A. 332 3 Credits Spring
Survey of the legal aspects of business problems; basic principles, institutions, and administration of law.

Fall semester: Contracts, agency, employment, negotiable instruments, personal property sales.

Spring semester: Insurance, suretyship, partnerships, corporations, real property, trusts and wills, bankruptcy, torts and business crimes.

Prerequisites: Third-year standing.

B.A. 343 Marketing (3+0) 3 Credits Fall
Fundamental problems; simulation exercises; interrelations with other business activities; conceptual and quantitative sciences in marketing. Prerequisite: Econ. 121-122.

B.A. 350 Financial and Fiscal Theory and Policy (3+0) 3 Credits Fall or Spring
(See Econ. 350 for course description)

B.A. 359 Government and Private Enterprise (3+0) 3 Credits Fall or Spring
Effects of government regulation, economic policy and executive policy on private and public enterprise.

*B.A. 361 Industrial Relations (3+0) 3 Credits Fall
Personnel practice in industry; analysis of labor-management problems; methods and administration of recruiting, selecting, training and compensating employees; labor laws and their applications.

*B.A. 363 Production Management (3+0) 3 Credits Fall
Practices and principles of scientific management of all business enterprises; principles of organization and techniques of management relating to planning organization, policies, controls, and methods improvement. Prerequisite: Econ. 121, or permission.

*B.A. 422 Corporate Financial Problems (3+0) 3 Credits Spring
Financial problems frequently confronting the modern U.S. Corporation and proposed solutions. Topics include earnings retention and dividend policy, expansion and combination, refinancing and recapitalization, and treatment for financial failure.
*B.A. 423 Investment Management (3+0)  3 Credits  Fall or Spring
Management securities, portfolios of individuals and institutions; basic security analysis; investment policies of banks, insurance companies, investment companies, and fiduciaries.

*B.A. 424 Financial Administration and Management (3+0)  3 Credits  Spring
New tools in financial management and control including profit and loss budgeting, profit behavior analysis, uses and sources of funds analysis, capital expenditure planning, asset administration, and control of research expenditures.

*B.E. 443 Theories and Analysis of Market Changes (3+0)  3 Credits  Fall or Spring
Economic, sociological, psychological and anthropological factors influencing behavior of consumer and business units; long-run and short-run behavior change. Prerequisite: B.A. 343, completion of behavioral science requirements.

B.A. 462 Administrative Policy (3+0)  3 Credits  Spring
Organization role in a dynamic society; decision problems in varying social, economic, and political environments.

B.A. 450 Organization Theory (3+0)  3 Credits  Fall or Spring
Literature of organizational theory; emphasis on theoretical concepts, social science research techniques and organizational behavior. Prerequisite: Upper Division standing, completion of behavioral science requirements, or permission of Instructor.

B.A. 493 Special Topics  3 Credits  Arr. Fall
B.A. 494 Special Topics  3 Credits  Arr. Spring

B.A. 693 Special Topics  3 Credits  Arr. Fall
B.A. 694 Special Topics  3 Credits  Arr. Spring

B.A. 648 Mathematical Method and Computers Workshop (3+0)  3 Credits  Fall or Spring
Selected topics in the use of mathematical models, econometric techniques, and computers in marketing; individual research projects. Prerequisite: B.A. 542 or permission of Instructor.

B.A. 691 Seminar on Market Analysis (3+0)  3 Credits  Fall or Spring
Analysis of factors affecting consumer trial and adoption of product innovation. Emphasis on current behavioral science research. Prerequisite: B.A. 343 or permission of Instructor.

B.A. 697 Thesis  3 Credits  Arr. Fall
B.A. 698 Thesis  3 Credits  Arr. Spring

CHEMICAL ENGINEERING

Ch.E. 477 Unit Operations (3+0)  3 Credits  Fall
Fundamental unit operations; principles of fluid film theory, flow of fluids, flow meters, heat transmission, evaporation, crushing grinding size separation, filtration, crystallization, vaporization, diffusion, adsorption, extraction, distillation, humidity, air conditioning, drying. Prerequisite: Chem. 202, Math. 203, Phys. 212, and E.S. 346 or Chem. 331.

Ch.E. 479 Unit Operation Laboratory (0+3)  1 Credit  Fall
Experiments on unit operations. Concurrent: Ch.E. 477.

Ch.E. 486 Chemical Engr. Thermodynamics (3+0)  3 Credits  Spring
Application of thermodynamics and principles of physical chemistry to physical and chemical equilibria encountered in Chemical Engineering processes. Prerequisite: Chem. 332, Math. 310, E.S. 346 or Chem. 331, and Ch.E. 477 recommended.

Ch.E. 491 Seminar (1+0)  1 Credit  Spring
Current Topics In Chemical Engineering.
### Course Descriptions

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch.E. 433</td>
<td>Applied Chemical Kinetics (3+0)</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td></td>
<td>Kinetics of various reactions. Prediction of course of reactions. Prerequisites: Chem. 332 or 477, Ch.E. 477, 479 and 486.</td>
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<tr>
<td>Ch.E. 487</td>
<td>Advanced Unit Operations (3+0)</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td></td>
<td>Advanced treatment of flow of fluids, flow of heat, crystallization, diffusion, distillation, adsorption, fuels and combustion. Prerequisites: Ch.E. 477.</td>
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<tr>
<td>Ch.E. 490</td>
<td>Unit Operations Laboratory (0+6)</td>
<td>2</td>
<td>Spring</td>
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<tr>
<td></td>
<td>Experiments on unit operations. Prerequisites: Ch.E. 486, Ch.E. 587 and Ch.E. 588 concurrent.</td>
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<tr>
<td>Ch.E. 493</td>
<td>Special Topics</td>
<td>Credits Arr.</td>
<td>Fall</td>
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<td></td>
<td>Subjects include chemical engineering thermodynamics, unit processes in organic synthesis, industrial chemistry, inorganic chemical technology, nuclear chemical catalysis. Prerequisites: Appropriate for subject given.</td>
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### CHEMISTRY

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
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<tbody>
<tr>
<td>Chem. 101</td>
<td>General Chemistry (3+3)</td>
<td>4</td>
<td>Fall</td>
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<tr>
<td></td>
<td>Gen. Chem. &amp; Introductory Qual. Anal. (3+3)</td>
<td>4</td>
<td>Spring</td>
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<tr>
<td></td>
<td>General chemistry and introductory qualitative analysis. Fall Semester: General principles, chemistry of the non-metals. Spring Semester: Chemistry of the metals, and qualitative analysis.</td>
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<tr>
<td>Chem. 103</td>
<td>Introductory Chemico-Physical Science (3+0) or (3+3)</td>
<td>3 or 4 Credits</td>
<td>Fall</td>
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<td></td>
<td>or (3+0) or (3+3)</td>
<td>4</td>
<td>Spring</td>
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<tr>
<td></td>
<td>Descriptive course in Chemico-Physical Science. Either semester may be taken separately. One 3-hr. laboratory period may be elected but must be concurrent with lecture program.</td>
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<tr>
<td>Chem. 201</td>
<td>General and Quantitative Chemistry (3+3)</td>
<td>4</td>
<td>Fall</td>
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<tr>
<td></td>
<td>202</td>
<td>4</td>
<td>Spring</td>
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<td></td>
<td>Full Semester: Classical principles of chemistry, atomic structures and the periodic table, molecular structure, the states of matter. For students in engineering. Prerequisites: Math. 102, E.S. 112, High school chemistry. or Chem. 104 or Chem. 101 recommended.</td>
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<tr>
<td>Chem. 207</td>
<td>Problems in Chemistry (Arranged)</td>
<td>1 or 2 Credits</td>
<td>Fall</td>
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<td></td>
<td>208</td>
<td>1 or 2 Credits</td>
<td>Spring</td>
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<td>Supplementary work, problems or topics in chemistry designed for those especially interested in chemistry. Prerequisite or concurrent: Chem. 101 or 201.</td>
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<td>Chem. 212</td>
<td>Introductory Quantitative Analysis (2+6)</td>
<td>4</td>
<td>Spring</td>
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<td></td>
<td>General principles of chemical analysis; introduction to volumetric and gravimetric methods. Theory, problems, and laboratory. Prerequisites: Chem. 102 or 202, and Math. 102 or 104.</td>
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<tr>
<td>Chem. 217</td>
<td>Elemental Qualitative Analysis (2+6)</td>
<td>4</td>
<td>Fall</td>
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<td></td>
<td>Qualitative Analysis including rarer elements. The theoretical basis of equilibria and its applications, etc., lectures, laboratories, problems. Prerequisites: Chem. 102 or Chem. 201. Math. 101 or 103 or equivalent.</td>
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<tr>
<td>Chem. 223</td>
<td>Introductory Organic Chemistry (3+3)</td>
<td>4</td>
<td>Fall</td>
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<tr>
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<td>For students in curricula requiring a one-semester terminal course in Organic Chemistry. Prerequisites: Chem. 102 or Chem. 202.</td>
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<tr>
<td>Chem. 224</td>
<td>Introductory Biochemistry (2+3)</td>
<td>3</td>
<td>Spring</td>
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<td>For students in curricula requiring a one-semester terminal course in Biochemistry. Prerequisites: Chem. 223 or Chem. 321.</td>
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<tr>
<td>Chem. 321</td>
<td>Organic Chemistry (3+3)</td>
<td>4</td>
<td>Fall</td>
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<tr>
<td></td>
<td>322</td>
<td>4</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Organic chemistry; preparation and properties of simple aliphatic and aromatic compounds. For Chemistry, Chemical Engineering, Premedical, Biochemistry, Science, etc. Prerequisites: Chem. 102 or 202 for Chem. 321; Chem. 321 for Chem. 322.</td>
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</tbody>
</table>
*Chem. 331 Physical Chemistry (3+3)  
4 or 5 Credits Fall
332  
4 or 5 Credits Spring

Fall Semester: Three states of matter, principles of heat and thermodynamics and applications; solutions, colloids.

Spring Semester: Thermochemistry, second and third laws of thermodynamics, equilibria, chemical kinetics, electrical phenomena, atomic structure, molecular structure, photochemistry. Prerequisite: For Chem. 331, Chem. 202 or 212, Math. 102, Phys. 104 or 212. For Chem. 332, Chem. 331.

*Chem. 401 Inorganic Chemistry (3+0) or (3+3)  
3 or 4 Credits Fall
402  
3 or 4 Credits Spring

Systematic presentation of inorganic chemistry emphasizing properties of various families of the periodic system. Prerequisite: Chem. 102 or Chem. 202 with grade of C or better. Offered as demand warrants.

Chem. 416 Chemical Analysis (1+6)  
3 Credits Spring

Analysis of mixtures illustrating principles of chemical separations, potentiometric and conductometric titrations; colorimetric methods; chromatographic methods; organic reagents for metals and their use in trace analysis. Prerequisite: Chem. 212, or 202 with permission.

*Chem. 421 Organic Chemistry (3+3)  
4 Credits Fall
422  
3 or 4 Credits Spring

Organic Chemistry for graduate students not majoring in Chemistry or Chemical Engineering. Prerequisite: Graduate standing and one year of college chemistry. Laboratory is required in Chem. 421 only.

*Chem. 425 Organic Qualitative Analysis (1+6)  
3 Credits Fall

Identification of pure organic compounds and mixtures. Prerequisite: Chem. 222. Offered as demand warrants.

*Chem. 451 General Biochemistry (3+3)  
4 Credits Full
453  
4 Credits Spring

General principles of biochemistry. Chemistry and metabolism of carbohydrates, lipids, and proteins together with a consideration of enzymes, vitamins, hormones and other biocatalysts; chemistry and physiology of living tissues, blood, and urine. Prerequisite: Chem. 321, (but not concurrent), Chem. 212 with Chem. 331 recommended.

*Chem. 486 Chemical Thermodynamics (3+3)  
3 Credits Spring

Classical thermodynamics as applied to chemistry with brief introduction to statistical thermodynamics. Prerequisite: Chem. 392 or E.S. 346, Math. 302.

Chem. 491 Seminar (1+0)  
0 or 1 Credit Fall
492  
0 or 1 Credit Spring

Discussion of current literature. Credit allowed only once.

*Chem. 493 Special Topics  
Credits Arr. Fall
494  
Credits Arr. Spring

Various subjects studied including advanced organic chemistry, advanced physical chemistry, advanced analytical chemistry, history and literature of chemistry, industrial chemistry, instrumental analysis, chemistry of radioactivity and isotopes, petroleum chemistry, spectroscopy. Prerequisite: At least junior standing and three semesters (or 12 credits) of college chemistry with grade of C or better.

Chem. 601 Inorganic Chemistry (3+0)  
3 Credits Fall
602  
3 Credits Spring

Techniques of study in inorganic chemistry. Periodic relationships among the elements, theories of valence, complex inorganic compounds, chemistry of typical elements and groups of elements. Offered as demand warrants.
Chem. 609 Advanced General Chemistry (3+3)  
3 or 4 Credits  Fall
610 3 or 4 Credits  Spring

First Semester: Intensive review of general chemistry, classical and modern atomic theory, applications to periodic classification; modern theories of valence, molecular structure, etc.; kinetic molecular theory, change of state, theory of solutions, etc.; chemical reactivity and its interpretation; energy of chemical reactions, cells, oxidation-reduction reactions, reaction velocity, ionic reactions.

Second Semester: Applications of theory and principles to typical groups of elements, acid-base theory, complex ions, radio-chemistry. Organic chemistry and biochemistry (8 weeks) emphasizing structure determination and structural formulae with some treatment of systematic nomenclature, synthesis and biochemical processes. Laboratory work (optional) will include experiments on special techniques, qualitative and quantitative analysis, organic and biochemical preparations and qualitative tests. **Prerequisite:** One year or equivalent of general chemistry. Offered as demand warrants.

Chem. 611 Analytical Chemistry (1+6)  
3 Credits  Fall
612 3 Credits  Spring

Emphasis on the theoretical interpretation of structure and reactions. One year of analytical chemistry. **Offered as demand warrants.**

Chem. 621 Organic Chemistry (3+0)  
622 3 Credits  Fall
3 Credits  Spring

Emphasis on the theoretical interpretation of structure and reactions. **Prerequisite:** One year of organic chemistry. Offered in alternate years; next offered 1966-67.

Chem. 631 Physical Chemistry (3+0)  
632 3 Credits  Fall
3 Credits  Spring

Fundamental physical-chemical principles with special emphasis on thermo-dynamics and chemical kinetics. **Prerequisite:** One year course in undergraduate physical chemistry. Offered as demand warrants.

Chem. 647 The Nature of the Chemical Bond (3+0)  
Fall

Electronic structure of molecules and its correlation with the chemical and physical properties of substances, non-mathematical.

Chem. 648 Quantum Mechanics with Chemical Applications (3+0)  
Spring

Quantitative introduction to quantum mechanics. Theoretical and experimental aspects of the electronic wave functions of molecules.

Chem. 651 Selected Topics in Biochemistry (2+0)  
652 2 Credits  Fall
2 Credits  Spring

Topic areas: vitamins and hormones, carbohydrates, physical biochemistry, nucleic acids, lipids, enzymes, protein chemistry; intermediary metabolism, oxidative enzyme systems, pathways of metabolism, biochemistry of the cell nucleus, etc. **Prerequisite:** One year of biochemistry or one year of organic chemistry or permission.

Chem. 691 Seminar (1+0)  
692 1 Credit  Fall
1 Credit  Spring

Reviews of current research.

Chem. 693 Special Topics  
694 Credits Arr.  Fall
Credits Arr.  Spring

Various subjects including kinetics, thermodynamics, statistical mechanics, photochemistry, colloid chemistry, nuclear chemistry, etc.

Chem. 697 Thesis  
698 Credits Arr.  Fall
Credits Arr.  Spring

**CIVIL ENGINEERING**

C.E. 116 Mapping (2+3)  
3 Credits  Spring
Maps and scales, compass surveys, stadia, plane table, altimeter surveying, U.S. Public Land System, use of aerial photos for mapping, height measurements with parallax bar, elementary photo interpretation. Offered in alternate years.

C.E. 334 Physical Properties of Materials (1+6)  
3 Credits  Spring
Physical properties, durability and manufacturing of materials commonly used in engineering. Design of concrete mixes, physical tests. **Prerequisite:** E.S. 331.
C.E. 344 Hydrology (2+0)  2 Credits  Spring

C.E. 402 Transportation Engineering (2+0)  2 Credits  Spring
Administration, economics, location, design, construction and maintenance of highways, railways, airports and other transportation facilities. Prerequisite: C.E. 344.

C.E. 412 Elements of Photogrammetry (2+3)  3 Credits  Spring
Elementary study of aerial and terrestrial photographs as applied to surveying and mapping. Prerequisite: E.S. 207.

C.E. 415 Surveying (1+6)  3 Credits  Fall
Field astronomy, adjustment of level nets, triangulation and traverses. State coordinate systems, cadastral surveys, curves. Prerequisite: E.S. 207.

C.E. 422 Foundation Engineering (2+0)  2 Credits  Spring
Principles of foundation action, analysis of action and design of spread footings mats, pile foundations, retaining walls and bulkheads, bridge piers, cofferdams and abutments. Prerequisite: C.E. 435.

C.E. 431 Structural Analysis (3+3)  4 Credits  Spring
Statically determinate structures. Loadings. Graphical and analytical solutions for stresses and deflections. Indeterminate frames. Influence lines. Prerequisite: 331.

C.E. 432 Structural Design (3+3)  4 Credits  Spring

C.E. 435 Soil Mechanics (2+3)  3 Credits  Fall
Identification, description, and physical properties of soils. Subsurface exploration, frost action. Entire soil mass surveyed for effect on substructure design. Prerequisite: E.S. 331.

C.E. 441 Sanitary Engineering (2+3)  3 Credits  Fall
Sources of water supply. Design of works for the conservation, collection, treatment and distribution of water for domestic and industrial use and waste water disposal. Arctic water supplies. Prerequisite: C.E. 344.

C.E. 491 Seminar  Credits Arr. Fall or Spr.

C.E. 493 Special Topics  Credits Arr. Fall
494

C.E. 499 Advanced Engineering Problems (1+0) or (2+0)  2 Credits  Fall
General problems drawn from science and engineering. This course is preparation for registration for Professional-Engineer-In-Training.

C.E. 603 Arctic Engineering (3+0)  3 Credits  Fall
Application of engineering fundamentals to problems of advancing civilization in Polar regions. Logistics, foundations on frozen ground and ice, thermal aspects of structures and materials; transport and communication; heating and ventilating.

