

COURSE DESCRIPTIONS

1988-89

CATALOG

UNIVERSITY OF ALASKA FAIRBANKS



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Catalog

Course Descriptions

UNIVERSITY OF ALASKA FAIRBANKS 

The University of Alaska Fairbanks is a major unit of the University of Alaska Statewide System of higher education. Under the direction of the Board of Regents, the University of Alaska System serves the people of America's largest state through facilities located throughout the state. Information about the programs of each unit in the system may be obtained from that unit.

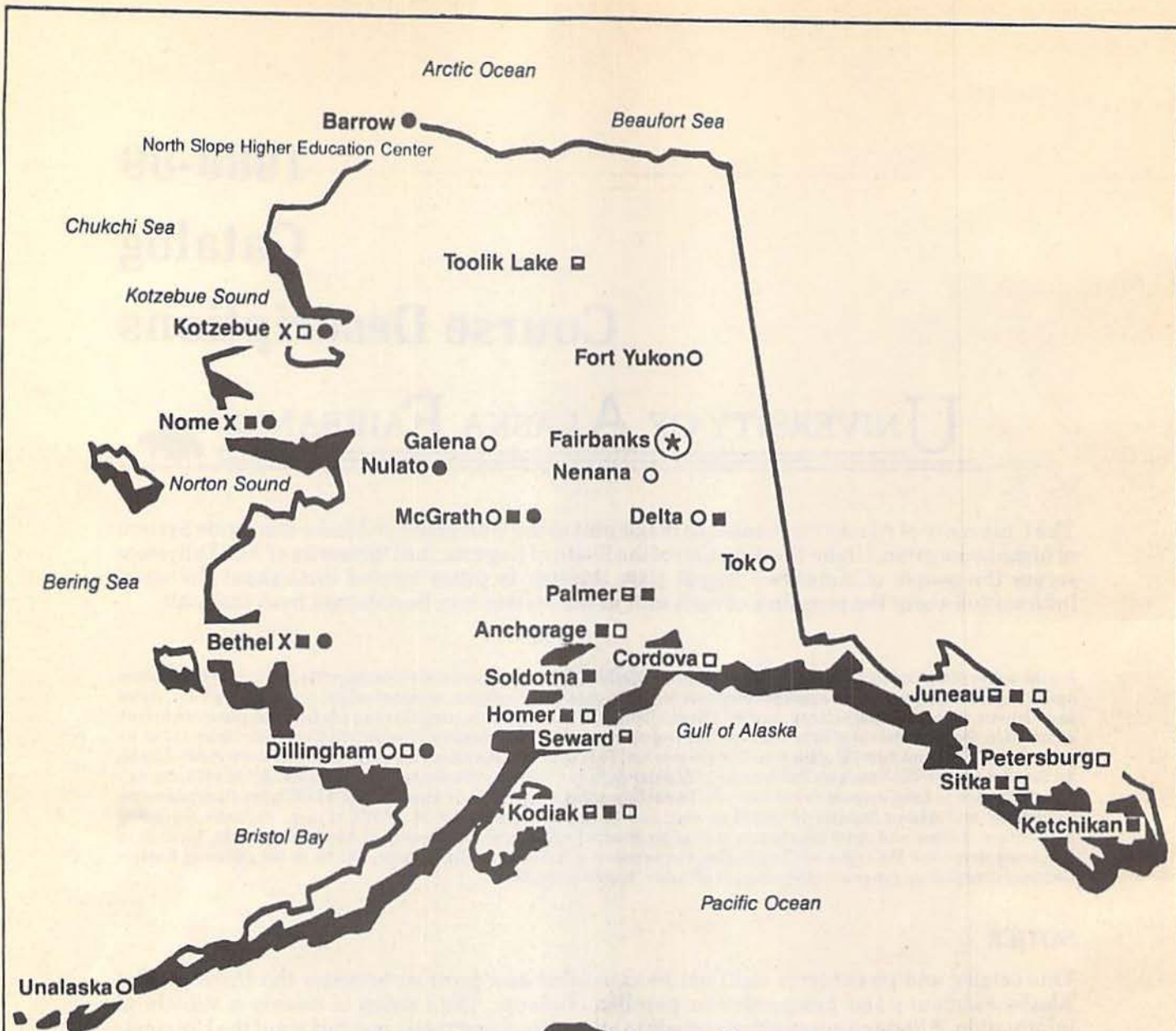
It is the policy of the University of Alaska to provide equal education and employment opportunities and to provide services and benefits to all students and employees without regard to race, color, religion, national origin, sex, age, disability, status as a Vietnam era or disabled veteran, marital status, changes in marital status, pregnancy or parenthood, pursuant to laws enforced by the Department of Education and the Department of Labor, including Presidential Executive Order 11246, as amended, Title VI and Title VII of the 1964 Civil Rights Act, Title IX of the Education Amendments of 1972, the Public Health Service Act of 1971, the Veteran's Readjustment Assistance Act of 1974, the Vocational Rehabilitation Act of 1973, the Age Discrimination in Employment Act of 1967, the Equal Pay Act of 1963, the 14th Amendment, EEOC's Sex Discrimination Guidelines, and Alaska Statutes 18.80.010 et. seq., and 14.18.010, et. seq., and 36.30.010, et. seq. Inquiries regarding application of these and other regulations should be directed either to the University of Alaska Fairbanks, Director of Employee Relations; the Office of Civil Rights, Department of Education, Washington, DC; or to the Office of Federal Contract Compliance Programs, Department of Labor, Washington, DC.

NOTICE

This catalog and its contents shall not be construed as a contract between the University of Alaska Fairbanks and prospective or enrolled students. The catalog is merely a vehicle of information. Although every effort is made to ensure its correctness, regulations of the University and its program requirements change from time to time during the period any student is attending the University of Alaska Fairbanks.

Accordingly if regulations or program requirements of the University in any way conflict with information contained in this catalog, the current regulations and program requirements govern. The University reserves the right to initiate changes in any of its regulations or program requirements affecting operation of the University and its program requirements; such changes shall become effective upon whatever time periods are required by applicable statutes, university regulations or program requirements.

This publication contains course descriptions which are generally part of the catalog. This book should be considered part of the 1988-89 University of Alaska Fairbanks academic catalog. Due to ongoing changes resulting from the university's recent restructuring, the 1988-89 academic catalog was published in two volumes.



Locations:

- | | |
|--|---|
| | University of Alaska Fairbanks main campus |
| | Branch campuses |
| | Rural education centers |
| | Research centers |
| | Cooperative Extension Service |
| | Marine Advisory Program |
| | XCED Cross-Cultural Education Development program |



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General Information

University of Alaska Fairbanks

Special Mission

The University of Alaska Fairbanks was established in 1917 as the Alaska Agricultural College and School of Mines. Today, as a comprehensive land grant and sea grant university, the multi-campus University of Alaska Fairbanks exists as a vital state resource to teach, to inquire and to serve.

The University of Alaska Fairbanks offers instructional programs covering a broad postsecondary spectrum and is the major research center for Alaska. The University is committed to providing a free and open forum where ideas and issues may be professionally pursued and frankly debated in an environment of mutual respect and intellectual integrity. It seeks to provide an intellectually stimulating learning process which is culturally sensitive and empowering to its students. The University is committed to assuring that its graduates receive a balanced education in the arts, humanities, natural and social sciences through which creativity is fostered and historical and philosophic perspectives are gained. As a result, the state benefits from an educated citizenry capable of the independent pursuit of further learning, of contributing to the economic well being of the state and nation and of participating in and contributing to global society. The University seeks a culturally diverse environment that values and promotes equal treatment of sexes, races, cultural and ethnic groups throughout its academic programs, student body, faculty and staff.

The University of Alaska Fairbanks as a residential institution of higher education serves students from all of Alaska as well as from other states and nations. It is particularly committed to enhancing educational opportunities for Alaska's rural and native populations. Through its branch campuses in Bethel, Kotzebue and Nome and its rural education centers, the University is responsive to local and regional needs, including open educational access to its programs. Special strengths exist in the use of educational technology which provide for the distance delivery of selected programs to many areas of the state. In seeking to serve a broad array of students, admission to several associate degree and certificate programs is open to all. Admission requirements to all baccalaureate and graduate programs as well as some Associate of Applied Science degree programs vary depending on the specific field of study.

The University of Alaska Fairbanks offers developmental programs and certificate, associate, baccalaureate and graduate/professional programs in the arts, sciences, career fields and professions. It is a center for graduate education and is currently Alaska's only doctoral granting institution. It possesses unique strengths in the physical and natural sciences and offers a broad array of engineering programs with a particular emphasis on the stresses of northern environments. UAF is a major center for the study of natural resources including minerals, forestry, wildlife, geology, agriculture, fisheries* and ocean sciences and their associated economics. It has been recognized for its work in multi-cultural understanding, rural health problems, and cross-cultural interaction in the human service professions.

As a major center for research and scholarship, the University of Alaska Fairbanks is committed to the mutual enhancement of teaching and research and creative activity, and public service. Scholarship which produces new knowledge instills a vigor into teaching which in turn stimulates inquiry and the quest for further answers to the unknown. The University seeks to use its particular location in the north as a natural laboratory for the study of questions and issues, whose solutions are not only applicable to Alaskan problems but to a broader understanding of our global community. As part of a network of state research universities, this institution has an active program of basic and applied research resulting in a well earned national and international reputation. Specific recognition has been achieved in space

physics, marine science, and high latitude biology, environmental sciences, engineering and geophysics. The University has recognized programs in definition, exploration, development and management of Alaska's renewable and non-renewable resources. It is the state's center for study of Alaskan native cultures and languages.