C.E. 620 Civil Engineering Construction (3+0)  3 Credits
Construction equipment and methods, construction management and accounting, construction estimates and costs. Prerequisite: E.S. 450 or equivalent and graduate standing.

C.E. 631 Advanced Structural Analysis (3+0)  3 Credits  Fall

C.E. 632 Advanced Structural Design (2+3)  3 Credits  Spring
Design of complex structures and frames. Live, dead, and earthquake loadings. Structural joints, columns, connectors, ties and struts. Application of modern materials and techniques to design. Prerequisite: C.E. 631.

C.E. 644 Hydraulics Engineering (2+3)  3 Credits  Spring
Study and design of hydraulic power projects, structures, and machines; reclamation and drainage; canals and reservoirs. Prerequisite: E.S. 341.
### C.E. 643 Advanced Sanitary Engineering (3+0)

Continuation of C.E. 441; emphasizes Polar problems involving water supply, sanitation, waste disposal, water and air pollution abatement.

**Credits**: 3
**Term**: Fall

### C.E. 649 City and Regional Planning (3+0)

Elements of city and regional planning for engineers. Demography, land use, physical planning techniques.

**Credits**: 3
**Term**: Fall or Spr.

### C.E. 691 Graduate Seminar (1+0)

Reports and papers on engineering topics. Practice in public speaking. **Prerequisite**: Permission of Instructor.

**Credits**: 1
**Term**: Fall

### C.E. 692 Graduate Seminar (1+0)

Reports and papers on engineering topics. Practice in public speaking. **Prerequisite**: Permission of Instructor.

**Credits**: 1
**Term**: Spr.

### C.E. 693 Special Topics

Various subjects. **Prerequisite**: Permission of Instructor.

**Credits**: Arr.

### C.E. 694 Special Topics

Various subjects. **Prerequisite**: Permission of Instructor.

**Credits**: Arr.

### C.E. 697 Thesis

Individual study or research for students of special aptitude.

**Credits**: Arr.

### C.E. 698 Thesis

Individual study or research for students of special aptitude.

**Credits**: Arr.

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### Classics

#### Classics 101 Introductory Classical Latin or Greek (5+0)

Rapid acquisition of a reading knowledge of Classical Latin or Greek. Fundamentals of grammar and immediate work with classical texts. **Offered as demand warrants.**

**Credits**: 5
**Term**: Fall

#### Classics 102 Introductory Classical Latin or Greek (5+0)

Rapid acquisition of a reading knowledge of Classical Latin or Greek. Fundamentals of grammar and immediate work with classical texts. **Offered as demand warrants.**

**Credits**: 5
**Term**: Spr.

### Classics 221, 321 Studies in Latin or Greek Literature

Selected readings in Classical Latin or Greek. **Admission by arrangement. Offered as demand warrants.** Students may repeat course for credit when topic varies.

**Credits**: 3
**Term**: Fall

### Classics 322, 322 Studies in Latin or Greek Literature

Selected readings in Classical Latin or Greek. **Admission by arrangement. Offered as demand warrants.**

**Credits**: 3
**Term**: Spr.

### Classics 493 Special Topics

Various subjects for advanced students. **Admission by arrangement. Offered as demand warrants.**

**Credits**: Arr.

### Classics 494 Special Topics

Various subjects for advanced students. **Admission by arrangement. Offered as demand warrants.**

**Credits**: Arr.

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### Economics

#### Econ. 121 Principles of Economics I (3+0)

Introduction to economics; analysis and theory of national income; money and banking; public finance and taxation; economic systems.

**Credits**: 3
**Term**: Fall

#### Econ. 122 Principles of Economics II (3+0)

Theory of prices and markets; income distribution; contemporary problems of labor, agriculture, public utilities, International economic relations.

**Credits**: 3
**Term**: Spr.

#### Econ. 321 Price and Allocation Theory (3+0)

Analysis of demand and supply under various market forms; cost and theory of production; factor pricing and theory of distribution; survey of welfare economics. **Prerequisite**: Econ. 121, Econ. 122.

**Credits**: 3
**Term**: Fall

#### Econ. 324 Income and Employment (3+0)

Concepts of income; underconsumption and underinvestment theories; theory of economic maturity; Implications of full employment and full investment. **Prerequisite**: Econ. 121, Econ. 122, Econ. 330 or Econ. 429.

**Credits**: 3
**Term**: Spr.

#### Econ. 337 Economic Development (3+0)

Theories of growth and development; problems of economic development illustrated with case studies; analysis of major policy issues. **Prerequisite**: Econ. 121, Econ. 122 and three additional hours of economics or other social sciences. **Offered as demand warrants.**

**Credits**: 3
**Term**: Fall or Spr.
Econ. 350 Financial and Fiscal Theory and Policy (3+0) 3 Credits Spring
Sources and uses of money and credit in modern society; regulation of money and credit and their impact on the economic welfare of the United States.

Econ. 351 Public Finance and Taxation (3+0) 3 Credits Fall or Spr.
Government taxation, borrowing and spending; economic effects of taxation; influence of fiscal policy on economic activity. Prerequisite: Econ. 121, Econ. 122. Offered in alternate years; next offered 1965-66.

Econ. 359 Government and Private Enterprise (3+0) 3 Credits Fall
(See B.A. 359 for course description.)

*Econ. 325 History of Economic Thought (3+0) 3 Credits Fall or Spr.
Economic thought from the physiocrats to the present, classical and neoclassical theory, exponents and critics; contemporary development in economic theory. Prerequisite: Econ. 121, Econ. 122 and three credits of upper division courses in economics or other social sciences. Offered as demand warrants.

Econ. 429 Business Fluctuations (3+0) 3 Credits Fall
Analysis of fluctuations in economic activity; theories of business fluctuations; methods of control and forecasting. Prerequisite: Econ. 121, Econ. 122.

*Econ. 432 Economic History of the United States (3+0) 3 Credits Spring
Economic developments in American history with emphasis on impact of industrialization since 1850. Prerequisite: Econ. 121, Econ. 122 and Hist. 132.

*Econ. 435 Economics of Resources (3+0) 3 Credits Fall
Concepts of resources; interaction among resources, industrialization and economic development; theories and problems of conservation; emphasis on Alaska. Prerequisite: Econ. 121, Econ. 122 or permission.

*Econ. 463 International Economics I (3+0) 3 Credits Fall
Theories of international trade; international payments and the balance of payments; public and private control of trade International economic cooperation. Prerequisite: Econ. 121, Econ. 122.

Econ. 464 International Economics II (3+0) 3 Credits Spring
Analysis of international disequilibrium; capital flow and foreign investment; international liquidity creation and mutual assistance plans; problems and international aspects of policies of underdeveloped areas. Prerequisite: Econ. 463.

Econ. 493 Special Topics 494 Arr. Fall
Econ. 693 Special Topics 694 Arr. Fall
Econ. 691 Seminar in Economic Theory 692 Credits Arr. Fall
Econ. 697 Thesis 698 Credits Arr.

EDUCATION

Ed. 202 Audio-Visual Education (2+1) 2 Credits Spring
Audio-visual materials, techniques and equipment in the total learning process; operation of specific types of equipment; preparation of material and displays for classroom use; familiarization with sources, standards, criteria in securing audio-visual materials.

Ed. 206 Teaching Arithmetic (2+0) 2 Credits Spring
Modern concepts, methods and materials. Prerequisite: Math. 205.

*Ed. 301 Social Studies (3+0) 3 Credits Fall
Methods and materials adaptable to modern curriculum in elementary social studies. Prerequisite: Junior standing, Ed. 313 (may be taken concurrently with permission of instructor).
Course Descriptions 137

*Ed. 302 Language Arts (3+0) 3 Credits Spring
Definition; role of language in children's learning; specific language skills to be taught in grades 1 through 8; methods and materials for effective teaching; organization for instruction; all aspects of the language arts, except reading. Prerequisite: Junior standing, Ed. 313 (may be taken concurrently with permission of instructor).

*Ed. 304 Literature for Children (3+0) 3 Credits Spring
Criteria for evaluating children's books and application of criteria to books selected by student; history of children's literature; study of outstanding authors, illustrators and content of specific categories of literature; book selection aids and effective use of literature to promote learning.

*Ed. 306 Teaching Elementary School Science (3+0) 3 Credits Fall
Modern concepts, methods and materials of teaching science. Prerequisite: Junior standing, Ed. 313 (may be taken concurrently with permission of instructor).

Ed. 313 Educational Psychology (3+0) 3 Credits Fall or Spr.
Application of principles of psychology to classroom teaching and learning. Prerequisite: Psy. 101 and Psy. 251 or 252.

*Ed. 322 Small Schools (2+0) 2 Credits Fall
Basic for students planning to teach in small schools; special problems in organization and methods; small schools in Alaska serve as the focal point for discussion and instruction.

*Ed. 333 Tests and Measurements (3+0) 3 Credits Fall & Spr.
Theory and practice of educational measurement emphasis on testing aspects most applicable for classroom teachers; construction of teacher-made tests; interpretation of teacher-made and standardized instruments emphasized. Not open to students having credit in Psy. 321. Prerequisite: Ed. 313.

*Ed. 345 Sociology of Education (3+0) 3 Credits Spring
Impact of culture on schools. Examination of contemporary social trends and relationships among church, school, government and family. Prerequisite: Soc. 101.

*Ed. 348 History of Education in the United States (3+0) 3 Credits Spring
Development of American Education as a facet of social and intellectual history. Prerequisite: Hist. 131 and 132.

Ed. 402 Methods of Teaching (3+0) 3 Credits Fall or Spr.
Principles and methods of teaching management, routine, daily programs, etc. Prerequisite: 100 collegiate credits, including Ed. 313 and Ed. 332.

Ed. 406 Methods of Teaching Physical Education (3+0) 3 Credits Fall or Spr.
Selection of materials and presentation methods for secondary school physical education. Prerequisite: 100 collegiate credits including Ed. 313 and Ed. 332.

Ed. 407 Methods of Teaching Home Economics (3+0) 3 Credits Fall or Spr.
Problems and methods in selecting and organizing materials for instruction; comparison and evaluation of methods, laboratory techniques, supplies, equipment; economy of time and materials. Admission by arrangement. Prerequisite: 100 collegiate credits, including Ed. 313 and Ed. 332.

Ed. 408 Methods of Teaching Business Education (3+0) 3 Credits Fall or Spr.
Organization and content of high school business education courses; equipping a business education department, including selection, care and maintenance; methods in teaching bookkeeping, typewriting, shorthand and transcription. Admission by arrangement. Prerequisite: 100 collegiate credits, including Ed. 313 and Ed. 332.

*Ed. 409 The Teaching of Reading (3+0) 3 Credits Fall
Importance and nature of reading. Specific steps involved in the teaching of reading, word analysis, comprehension, interpretation, reading rate; new developments in reading instruction emphasizing appropriate materials. Prerequisite: Junior standing, Ed. 313 (may be taken concurrently with permission of instructor).

*Ed. 411 Secondary Education (3+0) 3 Credits Fall
Development of a working concept of secondary education in the U.S., its history, objectives, curriculum, organization, practices and consideration of current issues. Prerequisite: Ed. 313.
*Ed. 422 Philosophy of Education (3+0)  
Basic philosophical concepts and their historical development; philosophy applied to education and related issues and problems; examinations of contributions of outstanding educators.  
Prerequisite: Senior standing.

*Ed. 425 Public School Finance (3+0)  
Contemporary basis for raising and distributing Federal, State and Local education funds; problems of school financing in Alaska. Open only to advanced students in education.

*Ed. 426 Principles and Practices of Guidance (3+0)  
Introduction to the philosophies, organization, patterns and techniques that aid teachers and guidance personnel in preparing students for responsible decision making in modern society. Prerequisite: Ed. 315.

*Ed. 428 Occupational Information (3+0)  
Principles and practices of vocational guidance; emphasis on sources of vocational information, its evaluation and use in educational and counseling situations. Prerequisite: Ed. 426.

*Ed. 431 Curriculum Development (3+0)  
Definitions; need for curriculum improvement; criteria for selection of broad goals; types of curriculum frameworks; organization of specific learning experiences as part of curriculum structure. Prerequisite: Ed. 313 and Senior standing.

*Ed. 441 School Law (2+0)  
Rights and responsibilities of teachers and pupils; rulings of the Attorney General; decisions of the courts; regulations of the State Board of Education. Open only to advanced students in education.

*Ed. 442 Public School Administration (3+0)  
Fundamentals of public school administration; relation of Federal, State and local agencies; problems incident to the administration of public school systems in Alaska. Open only to advanced students in education.

*Ed. 444 School Business Administration (3+0)  
Principles of business management; budgetary practice; payroll management; purchasing and supply problems; safeguarding school funds. Prerequisite: Ed. 425 or Ed. 442.

Ed. 452 Directed Teaching (0+6)  
Supervised teaching in elementary or secondary schools of Fairbanks or in a school approved by the Department of Education. The Department may limit registration, determine assignments, prescribe the number of teaching hours required and cancel the registration of students doing unsatisfactory work. Prerequisite: 100 collegiate credits, 10 of which are in education. A minimum program of 15 hours teaching and one conference a week. May be taken concurrently with Ed. 402.

Ed. 461 Research  
Credits Arr.  Fall or Spr.  
On approval of the Head of the Education Department, fourth year students who show outstanding ability for individual study in education may undertake research during their final year.

Ed. 491 Seminar  
Credits Arr.  Fall
Ed. 492 Seminar  
Credits Arr.  Spring

Current topics in Education. Admission by permission of Head of the Department.

Ed. 493 Special Topics  
Credits Arr.  Fall
Ed. 494 Special Topics  
Credits Arr.  Spring

Various subjects; principally directed study, discussion and research.

Ed. 604 Diagnosis and Correction of (3+0)  
3 Credits  Spring

Reading Deficiencies  
Nature of the reading process; emphasis on psychology involved in teaching reading difficulties; testing programs to ascertain specific disabilities in readiness, vocabulary, word attack, comprehension, speed and accuracy; specific suggestions for their correction; newer approaches to teaching reading. Prerequisite: Ed. 408, plus experience in the teaching of reading.
Ed. 623 Principles of Individual Counseling (3+0) 3 Credits Fall
Counseling techniques and procedures in education, social work, and on a limited basis, clinical psychology; their applications by the classroom teacher and guidance specialist in assisting students with adjustment problems within a normal range. Prerequisite: Ed. 426 or 633, Psy. 304 or 406 and permission of instructor.

Ed. 624 Group Counseling (3+0) 3 Credits Spring
Kinds and types of groups with emphasis on methods, problems and needed skills in working with groups in a counseling situation. Prerequisite: Ed. 426 or 633 and 623 or by permission.

Ed. 627 Education Research (2+0) 2 Credits Fall
Techniques on education research; selection of topics and problems, data gathering, interpretation and preparation of reports.

Ed. 629 Individual Tests of Intelligence (2+0) 2 Credits Fall
Individual intelligence tests with emphasis on the revised Stanford-Binet Intelligence Scale and the Wechsler Intelligence Scales. Prerequisite: Permission of Instructor.

Ed. 630 Laboratory in Individual Tests of Intelligence (0+6) 2 Credits Spring
Provides laboratory experience in administration of the Revised Stanford-Binet Intelligence Scale or the Wechsler Intelligence Scales. Prerequisite: Ed. 629 and permission.

Ed. 633 Organization, Administration and (2+0) 2 Credits Fall
Supervision of Guidance
For administrators, guidance personnel and others interested in developing or evaluating a guidance program; selection procedures and supervision of guidance personnel are considered. Prerequisite: Ed. 426 or permission of instructor.

Ed. 634 Counseling Practiceum (1+4) 3 Credits Arr.
Provides supervised field experience, including preparatory activities in an educational setting. Prerequisite: Approval of Head of Education Department; Ed. 426 or 633, Ed. 623, Psy. 304 or 406, Psy. 321.

Ed. 636 Advanced Public School Administration (2+0) 2 Credits Spring
Cases and Concepts
Case study approach to public school administration; identification and analysis of basic issues and problems; identification of pertinent data and possible solutions. Prerequisite: Ed. 442.

Ed. 638 Supervision and Improvement of Instruction (3+0) 3 Credits Spring
Development, purpose, organization of supervisory programs; special attention to current in-service education programs.

Ed. 691 Education Seminar 692 Credits Arr. Fall
Current topics in education. Maximum credit allowed toward advanced degrees: 4 credits. Admission by arrangement.

Ed. 693 Special Topics 694 Credits Arr. Fall
Various subjects, principally by directed study, discussion and research. Admission by arrangement.

Ed. 695 Research Education 696 Credits Arr. Fall
Independent project in lieu of theses. Admission by arrangement.

Ed. 697 Thesis 698 Credits Arr. Fall
Offered as demand warrants.
ELECTRICAL ENGINEERING

E.E. 102 Electrical Engineering Shop Practice (0+6) 2 Credits Spring
Essentials of metal-working, use of hand and machine tools; chassis construction; wiring and soldering; construction of electronic equipment; enrollment limited. Prerequisite: Registration in electrical engineering or consent of the instructor.

E.E. 203 Electrical Engineering Fundamentals (3+3) 4 Credits Fall
Analysis of alternating-current circuits using complex notation and phasor diagrams; resonance; transformers; Fourier analysis; the complex frequency plane; three-phase circuits. Prerequisite: Math. 102, credit or registration in Phys. 211 and Math. 201

E.E. 313 Elements of Electrical Engineering (2+3) 3 Credits Fall
Primarily for students of Civil, Mining, Mechanical, and Chemical Engineering. Circuits, machines, electronics, instrumentation. Prerequisite: Phys. 212.

E.E. 333 Electronics (3+3) 4 Credits Fall
Characterization of electronic devices including semiconductors and vacuum tubes. Theory and design of basic circuits including amplifiers, oscillators, rectifiers and detectors. Prerequisite: E.E. 204.

E.E. 403 Machines and Power (3+3) 4 Credits Fall
Electrical machines, with introduction to power systems; D.C. and A.C. machines, including motors, generators, transformers, alternators, and selectors; laboratory study of typical machine characteristics. Prerequisite: E.E. 204. Offered in alternate years; next offered 1966-7.

E.E. 432 Fields, Lines, and Antennas (3+3) 4 Credits Spring
Use of Maxwell's equations in the analysis of waveguides, cavity resonators, and transmission lines; retarded potentials; antennas for radio and microwave frequencies. Prerequisite: Math. 302, Phys. 331. Offered in alternate years; next offered 1966-7.

E.E. 435 Advances in Electronics (3+3) 4 Credits Fall
Additional topics in electronics to extend and broaden the student's background; new developments. Prerequisite: E.E. 334. Offered in alternate years; next offered 1966-7.