Through its Cooperative Extension Service and Marine Advisory Programs, research results are interpreted and transferred to people of the state. Its continuing education programs extend the expertise of the University to adult learners needing alternative learning opportunities. The University's library and museum provide the state's major information resources and cultural collections with a particular strength in Alaska and polar regions. Finally, through its programs in fine and performing arts, the University provides cultural enrichment to the state's interior and rural populations. In accomplishing this mission, the University seeks the advice and guidance of Alaska's residents and friends.

Student Rights Under Title IX

Title IX of the Education Amendments of 1972 was enacted to ensure that complete equality of education is afforded to all students, both male and female. This means that in every program, policy and practice at the UAF, there will be no discrimination on the basis of sex. Included in the areas covered by this law are: admissions, financial aid, counseling, health services, student activities and programs, and access to all course offerings, to name a few.

The Fairbanks campus Title IX coordinator is located in Room 101 of the Eielson Building. All concerns and/or allegations that relate to Title IX are to be directed to the Fairbanks campus Title IX coordinator.

Historical Dates

1917 - Alaska Agricultural College and School of Mines created by the Territorial Legislature.

1922 - College opens with six faculty members and six students.

1923 - First Commencement held for first graduate.

1935 - Territorial Congress changes college name to the University of Alaska.

1946 - Geophysical Institute established by an Act of the U.S. Congress.

1947 - First summer session established at the university.

1957 - First Ph.D. degree awarded at the university.

1960 - Institute of Marine Science established by the Alaska Legislature.

1963 - Institute of Arctic Biology established by the Alaska Legislature.

1975 - Creation of the UA System, with campus-specific administrations—Fairbanks campus referred to as UAF from now on.

1980 - Museum moves into Otto Geist Building.

1981 - Enrollment tops 5,000 students for the first time.

1984 - Increasing international awareness results in emphasis on cooperative agreements with international universities.

1986 - GNOSIS computer cataloging library system comes on-line.

1987 - Restructuring of the UA System produced a multi-campus University of Alaska Fairbanks with campuses in Fairbanks, Bethel, Nome and Kotzebue.

Accreditation/Memberships

UAF is accredited as an institution of higher learning by the Commission on Colleges of the Northwest Association of Schools and Colleges.

* Juneau fisheries students should also reference the University of Alaska Southeast catalog.

In addition, UAF has received for certain of its programs the accreditation extended by specialized national agencies, including the American Chemical Society, the Accreditation Board for Engineering and Technology, the American Association of Museums, the Accrediting Council on Education in Journalism and Mass Communication, the National Association of Schools of Music, the National Council for Accreditation of Teacher Education, the American Assembly of Collegiate Schools of Business, the Alaska State Board of Education in accordance with standards set by the National Association of State Directors of Teacher Education and Certification and the Council on Social Work Education.

UAF is affiliated with the National Association of State Universities and Land-Grant Colleges and holds institutional membership in the American Council on Education, the American Association of State Colleges and Universities, the Council of Graduate Schools in the United States, the Western Association of Graduate Schools and the Western Interstate Commission for Higher Education.

In addition, UAF holds official designation as both a land-grant and sea-grant institution. In 1917, the federal government gave land-grant status to the university, and in 1980 sea-grant status was added.

UAF Governance

Students (ASUAF), faculty (Faculty Senate) and staff (Staff Council) are represented by individual governance structures which address their concerns. The UAF Assembly provides a forum for the three individual governance bodies to address common concerns.

The governance organizations function as legislative and consultative bodies having primary authority to initiate, develop and review policies pertinent to UAF.

ASUAF is responsible for those issues which are uniquely student affairs issues. The Faculty Senate is responsible for those issues which are uniquely faculty purview. The Staff Council is responsible for those issues which are uniquely staff affairs issues.

Actions by each governance body are forwarded for consideration to the chancellor's office which shares in the responsibility for campus governance. All governance activities are subject to the authority of Board of Regents policy.

ASUAF information can be obtained by calling 474-7355. All other governance information is coordinated through the UAF Governance Office in 312 Signers' Hall. The phone number is 474-7056 or 474-7964.

Transportation to the University

The city of Fairbanks is served by air, rail and highway.

The UAF campus is some four miles west of the Fairbanks central business district. A bus line offers service between the campus, downtown, the airport, and surrounding areas. Bus service is frequent, providing reliable transportation to and from most areas.

UAF also has on-campus shuttle service between the lower campus area and the West Ridge facilities.

Academic Units

Three colleges and six schools offer degrees in more than 70 fields with a host of options in many of the degree programs, as well as a wide range of technical and vocational programs. The colleges include the College of Liberal Arts, the College of Natural Sciences and the Rural College. The schools are the School of Agriculture and Land Resources Management, the School of Career and Continuing Education, the School of Engineering, the School of Fisheries and Ocean Sciences, the School of Management and the School of Mineral Engineering.

Research

The University of Alaska Fairbanks is the state's center for organized activity in basic and applied research. UAF ranks among the 100 leading U.S. universities for its research and development activities.

UAF research units include the Agricultural and Forestry Experiment Station, the Alaska Native Language Center, the Center for Cross-Cultural Studies, the Fishery Industrial Technology Center and the Geophysical Institute. Other research units include the Institute of Arctic Biology, the Institute of Marine Science, the Institute of Northern Engineering, the Juneau Center for Fisheries and Ocean Sciences, the Mineral Industry Research Laboratory and the Petroleum Development Laboratory.

Academic Support and Public Service

Located on the University of Alaska Fairbanks main campus are numerous academic support and public service resources, including state and federal agencies. These units provide students with research and informational material, and perform public service functions in

Alaskan communities. These units include the Alaska Sea Grant College Program, the Computer Support Group, Conferences and Institutes, the Cooperative Extension Service, the Elmer E. Rasmuson Library, KUAC-FM and KUAC-TV, the Marine Advisory Program and the University of Alaska Museum.

Student Information

UAF's school colors are blue and gold, and its mascot is the Nanook, which means polar bear in Inupiaq Eskimo. The student government is the Associate Students of the University of Alaska. The Sun Star student newspaper is published weekly during the academic year. The William R. Wood Center is the student union on the main campus. Housing is available on the main campus for 1,600 single students and 150 apartments are available for married students.

Athletics

UAF competes at the Division I level of the NCAA in hockey, and in Division II in cross-country running and skiing, men's and women's basketball, women's volleyball and coed riflery.

The Rural College

Rural higher education in Alaska has experienced problems that originated because the responsibility for various rural programs resided in different independent units of the statewide university system. This resulted in a variety of models, different sets of rules, and problems for students associated with transfer, transcribing, financial aid and degree articulation between associate and baccalaureate programs. The recent university restructuring has resulted in the consolidation of these dispersed units in the northern, western and southwestern parts of the state into one Rural College which has the mandate not only to continue existing traditional research and instructional programs but also to assist with developmental activities in the rapidly changing socioeconomic context of rural Alaska. Through the Rural College the university has the opportunity to fulfill its service responsibility as a land-grant/sea-grant institution and to capitalize on the unique aspects of the Arctic social and cultural environment.

The Rural College is the integration of the following pre-existing institutions: Chukchi, Kuskokwim and Northwest Community Colleges; the Aleutians, Bristol Bay, Ft. Yukon, Galena, McGrath, Nenana and Tok rural education centers; the College of Human and Rural Development in Fairbanks; the Correspondence Study Program in Fairbanks; and the Alaska Native Human Resource Development Program, previously part of the Cooperative Extension Service, centered in Anchorage. Additionally the North Slope Higher Education Center has a cooperative agreement with the college. All of these programs have been reorganized into six campuses: Bristol Bay centered in Dillingham; Chukchi centered in Kotzebue; Interior centered in Fairbanks with regional centers in Ft. Yukon, Galena, McGrath, Nenana and Tok; Kuskokwim centered in Bethel; Northwest in Nome; and the programs on the Fairbanks campus. These are described in more detail below.

Chukchi Campus in Kotzebue

The Chukchi Campus is located in Kotzebue, Alaska, on the north-west shore of the Baldwin Peninsula, 30 miles above the Arctic Circle. It serves the NANA Region of northwest Alaska—an area of more than 36,000 square miles—which is about the size of the state of Indiana. This area lies almost totally north of the Arctic Circle. The population of the NANA Region is approximately 6,000, 88 percent of whom are Inupiaq Eskimo. This population is distributed throughout 11 villages which range in size from approximately 70 people in Kobuk to 3,000 in Kotzebue, the transportation-communication hub of the region. The 11 villages are not connected by road, nor is the region connected to the rest of the state by any road system. Transportation to and from the villages is limited to light aircraft, snow machines in winter and boats during the brief periods of open water.

With its special emphasis on the academic program in support of the associate of arts degree, Chukchi offers about 28 academic, lower division courses in each of two semesters—September through May. Because of the geographic isolation, transportation and population limitations of the region which Chukchi serves, the college has developed and implemented a comprehensive field-delivered A.A. degree program. Courses are delivered to students in their home villages through extensive use of audioconferencing. Student Instructional Meetings, and instructor travel to villages. Audioconferencing and computer-assisted instruction, while significant and invaluable tools to Chukchi in its delivery efforts, are only two important parts of the total delivery program. In addition to the Student Instructional Meetings and Instructor travel mentioned, Chukchi uses comprehensive

course outlines/syllabi, telephone, television and video and audio tapes, and the personal contact of the Village Academic Coordinators.