E.E. 442 Digital Computers (4+0) 4 Credits Fall
Design and functioning of digital computers; system organization, programming, computer arithmetic, combinational and sequential circuits, methods of control, electronic circuitry. Prerequisite: Upper-division standing in electrical engineering, mathematics, or physics, or consent of instructor.

E.E. 453 Circuit Theory (4+0) 4 Credits Fall
Transient analysis, Fourier analysis, network theorems, transmission lines, filters; circuit analysis by the Laplace Transform; theory of servomechanisms. Prerequisite: E.E. 204, credit or registration in Math. 302.

E.E. 462 Communication Systems (3+3) 4 Credits Spring
Theory and practice of communications systems; essentials of information theory; operation and maintenance of typical equipment. Prerequisite: Credit or registration in E.E. 334 and E.E. 432.

E.E. 471 Instrumentation and Control (3+3) 4 Credits Fall

E.E. 484 Design of Electrical Systems (1+6) 3 Credits Spring
The design process; class will design a simple system, with attention to capability, reliability, cost, and availability of parts. Prerequisite: Upper-division standing. Offered in alternate years; next offered 1965-6.
Course Descriptions

E.E. 491 Seminar (1-4)  
1 Credit  Fall
1 Credit  Spring
Current topics. Students will have an opportunity to present papers. Prerequisite: Senior standing in electrical engineering.

E.E. 493 Special Topics  
Credits Arr.  Fall
Various subjects studied.

E.E. 494 Special Topics  
Credits Arr.  Spring

ELECTRONICS TECHNOLOGY

E.T. 51 DC Circuits  
4 Credits  Fall
E.T. 52 AC Circuits (5-12)  
(5-12)
The first course in electricity for electronics technicians. Basic physics, electrical terms and units, meters and their use, resistance, Ohm's law, simple circuits, magnetic fundamentals, betteries, Kirchoff's laws, DC circuit analysis, inductance, capacitance. Principles of alternating current, vectors, phase relationships, inductive and capacitative reactance and impedance, AC circuit analysis, series and parallel resonant circuits, transformers, Thévenin's equivalent circuit.

E.T. 55 Electronics Practice I (0-12)  
3 Credits  Fall
Electronic drawings, soldering electrical connections, use of hand tools, preparation for license examinations, layout and assembly of audio-frequency equipment, operation of transmitters and receivers, troubleshooting, practical aspects of electronics.

E.T. 59 Mathematics for Electronics (5-3)  
5 Credits  Fall
Review of arithmetic. Selected topics in algebra, trigonometry, slide-rule computation, graphs, analytical geometry, waveform analysis, decibel calculations, with application to electronics. Prerequisite: High school mathematics.

E.T. 61 Tubes and Semiconductors  
4 Credits  Spring
E.T. 62 Electronic Circuits I (3-15)  
3 Credits  Spring
E.T. 63 Electronic Systems I  
4 Credits  Spring
Vacuum tubes, semiconductors, transistors. Fundamentals, construction, characteristics, parameters, specifications. Power supplies, basic amplifiers, loudspeakers, microphones and pickups, basic oscillators. The radio-communication system, operation and detection of radio waves; antennas and transmission lines; the radio receiver; special receiver circuits; frequency-modulated transmitters and receivers; transistor applications; single-sideband communications. Prerequisites: E.T. 51, 52, 59.

E.T. 66 Electronics Practice II (0-12)  
3 Credits  Spring
Layout and assembly of radio-frequency equipment, practical aspects of electronics, alignment and repair procedures, practical experience in electronics, use of test equipment, preparation for license examinations. Prerequisite: E.T. 55.

E.T. 71 Electronic Circuits II  
5 Credits  Fall
E.T. 72 Electronic Circuits III (10-15)  
4 Credits  Fall
E.T. 75 Microwave Electronics  
4 Credits  Fall
Non sinusoidal waveshapes, multivibrators, blocking and shock-excited oscillators, wave-shaping circuits, limiters, clamps, counters, sweep-generator circuits, special power supplies, systems, transistor applications, television transmitters and receivers. Microwaves; microwave oscillators, transmitters, duplexers, antennas, amplifiers, mixers, receivers; multiplexing. Prerequisites: E.T. 61, 62, 63.

E.T. 77 System Maintenance (0-12)  
4 Credits  Fall
Principles and practice of system maintenance. Experience with a system, such as a transmitter or carrier communications system, including work with system drawings, the log-book, routine maintenance, and repair of troubles. Prerequisite: Registration or credit in E.T. 71, 72, 75.
E.T. 83 Industrial Electronics (3+3) 3 Credits Spring
Generators, motors, small power systems, synchros, servo devices, control systems, industrial electronics. Prerequisite: E.T. 61, 62, 63.

E.T. 84 Advanced Electronic Systems (5+3) 5 Credits Spring
Organization, functioning and maintenance of large electronic systems such as radars and computers. Prerequisite: E.T. 72, 73.

ENGINEERING MANAGEMENT

E.M. 604 Arctic Engineering (3+0) 3 Credits Spring
Application of engineering, scientific and mathematic fundamentals to problems of advancing civilization in Arctic regions. Logistics for Arctic operations, foundations on ice and frozen ground, thermal aspects of structures and materials, Arctic transport and communication, heating and ventilating Arctic installations. Specialists will be guest lecturers.

E.M. 605 Advanced Engineering Economy (3+0) 3 Credits Fall
The science of fiscal decision making. Graduate level studies in problems of replacement, economic selections, income tax accounting, engineering evaluation and introduction to the problems of depreciation.

E.M. 611 Engineering Management (3+0) 3 Credits Fall
Review of accounting principles; industrial accounting including cost accounting; business organization; business finance; emphasis on use of data in management rather than its generation.

E.M. 612 Engineering Management (3+0) 3 Credits Spring
Development of ability to seek out needed information, analyze it, and make recommendations over a wide range of managerial problems involving fiscal matters; cases involving capital acquisitions, profit maximization, methods improvement, pricing, modification of controls, and other management problems. Prerequisite: E.M. 611 and E.M. 605.

E.M. 613 Engineering Management (3+0) 3 Credits Spring
Human element in management; labor relations, human relations, personnel administration, industrial psychology, employee relations, and labor economics from the viewpoint of needs of a manager.

ENGINEERING SCIENCES

E.S. 101 Graphica (0+6) 2 Credits Fall
102 2 Credits Spring
Fall Semester: Orthographic projection, pictorial drawing, sketching, lettering, geometric construction. Charts, graphs and diagrams.
Spring Semester: Descriptive geometry; graphic solution of 3 dimensional problems.

E.S. 111 Engineering Science (2+3) 3 Credits Fall
112 3 Credits Spring
Engineering problem solving with emphasis on the statistics, kinematics and dynamics of engineering systems. Conservation laws, oscillations, fluid mechanics, heat, and sound. Prerequisite: Credit or registration in Math. 101 (Fall) and Math. 102 (Spring).

E.S. 207 Measurements (1+6) 3 Credits Fall
Theory of measurement, precision, dispersion, distribution of error; with practice problems taken from all fields of engineering. Prerequisite: E.S. 112.

E.S. 208 Mechanics (3+3) 4 Credits Spring

E.S. 331 Mechanics of Materials (2+3) 3 Credits Fall
Analysis of stresses and deformation of elastic and plastic materials. Two dimensional stress distribution. Homogeneous and heterogeneous systems. Determine and indeterminate systems. Prerequisite: E.S. 208, Math. 201.
### Course Descriptions

**E.S. 341 Fluid Mechanics (3+3)**
3 Credits  Fall
Statics and dynamics of fluids. Basic equations of hydrodynamics, dimensional analysis, simple hydraulic machinery. **Prerequisite:** E.S. 208, Math. 201.

**E.S. 346 Basic Thermodynamics (3+0)**
3 Credits  Spring
Systems, properties, processes and cycles. Fundamental principles of thermodynamics (first and second laws), elementary applications. **Prerequisite:** Math. 202, Phys. 212.

**E.S. 450 Engineering Management and Operations (3+0)**
3 Credits  Spring
Fundamentals of Engineering Economy; contracts, specifications, legal and ethical principles, management. **Prerequisite:** Senior standing or permission.

**E.S. 491 Engineering Seminar**
Credits Arr.  Fall or Spr.
Oral and written exposition on current engineering topics.

### ENGLISH

**Engl. 1 Elementary English (3+0)**
0 Credits  Fall-Spring
For students inadequately prepared for English 101. Intensive practice in written and oral comprehension. Frequent writing assignments.

**Engl. 3 Laboratory in Usage (0+2)**
0 Credits  Fall-Spring

**Engl. 101 Composition and Modes of Literature (3+0)**
3 Credits  Fall or Spring
102
Orderly thought and its clear expression. Expository and creative literature, teaching students to read perceptively, essays, short stories, poems, plays and novels. Weekly writing assignments requiring students to comment critically on works of literature and to demonstrate ability to carry out and document research. English 1 also required of students weak in English. English 101 and 102 Honors for students highly proficient in English.

**Engl. 201 Masterpieces of World Literature (3+0)**
3 Credits  Spring
202
Masterworks of literature, studied to acquire a broad background and develop standards of literary judgment. **Fall Semester:** Home through Dante. **Spring Semester:** Renaissance to the present. Not open to English majors. **Prerequisite:** Engl. 101 and 102.

**Engl. 213 Advanced Exposition (1+2)**
3 Credits  Fall-Spring
Clarity and vigor in written communication of facts and ideas. Principles of style and methods of exposition. Students write for Individual weekly conferences. **Prerequisite:** Engl. 102.

**Engl. 239 Forms and Techniques of Poetry (3+0)**
3 Credits  Fall
Devices, aesthetic and criticism of verse composition. **Prerequisite:** Engl. 101 and 102.

**Engl. 240 Form and Technique of Fiction (3+0)**
3 Credits  Spring
Devices, aesthetic and criticism of prose composition. **Prerequisite:** Engl. 101 and 102. EXCEPT WHERE OTHERWISE INDICATED, PREREQUISITES FOR 300 AND 400 LEVEL COURSES ARE ENGLISH 201 OR 202 FOR NON-MAJORS, AND ENGLISH 239 OR INSTRUCTOR'S PERMISSION FOR MAJORS.

**Engl. 314 Research Writing (3+0)**
3 Credits  Spring
Organizing reports, documenting research, language and style in scholarly articles. Papers in students' fields prepared for conference and class. **Prerequisite:** Engl. 213 or by arrangement.

**Engl. 321 The Renaissance (3+0)**
3 Credits  Fall
Poetry and prose of the sixteenth century.

**Engl. 322 Neoclassical Age (3+0)**
3 Credits  Spring
Poetry and prose from Samuel Butler through Samuel Johnson. Impact of intellectual, religious, and political controversies on the literature of the period.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
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<tbody>
<tr>
<td>Engl. 323</td>
<td>Romantic Period (3+0)</td>
<td>3</td>
<td>Fall</td>
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<td></td>
<td>Poetry and prose from the late 1700's to 1830.</td>
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<td>*Next offered 1965-6.</td>
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<tr>
<td>Engl. 324</td>
<td>Victorian Period (3+0)</td>
<td>3</td>
<td>Spring</td>
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<td>Poetry and non-fictional prose, 1830-1902.</td>
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<tr>
<td>Engl. 328</td>
<td>19th Century American Prose (3+0)</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td></td>
<td>The works of Emerson, Hawthorne, Melville, Adams,</td>
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<td>Twain, Howell and James.</td>
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<td>Engl. 336</td>
<td>20th Century American Prose (3+0)</td>
<td>1-3</td>
<td>Spring</td>
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<td>The major fiction of Lewis, Fitzgerald, Hemingway,</td>
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<td>Faulkner, and Steinbeck.</td>
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<tr>
<td>Engl. 337</td>
<td>20th Century American Poetry (3+0)</td>
<td>3</td>
<td>Fall</td>
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<tr>
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<td>The poetry of Whitman, Dickinson, Robinson, Frost,</td>
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<td>Stevens, Roethke and others.</td>
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<tr>
<td>Engl. 341</td>
<td>20th Century British Literature (3+0)</td>
<td>3</td>
<td>Fall</td>
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<td>Major achievements of modern British poetry and</td>
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<td>Engl. 342</td>
<td>20th Century Drama (3+0)</td>
<td>3</td>
<td>Spring</td>
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<td>From Chekhov to Ionesco, the major dramatists</td>
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<td>and their achievements.</td>
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<tr>
<td>Engl. 352</td>
<td>The British Novel to 1900 (3+0)</td>
<td>3</td>
<td>Spring</td>
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<td>Origin and development of the novel with</td>
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<td>concentration on Richardson, Fielding, Austen,</td>
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<td>E. Bronte, Dickens, Conrad and Hardy.</td>
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<td>Engl. 413</td>
<td>Old and Middle English Literature (3+0)</td>
<td>3</td>
<td>Spring</td>
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<td>Old English literature in translation;</td>
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<td>representative Middle English texts exclusive of</td>
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<td></td>
<td>Chaucer.</td>
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<td>*Engl. 421</td>
<td>Chaucer</td>
<td>3</td>
<td>Fall</td>
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<tr>
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<td>Chaucer's poetry, with emphasis on The Canterbury</td>
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<td>Tales.</td>
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<tr>
<td>Engl. 423</td>
<td>Elizabethan Drama (3+0)</td>
<td>3</td>
<td>Fall</td>
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<td>Major plays of Elizabethan dramatists and the</td>
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<td>early plays of Shakespeare.</td>
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<tr>
<td>Engl. 424</td>
<td>Shakespeare (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Major works, emphasis on the later plays and</td>
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<tr>
<td></td>
<td>review of shakespearean criticism.</td>
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<tr>
<td>Engl. 431</td>
<td>Creative Writers Workshop (3+0)</td>
<td>1-3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Writing fiction and poetry.</td>
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<tr>
<td></td>
<td>Critique of student productions.</td>
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<tr>
<td>Engl. 432</td>
<td>1-3 Credits</td>
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<tr>
<td></td>
<td>Writing fiction and poetry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Critique of student productions.</td>
<td></td>
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<tr>
<td>Engl. 443</td>
<td>Greek and Roman Literature (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Greek and Roman literature in English</td>
<td></td>
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<tr>
<td></td>
<td>translation.</td>
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<tr>
<td>Engl. 444</td>
<td>European Literature (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Origin and development of the English Language;</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>modern syntax and usage.</td>
<td></td>
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<tr>
<td>*Engl. 472</td>
<td>History of English Language (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Origin and development of the English language;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>modern syntax and usage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engl. 493</td>
<td>Special Topics (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Various subjects in American and British</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>literature.</td>
<td></td>
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</tr>
<tr>
<td>Engl. 605</td>
<td>Studies in Drama (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Principles of Comedy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engl. 610</td>
<td>Studies in Fiction (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Space-Time Convention in the Modern Novel.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engl. 615</td>
<td>Studies in Poetry (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Engl. 620</td>
<td>Studies in Criticism (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
</tbody>
</table>
**Course Descriptions**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 625</td>
<td>Studies in Middle English Literature (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Engl. 630</td>
<td>Studies in Literature of the (3+0) English Renaissance</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Engl. 635</td>
<td>Studies in 17th Century English Literature (3+0) The Major Prose.</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Engl. 640</td>
<td>Studies in 18th Century English Literature (3+0) Satire.</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Engl. 645</td>
<td>Studies in the Literature of the British (3+0) Romantic Period.</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Engl. 650</td>
<td>Studies in the Literature of the (3+0) Victorian Period</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Engl. 655</td>
<td>Studies in 20th Century British Literature (3+)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Engl. 660</td>
<td>Studies in 20th Century American Literature (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Engl. 665</td>
<td>Studies in 19th Century American Literature (3+0) Transcendentalism and Tragedy.</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Engl. 670</td>
<td>Studies in Comparative Literature (3+0) The Epic.</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Engl. 697</td>
<td>Thesis</td>
<td>Credits Arr.</td>
<td>Fall</td>
</tr>
</tbody>
</table>

**WRITERS' WORKSHOP**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl. 675</td>
<td>Writing Drama</td>
<td>Credits Arr.</td>
<td>Fall-Spring</td>
</tr>
<tr>
<td>Engl. 681</td>
<td>Writing Fiction</td>
<td>Credits Arr.</td>
<td>Fall-Spring</td>
</tr>
<tr>
<td>Engl. 685</td>
<td>Writing Verse</td>
<td>Credits Arr.</td>
<td>Fall-Spring</td>
</tr>
</tbody>
</table>

**FRENCH**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fren. 101</td>
<td>Elementary French (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>102</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Designed to teach students to hear, speak, read and write French. Oral practice is emphasized.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fren. 150</td>
<td>Scientific French (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Rapid acquisition of a reading knowledge of scientific French. Offered as demand warrants.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fren. 201</td>
<td>Intermediate French (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>202</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>A continuation of French 102. Increasing emphasis on reading ability and cultural material. Conducted in French. Prerequisites: French 102 or 2 years of high school French.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fren. 311</td>
<td>Survey of French Literature (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>312</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Representative masterpieces from the beginnings to the twentieth century. Lectures in French. Prerequisites: French 202, or equivalent. Offered as demand warrants.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Fren. 321</td>
<td>Studies in French Literature (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>322</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Choice of authors, genres, or periods of French literature for intensive study. Prerequisites: French 202, or equivalent. Students may repeat course for credit when topic varies.</td>
<td></td>
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</tr>
<tr>
<td>*Fren. 493</td>
<td>Special Topics</td>
<td>Credits Arr.</td>
<td>Fall</td>
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<tr>
<td></td>
<td>494</td>
<td>Credits Arr.</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Various subjects for advanced students. Admission by arrangement. Offered as demand warrants.</td>
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</tr>
</tbody>
</table>
### GEOGRAPHY

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. 101</td>
<td>Introductory Geography (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>World regions; an analysis of environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geog. 201</td>
<td>Elements of Physical Geography (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Description of physical environment and introduction to techniques of geographic analysis. Prerequisites: Geog. 101.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Geog. 302</td>
<td>Geography of Alaska (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Regional geography of Alaska. Prerequisites: Geog. 101 or Junior standing.</td>
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</tr>
<tr>
<td>Geog. 316</td>
<td>Pleistocene Environment (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>*Geog. 327</td>
<td>Cold Lands (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Climate, natural resources and man's adjustment to environment in cold lands. Prerequisites: Anth. 101, or by permission.</td>
<td></td>
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<tr>
<td>Geog. 401</td>
<td>Weather and Climate (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Introduction to the study of weather and the classification of climates. Prerequisites: Geog. 201.</td>
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<tr>
<td>Geog. 402</td>
<td>Man and Nature (3+0)</td>
<td>3</td>
<td>Spring</td>
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<tr>
<td></td>
<td>Detailed analysis of the interrelationships of man and environment with particular emphasis on the Arctic. Admission by arrangement.</td>
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<tr>
<td>Geog. 491</td>
<td>Seminar</td>
<td></td>
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<tr>
<td>492</td>
<td>Selected topics in Geography. Admission by arrangement.</td>
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</tr>
<tr>
<td>*Geog. 493</td>
<td>Special Topics</td>
<td></td>
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<tr>
<td>494</td>
<td>Various subjects studied. Admission by arrangement.</td>
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</tbody>
</table>

### GEOLOGY

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geol. 101</td>
<td>General Geology (3+3)</td>
<td>4</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>Introduction to physical geology; the earth, its materials, the processes that affect changes upon and within it. Laboratory training in the use of topographic maps and recognition of common rocks and minerals.</td>
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<tr>
<td>Geol. 102</td>
<td>Historical Geology (3+3)</td>
<td>4</td>
<td>Spring</td>
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<tr>
<td></td>
<td>Summary of the history of the earth from the earliest stages to the present; sequence of geologic events and succession of life forms. Laboratory work includes the reconstruction of geologic history of various regions through geologic maps, structure sections; plant and animal life throughout geologic times. Prerequisites: Geol. 101.</td>
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<tr>
<td>Geol. 104</td>
<td>Elements of Geology (3+0)</td>
<td>3</td>
<td>Evening</td>
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<tr>
<td></td>
<td>A non-laboratory introduction to physical and historical geology; the earth, its origins, processes that affect it, sequence of events in its evolution and succession of life on it; appreciation of the modern landscape. Not acceptable toward a degree in geology or fulfilling a laboratory science requirement.</td>
<td></td>
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<tr>
<td>Geol. 213</td>
<td>Mineralogy (3+6)</td>
<td>5</td>
<td>Fall</td>
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<tr>
<td></td>
<td>Introduction to mineral chemistry, atomic structure, elementary crystallography, crystal chemistry and descriptive and determinative mineralogy. Includes instrumental determinative techniques, simple qualitative chemical tests, and the theory and use of the petrographic microscope including the immersion technique. May be taken for 4 credits by arrangement. Prerequisites: Math. 101, 102, Chem. 101, 102.</td>
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</tbody>
</table>
Course Descriptions 147

Geol. 214 Petrology (3-3-6)  5 Credits  Spring
Mineralogy and chemical composition, genesis and identification of igneous, metamorphic
and sedimentary rocks. Laboratory work based on study of paired hand specimens and
thin sections.  Prerequisite:  Geol. 213.