Kuskokwim Campus in Bethel

The Kuskokwim Campus can most accurately be described as a regional center serving an extended community.

The region is composed primarily of treeless tundra, with some birch and spruce forests on the northern and eastern edges. On the west, the region is bordered by the Bering Sea. The climate ranges from maritime days of 70 degrees F during the short summer months to arctic winter conditions that include chill factors to -100 degrees F.

The majority of the 19,000 residents of the Delta are Yup'ik Eskimos who live in villages of 200 to 500 people. The city of Bethel, located 80 miles inland on the Kuskokwim River, is a community of approximately 4,000 and serves as the headquarters of the campus. Bethel is also the transportation and service center of the region.

Commercial and subsistence fishing is a major economic activity of the Delta. For many families it constitutes the only income and the major source of food. Traditional hunting activities also play an important role in the subsistence life style, involving the taking of such species as seal, walrus, waterfowl and moose. Seasonal employment is found in fisheries and transportation. Year-round employment is largely found in providing public services, e.g., education, health care, social services, and public administration.

In many villages the primary language of the people continues to be Yup'ik, and the residents proudly retain their traditional cultural values. Many college students within the region seek ways of blending this inherited wisdom with a knowledge of today's western technology in the interest of creating a modern Yup'ik world.

Northwest Campus in Nome

In accordance with the University of Alaska's philosophy of taking higher education to the people, Northwest Campus serves not only the residents of Nome, where it is located, but also the people in the 15 regional villages surrounding Nome. Six of these villages (Gambell, Savoonga, Unalakleet, Stebbins, Shishmaref and Koyuk) have village-owned adult learning centers.

Northwest offers a general program of the first two years of a college curriculum, including courses leading to the associate of arts and associate of applied science degrees. In addition, the curriculum provides a good basis for pursuit of a bachelor's degree at other institutions. A number of vocational and general interest courses are also taught.

Northwest is small, with the majority of students attending on a part-time basis. Class sizes range from six to 20 students so personal attention is optimum. Many of the courses taught are individualized, or self-paced. A sophisticated telecommunications system allows most courses to go to communities outside of Nome. Workshops are held in Nome which stress "hands-on" experience. The programs and courses offered are focused both on the career development and personal growth of the permanent residents of western Alaska and the needs of the communities themselves.

Interior Campus

The Interior campus is composed of university centers in the villages of Fort Yukon, Galena, McGrath, Nenana, Tok and the Aleutians. The centers are a unified network for delivering university services with college-wide resources and many common programs. The centers vary widely from one another in ethnic background, population density and geographic conditions. Each center's program is defined by expressed needs for education and reflects geographical and social/economic conditions in the service areas—semi-urban commercial fishing centers, highway communities and small bush villages.

The **Fort Yukon Center** serves the Upper Yukon Valley from Circle in the south and Chalkyitsik in the east, north to Arctic Village in the beginnings of the Brooks Range and downriver to Rampart in the west. The region covers about 53,000 square miles and has a population of 2,000 people who are predominantly Gwich'in Athabaskan. Except for Circle, which is accessible by road, the villages of the region rely on air and extensive water systems for transportation. The economy is based on subsistence activities and trapping; sources of wage employment are government, education, Tanana Chiefs Conference, village corporations and some private businesses. Each semester, in addition to a

slate of courses in all the discipline categories needed to meet A.A. degree requirements, the center seeks to provide educational and vocational opportunities which reflect a culture that relies heavily upon subsistence activities. The courses offered are varied and determined by the requests of the community members.

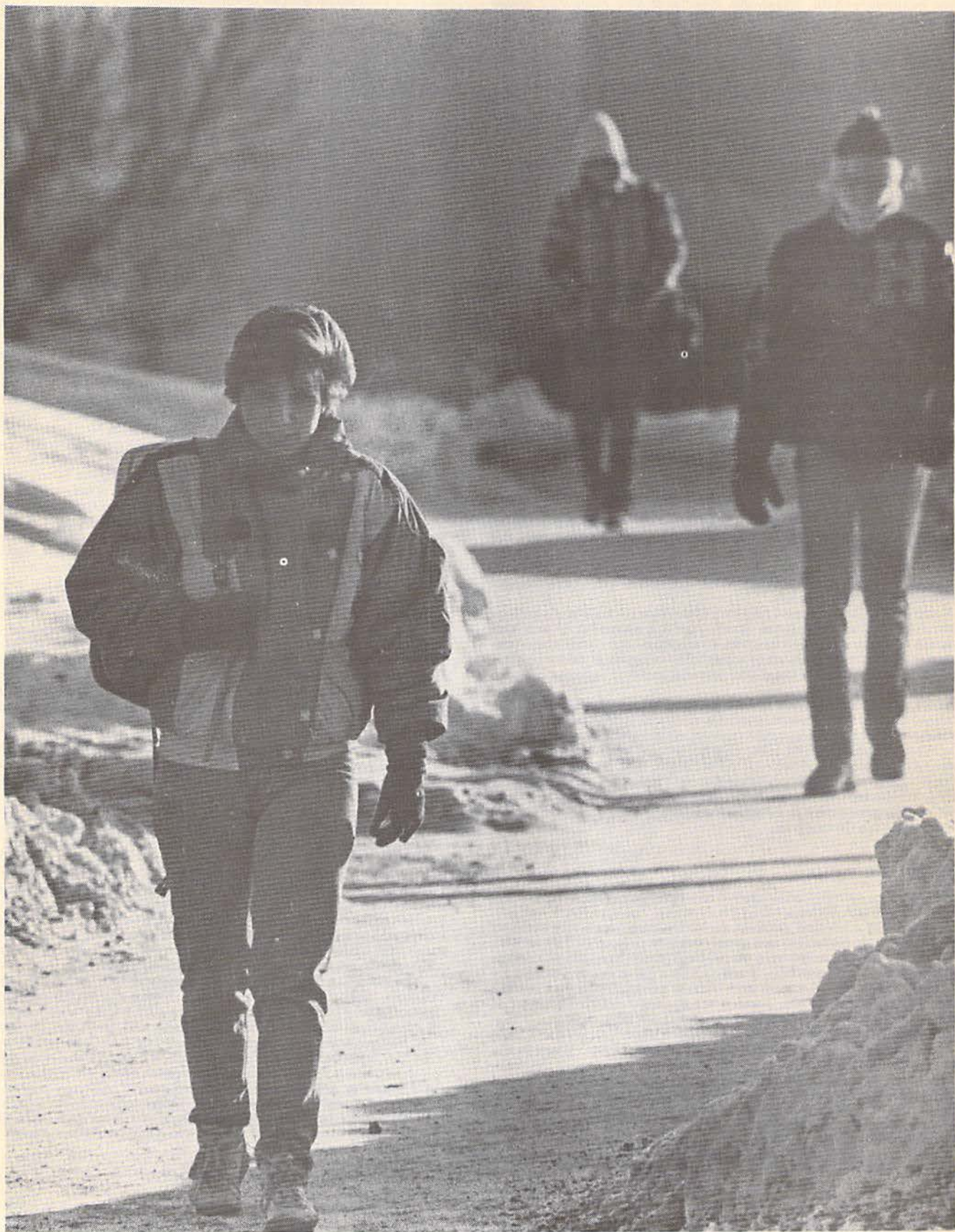
The **Galena Center** serves villages in interior Alaska along the Yukon and Koyuk rivers. The region has a population of about 4,500 people and there is little in the way of cash economy. No roads serve the area and transportation is by small aircraft, riverboat or snowmobile. During the past three years, the Galena Center has grown significantly. The center has conducted classes in the areas of business, accounting, computers, management, welding, small engine repair, equipment maintenance and operation, private pilot ground school, Native art, basic English and math skills, and a variety of humanities courses.

The **McGrath Center** serves an area the size of Ohio, including the communities of McGrath, Nikolai, Medfra, Telida and Takotna on the Upper Kuskokwim River and Shageluk, Grayling, Anvik and Holy Cross on the Yukon River. McGrath serves as a commercial and transportation hub for the area. Many residents of the area engage in seasonal work and are partially dependent on a subsistence lifestyle. It is the aim of the center to assist area residents in meeting their educational goals. For some, this means improving or gaining job-related skills such as typing, accounting or programming a microcomputer. Others are interested in working toward a college degree or want to develop a personal interest such as art or philosophy.

The **Nenana Center** encompasses 100 miles along the Parks Highway and the two small villages of Manley Hot Springs and Minto. The communities along the highway are Nenana, Clear Air Force Base, Anderson, Brown's Court, Healy, Cantwell and McKinley Park. This widely diverse area has many different economic capabilities and an array of people spanning many walks of life from self-educated people who still depend on and enjoy the subsistence type of lifestyle to those interested in computer learning and degrees. Classes through the center are held in many different locations. The region encompasses three school districts, all of which cooperate in the use of their buildings and audio/video equipment. The courses are offered in a variety of ways: lecture, correspondence, combination of lecture/correspondence with a visiting professor, multi-media, independent study, small group instruction or module method with the instructor used as a resource person. All students in the region now have easy access to courses which are offered on a sequential basis leading to the fulfillment of the general education requirements for an associate of arts degree. The center serves as an educational information center which helps deliver the needed answers to problems and plan education and professional programs.