Geol. 304 Geomorphology (2-3-3)  3 Credits  Spring
Land forms and processes which create and modify them. Laboratory and field study
of physiographic features.  (Field trips.)  Prerequisite:  Geol. 102, 214.

Geol. 314 Structural Geology (2-3-3)  3 Credits  Spring
Origin and interpretation of primary and secondary geologic structures. Graphical solution
of structural problems.  (Field trips.)  Prerequisite:  Geol. 101, recommended, Geol. 102,
Phy. 103, E.S. 11, or by arrangement.

Geol. 321 Principles of Sedimentation (2-3-3)  3 Credits  Spring
Sources of materials, sedimentary and diagenetic processes, classification.  Prerequisite:
Geol. 213.

Geol. 351 Field Geology  8 Credits  Summer
Practical experience in collecting and presenting basic data obtained from the field.
Includes field mapping on topographic maps, aerial photographs, plane table maps, presenta-
tion of results in a professional report and finished geologic map.  Prerequisite:  Junior.
status in geology.  Students pay their own transportation, subsistence, course and tuition fee.
Enterance by preregistration only.

*Geol. 400 Earth Sciences Journal Club (1-0)  No Credits  Fall and Spr.
Attendance required by upper division geology majors and graduate students.

Geol. 401 Invertebrate Paleontology (3-3-3)  4 Credits  Fall
Paleontological theory and practice. Systematic study of fossil invertebrates.  Prerequisite:
Geol. 101, recommended Biol. 305 (Invertebrate Zool.).

*Geol. 402 Principles of Stratigraphy (2-3-3)  3 Credits  Fall or Spring
History of the development of stratigraphy, its principles and application.  Prerequisite:
Geol. 101, recommended Geol. 401, 321.

Geol. 406 Ore Deposits (3-3-3)  3 Credits  Fall
Form, structure, mineralogy, petrology, and mode of origin of ore deposits.  (Field trips.)
Prerequisite:  Geol. 214, 314.

*Geol. 408 Map Interpretation (1-1-9)  4 Credits  Fall or Spring
Topographic maps in interpretation of geologic structures, analysis of local and regional
global development.  Prerequisite:  Geol. 304.  Offered as demand warrants.

*Geol. 410 Micro-paleontology (2-3-3)  3 Credits  Fall or Spring
Microfossils and their use in stratigraphic correlation.  Prerequisite:  Geol. 102.  Offered as
demand warrants.

*Geol. 412 Geology of Alaska (2-3-3)  3 Credits  Fall or Spring
Interpretation of the geology of Alaska.  (Field trips.)  Prerequisite:  Geol. 102, 314, 304.
Offered as demand warrants.

*Geol. 413 Vertebrate Paleontology (2-3-3)  3 Credits  Fall
Systematic study of the fossil vertebrates with emphasis on evolution, morphology and
ecology.  (Field trips.)  Prerequisite:  Geol. 102.

*Geol. 415 Geology and Engineering Problems (3-3-3)  3 Credits  Fall
Geological and engineering importance of seasonally and permanently frozen ground (perma-
frost).  Properties, distribution, origin of ice in the ground and its application to engineering
and land utilization problems in the northern States, Canada, and Alaska.  (Field trips.)
Prerequisite:  Geol. 101, Phy. 111.

*Geol. 416 Introduction to Geochemistry (3-3-3)  3 Credits  Spring
Introduction to geochemistry of the earth.  Prerequisite:  Chem. 101, 102.

*Geol. 421 Principles of Sedimentology (3-3-3)  3 Credits  Fall
Historical introduction, observational sedimentology, seismometry, simple elastic wave propa-
gation.
GeoL 493 Special Topics 4 Credits Arr. Fall 494 Credits Arr. Spring
Geologic problems of the student’s choice approved by instructor. Transportation expenses met by student. No more than 3 credits allowed per semester.

GeoL 602 Advanced Problems of Frozen Ground (2+0) 2 Credits Spring Advanced topics in permafrost and seasonally frozen ground. (Field trips.) Prerequisite: Geol. 415. Offered as demand warrants.

GeoL 605 Glacial Geology (2+3) 3 Credits Fall Properties, distribution and origin of glacial deposits including principles of their stratigraphy and correlation. Processes of glacial erosion and deposition. Special reference to polar areas. (Field trips.) Prerequisite: Geol. 304.

GeoL 606 Pleistocene Geology (2+3) 3 Credits Spring Geology of the Pleistocene Epoch in both glaciated and unglaciated areas. Stratigraphy and correlation of nonglacial deposits. Special reference to polar areas. (Field trips.) Prerequisite: Geol. 304, 605, or by arrangement.

GeoL 607 Seminar in Geology and Glaciology (1+0) 1 Credit Fall of Antarctica
Discussions of exploration, glaciology, glacial geology, sub-ice topography, geology and permafrost for the continent. One seminar. Prerequisite: Geol. 415, 606. Offered as demand warrants.

GeoL 608 Seminar in Pleistocene Environment (1+0) 1 Credit Spring Discussion of glaciations, land bridges, Mackenzie Corridor problem, permafrost in relation to biogeography including coming of man. Faculty panel of geologists, glaciologists, anthropologists, biologists, and botanists. Prerequisite: Geol. 304, 605, 606, or by arrangement. One seminar. Offered as demand warrants.

GeoL 611 Stratigraphic Paleontology (Paleozoic) (2+3) 3 Credits Fall North American index fossils and stratigraphy of North America and the British Isles. Prerequisite: Geol. 401, 402.

GeoL 612 Stratigraphic Palaeontology (2+3) 3 Credits Spring (Mesozoic and Cenozoic)
North American index fossils and stratigraphy of North America and the British Isles. Prerequisite: 401, 402.

GeoL 622 Advanced Metamorphic Petrology (2+6) 4 Credits Spring Prerequisite: Geol. 214, 321. Offered in alternate years. Next offered in 1965-66.

GeoL 624 Advanced Igneous Petrology (2+6) 4 Credits Spring Prerequisite: Geol. 214, 321. Offered in alternate years; next offered 1966-7.

GeoL 627 Advanced Structural Geology I (3+0) 3 Credits Spring Large scale structural features, time and place in orogenesis, theories of orogenesis. Prerequisite: Geol. 314. Offered in alternate years; next offered in 1966-7.

GeoL 628 Advanced Structural Geology II (3+0) 3 Credits Spring Structural petrology, mechanisms of folding, theoretical basis for mechanical behavior of rocks. Prerequisite: Geol. 314, 314.

GeoL 629 Principles of Paleogeographic Reconstruction (2+3) 3 Credits Fall Sedimentary structures, petrographo data, and subsurface data are used in determining provenance, paleotectonic situation, and environment of sedimentary units; regional facies analyses. Prerequisite: Geol. 214, 321, 402. Offered in alternate years; next offered in 1966-7.

GeoL 631 Petroleum Geology of Northern Alaska (2+0) 2 Credits Fall Stratigraphy, structure, paleontology, and drilling problems of the area north of the Brooks Range. Prerequisite: Geol. 214, 321, 401, or by arrangement. Offered as demand warrants.

GeoL 635 Seminar in Glaciology 2 Credits Fall 636 2 Credits Spring Discussion of advanced and classical work in Greenland and Antarctica. Prerequisite: Math. 201, Geol. 402, or by arrangement. Two seminars.
Course Descriptions

**Geol. 693 Special Topics**  
694  
Research in various fields.

**Geol. 697 Thesis**  
698  
By arrangement. Transportation expenses met by the student.

**Geol. 697 Dissertation**  
698  
Credits Arr.  
Fall

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**GERMAN**

Ger. 101 Elementary German (5+0)  
102  
5 Credits  
Fall

Ger. 102 Intermediate German (3+0)  
202  
3 Credits  
Fall

Ger. 150 Scientific German (3+0)  
3 Credits  
Spring

Ger. 201 Intermediate German (3+0)  
202  
3 Credits  
Spring

Ger. 201 Intermediate German (3+0)  
202  
3 Credits  
Spring

**HISTORY**

Hist. 117 Formation of European Civilization (3+0)  
3 Credits  
Fall

Hist. 118 Development of Modern Europe (3+0)  
3 Credits  
Spring

Hist. 131 History of the U.S. (3+0)  
132  
3 Credits  
Fall  
3 Credits  
Spring

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**Offered in alternate years; next offered 1956-7.**
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hist. 225</td>
<td>Ancient History (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Political, social, economic and cultural development of the ancient Near East, Greece and Rome.</td>
</tr>
<tr>
<td>Hist. 254</td>
<td>History of Canada (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>The French foundation to the establishment of colonial status, relations with the U.S. and British Commonwealth of nations. Offered as demand warrants.</td>
</tr>
<tr>
<td>Hist. 261</td>
<td>Russian History (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Origins of Russia. Kievan Russia. The Mongol Era and the Rise of Muscovy. Early modern Russia.</td>
</tr>
<tr>
<td>Hist. 263</td>
<td>Russian History</td>
<td>3</td>
<td>Spring</td>
<td>The Romanoffs and the Development of the Russian Empire; the Peterine Reforms; the Great Reform of the 19th Century; revolutionary movements; Strains and stresses in Tsarist Russia.</td>
</tr>
<tr>
<td>Hist..302</td>
<td>The Old Regime, The Enlightenment (3+0)</td>
<td>3</td>
<td>Spring</td>
<td>The political, social and economic structure of the Old Regime; intellectual developments in the 18th century; the Revolution and the Napoleonic period; influence of France upon European development in the 18th century.</td>
</tr>
<tr>
<td>Hist. 305</td>
<td>Europe: 1815 to 1870 (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Political, economic, social, and intellectual history. Development of Industrial Revolution, romantic movement and unification of Germany and Italy. Prerequisite: Hist. 118. Offered in alternate years; next offered 1965-6.</td>
</tr>
<tr>
<td>Hist. 306</td>
<td>Europe: 1870 to 1914 (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Continuation of Hist. 305. The rise of socialism, Imperialism, outbreak of World War I. Prerequisite: Hist. 118.</td>
</tr>
<tr>
<td>Hist. 315</td>
<td>Contemporary Europe (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Europe from 1914 to the present. Prerequisite: Hist. 117, Hist. 118 or by arrangement. Offered in alternate years; next offered 1966-7.</td>
</tr>
<tr>
<td>Hist. 334</td>
<td>Diplomatic History of the U.S. (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Foreign relations from 1775 to the present. Designed for History and Political Science majors. Prerequisite: Hist. 131, Hist. 132. Offered in alternate years; next offered 1965-6.</td>
</tr>
<tr>
<td>Hist. 341</td>
<td>History of Alaska (3+0)</td>
<td>3</td>
<td>Fall</td>
<td>The Russian background; acquisition, settlement, and development of Alaska as an American territory and the 49th state. Prerequisite: Junior standing.</td>
</tr>
<tr>
<td>Hist. 344</td>
<td>The Soviet Union (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Origin and development of the Soviet Union from the Revolution of 1917 to the present day; stages of economic development; Soviet government and the Communist Party. Prerequisite: Hist. 118 or Hist. 261 or by permission. Offered in alternate years; next offered 1965-6.</td>
</tr>
<tr>
<td>Hist. 343</td>
<td>The Far East in Modern Times (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Nations of eastern Asia; their relations with the West since the early nineteenth century. Prerequisite: Admission by arrangement. Offered in alternate years; next offered 1965-6.</td>
</tr>
<tr>
<td>Hist. 416</td>
<td>The Renaissance (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Political, social, economic, and cultural developments in the Age of the Renaissance. Prerequisite: Hist. 117, Hist. 118. Offered in alternate years; next offered 1965-7.</td>
</tr>
<tr>
<td>Hist. 430</td>
<td>American Colonial History (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Early America; European settlement; economic and social development of the American community; establishment of political independence. Prerequisite: Hist. 131, Hist. 132. Offered in alternate years; next offered 1965-6.</td>
</tr>
<tr>
<td>Hist. 435</td>
<td>Civil War and Reconstruction (3+0)</td>
<td>3</td>
<td>Fall or Spring</td>
<td>Political economic, social, and diplomatic history from 1860-77; disruption and reestablishment of the Union. Prerequisite: Hist. 131, Hist. 132. Offered in alternate years; next offered 1965-7.</td>
</tr>
</tbody>
</table>
Course Descriptions 151

Hist. 440 The Westward Movement (3+0) 3 Credits Fall or Spring
Westward migration; establishment of new states and political institutions. Influences of the West. Prerequisite: Hist. 131, Hist. 132. Offered in alternate years; next offered 1965-6.

Hist. 450 Twentieth Century America (3+0) 3 Credits Fall or Spring
United States from the Progressive Movement to the present day. Prerequisite: Hist. 131, Hist. 132. Offered in alternate years; next offered 1966-7.

Hist. 461 American Intellectual and Cultural History (3+0) 3 Credits Fall
Lectures, readings, discussion. Examination of the development of American thought, including the transfer and modification of European ideas and the influence of American conditions on popular attitudes and culture. The semester division comes at approximately 1845.

Hist. 475 Introduction to Historical Method (3+0) 3 Credits Fall or Spring
Historiography (History of historical writing); methods of historical research; the preparation of bibliographies and syllabi. Admission by arrangement.

Hist. 493 Special Topics 4 Credits Fall
Hist. 494 Special Topics 4 Credits Spring

Hist. 601 Historiography (3+0) 3 Credits Fall or Spring
History of historical writing. Study and analysis of works of selected major historians.

Hist. 691 Seminar in European History (3+0) 3 Credits Fall or Spring
Hist. 692 Seminar in American History (3+0) 3 Credits Fall or Spring
Hist. 693 Special Topics 694 Credits Arr. Fall
Hist. 697 Thesis 698 Credits Arr. Spring

HOME ECONOMICS

H.E. 102 Meal Management (1+6) 3 Credits Fall or Spring
Planning, buying, preparing and serving meals. Emphasis on management, cost, nutrition.

H.E. 113 Clothing Construction and Selection (1+6) 3 Credits Fall or Spring
Fundamental sewing processes in garment construction, using modern techniques. Clothing selection and wardrobe study and the psychological and social significance.

H.E. 121 Related Art (1+3) 2 Credits Fall
122 Credits Spring
Practice in creative design to understand, appreciate and apply art principles in everyday life. Home furnishing is included in the second semester.

H.E. 211 Textiles (1+6) 3 Credits Fall
Identification, structure, selection, use, care of fabrics.

H.E. 236 Marriage and Family Life (3+0) 3 Credits Fall or Spring
Preparation for marriage and family life; personality development, dating, courtship, engagement, morality, reproduction, conflicts, money matters, crises, divorce, religion, parenthood and other topics.

H.E. 241 Home Management Residence Credits Arr. Fall or Spr.
Complete responsibility for a home with an opportunity to be creative and to experiment. Credit depends on the time of residence in the University Home Management House. Admission by arrangement.
H.E. 242 Household Equipment (2+3)  3 Credits  Fall or Spring
Selection, operation, care and efficient arrangement of household equipment for family use. Offered as demand warrants.

H.E. 251 Child Development (2+3)  3 Credits  Spring
Mental, emotional, social and physical developmental patterns from birth to adolescence. Laboratory arranged for observation of children in a variety of settings including public schools. Not open to students having credit in Psy. 252. Prerequisite: Psy. 101 and permission of Instructor.

H.E. 302 Advanced Foods (1+6)  2 Credits  Fall or Spring
Food selection and preparation based on composition, nutrition and basic scientific principles and comparison of methods. Food preservation. Prerequisite: 3 hours of Biol. and 3 hours of Chem.

*H.E. 304 Nutrition (3+0)  3 Credits  Fall or Spring
Nutritional value of foods. Planning and evaluation of diets. Practical application to daily living.

H.E. 311 Costume Study; History and Design (2+3)  3 Credits  Spring
Historic costume; suitability of color, fabric and design; creative problems in costume design. Prerequisite: H.E. 122 or by arrangement. Offered as demand warrants.

H.E. 312 Advanced Clothing (1+6)  3 Credits  Spring
Advanced clothing problems in selecting, fitting, construction, fabrics, and design; modern construction techniques. Prerequisite: H.E. 113 or by arrangement.

H.E. 401 Consumer Buying (3+0)  2 Credits  Fall or Spring
Problems of consumers in buying goods and services to satisfy wants and needs. Offered as demand warrants.

H.E. 402 Nursery School Laboratory (0+9)  3 Credits  Fall or Spring
Observation, experience, participation in the guidance of young children. Prerequisite: H.E. or Psy. 251 and permission of Instructor.

H.E. 404 Quantity Cookery (1+6)  3 Credits  Fall or Spring
Cooking for large groups; institutional management. Prerequisite: H.E. 302. Offered as demand warrants.

H.E. 405 Camp Cookery (0+3)  1 Credit  Fall or Spring
For men only. Preparation of nutritious meals from foods available in camps. Offered as demand warrants.

H.E. 406 Cafeteria Management (1+6)  3 Credits  Fall or Spring
Buying and management for institutional feeding. Prerequisite: H.E. 404. Offered as demand warrants.

*H.E. 412 Clothing Problems (0+6)  2 Credits  Fall or Spring
Advanced work in clothing selection and construction. 1 Freedom in the selection and execution of problems. Prerequisite: H.E. 312. Offered as demand warrants.

*H.E. 413 Pattern Drafting and Draping (1+6)  3 Credits  Fall or Spring
Drafting of flat patterns; draping of fabrics for construction of student-designed garments. Prerequisite: H.E. 312. Offered as demand warrants.

H.E. 422 Weaving (0+3)  1 Credit  Fall
1 Credit  Spring
Hand weaving of textiles, including rugs. Several looms used. Laboratory time averages three hours per week. Offered as demand warrants.

H.E. 441 Family Health (1+3)  2 Credits  Fall
Family and community health; home nursing, first aid. Offered in alternate years; next offered 1965-6.

*H.E. 445 Home Management (3+0)  3 Credits  Fall or Spring
Time, energy, finance, housing, and other management problems in relation to family living. Prerequisite: H.E. 241 and Junior standing. Offered in alternate years.
### Course Descriptions 153

**H.E. 446 House Planning and Furnishing (1+6)**  
3 Credits  
Spring  
Planning, building, furnishing, decorating a home. Field trips to homes. *Offered as demand warrants.*

**H.E. 491 Seminar (1+0)**  
492  
Credits Arr.  
Fall  
Selected topics in Home Economics.

**H.E. 493 Special Topics (1+0)**  
494  
Credits Arr.  
Fall  
Credits Arr.  
Spring  
Various subjects studied, principally through directed reading and discussions. *Admission by arrangement.*

### JOURNALISM

**Jour. 201 Introduction to Journalism (2+3)**  
3 Credits  
Fall  
Structure of news stories, various news leads and feature stories; gathering and evaluating information for simple news stories; writing stories. *Prerequisite: Engl. 102 or by arrangement.*

**Jour. 202 Advanced News Writing (2+3)**  
3 Credits  
Spring  
Study and writing of involved news stories; emphasis on the feature. *Prerequisite: Jour. 201.*

**Jour. 203 Photography (1+3)**  
2 Credits  
Fall or Spring  
Picture-taking techniques and darkroom procedures; emphasis on the camera in the modern press. *Admission by arrangement.*

**Jour. 204 Journalism Laboratory (0+3, 6 or 9)**  
1, 2, or 3 Credits  
Fall or Spring  
Credits arranged for students holding editorial or other positions on university publications or obtaining other similarly supervised experience in journalism practices. *Prerequisite: Engl. 102 or permission. By arrangement.*

**Jour. 311 Magazine Article Writing (3+0)**  
3 Credits  
Fall or Spring  
Study and practice in writing articles for publication in national media. Students repeating the course limited to a total of six credits. *Admission by arrangement.*

**Jour. 312 Editing (3+0)**  
3 Credits  
Spring  
Editorial writing, editing copy, writing headlines; newspaper layout; general study of mechanical, circulation, editorial, and advertising departments. *Prerequisite: Jour. 202.*

**Jour. 493 Special Topics**  
494  
Credits Arr.  
Fall  
Credits Arr.  
Spring  
Various subjects in journalism. *Offered as demand warrants. Admission by arrangement.*

### LINGUISTICS

**Ling. 281, 381 Structural Linguistics and (3+0)**  
282, 382 Linguistics Analysis  
3 Credits  
Fall  
Introduction to the structure of language and practice in analysis; sound structure (phonetics and phonology); grammatical structure (morphology and syntax). Work with Alaskan Native languages. *Offered as demand warrants.*

**Ling. 285, 385 Alaskan Eskimo (3+0)**  
286, 386  
3 Credits  
Fall  
3 Credits  
Spring  
Analysis of the living language with native speaker in the classroom. Learning to read and write the language. *Admission by arrangement. Offered as demand warrants.*

**Ling. 388 Alaskan Athapaskan (3+0)**  
3 Credits  
Spring  
Athapaskan languages in general and Alaskan dialects in particular; dialect geography; comparative phonology; Eyak, Tlingit, Haida. *Admission by arrangement. Offered as demand warrants.*
Ling. 485 Eskimo Workshop  
Credits Arr. Fall  
Credits Arr. Spring  
Advanced work in Eskimo, including creative writing, transcription of texts, study of comparative Eskimo dialectology; Aleut; preparation of materials for radio broadcast and publication. Prerequisite: Ling. 285 or 386, or speaking knowledge of Eskimo and permission of instructor. Offered as demand warrants.

Ling. 493 Special Topics  
Credits Arr. Fall  
Credits Arr. Spring  
Various languages and subjects in linguistics. Admission by arrangement. Offered as demand warrants.

MATHEMATICS

Math. A Review of Algebra (5+0)  
Required of those insufficiently prepared to take Math. 101. May be used to remove high school deficiency. Five classes 1-kr.

Math. 101 Introduction to Analysis (4+0)  
First Semester: College algebra and introductory calculus. 
Second Semester: Topics in elementary calculus; analytic trigonometry, and plane and solid analytic geometry. Prerequisite: High school trigonometry, or Math. 108 concurrently.

Math. 103 Survey of College Mathematics (3+0)  
Survey course designed to give understanding and appreciation of mathematics. Primarily a terminal college course.

Math. 106 College Algebra and Trigonometry (5+0)  
Review of high school algebra, determinants, matrices, topics in the theory of equations, systems of equations, inequalities, curve sketching, probability, and applications; plane trigonometry with emphasis on the analytical and periodic properties of trigonometric functions.

Math. 107 College Algebra (3+0)  
Review of high school algebra, determinants, matrices, topics in the theory of equations, systems of equations, inequalities, curve sketching, probability, and applications.

Math. 108 Trigonometry (2+0)  
Plane trigonometry with emphasis on the analytical and periodic properties of trigonometric functions. Prerequisite: Math. 107.

Math. 109 Analytic Geometry (3+0)  
Rectangular co-ordinate system, the straight line, conic sections, transcendental curves, polar co-ordinates, parametric equations, and solid analytic geometry. Prerequisite: High School trigonometry or Math. 108.

Math. 110 Mathematics of Finance (3+0)  
Simple and compound interest, discount, annuities, amortization, sinking funds, depreciation and capitalization. Prerequisite: Math. A or by arrangement.

Math. 111 Beginning Calculus (3+0)  
Sequences, limits, differentiation and applications, integration and applications, differentiation of algebraic and transcendental functions. Prerequisite: Math. 109.

Math. 115 Foundations of Mathematics (4+0)  
Selected topics from arithmetic, algebra, geometry, sets, logic, elementary functions and probability.
Math. 121 Introduction to Modern Algebra 4 Credits Fall or Spring
122 and Analysis with Applications 4 Credits Fall or Spring
Sets, relations, functions, mappings, limits, continuity, differentiation, integration, differential
equations, difference equations, groups, rings, fields, vectors, matrices, linear transformations,
and related topics. Not open for credit to mathematics majors. Prerequisites: Math. 106 or 108 or equivalent. The student may enroll in Math. 201 upon completion of this sequence and Math. 109 or equivalent.

Math. 200 Calculus (4+0) 4 Credits Fall or Spring
201 4 Credits Fall or Spring
202 4 Credits Fall or Spring
Techniques and application of differential and integral calculus, vector analysis, partial
derivatives, multiple integrals and infinite series. Prerequisites: Math. 105 or 108. Admission
to Math. 201. Is also possible on completion of Math. 102 or Math. 111.

Math. 204 Elementary Probability & Statistics (3+0) 3 Credits Fall or Spring
Basic concepts: descriptive statistics, methods of presenting data, frequency distributions,
mean, median, mode, standard deviation; elementary probability; inferential statistics;
estimation of population parameters, point estimates, confidence interval estimates, tests
of hypotheses; introduction to regression, correlation, and analysis of variance. Prerequisites:
Math. 105 or Math. 108.

Math. 205 Mathematics for Teachers (3+0) 3 Credits Fall
Background for better understanding and appreciation of fundamental principles underlying
mathematics taught in elementary schools. Prerequisite: Math. 205.

Math. 302 Differential Equations (3+0) 3 Credits Fall or Spring
Nature and origin of differential equations; first order equations and solutions, linear
differential equations with constant coefficients, systems of equations, power series solutions,
operational methods, physical, biological, and geometrical applications. Prerequisites:

Math. 303 Introduction to Modern Algebra (3+0) 3 Credits Fall
A critical examination of the familiar real and complex number system from a postulational
point of view, followed by generalizations to groups, rings, and fields.

Math. 308 Higher Geometry (3+0) 3 Credits Spring
Advanced euclidean geometry, non-euclidean geometries, including projective and finite

Math. 309 Programming of Digital Computers (3+0) 3 Credits Fall
Organization, function, and applications of digital computers, with special reference to
IBM 1620. Programming languages, including machine language, SPS, FORTRAN, and
Algol. Directed primarily to needs of scientific and statistical calculation. Emphasis on
individual use of the IBM 1620. Prerequisites: Math. 202 or Math. 204 or permission of
instructor.

Math. 310 Numerical Analysis (3+0) 3 Credits Spring
Finite differences, numerical solutions of differential equations, relaxation methods, inter-

Math. 312 Numerical Methods for Engineers (3+0) 3 Credits Spring
Numerical analysis and computer programming designed for engineering students. FORTRAN
language for IBM 1620; numerical approximations, solution of differential equations, non-
linear equations, iterative and direct methods for simultaneous linear equations. Individual
use of computer parallels lecture topics. Prerequisites: Math. 302.

Math. 314 Linear Algebra (3+0) 3 Credits Spring
Linear equations, vector spaces, matrices, determinants, linear transformations, charac-
teristic values. Inner product spaces.

Math. 315 Game Theory & Linear Programming (3+0) 3 Credits Fall
Mathematical approach to Game Theory and Linear Programming with application to
economics and operations research. Prerequisites: Math. 122 or 202 or permission of
instructor.
Math. 371 Probability (3+0)  3 Credits  Fall
Definitions, sample spaces combinatorial analysis, occupancy and ordering problems, conditional probability, Poisson, binomial, and normal distributions, random variables, expectation, law of large numbers, generating functions. Prerequisites: Math. 202.

Math. 372 Stochastic Processes (3+0)  3 Credits  Spring
Elements of stochastic processes and their applications, including random walks, Markov chains, recurrent events, Brownian motion, and elementary queuing theory. Prerequisite: Math. 371.

Math. 401 Advanced Calculus (1+0)  3 Credits  Fall
Partial differentiation, vectors, Stieltjes integral, multiple integrals, line and surface integrals, series, convergence of improper integrals, Fourier series. Prerequisite: Math. 302.

Math. 407 Mathematical Statistics (3+0)  3 Credits  Fall
Advanced probability theory, point estimation, tests of statistical hypotheses, confidence intervals. Prerequisite: Math. 371.

Math. 409 Experimental Design (3+0)  3 Credits
Methods of analyzing data; constructing and analyzing designs for experimental investigations; completely randomized, randomized block, and Latin-square designs, split-plot design, incomplete block design, simple and partially confounded factorial designs, lattice and cubic lattice designs, treatment of missing data, comparison of designs. Prerequisite: Math. 202.

*Math. 421 Vector Analysis (3+0)  3 Credits
Fundamental operations on vectors, potential functions, gradient, divergence, and curl; applications in physics and mechanics. Offered as demand warrants.

*Math. 491 Seminar  Credits Arr.  Fall
492  Credits Arr.  Spring
Topics are selected according to needs and interests of the students to introduce them to independent study and research.

Math. 493 Special Topics (2+0)  3 Credits  Fall
494  Credits Arr.  Spring
Primarily for mathematics majors. Various topics studied.

Math. 601 Complex Function Theory (3+0)  3 Credits  Fall
602  3 Credits  Spring
Analytic functions, singularities, analytic continuation, integration, Riemann surfaces, the logarithmic function, conformal representation. Prerequisite: Math. 402, or by arrangement. Offered as demand warrants.

Math. 605 Real Function Theory (3+0)  3 Credits  Fall
606  3 Credits  Spring
Real number system, sequences, topological spaces, measure theory. Lebesque integral. Prerequisite: Math. 402, or by arrangement. Offered as demand warrants.

Math. 608 Partial Differential Equations (3+0)  3 Credits  Spring
First and second order differential equations, boundary value problems, existence and uniqueness theorems, Green's functions, principal equations of mathematical physics. Prerequisite: Math. 402, or by arrangement. Offered as demand warrants.

Math. 609 Modern Algebra (3+0)  3 Credits  Fall
610  3 Credits  Spring
Groups, rings, fields, matrices, lattices, vector spaces, representation. Prerequisite: Math. 303. Offered as demand warrants.
Math. 611 Mathematics of Physics & Engineering (3+0) 3 Credits Fall

612 3 Credits Spring

Infinite series, functions of several variables, algebra and geometry of vectors, matrices, vector field theory, partial differential equations, complex variables. Prerequisite: Math. 302. Offered as demand warrants.

Math. 693 Special Topics 694 Credit Arr. Fall

Credit Arr. Spring

Various subjects studied.

Math. 697 Thesis 698 Credit Arr. Fall

Credit Arr. Spring

MECHANICAL ENGINEERING

M.E. 301 Kinematics of Machines (2+3) 3 Credits Fall

Velocity and acceleration analyses of mechanisms and machines; principles of transforming and transmitting motion, including linkages, cams, gears, belts, chains, and trains of mechanism; dimensional synthesis. Prerequisite: Math. 202, E.S. 208.

M.E. 302 Dynamics of Machines (3+3) 4 Credits Spring

A continuation of M.E. 301 with graphical and analytical analyses of forces; balancing of machines. Prerequisite: M.E. 301.

M.E. 401 Machine Design (2+6) 4 Credits Fall

Design of machine elements, including allowances, tolerances, keys, shafts, couplings, springs, clutches, belts, brakes, flywheels, power screws, gears, bearings, lubrication and stress analysis of components. Prerequisite: E.S. 331, M.E. 302.

M.E. 411 Space Conditioning (2+3) 3 Credits Fall

Principles of heating, ventilating, air conditioning, and refrigeration with practical applications. Prerequisite: E.S. 341, E.S. 346.

M.E. 413 Mechanical Engineering Thermodynamics (3+0) 3 Credits Fall

Continuation of E.S. 346, including vapor power cycles (rankine, reheat, binary and regenerative cycles); flow through nozzles and diffusers; gas power cycles; gas mixtures and psychrometrics; vapor-compression refrigeration cycles. Prerequisite: E.S. 346, E.S. 341.

M.E. 418 Power Analysis (3+3) 4 Credits Spring

Fundamentals of power generation including piping, pumps, fuels and combustion, steam generators, condensers, deaerators, evaporators, feedwater treatment and heating, regeneration, fuel handling, heat balance, equipment, economics and plant layout. Prerequisite: M.E. 413.

M.E. 420 Industrial Processes (3+0) 3 Credits Spring

Methods and equipment used in working, welding, casting, cutting, machining and fabrication of materials. Use of jigs, fixtures and machine tools. Selection of equipment, routing, planning, time and motion study.

M.E. 430 Instruments and Controls (2+3) 3 Credits Spring

Automatic control and instrumentation of equipment including mechanical, hydraulic, pneumatic, electric and electronic systems. Prerequisite: All 300 level E.S. and M.E. courses.

M.E. 440 Mechanical Engineering Laboratory (0+6) 1 Credit Spring

Experimental work with mechanical equipment, pumps and fans, heat exchangers, fuels, power plants and refrigerating machines. Prerequisite: M.E. 413.
METALLURGY

Met. 304 Introduction to Metallurgy (3-1-0) 3 Credits Spring
Definitions and principles of basic science and engineering principles as applied to process and adaptive metallurgy. Prerequisites: Math. 102, Chem. 203 or 211, Phys. 212.

Met. 312 Fire Assaying (0-4-6) 2 Credits Spring
Sampling and preparation of ores, mill products, and smelter products for assay; assaying gold, silver, and lead. Prerequisites: Met. 304, concurrent Chem. 212. Offered as demand warrants.

Met. 332 Physical Metallurgy and Metallography (3-1-3) 4 Credits Spring
Properties of metals and alloys, metal crystals, chemical and metallic bonds, equilibrium diagrams, defect in metals, heat treatment, pyrometry, foundry, forging welding, principles and application of electron microscope, x-ray and emission spectroscopy. Equipment used in metallurgy. Prerequisite: 304. Offered as demand warrants.

Met. 493 Special Topics Credits Arr. Fall
Met. 494 Credits Arr. Spring
Various subjects studied, principally through directed reading and discussions. Admission by arrangement.

Met. 693 Special Topics Credits Arr. Fall
Met. 694 Credits Arr. Spring
Various subjects studied. Admission by arrangement.

MILITARY SCIENCE

Mil. 101 First-Year Military Science (2+1) 1½ Credits Fall
Mil. 102 1½ Credits Spring
First-year basic: Organization of the Army; individual weapons and marksmanship; U.S. Army and National Security; school of the soldier and exercise of command.

Mil. 201 Second-Year Military Science (2+1) 1½ Credits Fall
Mil. 202 1½ Credits Spring
Second-year basic: American military history; map and aerial photograph reading; introduction to operations and basic tactics; school of the soldier and exercise of command.

Mil. 301 Third-Year Military Science (3+1) 3 Credits Fall
Mil. 302 3 Credits Spring
First-year advanced: Leadership; military teaching; branches of the Army; small unit tactics; communications; school of the soldier and exercise of command.

Mil. 401 Fourth-Year Military Science (3+1) 3 Credits Fall
Mil. 402 3 Credits Spring
Second-year advanced: Operations; logistics; Army administration; military law; the role of the U.S. in world affairs; service orientation; school of the soldier and exercise of command.