The **Tok Center** serves communities along the Alaska Highway system including Tok, Northway, Tanacross and Dot Lake. Eagle, accessible via the Taylor Highway from May through September, is the northernmost community served. Approximately 2,500 people reside in the 30,000-square-mile service area in small towns, Native villages or widely scattered homesites. The population consists of Caucasians, minorities and Athabaskan Indians. The center is located in Tok, the major commercial center for travelers entering Alaska on the Alcan Highway. Numerous businesses and facilities exist to serve the summer tourists as well as the local population. Employment opportunities are found in tourism, social services, education and government. In the outlying communities, employment opportunities are more limited and many individuals include hunting, fishing and trapping in their livelihood. Responsiveness to local needs is a determining factor shaping the Tok Center program and the center offers a wide variety of courses to meet the diverse needs of its clientele. Course offerings have included business and computer science, education, basic vocational/industrial skills, paraprofessional counseling, private pilot training, office skills, art and general education, and degree requirements.

The **Aleutian Center** services the villages of Cold Bay, King Cove, Pribilofs, Sand Point and Unalaska. These communities share the characteristics of a relatively temperate climate, marked rainfall, mixed Aleut-Scandinavian-Russian heritage and, with the exception of Cold Bay, an economy based on fishing. The population of these communities is approximately 5,000 people, which can easily double during the summer fishing season. The center offers a variety of courses each semester and augments its local course offerings with courses delivered through teleconferencing. This enables the smallest village to have access to experts from many disciplines and to meet with students from other parts of the state in a statewide classroom.



Course Descriptions



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. For example, Engl. 111 is given for first-year students and Engl. 318 is given for third-year students. Freshman and sophomore students are cautioned to register for upper division (300 and 400) level courses only if they have had adequate preparation and background to undertake advanced study in the field in which those courses are offered.

000-049 — Non-credit courses

050-099 — Developmental courses. Developmental courses are preparatory courses which do not apply to associate of arts, baccalaureate or graduate degrees. Credits earned in these courses may be applied toward associate of applied science degree requirements, with approval of program or department head.

100-299 — Lower-division courses.

300-499 — Upper-division courses. Freshman and sophomore students may be required to obtain special permission to take 300 and 400 level courses unless such courses are required in the first two years of their curriculum as printed in this catalog.

500-599 — Post-baccalaureate courses which are considered professional and specialized. Such courses are not interchangeable with 600 level courses for graduate degree programs.

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.

Special or Reserved Numbers — Courses identified with numbers ending in -92 are seminars; ending in -93 are special topics courses, approved to be offered only during one academic year; -94, approved trial courses; -95, special topics summer session courses, offered only during the summer; -97 indicates individual study -98, individual research; -99, thesis.

Courses identified with these special or reserved numbers may be available at all levels (i.e., 193, 293, 393, etc.) at the discretion of any department, although offerings above the level of approved programs must be approved in advance by the Vice Chancellor for Academic Affairs (e.g., 600-level offerings in areas without approved graduate programs). These courses may be repeated for credit.

Course Credits

One credit represents satisfactory completion of 800 minutes of lecture or 1600 or 2400 minutes of laboratory, whichever is appropriate. Credit hours may not be divided, except one-half credit hours may be granted at the appropriate rate. For short courses and classes of less than one semester in duration, course hours may not be compressed into fewer than *three days per credit*, and no more than one credit may be earned per week, per student.

Following the title of each course, the figures in parentheses indicate the number of lecture and laboratory hours the class meets each week for one semester. The first, lecture hours; the second, laboratory. For example (2+3) indicates that a class has two hours of lecture and three of laboratory work week.

The number of credits listed is for each semester. Thus "3 credits" means three credits may be earned.

Credit may not be given more than once for the completion of a course unless the course has been designated as repeatable for credit.

Course Classification Identification

Courses that may be used in satisfying general degree requirements (e.g., Social Science Elective, Written Communication, etc.) are identified in the course description section of this catalog by the following designators:

h — Humanities	o — Oral Communication
m — Mathematics	s — Social Science
n — Natural Science	w — Written Communication

For example, Hist. 341, History of Alaska (3+0)s may be utilized to satisfy the "social science elective" requirement. ENGL 111, Methods of Written Communication (3+0)w may be used to meet the written communication general degree requirement.

Note: Courses which are offered only every other year are indicated by the specific year in which they are next scheduled. Courses with no year scheduled are offered every year, except as noted.

Note: All courses are not offered at all locations of the University of Alaska Fairbanks. Check the local class schedule for course offerings.

Accounting

Admittance to upper division School of Management courses will be granted only to students with junior standing or above. Others will be admitted only with the written permission of the appropriate department head.

ACCT 101 3 Credits Fall and Spring
Elementary Accounting (3+0)

An introduction course in accounting concepts and procedures for service businesses and for merchandising businesses owned by a single proprietor.

ACCT 102 3 Credits Fall and Spring
Elementary Accounting (3+0)

A continuation of introductory accounting concepts and procedures emphasizing the problems of businesses organized as partnerships or corporations and performing manufacturing operations. (Prerequisite: Acct. 101.)

ACCT 103 3 Credits As Demand Warrants
Principles of Accounting III (3+0)

Accounting in a manufacturing business and cost accounting. Emphasizes taxes as they apply to business and corporations. (Prerequisite: Acct 101 and 102.)

ACCT 303 3 Credits Spring
Governmental Accounting (3+0)

Principles and operation of fund accounting; financial reporting, budgetary control for governmental, municipal and non-profit organizations. (Prerequisite: Acct. 101.)

ACCT 310 3 Credits Fall
Income Tax (3+0)

A study of federal and state income taxes relating primarily to the individual residing in Alaska and an introduction to corporate income taxation. The course entails tax reporting, planning, and research. (Prerequisite: Acct. 102 or permission of instructor.)

ACCT 316 3 Credits Spring
Accounting Information Systems (3+0)

The design and analysis of accounting systems for business entities in various industries. Internal control for the business, data processing and its relationship to accounting systems examined. Materials fee: \$20.00. (Prerequisite: Acct. 102.)

ACCT 323 3 Credits As Demand Warrants
Petroleum Accounting (3+0)

Financial reporting and accounting for the petroleum industry with an emphasis on the exploration, development and production phases of oil and gas operations. (Prerequisites: Acct. 101 and 102 or permission of instructor.)

ACCT 342 3 Credits Spring
Managerial Cost Accounting (3+0)

A cost accounting course with a managerial emphasis focusing on cost-volume-profit analysis, job order and process costing, joint costs, by-products, inventory costing alternatives, systems design, responsibility accounting, profit planning, standard costs, and flexible budgeting. This course is designed for accounting majors. (Prerequisite: Acct. 102.)

ACCT 352 3 Credits Fall and Spring
Management Accounting (3+0)

A managerial accounting course focusing on business policy profit planning, resource planning, control concepts, reporting for management control, and the impact of public reporting on management decisions. (Prerequisites: Acct. 101 and Acct. 102.)

ACCT 361 3 Credits Fall
ACCT 362 3 Credits Spring

Intermediate Accounting (3+0)
 A treatment in depth of the balance sheet accounts and procedures for their analysis and correction. Study of working capital and fixed assets will receive special emphasis during fall semester. Special attention will be given to long-term liabilities and stockholders' equity during spring semester. (Prerequisite: Acct. 102.)

ACCT 401 3 Credits Fall
Advanced Accounting (3+0)

A thorough study of accounting for parent-subsidiary relationships, partnerships, and fiduciaries. The principles of fund accounting will be introduced and international accounting problems will be emphasized. (Prerequisite: Acct. 362.)

ACCT 403 3 Credits Spring
Advanced Taxes (3+0)

A study of federal income tax for all entities, gift, estate, and payroll taxes. The course entails tax research, tax planning, and tax reporting for domestic and foreign tax payers. (Prerequisite: Acct. 310.)

ACCT 404 3 Credits Fall
Controllership and International Accounting (3+0)

A study of the controllership function in contemporary organizations with emphasis upon international accounting in multinational enterprises and selected cases in management accounting for governmental entities. (Prerequisites: All 300 level accounting major requirements; B.A. 325, 343 and 360; and Acct. 401 which may be taken concurrently.)

ACCT 405 3 Credits Spring
Contemporary Issues in Accounting (3+0)

A study of current developments in financial and managerial accounting theory and research. Relevant court cases, SEC rulings, FASB and AICPA publications, and academic accounting research will be emphasized. (Prerequisite: Acct. 401.)

ACCT 452 3 Credits Fall
Auditing (3+0)

A study of the procedures for verification of financial data and the professional standards applicable to the auditor's examination of financial statements and his expression of opinion relative to them. (Prerequisite: Acct. 362.)

ACCT 471 3 Credits As Demand Warrants
Tax Planning and Research (3+0)

Tax planning and research primarily for business organizations. Tax planning for estates, trusts, and individuals will be examined. The course is designed for tax practitioners as well as for students without work experience in taxation. (Prerequisites: Acct. 310 and 403 or permission of instructor.)

ACCT 472 3 Credits Spring
Computer Control and Advanced Auditing (3+0)

An examination of advanced auditing theory and practice, including audit techniques and internal control of computer systems. The course is designed for auditor practitioners as well as for students without field experience in auditing. Materials Fee: \$20.00. (Prerequisites: Acct. 316 and Acct. 452. This course assumes prior exposure to auditing and information systems.)

ACCT 473 3 Credits Fall
Applied Systems Design (3+0)

The development and implementation of a computer-based accounting information system for a small business or not-for-profit entity. Materials Fee: \$20.00. (Prerequisites: Acct. 316, 342 and 362.)

ACCT 481 1 Credit As Demand Warrants
Personal Tax Planning (1+0)

The course will concern personal tax planning rather than tax preparation. The course will focus on the provisions of tax law affecting the individual taxpayer. (Prerequisites: Upper division standing, permission of instructor.)