Mil. 403 ROTC Flight Training 2 Credits Fall
Thirty-five hours of ground school and thirty-six and one half hours of flight; includes FAA flight check.
MINERAL PREPARATION ENGINEERING

M.Pr. 313 Introduction to Mineral Preparation (2+3)  3 Credits  Fall
Elementary theory and principles of unit processes of liberation, concentration and solid-fluid separation as applied to mineral beneficiation. Prerequisite: Junior standing or permission. By arrangement.

M.Pr. 314 Unit Preparation Processes (1+6)  3 Credits  Spring
Principles and practices in liberation and concentration by gravity, electromagnetic and electrostatic methods; analysis of costs and economics of mill operation; flowsheets for different ores developed in the laboratory on a pilot plant scale. Prerequisite: M.Pr. 313.

M.Pr. 318 Mineral Preparation Testing (1+3)  2 Credits  Spring
Calculations of complex problems in testing and control of milling operations. Proximate analysis of coals, application of microscopy, spectroscopy and x-ray to mineral dressing problems. Prerequisite: Min.Pr. 313 and concurrent enrollment in Min.Pr. 314.

M.Pr. 433 Coal Preparation (2+3)  3 Credits  Fall
Unit operations, flowsheets, washability characteristics and control by sink-float methods for coal preparation plants; market requirements and economics of preparation. Prerequisite: Min.Pr. 313.

M.Pr. 493 Special Topical Credits Arr.  Fall
Various subjects studied through directed reading, discussions and laboratory work. Admission by arrangement.

M.Pr. 601 Froth Flotation (2+3)  3 Credits  Fall
Theory and application of bulk and differential froth flotation to metallic minerals, non-metallic minerals and coal.

M.Pr. 606 Plant Design (1+6)  3 Credits  Spring
Selection, design and layout of equipment for erection and operation of mineral and coal beneficiation plants for specific custom and milling problems.

M.Pr. 693 Special Topics Credits Arr.  Fall
Various subjects studied. Admission by arrangement.

M.Pr. 695 Mineral Preparation Research (1+6)  3 Credits  Spring
3 Credits
Familiarizes students with the concept of basic research and its needs in the field of mineral beneficiation, including such research subjects as magnetic susceptibility, dielectric constants and electrical conductivity of minerals; chemical theory and mechanism of bubble contact in flotation; the effect of ultrasonic vibration in unit processes.

M.Pr. 697 Thesis  3 Credits  Fall
3 Credits
Application of fundamentals to the actual beneficiation problems of Alaskan ores; to produce increased effectiveness in ability to organize, interpret, and present the results of research clearly, precisely and with meaning in acceptable thesis form.

MINING ENGINEERING

Min. 102 Mining Engineering Systems A, B, C (4+0)  4 Credits  Spring
Min. 102A—Introduction to mineral industries and principles of exploration; four, one hour classes per week for 4 weeks. 1 Credit.
Min. 102B—Utilization and application of mining explosives; four, one hour classes per week for 4 weeks. 1 Credit.
Min. 102C—Fundamentals of mining systems for bedded, massive, vein and surface deposits; four, one hour classes per week for 8 weeks. 2 Credits.
Can be taken in various combinations of parts A, B, C.

Min. 300 Mine Rescue First Aid  No Credit
U.S. Bureau of Mines instruction in mine rescue and first aid. Offered as demand warrants.
Min. 302 Mine Surveying (3+3) 3 Credits Spring
Surveying principles for surface and underground control of mining properties. Field and office procedures for preparation of maps and engineering data.

Min. 303 Mining Plant Engineering (3+3) 4 Credits Fall
Principles of mine ventilation, haulage, pumping and energy transmission systems. Prerequisites: Min. 102, Phys. 212 and E.S. 341 (concurrent).

Min. 306 Rock Mechanics (2+3) 3 Credits Spring
Analysis of stress and strain. Physical properties of rock and fundamentals of rock behavior. Rock stresses in mining with design and layout of underground workings. Prerequisite: E.S. 331.

Min. 303 Mining Law (2+0) 2 Credits Fall
History of mining law; essentials of mining laws of the United States and Alaska. Discussions and interpretation of important court decisions in mining litigation. Offered as demand warrants.

Min. 400 Practical Engineering Report 1 Credit Spring
Twelve weeks practical work in an industry or project related to the student’s option, or equivalent. Performed during one or more of the summer vacations before the fourth year. Offered as demand warrants.

Min. 405 Geophysical and Geochemical Exploration (2+3) 3 Credits Fall

Min. 408 Mineral Valuation and Economics (3+3) 4 Credits Spring
Theory of sampling techniques, deposit and reserve calculations and analysis of mineral economic problems. Prerequisite: Min. 102 or permission.

Min. 430 Seminar and Senior Field Trip 1 Credit Fall or Spring
Mining field trip. Mines and districts, selected for exemplifying and providing instruction in geological principles, mining methods, metallurgical practices and industrial economics; seminar discussions cover operations and industries visited and current mineral industry problems. Prerequisite: Senior standing and permission. Fee: Field trip expenses to be paid by student. Offered as demand warrants.

Min. 493 Special Topics Credits Arr. Fall
Various subjects studied, principally through directed reading and discussions. Admission by arrangement.

Min. 496 Mining or Mineral Research (1+6) 3 Credits Spring
Selected mining, mineral preparation or mineral economic research problems. Prerequisite: Senior standing or permission.

Min. 621 Advanced Mineral Economics (3+0) 3 Credits Fall
Economics of mineral exploitation and utilization. International trade, state and federal policies, financial control and research methods.

Min. 691 Seminar Credits Arr. Fall
Reading and report required. Admission by arrangement.

Min. 693 Special Topics Credits Arr. Fall
Various subjects studied. Admission by arrangement.

Min. 697 Thesis Credits Arr. Fall

MUSIC

APPLIED MUSIC

Music 101 Chorus (0+3) 1 Credit Fall
Music 109 R.O.T.C. Band (0+3) 1 Credit Fall
Music 203 Orchestra (0+3) 1 Credit Fall
Music 205 Concert Band (0+3) 1 Credit Spring
Music 211 "Choir of the North" (0+3) 1 Credit Spring
Music 307 Chamber Music (0+3) 1 Credit Fall
Music 313 Opera Workshop (0+3, 6, or 9) 1, 2, 3 Credits Spring
Music 317 Collegium Musicum (0+3) 1 Credit Spring
Music 319 Madrigal Singers (0+3) 1 Credit Spring

Note: Admission to ensemble courses above the 100 level is by permission of the instructor. Ensemble courses may be repeated for credit; a maximum of 12 such credits may be counted toward graduation.

Music 151, 251 Class Lessons (0+3) 1 Credit Fall
152, 252 1 Credit Spring

Class instruction in piano, voice, or orchestral instrument.

Fees for Class Lessons:
Lesson Fee — $15.00
Practice Room Rental Fee — 7.50
Above fees waived for students enrolled in 7 or more credit hours and majoring or minoring in Music or Music Education.

Music 161, 261, 361, 461 Private Lessons (1+0) 1 Credit Fall
162, 262, 362, 462 1 Credit Spring

Private instruction in piano, voice, or orchestral instrument. Prerequisite: Admission by examination.

Fees for Private Lessons:
Lesson Fee — $45.00
Practice Room Rental Fee — 7.50
Above fees waived for students enrolled in 7 or more credit hours and majoring or minoring in Music or Music Education.

MUSIC THEORY AND HISTORY

Music 123 Introduction to Music (2+3) 3 Credits Fall
Music 124 3 Credits Spring
Cultivation of the understanding and intelligent enjoyment of music through a study of its elements, forms, and historical styles. Open to all students, including music majors, but not a part of the music major curriculum. May be repeated for maximum of 6 hours credit.

Music 131 Basic Theory (2+3) 3 Credits Fall
132 3 Credits Spring
Rhythmic, melodic, and harmonic dictation; keyboard harmony, including resolution of figured bass; sight-singing and ear training; stylistic analysis of works of eighteenth and nineteenth century composers. Semesters must be taken in sequence.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music 231</td>
<td>Advanced Theory (2+3)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Music 232</td>
<td>History of Music (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Music 331</td>
<td>Form and Analysis (1+3)</td>
<td>2</td>
<td>Fall</td>
</tr>
<tr>
<td>Music 491</td>
<td>Senior Seminar (2+0)</td>
<td>2</td>
<td>Fall</td>
</tr>
<tr>
<td>Music 332</td>
<td>History or Music (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Music 333</td>
<td>History or Music (3+0)</td>
<td>3</td>
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<td>Music 492</td>
<td>History or Music (3+0)</td>
<td>2</td>
<td>Spring</td>
</tr>
<tr>
<td>Music 493</td>
<td>Special Topics</td>
<td>Credits Arr.</td>
<td>Fall</td>
</tr>
<tr>
<td>Music 494</td>
<td>Special Topics</td>
<td>Credits Arr.</td>
<td>Spring</td>
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**MUSIC EDUCATION**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music 243</td>
<td>Education, Music for the Classroom Teacher (2+3)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Music 315</td>
<td>Instrumental Methods and Techniques (1+3)</td>
<td>2</td>
<td>Fall</td>
</tr>
<tr>
<td>Music 316</td>
<td>Instrumental Methods and Techniques (1+3)</td>
<td>2</td>
<td>Spring</td>
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<tr>
<td>Music 343</td>
<td>Education, Music in the Elementary School (3+0)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Music 344</td>
<td>Education, Music in the Secondary School (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Music 415</td>
<td>Instrumental Methods and Techniques (1+3)</td>
<td>2</td>
<td>Spring</td>
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</table>

**OFFICE ADMINISTRATION**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Term</th>
</tr>
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<tbody>
<tr>
<td>O.A. 101</td>
<td>Shorthand (2+2)</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>O.A. 102</td>
<td>Shorthand (2+2)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>O.A. 103</td>
<td>Elementary Typewriting (2+2)</td>
<td>2</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>O.A. 105</td>
<td>Intermediate Typewriting (2+2)</td>
<td>2</td>
<td>Fall or Spring</td>
</tr>
</tbody>
</table>
Course Descriptions

O.A. 106 Advanced Typewriting (2+2)
2 Credits Fall or Spring
Letter writing with special problems, reports, business forms, statistical tabulations and legal documents; emphasis is on speed and office standards. Prerequisite: O.A. 105 or equivalent and speed of 40 words per minute.

O.A. 201 Intermediate Stenography (2+2)
3 Credits Fall
202 Advanced Stenography
3 Credits Spring
High speed shorthand dictation and transcription. Prerequisite: O.A. 102 and O.A. 106 or equivalent.

O.A. 203 Office Machines (1+2)
3 Credits Fall
Basic operation of calculating, adding, duplicating, and dictation machines. Prerequisite: O.A. 103 or equivalent.

O.A. 208 Specialized Secretarial Skills (3+0)
3 Credits Fall or Spring
Principles, practices, and rules of filing. Training and practice in the operation of transcribing machines, responsibilities and duties of the secretary; business ethics and the preparation of office manuals.

O.A. 231 Business Correspondence (3+0)
3 Credits Fall
Fundamentals of business writing; emphasis on clarity, accuracy, and effectiveness in the writing of business letters and reports. Prerequisite: Eng. 102, O.A. 103 or equivalent.

O.A. 302 Secretarial Training (3+0)
3 Credits Spring
Business office systems, procedures, organization; professional secretarial standards and practices; C.P.S. program and requirements.

O.A. 351 Readings in Office Administration (1+0)
1 Credit Fall or Spring
Readings in current problems, practices, procedures, methods. Not more than 2 credits to be earned by any student.

PHILOSOPHY

PhD. 201 Introduction to Philosophy (3+0)
3 Credits Fall
Terms, concepts and problems as reflected in writings of great philosophers. Prerequisite: Eng. 102, Sophomore standing. Three classes 1 hour.

PhD. 204 Introduction to Logic (3+0)
3 Credits Spring
Principles of deductive and inductive logic, application of these laws in science and other fields; brief introduction to symbolic logic and its applications. Prerequisite: Sophomore standing. Three classes, 1 hour.

PhD. 331 Aesthetics (3+0)
3 Credits Fall
The nature of aesthetic experience in poetry, music, painting, sculpture and architecture; studies in relation to artistic production and the role of art in society. Offered in alternate years; next offered 1966-7.

PhD. 332 Ethics (3+0)
3 Credits Spring
Examination of ethical theories and basic issues of moral thought. Offered in alternate years, next offered in 1966-7.

PhD. 351 History of Philosophy (3+0)
3 Credits Fall
Ancient and Medieval periods. Prerequisite: 6 Credits in Philosophy or Social Science.

PhD. 352 History of Philosophy (3+0)
3 Credits Spring
Renaissance, Modern, and Recent periods. Prerequisite: 6 credits in Philosophy or Social Science.

PhD. 471 Contemporary Philosophical Problems (3+0)
3 Credits Fall
Ideological issues facing the modern world. Prerequisite: 9 credits in Philosophy or permission of instructor.

PhD. 481 Philosophy of Science (3+0)
3 Credits Fall
Comparison and discussion of various contemporary methodological positions. Prerequisite: Junior standing.
### PHYSICAL EDUCATION

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Term</th>
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<tbody>
<tr>
<td>P.E. 101</td>
<td>Freshman Physical Education (Women) (0+3)</td>
<td>1</td>
<td>Fall</td>
</tr>
<tr>
<td>P.E. 102</td>
<td>Freshman Physical Education (Men) (0+3)</td>
<td>1</td>
<td>Spring</td>
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<tr>
<td>P.E. 103</td>
<td>Fundamentals of Sports—Tennis and Badminton</td>
<td>1</td>
<td>Fall</td>
</tr>
<tr>
<td>P.E. 105</td>
<td>Freshman Physical Education (Men) (0+3)</td>
<td>1</td>
<td>Fall</td>
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<tr>
<td>P.E. 106</td>
<td>Freshman Physical Education (Women) (0+3)</td>
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<td>Spring</td>
</tr>
<tr>
<td>P.E. 107</td>
<td>Beginning Swimming (0+3)</td>
<td>1</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>P.E. 108</td>
<td>Handball (0+3)</td>
<td>1</td>
<td>Spring</td>
</tr>
<tr>
<td>P.E. 109</td>
<td>Beginning Skiing (0+3)</td>
<td>1</td>
<td>Fall</td>
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<tr>
<td>P.E. 111</td>
<td>Principles of Physical Education (4+0)</td>
<td>4</td>
<td>Fall</td>
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<tr>
<td>P.E. 113</td>
<td>Ice Skating (0+3)</td>
<td>1</td>
<td>Fall</td>
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<tr>
<td>P.E. 142</td>
<td>Personal and Community Health (3+0)</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>P.E. 146</td>
<td>First Aid (2+0)</td>
<td>2</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>P.E. 201</td>
<td>Sophomore Physical Education (Women) (0+3)</td>
<td>1</td>
<td>Fall</td>
</tr>
<tr>
<td>P.E. 202</td>
<td>Sophomore Physical Education (Men) (0+3)</td>
<td>1</td>
<td>Spring</td>
</tr>
</tbody>
</table>

- **P.E. 101 Freshman Physical Education (Women) (0+3)**
  - 1 Credit
  - Term: Fall

- **P.E. 102 Freshman Physical Education (Men) (0+3)**
  - 1 Credit
  - Term: Spring

- **P.E. 103 Fundamentals of Sports—Tennis and Badminton**
  - 1 Credit
  - Term: Fall

- **P.E. 105 Freshman Physical Education (Men) (0+3)**
  - 1 Credit
  - Term: Fall

- **P.E. 106 Freshman Physical Education (Women) (0+3)**
  - 1 Credit
  - Term: Spring

- **P.E. 107 Beginning Swimming (0+3)**
  - 1 Credit
  - Term: Fall or Spring

- **P.E. 108 Handball (0+3)**
  - 1 Credit
  - Term: Spring

- **P.E. 109 Beginning Skiing (0+3)**
  - 1 Credit
  - Term: Fall

- **P.E. 111 Principles of Physical Education (4+0)**
  - 4 Credits
  - Term: Fall

- **P.E. 113 Ice Skating (0+3)**
  - 1 Credit
  - Term: Fall

- **P.E. 142 Personal and Community Health (3+0)**
  - 3 Credits
  - Term: Spring

- **P.E. 146 First Aid (2+0)**
  - 2 Credits
  - Term: Fall or Spring

- **P.E. 201 Sophomore Physical Education (Women) (0+3)**
  - 1 Credit
  - Term: Fall

- **P.E. 202 Sophomore Physical Education (Men) (0+3)**
  - 1 Credit
  - Term: Spring

- **P.E. 205 Sophomore Physical Education (Men) (0+3)**
  - 1 Credit
  - Term: Fall

- **P.E. 206 Sophomore Physical Education (Men) (0+3)**
  - 1 Credit
  - Term: Spring
P.E. 207 Intermediate Swimming (0+3) 1 Credit  Fall or Spring
Advanced instruction in basic strokes, stressing skill in performance and endurance; instruction in water safety and accident prevention. **Prerequisite:** P.E. 107 or ability to swim one hundred yards with good form.

P.E. 209 Advanced Skiing (0+3) 1 Credit  Fall
Learning skills of advanced slope and cross-country skiing.

P.E. 211 Fundamentals of Sports— (0+2) 1 Credit  Fall
**Volleyball and Soccer**
Skills, rules, strategies, terminology of Volleyball and Soccer.

P.E. 213 Fundamentals of Sports— (0+2) 1 Credit  Spring
**Recreational Activities**
Skills, rules, strategies, terminology of such activities as archery, bowling, table tennis and shuffleboard.

P.E. 215 Fundamentals of Sports— (0+2) 1 Credit  Fall
**Tumbling and Gymnastics**
Skills, techniques, terminology of tumbling and gymnastics.

P.E. 216 Fundamentals of Sports—Rhythms (0+2) 1 Credit  Spring
Skills, terminology and basic patterns of movement.

P.E. 220 Physical Education for the Elementary School (2+3) 3 Credits  Spring
Philosophy, source materials, games, rhythms, group activities and program planning; participation required to gain skills and techniques of teaching activities for elementary grade children.

P.E. 301 Techniques in Physical Education (2+1) 2 Credits  Fall
**Basketball (Men)**
Methods of coaching and training basketball teams; strategy, methods, and psychology of offense and defense.

P.E. 302 Techniques in Physical Education (2+1) 2 Credits  Spring
**Track and Field**
Methods and strategy of coaching track and field; form, technique and training for events; organization and conduct of meets; construction, assembly and use of equipment.