ACCT 482 1 Credit As Demand Warrants
Business Tax Planning (1+0)

The course will concern business tax planning rather than tax preparation. The course will focus on applicable tax credits, business deductions, profit sharing plans, and various state taxes. (Prerequisites: Upper division standing or permission of instructor.)

ACCT 483 1 Credit As Demand Warrants
Estate Tax Planning (1+0)

The course will entail estate tax planning. The course will focus on gift, estate, and social security taxes. (Prerequisites: Upper division standing or permission of instructor.)

ACCT 602 3 Credits Spring
Financial Accounting Concepts for Administrators (3+0)

A complete and balanced treatment of the concepts, procedures and uses of financial accounting, including the accounting cycle, mass processing of transactions, internal control, inventories and merchandising operations, long-lived assets and liabilities, corporate accounting and reporting, partnership accounting, accounting principles, interpretation of financial statements, consolidated financial statements, analysis of funds flow, manufacturing operations and cost systems, managerial accounting and capital budgeting. (Prerequisite: Graduate Standing.)

ACCT 623 3 Credits As Demand Warrants
Land Valuation and Petroleum Accounting (3+0)

Accounting concepts and principles, financial reporting and basic tax procedures applicable to the petroleum industry. (Prerequisites: Graduate standing and permission of instructor.)

ACCT 650 3 Credits Spring
Management Accounting Seminar (3+0)
 Use of accounting information for managerial decisions, planning and control in economic entities. Topics covered include: the accounting process, responsibility accounting, performance measurement, capital budgeting, financial analysis and financial reports for managers, government, investors and the public. Student participation will include problem analysis and oral and written report preparation. (Prerequisite: Graduate standing. Acct. 101 and 102, or permission of instructor.)

Agriculture and Land Resources

RESOURCES MANAGEMENT

ALR 101 3 Credits Fall
Conservation of Natural Resources (3+0)
 Consideration of natural resources including discussion of their biological and physical nature, social and economic aspects of use, conflicts of use, and alternative means for conservation. Majors in all fields are welcome.

ALR 102 1-3 credits Fall and Spring
Practicum in Natural Resources Management
 An individual study opportunity providing practical experience in some field related to natural resources management. This supervised, occupational experience may take place on a farm, in a greenhouse, in a managed forest, with an agency or business, or in another approved location. (Prerequisite: Enrollment limited to Natural Resource Management majors only.)

ALR 201 3 Credits Fall
Processes of Natural Resources Management (3+0)
 An introductory course in natural resources management institutions and processes. Emphasizes public lands and resources, but considers private firms and native regional corporations as well. (Prerequisites: ALR 101 and at least sophomore standing.)

ALR 220 3 credits Spring
Elements of Information Transfer for Natural Resource Managers (3+0)
 Introduction to information transfer processes used by natural resource managers, including principles of the extension processes. Identification of, and networking with various publics, with emphasis on natural resources-orientated agencies; tools, techniques (formal and informal), and planning strategies for promoting effective information transfer; theory and practical applications. (Prerequisites: ALR 101 and a speech communications course or permission of instructor.)

ALR 300 1-3 Credits Fall, Spring, Summer
Internship in Natural Resources Management
 Supervised programs designed to provide carefully selected upper division or graduate students with practical experience working with government units or agencies in natural resources management. Opportunities to apply theories and practical application, observe procedures and operations of the agencies, and become better prepared for professional employment. (Prerequisite: A.L.R. 101, at least upper division standing, and permission of instructor.)

ALR 310 3 Credits Spring
Agricultural Concepts and Techniques (3+0)
 Concepts and techniques of agriculture in its broadest sense as related to past, present, and future cultures; food and fiber production; uses of wild and domestic plants and animals; esthetics; and quality and protection of the environment. (Prerequisite: Biol. 105, 106; Chem. 105, 106.)

ALR 360 3 Credits Alternate Spring
Outdoor Recreation Planning (3+0)
 The course develops on the basic theory and practices related to the allocations of natural resources for recreational purposes, including concomitant services related to that use. Macrobehavioral patterns are studied as they influence the allocation process. (Prerequisites: A.L.R. 101 and Econ. 235 or equivalent, or with permission of instructor. Next offered: 1989-90.)

ALR 400 3 Credits Alternate Spring
Natural Resource Policies (3+0)
 The origin and significance of public policies in land, water, forest, wildlife, mineral, petroleum, agricultural and aesthetic resources. Focuses on Alaskan and relevant national issues. (Prerequisites: Upper division or graduate standing. Next offered: 1989-90.)

ALR 401 3 Credits Alternate Spring
Natural Resources Legislation (3+0)
 The background and importance of selected federal and Alaskan legislation in land management, resource conservation and environmental arenas. (Prerequisite: Upper division or graduate standing in agriculture, wildlife, fisheries, natural resources management, or related fields, or permission of instructor. Next offered: 1988-89.)

ALR 403 4 Credits Alternate Spring
Managing Food Production Systems (3+3)
 The examination of alternative and traditional food production systems in light of changing economic conditions in world markets; emphasis on subarctic areas. Available economic and engineering principles will form the core of the course. Applications include development of a diversified plan for food production. Personal computers will be used in development of budget and cash flows. (Prerequisites: ALR 310, ALR 320, basic economics (can be taken concurrently), and basic knowledge of operation of a personal computer, or permission of instructor. Next offered: 1989-90.)

ALR 425 2 Credits Spring
Alaska's Reindeer Industry (2+0)
 Alaska's reindeer industry will be examined as a practical case in natural resources management. Social, economic, historical, and ecological aspects will be addressed. Emphasis will be placed on (1) the multi-disciplinary nature of natural resource management and planning; and (2) the coordination of agency and private involvement in management of the reindeer industry's resource base. (Prerequisites: ALR 101, at least junior standing or permission of instructor.)

ALR 430 3 Credits Spring
Land-Use Planning (3+0)
 History, legal framework, principles, processes, and practices of land use planning. Important Alaskan issues and problems are emphasized. (Prerequisite: Upper division standing.)

ALR 460 3 Credits Fall
Principles of Outdoor Recreation Management (2+3)
 Theories, practices, economics, and problems fundamental to the use of land and related natural resources for recreation. (Prerequisite: at least junior standing or permission of the instructor.)

ALR 461 3 Credits Alternate Spring
Interpretive Services (3+0)
 Naturalist and other visitor programs in outdoor recreation areas: philosophy, planning, and development of interpretive programs; resources, agencies, users, interpretive media, and program evaluation. (Prerequisites: At least junior standing or permission of instructor. Next offered: 1988-89.)

ALR 462 3 Credits Fall
Alaskan Environmental Education (3+0)
 (Same as ED. 462)
 Environmental concepts, motivational and discovery techniques, and practical skills for utilizing the environment inside and outside the formal classroom in all subject areas. Course content includes information on curriculum materials (K-12), interpretive and audiovisual aids facilities, environmental problem solving and applications of environmental education to situations from the public schools to summer campus, short courses, and workshops for individuals of any age. (Prerequisites: at least junior standing or permission of instructor.)

ALR 630 3 Credits Fall
Planning Theory (3+0)
 Detailed analysis of principles and processes of solving complex group problems; focused on land planning in Alaska. (Prerequisite: Graduate standing or permission of instructor.)

ALR 631 3 Credits Spring
Planning Practicum (3+0)
 Application of principles and processes through group projects focused on Alaska land or resource problems. (Prerequisite: A.L.R. 630 or permission of instructor.)

ALR 641 3 Credits Alternate Spring
Natural Resources Applications of Remote Sensing (2+3)
 An introduction to the interpretation of remote sensing data and applications to natural resources. Course topics include a discussion of types of remote sensing data and product displays, the advantages and limitations of data types, and techniques of data interpretation for various natural resources problems. Emphasis is placed on vegetation survey and inventory, wildlife habitat, forest and range management, agriculture, geo-botanical correlations, and change detection-monitoring. Techniques include manual interpretation and computer-aided analysis. (Prerequisites: Geos. 422 or permission of instructor. Next offered: 1988-89.)

ALR 675 3 Credits Alternate Fall
Applied Ecosystem Science (3+0)
 Modern concepts of ecosystem science and their application to solving problems of land use and management. Worldwide patterns and control processes of and management implications for major ecosystems. Designed for students in biology and renewable resources management. (Prerequisites: Undergraduate major in biological sciences or renewable resources including at least one course in ecology, one approved college-level mathematics course and graduate standing or permission of instructor. Next offered: 1988-89.)

ALR 680 3 Credits Alternate Fall
Environmental Decision-Making (3+0)
 The potential and actual role of science in natural resources and environmental decision-making. Explores the roles of values and analysis, and of techniques such as modeling, forecasting and technology assessment in political decisions. (Prerequisites: Graduate standing or permission of instructor. Next offered: 1988-89.)

ALR 690 3 Credits Alternate Fall
Advanced Topics in Resource Management (3+0)
 Examines common and alternative assumptions basic to resource management approaches as expressed in global, national, or important local issues in resource management. (Prerequisites: Graduate standing or permission of instructor. Next offered 1989-90.)

FOREST SCIENCES

ALR 251 3 credits Spring
Silvics and Dendrology (3+0)
 The ecological requirements and characteristics of tree species of the Northern Forest and western North American forest; silvical characteristics including range, climate, soils, shade tolerance, growth, and principal enemies. Family and species characteristics essential for identification on sight or with a key are stressed. (Prerequisites: ALR 101 and introductory biology course or permission of instructor.)

ALR 340 3 Credits Spring
Natural Resources Measurements (2+3)
 Introduction to the techniques and instrumentations used in the measurement and inventory of natural resources. Measurements used by managers of land, timber, range, wildlife, water, and recreation resources will be discussed. (Prerequisites: junior standing or permission of instructor.)

ALR 370 3 Credits Fall
Introduction to Watershed Management (2+3)
 Examination of the hydrologic cycle and the influence of land management techniques on water quantity, quality, and timing. Topics of water yield, soil erosion and non-point pollution, snowpack management, and land use alternatives will be discussed. (Prerequisites: Bot. 239, and Geos. 101, or permission of instructor.)

ALR 450 3 Credits Alternate Fall
Forest Management (3+0)
 Introduction to forest land management for production of goods and services; relation of timber production to other forest land uses; topics include sustained yield, allowable cut, management planning inventory, valuation. (Prerequisites: A.L.R. 350, Econ. 235, or permission of instructor. Next offered: 1988-89.)

ALR 451 3 credits Alternate Spring
Regeneration and Silviculture of Northern Boreal Forests (2+3)
 An examination of the biological, environmental, silvicultural, and economical considerations for the successful regeneration and subsequent management of the northern boreal forest. Designed particularly for persons with interest in land management, including timber management, woodlot management, habitat manipulation, site rehabilitation and streamside management. (Prerequisites: ALR 350, Biol 271, junior standing or permission of the instructor. Next offered: 1988-89.)

ALR 452 3 Credits Alternate Spring
Forest Protection (3+0)
 The basic principles and practical management systems for forest protection from fire, insects, and diseases are presented. Emphasis is on understanding the role of these factors in managing forest ecosystems, and problems and techniques particularly important in the forest of high latitudes, especially in Alaska. (Prerequisites: Biol. 105, 106, 271, Bot. 239; A.L.R. 350 or instructor's permission. Next offered: 1989-90.)

ALR 453 3 Credits Alternate Fall
Harvesting and Utilization of Forest Products (3+0)
 The first half of this course will be an in-depth study of timber harvesting systems including timber cutting, yarding, and transport processes. Both manual and mechanized aspects will be considered. The second half of the course will cover the technology of processing wood into various products including lumber, plywood, veneer, pulp, and energy. (Prerequisites: A.L.R. 101 and 350. Next offered: 1988-89.)

ALR 640 3 Credits Alternate Spring
Simulation and Modeling in Resource Management (3+0)
 An introduction to and discussion of the use of simulation and modeling in natural resource management. Emphasis on concepts, strategies, and case studies. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)

ALR 670 3 Credits Alternate Fall
Biometeorology (3+0)
 Solar radiation, energy balance relationships, and disposal of incident energy at the earth's surface; physical environment in relation to biological activity of plants and animals. Concepts emphasized. (Prerequisites: Calculus, physics, biology or permission of the instructor. A.L.R. 350 recommended. Next offered: 1989-90.)

ALR 672 2 Credits Alternate Fall
Dynamics of Nitrogen in Forest Ecosystems (2+0)
 Consideration of the state and dynamics of nitrogen in the complete forest ecosystem, including its basic chemistry, measurement techniques, functions, component partition, and changes in these features with forest disturbances. (Prerequisites: Graduate status in natural resources management, wildlife-fisheries, biological sciences, or permission of the instructor. Next offered: 1988-89.)

PLANT AND ANIMAL SCIENCES

ALR 211 3 Credits Alternate Fall
Introduction to Agronomy and Horticulture (2+3)
 Principles of plant science as related to production of economic crops, with special attention to those grown in Alaska. (Prerequisite: A general botany course or permission of instructor. Next offered: 1989-90.)

ALR 312 3 Credits Alternate Fall
Introduction to Range Management (3+0)
 Applied ecological treatment of soil, plant and grazing animal relationships on uncultivated lands, including discussions on the origin of the discipline, management practices, important rangelands of North America, with emphasis on Alaska's rangelands and grazers. (Prerequisites: Biol. 105, 106, Bot. 239 or permission of instructor; A.L.R. 320, 321 recommended. Next offered: 1988-89.)

ALR 313 4 Credits Alternate Spring
Introduction to Plant Pathology (3+3)
 An introduction to the field of plant pathology; non-parasitic and parasitic causes of plant diseases; methods of plant infestation and mechanism of plant defenses; epidemiology and disease control. (Prerequisites: Biol. 105 and 106; Bot. 239 recommended. Next offered: 1988-89.)

ALR 320 3 Credits Alternate Fall
Introduction to Animal Science (2+3)
 Origin, history, and economic significance of breeds of dairy and beef cattle, swine, sheep, and poultry. Discussion of reindeer, bison, and musk-ox. Introduction to management and production systems with special reference to Alaska. (Prerequisite: A course in general biology. Next offered: 1988-89.)

ALR 321 3 Credits Alternate Fall
Applied Animal Nutrition (2+3)
 Application of feeding standards and feedstuffs analysis to the nutrition of farm animals. Comparative anatomy of the digestive system of pig, horse, and cow. (Prerequisite: A course in general biology. Next offered: 1989-90.)

ALR 380 3 Credits Spring
Soils (2+3)
 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. 105.)

ALR 411 3 Credits Alternate Fall
Plant Propagation (2+3)
 Principles of plant propagation, including seeds, bulbs, divisions, layers, cuttings, buds, grafts, and rootstocks. Where possible, emphasis will be placed on the propagation of indigenous plants. (Prerequisites: A.L.R. 311 or permission of instructor. Next offered: 1988-89.)

ALR 412 3 Credits Alternate Fall
Field Crop Production (3+0)
 Agronomic principles and practices involved in the production, storage, marketing, and utilization of field crops. (Prerequisites: A.L.R. 311. Next offered: 1988-89.)

ALR 420 3 Credits Alternate Spring
Animal Nutrition and Metabolism (3+0)
 Nutrition and metabolism of domestic animals; ruminant and monogastric. (Prerequisites: Chem. 105, 106; biochemistry recommended. Next offered: 1989-90.)

ALR 480 3 Credits Alternate Fall
Soil Conservation (3+0)
 Managing soil to maintain or increase crop productivity while minimizing soil losses from wind and water erosion. (Prerequisites: A.L.R. 380. Next offered: 1989-90.)

ALR 607 3 Credits Alternate Spring
Biotechnology (3+0)
 (Same as EQE 607)
 Theory and application of bioconversion and bioengineering processes for foods, agriculture, pharmaceuticals methods (recombinant DNA, immobilized enzymes and cells, hybridomas, and mutation and selection) for the production of conventional bioproducts and in the development of new bioproducts. (Prerequisites: BIOL 442, CHEM 322. Next offered 1989-90.)

Airframe and Powerplant

AFPM 111 3 Credits As Demand Warrants
General Airframe and Powerplant (4+0)
 Introduction to Airframe and Powerplant Mechanics including shop practices, basic math, applied physics, F.A.A. regulations, basic electricity, aircraft weight and balance, ground operations and servicing, cleaning and corrosion control, and materials and process. Designed to prepare the student for the FAA Mechanics Airframe Structures Written, Oral and Practical Exam. Materials fee: \$20.00. (Prerequisite: Meet the experience requirements of FAR 65.77 or permission of the instructor.)

AFPM 145 1 Credit As Demand Warrants
Basic Mathematics (1+0)
 A beginning course in Mathematics. The course contains a thorough review of applied and technical mathematics, including common and decimal, fractions and mixed numbers; extracting square roots and raising numbers to a given power; solving ratios, proportions and percentage problems; and performing fundamental algebraic operations as they relate to the construction of aircraft and their engines. (Prerequisite: Admission to A & P Program or permission of instructor.)

AFPM 146 2 Credits As Demand Warrants
Basic Electricity (2+0)
 A beginning level course in electrical theory and concepts. The course is directed towards the needs of the aviation mechanic and includes a study of Ohm's law, electrical circuits, diagrams, batteries, and a variety of electrical components. (Prerequisite: Admission to A & P Program or permission of the instructor.)

AFPM 147 0.5 Credits As Demand Warrants
Physics for Mechanics
 A study of the principles and applications of mechanics with emphasis placed on levers, sound, fluid and heat dynamics. Basic aircraft structures and aerodynamic principles will be covered. (Course does not fulfill Natural Science requirements for any degree.) (Prerequisite: Admissions to A & P Program or permission of instructor.)

AFPM 148 1 Credit As Demand Warrants
Aircraft Drawing
 A beginning course designed to build skill and knowledge of basic drafting. The student will learn to use drawings, symbols and schematic diagrams, make sketches of repairs and alterations, and use blueprint information, graphs and charts. (Prerequisite: Admission to A&P program or permission of instructor.)

AFPM 149 0.5 Credits As Demand Warrants
Fluid Lines and Fittings
 A practical course covering the study of rigid and flexible fluid lines and fittings, including their fabrication and installation. (Prerequisite: Admission to A & P Program or permission of instructor.)

AFPM 150 2 Credits As Demand Warrants
Materials and Processes (2+0)
 This course covers basic shop practices, including the selection, identification and installation of aircraft hardware and materials, precision measuring tools and operations, basic heat treating processes, and all forms of non-destructive inspections. (Prerequisite: Admission to A & P Program or permission of instructor.)

AFPM 151 1 Credit As Demand Warrants
Cleaning and Corrosion Control (1+0)
 This course covers the basic aircraft cleaning materials, methods, and an in-depth study of aircraft corrosion control. (Prerequisite: Admission to A & P Program or permission of instructor.)