P.E. 303 Techniques in Physical Education (2+1) 2 Credits  Fall
**Team Sports (Women)**
Methods and practice, analysis of skills and progressions for selected team sports for women.

P.E. 317 Senior Life Saving (0+3) 1 Credit  Fall
Instruction in basic skills and techniques of life saving: personal safety skills, non-swimming assists, swimming assists, approaches and carries, body recovery, releases, equipment rescue, lifts, carries, and let-downs, and resuscitation. **Prerequisite:** P.E. 207 or demonstrated swimming skill and water agility.

P.E. 331 Sports Officiating (1+3) 2 Credits  Fall
Ethics of sports officiating; mastery, interpretation and application of sports rules; laboratory consists of game officiating in the intramural program.

P.E. 358 History of Physical Education (3+0) 3 Credits  Spring
The position of physical education in successive societies since primitive man, with emphasis on its relation to general education.

P.E. 400 Techniques in Physical Education (2+1) 2 Credits  Spring
**Tumbling and Gymnastics**
Methods and practice in teaching tumbling and gymnastics. **Prerequisite:** P.E. 215.
P.E. 401 Techniques in Physical Education (2+1) 2 Credits Fall
Aquatics and Rhythms
Methods and materials, techniques and practice in teaching aquatics and rhythms. Prerequisite: P.E. 213 and P.E. 216.

P.E. 425 Organization and Administration of (3+0) 3 Credits Fall
Physical Education
Philosophy, methodology and problems of planning, organizing and directing the total physical education program at the secondary school level.

P.E. 440 Prevention and Care of Athletic Injuries (2+1) 2 Credits Spring
Athletic Injuries; practical and theoretical aspects of taping, bandaging and massage; physical therapeutic procedures.

P.E. 493 Special Topics Credits Arr. Fall
P.E. 494 Special Topics Credits Arr. Spring
Individual study of chosen topic in health, physical education or recreation. Approved by the department and directed by a selected staff member.

PHYSICS

Phys. 103 College Physics (4+3) 4 Credits Fall
104 4 Credits Spring
Unified classical and modern physics for majors in the arts, biological sciences and education. Prerequisite: High school algebra and geometry.

Phys. 111 General Physics (2+3) 3 Credits Fall
112 3 Credits Spring
Mechanics, conservation laws, statics, oscillations, gravitation, fluids, sound and heat. Identical with E.S. 111-112. Prerequisite: Credit or registration in Math. 101 (Fall) and Math. 102 (Spring).

Phys. 211 General Physics (3+3) 4 Credits Fall
212 4 Credits Spring
Thermodynamics and kinetic theory, electricity and magnetism, electromagnetic oscillations, waves and propagation, optics, quantum physics. Prerequisite: Math. 102, Phys. 112 or E.S. 112, credit of registration in Math. 201 (Fall), Math. 202 (Spring).

Phys. 275 Astronomy (3+0) 3 Credits Fall
276 3 Credits Spring

Phys. 280 Shop Technique (0+3) 1 Credit Fall or Spring
Elements of machine tool operation, welding, soldering, glass blowing, high vacuum technique. Rudiments of apparatus construction. Shop project. Enrollment limited. Prerequisite: Permission of Instructor.

Phys. 281 Astronomy Laboratory (0+3) 1 Credit Fall
282 1 Credit Spring
Laboratory experiments in gravitation, geometrical optics, physical optics, radiometry, photoelectricity, spectrophotometry and spectroscopy illustrating and supplementing Phys. 275-276. Prerequisite: Sophomore standing, Phys. 281 not required for 282.

Phys. 301 Applied Physics (2+3) 3 Credits Fall
302 3 Credits Spring
Applied physics for majors in the arts, biological sciences, and education. Electronics, atomic structure and spectra, nuclear structure and reactions, radioactivity, tracer techniques, nuclear power. Prerequisite: Phys. 104, Math. 102.

Phys. 311 Classical Physics (4+0) 4 Credits Fall
312 4 Credits Spring
Selected topics from mechanics, thermodynamics, kinetic gas theory, statistical mechanics, acoustics, geometric and physical optics. Prerequisite: Phys. 212, Math. 202, or permission of Instructor.
Course Descriptions 167

Phys. 331 Electricity and Magnetism (3+0) 3 Credits Fall

Phys. 361 General Geophysics (3+0) 3 Credits Fall
Introduction to basic geophysics including terrestrial electricity and magnetism, meteorology and seismology, geodesy and volcanocology, glaciology, oceanography and tectonophysics. Prerequisite: Junior standing, Phys. 104 or 212, Math 102, Chem. 102, one semester of Geology. Offered as demand warrants.

Phys. 381 Physics Laboratory Credits Arr. Fall
Laboratory experiments illustrating and supplementing Phys. 311-312, and Phys. 331-332. Enrollment limited. Prerequisite: Permission of Instructor.

*Phys. 411 Modern Physics (3+0) 3-4 Credits Fall
Relativity, elementary particles, atomic structure, x-rays, solid state physics, nuclear structure and reactions. Engineering majors take the 3 credit-lecture course only, physics majors are required to take a supplementary 1 credit reading course. Prerequisite: Phys. 212, 312, Math. 202.

*Phys. 445 Solid State Physics (3+0) 3 Credits Fall

Phys. 455 Atomic and Nuclear Physics (3+0) 3 Credits Fall

*Phys. 460 Geophysical Prospecting (2+3) 3 Credits Fall or Spring
Basic methods in geophysical exploration and measurements, gravimetric, seismic, electrical, magnetic and radioactive. Prerequisite: Phys. 212, Geol. 101, 102, and Math. 101. Offered as demand warrants.

Phys. 465 Meteorology (3+0) 3 Credits Fall or Spring
Instruments and observations. Introduction to mechanics and thermodynamics of the atmosphere. Weather analysis and forecasting. Prerequisite: Phys. 104 or 212, Math. 102. Offered as demand warrants.

Phys. 470 Astronautics (3+0) 3 Credits Fall or Spring

Phys. 475 Astrophysics (3+0) 3 Credits Fall or Spring
Introduction to stellar spectrophotography, atomic theory and astrophysics, stellar luminosities, atmospheres and interior, energy production and evolution of the stars. Admission by arrangement. Offered as demand warrants.

Phys. 481 Advanced Physics Laboratory Credits Arr. Fall
Laboratory experiments illustrating and supplementing Phys. 411, 412, 445, 455, 475. Enrollment limited. Prerequisite: Permission of Instructor.

Phys. 485 Experimental Physics Credits Arr. Fall
Senior projects in experimental physics. Enrollment limited. Prerequisite: Senior standing and permission of instructor.

*Phys. 491 Physics Seminar Credits Arr. Spring
Seminar courses in various topics selected according to needs and interests of students. Primarily for physics majors. Prerequisite: Permission of Instructor.
**Phys. 493** Special Topics  
Various subjects. *Admission by arrangement.*

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>Phys. 611</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Theoretical Physics (3+0)</td>
<td>3 Credits</td>
<td>Fall</td>
</tr>
<tr>
<td>Phys. 612</td>
<td>3</td>
<td>Spring</td>
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</tbody>
</table>

Fundamentals of mathematical physics with emphasis on problem solving; analytical mechanics, power series; vibrating systems, Fourier analysis; hydrodynamics, vector analysis; electromagnetism, complex analysis; wave optics, wave mechanics, matrices, perturbation theory; atomic structure, statistical physics, asymptotic expansions. *Admission by arrangement.*

<table>
<thead>
<tr>
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<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>Phys. 621</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>Classical Mechanics (3+0)</td>
<td>3 Credits</td>
<td>Fall</td>
</tr>
</tbody>
</table>

Lagrange's equations, two-body problem, rigid body motion, special relativity, canonical equations, transformation theory and Hamilton-Jacobi method. *Admission by arrangement.*

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<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Phys. 622</td>
<td>3</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>Statistical Mechanics (3+0)</td>
<td>3 Credits</td>
<td>Fall or Spring</td>
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</table>

Classical and quantum statistics of independent particles, ensemble theory, applications. *Admission by arrangement.*

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>Phys. 625</td>
<td>3</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>Hydrodynamics (3+0)</td>
<td>3 Credits</td>
<td>Fall or Spring</td>
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</table>

Equations of motion, rotational motion of perfect fluid, motion of solids through fluids. Vortex motion, waves, viscosity, turbulent flow. Compressible fluids. *Admission by arrangement.* Offered as demand warrants.

<table>
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<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
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<tbody>
<tr>
<td>Phys. 626</td>
<td>3</td>
<td>Fall or Spring</td>
</tr>
<tr>
<td>Magnetohydrodynamics (3+0)</td>
<td>3 Credits</td>
<td>Fall or Spring</td>
</tr>
</tbody>
</table>

Fundamental equations of magnetohydrodynamics, magnetohydrodynamic waves. Invariants of the motion of a charged particle in a magnetic field. Dynamics of a plasma, plasma waves. *Admission by arrangement.* Offered as demand warrants.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
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<tr>
<td>Phys. 631</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td>Electromagnetic Theory (3+0)</td>
<td>3 Credits</td>
<td>Fall</td>
</tr>
<tr>
<td>Phys. 632</td>
<td>3</td>
<td>Spring</td>
</tr>
</tbody>
</table>

Electrostatics, magnetostatics, Maxwell's equations, potentials, Lorentz equations, field energy, gauge conditions, retarded potentials, waves, radiation, tensor formulations, non-Maxwellian electrodynamics. *Admission by arrangement.*

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phys. 641</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Radio Waves (3+0)</td>
<td>3 Credits</td>
<td>Spring</td>
</tr>
</tbody>
</table>

The ionosphere, Maxwell's equations and constitutive relations, propagation, magneto-ionic theory, ray theory and wave solutions. *Admission by arrangement.* Offered as demand warrants.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phys. 642</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Radio Physics (3+0)</td>
<td>3 Credits</td>
<td>Spring</td>
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</table>

Selected topics from ionospheric absorption, diffraction and scattering of radio waves. *Admission by arrangement.* Offered as demand warrants.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>Phys. 651</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Quantum Mechanics (3+0)</td>
<td>3 Credits</td>
<td>Spring</td>
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</tbody>
</table>

Schrödinger's equation, operator formalism, correspondence principle, central force problems, matrix representations, perturbation theory, quantum-statistical mechanics. *Admission by arrangement.*

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<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
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<tbody>
<tr>
<td>Phys. 652</td>
<td>3</td>
<td>Fall or Spring</td>
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<tr>
<td>Applied Quantum Mechanics (3+0)</td>
<td>3 Credits</td>
<td>Fall or Spring</td>
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Applications of quantum mechanics to collision problems, radiation and spectroscopy. *Prerequisite: Phys. 651 or consent of Instructor.* Offered as demand warrants.

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<th>Course</th>
<th>Credits</th>
<th>Semester</th>
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<tr>
<td>Phys. 655</td>
<td>3</td>
<td>Fall or Spring</td>
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<tr>
<td>Nuclear Physics (3+0)</td>
<td>3 Credits</td>
<td>Fall or Spring</td>
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Properties of nuclei, interaction of radiation with matter, alpha emission, gamma decay, nuclear forces, mesons, neutrons, cosmic rays. *Admission by arrangement.* Offered as demand warrants.

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<th>Course</th>
<th>Credits</th>
<th>Semester</th>
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<tr>
<td>Phys. 660</td>
<td>3</td>
<td>Fall or Spring</td>
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<tr>
<td>Theoretical Geophysics (3+0)</td>
<td>3 Credits</td>
<td>Fall or Spring</td>
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Selected topics in theoretical geophysics, mainly in solid earth physics, seismology, and geomagnetism. *Admission by arrangement.* Offered as demand warrants.

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<tr>
<th>Course</th>
<th>Credits</th>
<th>Semester</th>
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<tr>
<td>Phys. 661</td>
<td>2</td>
<td>Spring</td>
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<tr>
<td>Physics and Chemistry of the (2+0)</td>
<td>2 Credits</td>
<td>Spring</td>
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Upper Atmosphere  
Phys. 662 Ionospheric Phenomena (2+0) 2 Credits Spring

Phys. 663 The Geomagnetic Field (2+0) 2 Credits Spring
The main field at the earth’s surface. Spherical harmonic analysis; the field within the earth; the field outside the earth; the secular magnetic variation; paleomagnetism; the dynamo theory of the field and its secular variation; distortion of the outer field by electric currents associated with magnetic disturbance. Admission by arrangement. Offered as demand warrants.

Phys. 664 Geomagnetic Disturbance and the Aurora (2+0) 2 Credits Spring
The morphology, statistics, solar and ionospheric associations of magnetic disturbance; indices of disturbance; auroral phenomena; theories of magnetic disturbance and the aurora. Admission by arrangement. Offered as demand warrants.

Phys. 665 Dynamic Meteorology (3+0) 3 Credits Fall or Spring
Atmospheric statics, thermodynamics, radiation and dynamics; atmospheric turbulence; general circulation; perturbation theory. Admission by arrangement. Offered as demand warrants.

Phys. 670 Solar Physics (3+0) 3 Credits Fall or Spring
Structure of the solar interior and atmosphere, theory of radiation, radio emission, solar-terrestrial relations. Admission by arrangement. Offered as demand warrants.

Phys. 671 Space Physics (2+0) 2 Credits Fall or Spring
Radiation belts, motions and magnetic fields of trapped particles, geomagnetic storm effects and primary auroral particles. Admission by arrangement. Offered as demand warrants.

Phys. 675 Radio Astronomy (3+0) 3 Credits Fall or Spring
Survey of instruments and techniques, radio wave generation and propagation in ionized media, solar radio waves, cosmic radio waves, effects of the troposphere and ionosphere on extra-terrestrial radio waves, radar astronomy. Admission by arrangement. Offered as demand warrants.

Phys. 681 General Laboratory Credits Arr. Fall
Basic laboratory experiments in physics for graduate students. Admission by arrangement.

Phys. 683 Experimental Electronics Credits Arr. Fall
Advanced work in experimental electronics, in particular low noise receivers; design, construction and stabilization of parametric and tunnel diode devices. Admission by arrangement. Offered as demand warrants.

Phys. 685 Experimental Physics Credits Arr. Fall
Advanced work in experimental physics. Admission by arrangement. Offered as demand warrants.

Phys. 690 Colloquium 0 Credit Fall or Spring
Various topics. Admission by arrangement.

Phys. 691 Seminar Credits Arr. Fall
Credits Arr. Spring
Various subjects. Admission by arrangement.

Phys. 697 Thesis Credits Arr. Fall
Credits Arr. Spring
A reading course in theoretical physics to review and unify from an advanced standpoint the material of the basic physics courses. Primarily for advanced students. Admission by arrangement. Offered as demand warrants.
Phys. 710 Mathematical Physics (3+0)  
3 Credits  Fall or Spring
Linear spaces, operator theory, generalized functions, variational methods in theoretical physics. *Prerequisite: Math. 612 or permission of instructor. Offered as demand warrants.*

Phys. 720 Relativity (3+0)  
3 Credits  Fall or Spring
Origins, special theory, mechanics and electrodynamics, tensors, gravitational field equations and their solutions; particles in general relativity, cosmology; extensions to unified field theories. *Admission by arrangement. Offered as demand warrants.*

Phys. 770 Theoretical Astrophysics (3+0)  
3 Credits  Fall or Spring
Radiative transfer and stellar hydrodynamics; theory of continuous and line spectrum from stellar atmospheres; solar photosphere, chromosphere and corona. *Admission by arrangement.*

Phys. 791 Seminar  
Credits Arr.  Fall
792  Credits Arr.  Spring
Various subjects. *Admission by arrangement.*

Phys. 797 Dissertation  
Credits Arr.  Fall
798  Credits Arr.  Spring

**POLITICAL SCIENCE**

P.S. 101 American Government (3+0)  
102  3 Credits  Fall
Fall Semester: Constitutional democracy; American national government. Federalism, separation of powers, suffrage, representation, political parties and elections; executive, legislative, and judicial branches.

Spring Semester: Functional and administrative practices and problems of the national government; state, territorial, and local governments. *Prerequisite: P.S. 101.*

P.S. 201 Comparative Government (3+0)  
3 Credits  Fall
Comparative study of government and politics of major world powers. *Admission by permission of instructor.*

P.S. 203 International Relations (3+0)  
3 Credits  Fall or Spring
Development of internationalism in relation to nationalism and imperialism; attempts at world government; The League of Nations, and the United Nations; international law and settlement of disputes. May be taken concurrently with P.S. 102.

P.S. 211 State and Local Government (3+0)  
3 Credits  Fall or Spring
Organization and activities of state, territorial, and local governments of the United States; state constitutions, state executive, legislative, and judicial systems, county and city governments, and public services; problems of growing communities. *Prerequisite: P.S. 102. Offered in alternate years; next offered 1965-6.*

P.S. 221 American Political Parties (3+0)  
3 Credits  Fall or Spring
American party system; organization and functions of parties, suffrage, public opinion, role of pressure groups; survey of contemporary political issues. *Admission by permission of instructor. Offered in alternate years; next offered 1966-7.*

P.S. 301 Public Administration (3+0)  
3 Credits  Fall
Techniques and problems of administering public policy on national and state levels; relations of executive control to legislative and judicial controls. *Prerequisite: P.S. 101 and P.S. 102, or permission of instructor.*

P.S. 344 The Soviet Union (3+0)  
3 Credits  Fall or Spring
(See History 344 for course description.)

P.S. 347 Contemporary Southeast Asia (3+0)  
3 Credits  Fall
Post independence problems; relations among countries of region; their role in world politics.
Course Descriptions

P.S. 351 International and Regional Organization (3+0) 3 Credits Fall or Spring
Development, structure, policies and problems of public international organizations, especially the United Nations and its specialized agencies. Accomplishments and limitations of general and regional organizations. Prerequisite: P.S. 203. Offered as demand warrants.

P.S. 353 International Law (3+0) 3 Credits Fall
Classical international law. Law of outer space, international and regional organizations. Private international law.

P.S. 357 The Legislative Process (3+0) 3 Credits Fall or Spring
Role of Congress as an instrument of public policy; congressional staffing; committee system; legislative tactics and leadership; relations between the executive and Congress. Prerequisite: P.S. 101, P.S. 102. Offered in alternate years; next offered 1966-7.

P.S. 359 Government and Private Enterprise (3+0) 3 Credits Fall or Spring
(See B.A. 359 for course description.)

P.S. 365 Contemporary Latin America (3+0) 3 Credits Fall
Economic, social and political problems of a developing area; foreign policies of states; organization of American states.