AFPM 152 1 Credit As Demand Warrants
Federal Aviation Regulations (1+0)
 This course provides an overview of the Federal Aviation Regulations as they apply to the maintenance of aircraft. Includes a study of maintenance forms and records, maintenance publications, and the privileges and limitations of aircraft mechanics. (Prerequisite: Admission to A & P program or permission of instructor.)

AFPM 153 1 Credit As Demand Warrants
Weight and Balance (1+0)
 A study of weighing procedures, weight, arms, moments, center of gravity computations, and placarding. The student will compute loading an aircraft, completing required forms, and weigh an aircraft. (Prerequisite: Admission to A&P Program or permission of instructor.)

AFPM 154 0.5 Credits As Demand Warrants
Ground Operations & Servicing
 This course includes both theory and practice in the starting, moving, servicing, securing, and fueling aircraft. (Prerequisite: Admissions to A&P program or permission of instructor.)

AFPM 205 3 Credits As Demand Warrants
Airframe Structures (FAA Test Preparation)(3+0)
 Principles, practices, procedures, techniques relating to aircraft wood, dope, fabric finishes, welding, sheet metal, assembly and rigging and inspection. Designed to prepare the student for the FAA Mechanics Airframe Structures Written, Oral and Practical Exam. Materials fee: \$20.00. (Prerequisite: Meet the experience requirements of FAR 65.77 or permission of the instructor.)

AFPM 206 2 Credits As Demand Warrants
Airframe System & Components (FAA Test Preparation)(2+0)
 A study of aircraft electrical, hydraulic and pneumatic, landing gear, position and warning, aircraft instrument, aircraft fuel, communication and navigation, cabin atmosphere control, and fire protection systems, inspection, checking, troubleshooting. Repair and servicing is also covered. Designed to prepare the student for the FAA Mechanics Airframe Structures Written, Oral and Practical Exam. Materials fee: \$20.00. (Prerequisite: Meet the experience requirements of FAR 65.77 or permission of the instructor.)

AFPM 215 2 Credits As Demand Warrants
MOS Powerplant Theory/Maintenance (FAA Test Preparation) (2+0)
 Jet engine fundamentals, analysis, testing, and inspecting turbo jets, turbo shaft, and turbo fan engines as well as overhaul, inspection, and fundamentals of reciprocating engines. Designed to prepare the student for the FAA Mechanics Airframe Structures Written, Oral and Practical Exam. Materials fee: \$20.00. (Prerequisite: Meet the experience requirements of FAR 65.77 or permission of the instructor.)

AFPM 216 3 Credits As Demand Warrants
MOS Powerplant Sys/Components (3+0)
 Fuel metering, induction systems, propellers, control systems, and powerplant electricity. The repair, inspection, service and troubleshooting in the above area. Designed to prepare the student for the FAA Mechanics Airframe Structures Written, Oral and Practical Exam. Materials fee: \$20.00. (Prerequisite: Meet the experience requirements of FAR 65.77 or permission of the instructor.)

AFPM 230 2.5 Credits As Demand Warrants
Aircraft Electrical Systems
 Overview of electrical systems and their use in aircraft. Wiring, control, indication, and protection devices are covered for both AC and DC systems. Inspection, troubleshooting service and repair of these systems is emphasized. Materials fee: \$15.00. (Prerequisite: Admission to A&P Program or permission of instructor.)

AFPM 231 1.5 Credits As Demand Warrants
Powerplant Electrical Systems
 The installation, inspection, testing and service of engine electrical system wiring, controls, indicator and protective devices. Also, repair and service of electrical generating systems. Materials fee: \$15.00.

AFPM 235 5 Credits As Demand Warrants
Aircraft Reciprocating Engines (5+0)
 A survey of the history and development of the aircraft reciprocating engine. The student will engage in the repair, overhaul, and inspection of various types of engines. Operation and troubleshooting of engines is also discussed. Materials fee: \$120.00.

AFPM 240 1.5 Credits As Demand Warrants
Turbine Engines
 Development, theory and operation of modern gas turbine engines. Included is the study of engine design, performance, accessories and subsystems along with an investigation of engine maintenance and overhaul.

AFPM 244 1.5 Credits Lubricating Systems	As Demand Warrants	AFPM 259 1.5 Credits Hydraulic and Pneumatic Systems	As Demand Warrants
Identification and selection of lubricants for aircraft powerplants. Inspection, service, troubleshooting and repair of the lubrication systems and its components. Materials fee: \$5.00. (Prerequisite: Admission to A&P program or permission of instructor.)		The operation of hydraulic and pneumatic systems and their uses in aircraft. Included is the identification of hydraulic fluids, seals, hydraulic and pneumatic control devices, inspection and servicing, and troubleshooting of systems.	
AFPM 245 2.5 Credits Ignition Systems	As Demand Warrants	AFPM 260 2 Credits Aircraft Landing Gear Systems (2+0)	As Demand Warrants
Overhaul, inspection and troubleshooting of reciprocating and gas turbine ignition systems, in addition to repair and bench testing of components. Materials fee: \$15.00. (Prerequisite: Admission to A&P program or permission of instructor.)		Comprehensive examination of simple and complex aircraft landing gear systems. Included is the operation of mechanical and hydraulic retraction mechanisms, service and repair of those systems, and wheel, tire and brake service. (Prerequisite: Admission to A&P program or permission of instructor.)	
AFPM 246 1.5 Credits Fuel Metering Systems	As Demand Warrants	AFPM 261 0.5 Credits Wood Structures	As Demand Warrants
Fundamental operation of fuel metering systems in aircraft powerplants. Use of technical data to repair and overhaul carburetors and components. Includes the inspection and service of water injection systems. Materials fee: \$10.00. (Prerequisite: Admission to the A&P Program or permission of the instructor.)		Inspection, service and repair of wood aircraft structures. Identification and selection of woods, characteristics of glues, patching and splicing are discussed. Materials fee: \$5.00. (Prerequisites: Admission to A&P program or permission of instructor.)	
AFPM 248 0.5 Credits Induction Systems	As Demand Warrants	AFPM 262 1 Credit Aircraft Coverings (1+0)	As Demand Warrants
The operation and service of aircraft induction, preheat, anti-ice and super charger systems.		Selection, application, inspection and testing of fabric and fiberglass coverings and methods of repair. Materials fee: \$25.00. (Prerequisite: Admissions to A&P program or permission of instructor.)	
AFPM 249 0.5 Credits Powerplant Cooling Systems	As Demand Warrants	AFPM 263 0.5 Credits Aircraft Finishes	As Demand Warrants
Inspection, service and repair of engine cooling systems. Both air and liquid cooled installations will be discussed. (Prerequisite: Admissions to A&P Program or permission of instructor.)		Identification and selection of aircraft finishing materials. Application of paints, dopes, primers, and trim. Materials fee: \$30.00. (Prerequisite: Admission to A&P program and permission of instructor.)	
AFPM 250 0.5 Credits Powerplant Exhaust Systems	As Demand Warrants	AFPM 264 3.5 Credits Sheet Metal Structures	As Demand Warrants
Inspection, service and repair of engine exhaust systems. Operations turbo compounded engines, thrust reversers, and noise suppressors are also presented. (Prerequisite: Admission to A&P program or permission of instructor.)		Techniques of sheet metal fabrication, inspection and repair as they relate to aircraft. Included are the use of rivets and fasteners, repair of aircraft interiors and service of plastic, honeycomb and bonded structure. Materials fee: \$85.00.	
AFPM 251 1.5 Credits Fuel Systems	As Demand Warrants	AFPM 265 1.5 Credits Aircraft Welding	As Demand Warrants
A practical course covering the inspection, servicing, troubleshooting and repair of aircraft and engine fuel systems and components. (Prerequisite: Admission to A&P program or permission of instructor.)		The use of contemporary welding methods on aircraft structures. Includes oxyacetylene, arc, inert gas and brazing techniques. The inspection of welded structure and safety procedures are stressed. Materials fee: \$100.00.	
AFPM 252 2 Credits Propellers (2+0)	As Demand Warrants	AFPM 266 1.5 Credits Assembly and Rigging	As Demand Warrants
Identification and nomenclature of aircraft propellers. Operation, control and repair of both reciprocating and turbine engine installations will be covered. Materials fee: \$5.00. (Prerequisite: Admission to A&P program or permission of instructor.)		Review of aerodynamic theory and the function of aircraft control surfaces. The fabrication and installation of control devices for fixed and rotary wing aircraft, jacking and control surface balance. Materials fee: \$15.00. (Prerequisite: Admission to A&P program or instructor permission.)	
AFPM 253 0.5 Credits Position and Warning Systems	As Demand Warrants	AFPM 267 0.5 Credits Airframe Inspections	As Demand Warrants
A survey of speed and takeoff warning and anti-skid braking systems used in aircraft. Inspection, troubleshooting, service and repair of these systems is discussed. (Prerequisite: Admissions to A&P program or permission of instructor.)		Students develop those skills required to inspect and return an aircraft to service. Procedural and legal aspects of 100 hour, annual and periodic inspections are discussed. (Prerequisite: Admission to A&P program or permission of instructor.)	
AFPM 254 0.5 Credits Ice and Rain Control Systems	As Demand Warrants	AFPM 270 0.5 Credits Airframe Testing	As Demand Warrants
Inspection, operation and troubleshooting of de-ice and anti-ice systems.		Preparation for the Federal Aviation Administration written, oral and practical exams for the Powerplant Mechanics license. (Prerequisite: Admissions to A&P program or permission of instructor.)	
AFPM 255 0.5 Credits Fire Protection Systems	As Demand Warrants	AFPM 271 0.5 Credits Powerplant Inspections	As Demand Warrants
A practical course covering the inspection, servicing, troubleshooting and repair of aircraft and engine fire detection and extinguishing systems. (Prerequisite: Admission to A&P program or permission of instructor.)		Methodology and recordkeeping for the inspection of aircraft reciprocating and gas turbine engines. (Prerequisite: Admissions to A&P program or permission of instructor.)	
AFPM 256 0.5 Credits Communications & Navigation Systems	As Demand Warrants	AFPM 272 0.5 Credits Powerplant Testing	As Demand Warrants
Operation of aircraft avionics, autopilots and antennas, including their inspection and installation.		Preparation for the Federal Aviation Administration written, oral and practical exams for the Powerplant Mechanics license. (Prerequisite: Admissions to A&P program or instructor permission.)	
AFPM 257 0.5 Credits Instrument Systems	As Demand Warrants		
A practical course covering inspection, troubleshooting, removal and replacement of aircraft and engine instruments and indicating systems. (Prerequisite: Admission to A&P program or permission of instructor.)			
AFPM 258 1 Credit Cabin Atmosphere Control Systems (1+0)	As Demand Warrants		
Aircraft pressurization, air conditioning, heating and oxygen systems. Their operation, inspection, troubleshooting, service and repair will be covered.			