P.S. 411 Political Theory (3+0) 3 Credits Fall
Nature and views of the state as discussed by leading political thinkers from Plato to the present; freedom and authority; the regulation of property; law and state; democratic and authoritarian traditions. Prerequisite: Senior standing or by arrangement.

P.S. 422 American Political Thought (3+0) 3 Credits Fall or Spring
Main currents of American political thought from colonial times to the present; applications in the light of contemporary political problems; emphasis given to the Federalist and the work of John C. Calhoun. Admission by permission of instructor. Offered in alternate years; next offered 1966-7.

P.S. 434 American Constitution (3+0) 3 Credits Fall or Spring
Role of the judiciary in the American political system viewed both historically and through analysis of leading cases. Prerequisite: P.S. 101, P.S. 102, Hist. 131 and Hist. 132. Offered in alternate years; next offered 1966-7.

P.S. 475 Methods and Problems (3+0) 3 Credits Spring
Bibliography, critical evaluation of materials, research techniques, and special projects; conference or seminar. Prerequisite: Senior standing or by arrangement.

P.S. 485 Seminar in Contemporary (3+0) 3 Credits Fall or Spring
International Relations

P.S. 491 Seminar in Government and Administration 3 Credits Fall or Spring
492
Credits Arr.

P.S. 493 Special Topics 3 Credits Fall or Spring
494
Credits Arr.

PSYCHOLOGY

Psy. 101 Introduction to Psychology (3+0) 3 Credits Fall or Spring
Fundamentals of general psychology and human behavior.

Psy. 102 Introduction to Psychology (3+0) 3 Credits Spring
The principal areas of general psychology. A continuation of Psy. 101. Prerequisite: Psy. 101.

Psy. 205 Statistics for Behavioral Sciences (3+0) 3 Credits Fall or Spring
Introduction to the purposes and procedures of statistics; calculating methods for the description of groups (data reduction) and for simple inferences about groups and differences between group means. Requires high school algebra.

Psy. 209 Social Psychology (3+0) 3 Credits Fall
Social influences on human behavior. Prerequisite: 6 hours in Psy. and/or Soc.
Psy. 213 Experimental Psychology (2+3) 3 Credits Fall
Supervised experiments in sensory psychology and animal and human learning. Data collection and analysis; report writing. Prerequisite: Psy. 101 and 102, and Psy. 205.

Psy. 214 Experimental Psychology (2+3) 3 Credits Spring
Continuation of Psy. 213. Experimental design and experiments in interpersonal relations and psychodynamics. Prerequisite: Psy. 213.

Psy. 251 Child Development (2+3) 3 Credits Spring
Mental, emotional, social, and physical developmental patterns from birth to adolescence; laboratory arranged for observations of children in a variety of settings including public schools. Not open to students having credit in Psy. 252. Prerequisite: Psy. 101 and permission of instructor.

Psy. 252 Psychology of Adolescence (2+0) 3 Credits Spring
Mental, emotional, social, and physical developmental patterns during the adolescent years; laboratory arranged for observation of adolescents in a variety of settings including public schools. Not open to students having credit in Psy. 251. Prerequisite: Psy. 101 and permission of instructor.

Psy. 253 Psychological Testing (2+0) 3 Credits Fall
Job and worker analysis, selection, training, fatigue, worker adjustment, morale, labor-management relations. Prerequisite: Psy. 101 and 102 or permission.

Psy. 254 Abnormal Psychology (2+0) 3 Credits Spring
Abnormalities of human behavior. Prerequisite: Psy. 101 and 102.

Psy. 311 Comparative and Physiological Psychology (2+0) 3 Credits Spring
Neural and hormonal basis of behavior; evolution of sensory, motor, and cerebral systems; inter-species comparisons; current research methods in these areas. Prerequisite: Psy. 101 and 102, and Biol. 105 and 106.

Psy. 312 Perceptual and Human Behavior (2+0) 3 Credits Spring
Physiological, developmental, and social effects on interpretation of sensory processes. Prerequisite: Psy. 101 and 102.

Psy. 313 Theories of Personality (2+0) 3 Credits Spring
Current psychological theories, with a critical examination of the different approaches used in theory construction. Admission by arrangement.

Psy. 321 Psychology of Learning (2+0) 3 Credits Fall
Theories of human and animal learning. Prerequisite: Psy. 101 and 102.

Psy. 334 Social Science Research Methods (2+0) 3 Credits Spring
Techniques of social research—sampling, questionnaire construction, interviewing and data analysis in surveys; field and laboratory experiments; attitude scaling. Prerequisite: Psy. 101 and 102, or Soc. 101 and 102. (Also offered as Soc. 434.)

Psy. 491 Seminar in Human Behavior (2+0) 2 Credits Fall
Integrated behavioral approach emphasizing the major sociological and psychological theories with special attention to current literature. Prerequisite: Major in sociology or psychology, or permission of instructor. (Also offered as Soc. 491.)

Psy. 493 Special Topics

Various subjects. Admission by arrangement.

RUSSIAN

Russ. 101 Elementary Russian (5+0) 5 Credits Fall

Russ. 102 Elementary Russian (5+0) 5 Credits Spring

Designed to teach students to hear, speak, read and write Russian. Oral practice is emphasized.
### Course Descriptions  

#### Russ. 150  
**Scientific Russian (3+0)**  
Rapid acquisition of a reading knowledge of scientific Russian. *Offered as demand warrants.*

#### Russ. 201  
**Intermediate Russian (3+0)**  
*202*  
A continuation of Russian 102. Increasing emphasis on reading ability and cultural material. Conducted in Russian. *Prerequisite: Russian 102 or 2 years of high school Russian.*

#### Russ. 221  
**Studies in Russian Literature (3+0)**  
*222*  
Choice of authors, genres, or periods of Russian literature for intensive study. *Prerequisite: Russian 202 or equivalent. Students may repeat course for credit when topic varies.*

#### Russ. 493  
**Special Topics**  
Various subjects in Russian, for advanced students. *Admission by arrangement. Offered as demand warrants.*

## SOCIOLOGY

#### Soc. 101  
**Introduction to Sociology (3+0)**  
Man's relationship to the society in which he lives.

#### Soc. 106  
**Social Welfare (3+0)**  
Functions and development of modern social welfare and the distinctive features of the profession.

#### Soc. 201  
**Social Problems (3+0)**  
Problems of contemporary society; analysis of factors giving rise to them. *Prerequisite: Soc. 101 and 102.*

#### Soc. 205  
**Group Processes in Modern Society (3+0)**  
Formation, structure and functioning of groups; group processes and group products; implications of various research techniques. *Prerequisite: Soc. 101 and 102.*

#### Soc. 207  
**Population (3+0)**  
Analysis of world populations; growth and decline patterns, migratory trends and ecology; worldwide implications to current population growth; critical review of major theoretical contributions with introduction to demographic methods. *Prerequisite: Soc. 101 and 102.*

#### Soc. 209  
**Urban Sociology (3+0)**  
Growth and development of urban communities with reference to migration patterns, differentiation of functions, ecological patterns of land use, social control in secondary group associations of metropolitan magnitude. *Prerequisite: Soc. 101 and 102.*

#### Soc. 232  
**Family and Society (3+0)**  
The family as a social institution; its dynamics in the socialization process; social change and social values. *Prerequisite: Soc. 101 and 102.*

#### Soc. 303  
**Minority and Ethnic Groups (3+0)**  
Social stratification; the status of the chief minorities in the continental United States; development and effects of selective immigration, assimilationism, racism. *Prerequisite: Soc. 101 and 102.*

#### Soc. 304  
**Culture and Personality (3+0)**  
Theories of relation of variation in personality to culture and group life in primitive and modern societies; influence of the social role on behavior. *Prerequisite: Soc. 101 and 102.*

#### Soc. 306  
**Community and Ecology (3+0)**  
Modern, industrial, centralized society and institutional structure of community life—political, economic, religious—with reference to internal structure and external sources of control and domination. *Prerequisite: Soc. 101 and 102.*
174

Soc. 308 Field Practice Community Service Laboratory Credits Arr. Fall or Spring
Individual programs of self-help projects dealing with community needs and resources; theoretical analysis of experienced situations; learning through laboratory method. Prerequisites: Soc. 101, 102, 106, 203, and by arrangement.

Soc. 345 Sociology of Education (3+0) 3 Credits Fall
See description of Ed. 345, Social Foundations of Education.

Soc. 401 Sociology of Deviant Behavior (3+0) 3 Credits Fall
Crime and criminality in American culture. Prerequisites: Soc. 101 and 102.

Soc. 404 Sociology of Adolescence (3+0) 3 Credits Spring
Motivations, attitudes, beliefs, behavior of this age group, including delinquent or norm-violating behavior. Prerequisites: Soc. 101 and 102. Offered in alternate years.

Soc. 405 Social Change (3+0) 3 Credits Fall
Social change in long-time perspective, with emphasis on social movements. Prerequisite: Soc. 101 and 102.

Soc. 410 Sociology Theory (3+0) 3 Credits Spring
Major sociological theories and theorists of Western civilization; review of important contributions and approaches of various "national schools" with emphasis on current American and European trends.

Soc. 434 Social Science Research Methods (3+0) 3 Credits Spring
See description under Psy. 434, Social Science Research Methods.

Soc. 491 Seminar in Human Behavior (2+0) 2 Credits Fall
See description under Psy. 491, Seminar in Human Behavior.

Soc. 493 Special Topics Credits Arr. Fall
Various subjects. Admission by arrangement.

SPANISH

Spa. 101 Elementary Spanish (5+0) 5 Credits Fall
102 5 Credits Spring
Designed to teach students to hear, speak, read and write Spanish; oral practice emphasized.

Spa. 201 Intermediate Spanish (3+0) 3 Credits Fall
202 3 Credits Spring
Continuation of Spanish 102. Increasing emphasis on reading ability and cultural material; conducted in Spanish. Prerequisite: Spanish 102 or 2 years of high school Spanish.

*Spa. 321 Studies in Spanish Literature (3+0) 3 Credits Fall
322 3 Credits Spring
Choice of authors, genres, or periods of Spanish literature for intensive study. Prerequisite: Spanish 202 or equivalent. Offered as demand warrants. Students may repeat course for credit when topic varies.

*Spa. 493 Special Topics Credits Arr. Fall
494 Credits Arr. Spring
Various subjects for advanced students. Admission by arrangement. Offered as demand warrants.

SPEECH

Sp. 211 Public Speaking I (1+2) 2 Credits Fall or Spring
Basic oral composition and criticism. Theory and practice of exposition and persuasion. Prerequisite: Engl. 101 or Phil. 201 or by arrangement.

Sp. 212 Public Speaking II (1+2) 2 Credits Fall or Spring
Theory and practice of rhetoric and public address. Basic works from Plato to Quintillian. Practice in advanced forms of exposition and persuasion.
Sp. 221 Introduction to the Theatre (3+0)  
3 Credits Fall or Spring  
History of theatre with emphasis on dramatic form, architecture and standards of criticism.

Sp. 223 Acting I (1+4)  
3 Credits Fall or Spring  
Principles of acting developed through pantomime, improvisation and sense-memory; participation as an actor or technician in one Drama Workshop production required. Prerequisite: Sp. 221 or by arrangement.

Sp. 231 Introduction to Broadcasting (3+0)  
3 Credits Fall or Spring  
A survey of radio and television, with emphasis on the history, financing, regulation, and the operation of the broadcasting industry.

Sp. 237 Announcing (1+2)  
2 Credits Fall or Spring  
Microphone techniques, role of the announcee in broadcasting. Fundamentals of announcing; their practical application. Prerequisite: Sp. 211 or by arrangement.

Sp. 313 Argumentation and Debate (1+2)  
2 Credits Fall  
Theory of argumentation and debate applied to contemporary issues. Practice in briefing and presenting arguments, testing evidence and detecting fallacies.

Sp. 314 Discussion (1+2)  
2 Credits Spring  
Nature and operation of discussion groups; use of evidence, reasoning, reflective thinking, group psychology, participant and leader behavior.

Sp. 315 Phonetics (2+0)  
2 Credits Fall or Spring  
Use of the International Phonetic Alphabet; assimilation and dialectal problems; use in acting, teaching, speech improvement. Prerequisite: Sp. 211 or by arrangement. Offered as demand warrants.

Sp. 316 Voice and Diction (1+2)  
2 Credits Fall  
Development of fluency and clearness in the voice; study and practice to improve speech and eliminate faults of articulation and pronunciation; phrasing, inflection and emphasis, including individual analysis and tape recordings. Prerequisite: Sp. 211 or by arrangement.

Sp. 317 Oral Interpretation (2+2)  
3 Credits Fall or Spring  
Interpretative reading based on textual analysis of literary forms and careful study of principles of effective reading. Prerequisite: Sp. 211 or by arrangement.

Sp. 323 Acting II (1+4)  
3 Credits Fall or Spring  
Building a character; role study and performance of small scenes. Participation as an actor or technician in one Drama Workshop production required. Prerequisite: Sp. 221, 223, or by arrangement.

Sp. 325 Theater Production (1+4)  
3 Credits Fall or Spring  
Direction of short plays for Drama Lab. productions. Principles of makeup, lighting and production. Prerequisite: Sp. 221, 223, or by arrangement.

Sp. 327 Makeup for Theater (1+2)  
2 Credits Fall or Spring  
Theatrical makeup, designed for actors, teachers, directors and other theatre workers; makeup materials and use; straight and character makeup; illusionary and plastic relief; national types; influence of lighting. (Students will spend approximately $20.00 for materials.) Offered as demand warrants.

Sp. 333 Writing for Radio and Television (3+0)  
3 Credits Fall or Spring  
Preparation of announcements, interviews, music continuity, special events programs, documentaries, commentaries, news, and other basic radio and television continuity.

Sp. 334 Radio-Television Advertising (2+3)  
3 Credits Fall or Spring  
Academic approach to economics and standards of radio and television advertising. Special emphasis on ethical considerations involved in the preparation and presentation of commercial broadcast copy. Prerequisite: Sp. 333 or by permission.

Sp. 335 Broadcast Production (2+3)  
3 Credits Fall or Spring  
Use of studio equipment; radio-tv production techniques; radio-tv station organization; tape editing; sound effects; television directing.
Sp. 341 Fundamentals of Speech Correction (2+0)  2 Credits  Fall
Understanding and aiding speech development in normal and speech defective children and adults; for parents, teachers and others concerned with speech problems.  Prerequisites: Sp. 211 or by arrangement.

Sp. 343 Clinical Methods in Speech Correction (2+2)  3 Credits  Spring
Administration of clinical tests of speech and application of principles of speech correction; supervised clinical practice.  Prerequisites: Sp. 211, 313, 341, or by arrangement.

Sp. 425 Directing (3+0)  3 Credits  Spring
Directorial analysis of a major dramatic work for public presentation. Limited to senior majors with 3.00 G.P.A. in Speech.

Sp. 433 Radio-Television News (2+4)  3 Credits  Fall or Spring
Responsible news writing, editing, processing and delivery for the broadcast media. Special emphasis on ethical considerations in broadcast journalism.  Prerequisites: Sp. 333 and Jour. 201 or by permission.

Sp. 495 Special Topics  Credits Arr.  Fall
494  Credits Arr.  Spring
Various subjects.  Admission by arrangement.  Offered as demand warrants.

WILDLIFE MANAGEMENT

W.M. 102 Conservation of Natural Resources (2+0)  2 Credits  Fall
Conservation of renewable and non-renewable natural resources, emphasizing the United States situation.

W.M. 304 Wildlife Management Principles (2+3)  3 Credits  Spring
Economic, social, biological and other values of wildlife; basic principles of wildlife management and its integration with other land use practices; important wildlife resources of Alaska.  Prerequisites: W.M. 102, Biol. 303.

W.M. 410 Wildlife Techniques (2+3)  3 Credits  Spring
Field, laboratory and office techniques of collecting, analyzing, interpreting and presenting data and specimens.  Prerequisites or concurrent: W.M. 304 or by permission.

W.M. 417 Wildlife Management—Forest and Tundra (2+0)  2 Credits  Fall or Spring
Forest and tundra wildlife, with emphasis on game and fur species; correlation of wildlife management with forest and tundra land use practices.  Admission by arrangement.  Offered as demand warrants.

W.M. 419 Wildlife Management—Wetlands (2+0)  2 Credits  Fall or Spring
Wetland wildlife with emphasis on game and fur species of freshwater areas; correlation of wildlife management with wetland use practices.  Admission by arrangement.  Offered as demand warrants.

W.M. 421 Hydrobiology (2+3)  3 Credits  Fall
Survey of chemical, physical and biological aspects of fresh water and the ocean, providing a background for consideration of aquatic populations.  Admission by arrangement.

W.M. 424 Ecology of Fishes (2+3)  3 Credits  Spring
Ecology of fishes and current applications in sport and commercial fisheries.  Prerequisites: Biol. 326, W.M. 304, 421.  Admission by arrangement.

W.M. 491 Seminar (2+0)  1 Credit  Fall
492  1 Credit  Spring
Various topics in wildlife management.  Prerequisite: Senior standing in wildlife or by arrangement.  Offered as demand warrants.

W.M. 493 Special Topics (Arrange)  Credits Arr.  Fall
494  Credits Arr.  Spring
Various subjects studied principally through directed reading and discussions.  Admission by arrangement.
W.M. 611 Wildlife Field Trip  
Credits Arr.  Fall  
612 Credits Arr.  Spring  
Trips to wildlife areas to acquaint students with principal animals of the State and problems involved in their management. Admission by arrangement. Offered as demand warrants.

W.M. 621 Vertebrate Population Analysis (1+3)  
2 Credits  Fall  
Dynamics of vertebrate populations, with particular emphasis on the collection and interpretation of vital statistics of wild populations. Admission by arrangement. Offered as demand warrants.

W.M. 622 Environmental Analysis (2+3)  
3 Credits  Spring  
Recognition, description and evaluation of factors in terrestrial environments. Admission by arrangement. Offered as demand warrants.

W.M. 691 Seminar (2+0)  
1 Credit  Fall  
692 1 Credit  Spring  
Various topics in wildlife management; required of all graduate students. (Biol. 691, 692 may be substituted by permission of the major professor.) Offered as demand warrants.

W.M. 693 Special Topics  
Credits Arr.  Fall  
694 Credits Arr.  Spring  
Various subjects studied principally through directed reading and discussions. Admission by arrangement.

W.M. 695 Research  
Credits Arr.  Fall  
696 Credits Arr.  Spring  
Investigative work, either field or laboratory, on a problem of lesser scope than the thesis, or supplementary to the thesis. Admission by arrangement.

W.M. 697 Thesis  
Credits Arr.  Fall  
698 Credits Arr.  Spring  
Admission by arrangement.
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