Alaska Native Languages

- ANL 141 3 Credits Fall**
ANL 142 3 Credits Spring
Beginning Athabaskan — Koyukon (3+0) h
 Introduction to Koyukon, the Athabaskan language of the Koyukuk and Central Yukon rivers. Open to speakers and non-speakers. Literacy and grammatical analysis for speakers. For others, a framework for learning to speak, read, and write the language. (Prerequisite: ANL 141 for ANL 142)
- ANL 150 1 Credit As Demand Warrants**
Interpretive Communication (1+0)
 Participants will explore communication processes which occur in Yup'ik and English speaking cultures. They will develop working solutions that address identified problem areas in cross-cultural communication. This includes situations such as conversations, meetings, translating and interpreting. This course will concentrate heavily upon interpreting meaning in what is communicated between people of different socio/cultural backgrounds
- ANL 151 3 Credits As Demand Warrants**
Inter-Ethnic Communications (3+0)
 Students will acquire an understanding of the differences in cross-cultural interaction and, therefore, be able to function better in a cross cultural situation. The students will apply understanding of cross-cultural interactions to various communication settings. The course will concentrate heavily on the Yup'ik ways of communication.
- ANL 215 3 Credits Fall**
Alaska Native Languages: Eskimo-Aleut (3+0) h
 A survey of the Native languages of Alaska, particularly of the Eskimo-Aleut languages: history, present and future, with examples of language structure, present situation and prospects as a cultural force. Open to all students.
- ANL 216 3 Credits Spring**
Alaska Native Languages: Indian Languages (3+0) h
 A survey of all Native languages of Alaska; particularly of the Indian languages: Athabaskan-Eyak-Tlingit, Haida and Tsimshian. History, present, and future, with examples of language structure, present situation and prospects as a cultural force. Open to all students.
- ANL 241 3 Credits Fall**
ANL 242 3 Credits Spring
Intermediate Athabaskan — Koyukon (3+0) h
 Continuation of Elementary Athabaskan — Koyukon, concentrating on development of conversational ability with presentation of additional grammar and vocabulary. (Prerequisites: ANL 141 and 142 or permission of instructor.)
- ANL 387 3 Credits As Demand Warrants**
ANL 388 3 Credits As Demand Warrants
Bilingual Methods and Materials (3+0) h
 Training and research in bilingual education methods in Alaska Native languages and preparation of books and materials in any of them.

Alaska Native Politics

- AKNP 131 1 Credit As Demand Warrants**
Introduction to the Alaska Native Claims Settlement Act (1+0)
 An introduction to the events which resulted in concern over the relation of Alaska Natives to their land, the movement for the Land Claims; the key issues; the organizations involved in the movement; the current corporation structure - regional and village; the current and future problems facing these groups, and strategies being used to resolve them.
- AKNP 151 3 Credits As Demand Warrants**
Alaska Native Claims Settlement Act (3+0)
 A general survey of the Alaska Claims Settlement Act. It will include a brief historical overview of land claims of various tribes in the Lower 48 and in Alaska leading to the Settlement Act of 1971. We will examine the current status of the various Native corporations, including regional, village and non-profit corporations. We will also give special attention to the discussion of future issues related to implementation of ANCSA.
- AKNP 212 1 Credit As Demand Warrants**
Duties and Powers of Local Government (1+0)
 This workshop focuses on the development, operation and improvement of local government in Alaska. It is aimed at the practical needs of the citizen, practitioner and advocate. Some discussion will also revolve around the future of local government in bush Alaska.

- AKNP 230 3 Credits As Demand Warrants**
Federal Indian Law (3+0)
 A basic understanding of the principles of Federal Indian Law and help to form an opinion about the extent to which these principles may or may not be applicable to Alaska Natives. This course will outline the foundation of principles that formed the bases of the relationship of the United States to the tribes and the development of this relationship. The legal perspective and land issues will be covered. (Prerequisite: English placement test.)
- AKNP 232 3 Credits As Demand Warrants**
1991 and Beyond - Implications of ANCSA (3+0)
 An examination of some of the specific provisions of the Alaska Native Claims Settlement Act as related to 1991. It will include acquisitions, and takeovers of corporations, a more in-depth look at such provisions as those outlined in Sections 7(i), 7(j), 7(h), and 14(c), some of the changes allowed under ANILCA and other amendments to the Act, the effect of ANCSA on such statutes as the Indian Reorganization Act and the Indian Self-Determination Act, and some of the issues commonly termed 1991 issues involving land and stock status in the future. (Prerequisite: English Placement test.)
- AKNP 233 1 Credit As Demand Warrants**
Tribal Government Issues (1+0)
 An introduction to tribal governments and related issues. It will review the political status and lawmaking, judicial, and regulatory powers of tribal governments. The topics of 'sovereignty' will be analyzed. Tribal enrollment and membership will be reviewed. A selected range of federal statutes and Indian Law affecting Alaska Native tribes will be studied. The potential role of tribal governments in planning for Alaska Natives' future will be defined and discussed.

Alaska Native Studies

- ANS 103 1 Credit As Demand Warrants**
Beginning Eskimo Dance (1+2)
 Teaching of traditional and contemporary Yup'ik Eskimo dance through the means of singing, drumming, and motions of the stage. In-depth analysis of each song and its relation to contemporary and traditional cultural lifestyles.
- ANS 110 1 Credit Fall and Spring**
Parliamentary Procedures (1+0)
 (Same as P.S. 110)
 Introduction to the rules and principles of parliamentary procedure and their application to group decision-making processes.
- ANS 120 3 Credits Fall**
Cultural Differences in Institutional Settings (3+0) s
 Introduction to the phenomena of culturally organized thought processes, with emphasis on the communication patterns resulting from the interaction of peoples from different linguistic/culture traditions in modern institutional settings. Special attention is paid to Alaskan Native and non-Native communication patterns.
- ANS 160 1 Credit Fall**
Alaska Native Dance (2+0) h
 Traditional Native Alaskan dancing, singing, and drumming of songs from Alaska's major indigenous groups will be taught by guest Native elders and dancers. If sufficient interest, a dance group will be assembled using class members for spring presentation primarily in the Fairbanks area, including the Festival of Native Arts.
- ANS 161 3 Credits Fall**
Introduction to Tuma Theater (3+0) h
 (Same as THR 161)
 Introduction to playwriting and acting within an Alaskan Native cultural context. Original theatrical works based on traditional themes and contemporary issues will be developed and rehearsed. Tuma Theater will tour its annual production each spring, its membership to be selected from the class. (Prerequisite for ANS/THR 361, Advanced Tuma Theater.)
- ANS 250 3 Credits Fall and Spring**
Current Alaska Native Leadership Perspectives (3+0) s
 Prominent leaders in the Native community are brought into direct classroom contact with students to discuss important issues in rural Alaska and the larger Native community.
- ANS 251 1-3 Credits Fall and Spring**
Practicum in Native Cultural Expression (0+variable)
 Students actively and regularly engaged in the formal organization, promotion, and expression of Alaskan Native cultural heritage may enroll in this practicum for 1-3 credits. The practicum may be repeated through three semesters providing the accumulated credits do not exceed three. (Prerequisite: Permission of the Department Head.)



- ANS 301 3 Credits** **Alternate Fall**
Native Cultural Heritage Documentation (3+0) h
 A study of the methods by which significant aspects of Native life may be documented for research purposes and/or community interests. This course is particularly suitable for students interested in Native cultural heritage expression through the arts, literature, language and historical research. (Prerequisites: Hist. 100 and Anth. 242 or permission of instructor. Next offered: 1988-89.)
- ANS 310 3 Credits** **Fall**
Alaska Native Corporations (3+0) s
 An examination of Native corporation goals and methods as they implement the Alaska Native Claims Settlement Act and establish themselves within the larger political economy. (Prerequisites: Anth. 242 or P.S. 263 or Hist. 100; Econ. 101 and Econ. 137; or permission of instructor.)
- ANS 320 3 Credits** **Spring**
Language and Culture: Applications of Alaska (3+0) s
 (Same as Anth. 320)
 Examination of aspects of language, ethnicity, and their interrelationships. Emphasis is placed on the systems language uses to communicate ethnic identity and how communication between ethnic groups is affected by patterns of language use. Attention is paid to the applicability of these concepts to Native/non-Native communication patterns. (Prerequisites: ANS 120 and ANL 215 or 216; or permission of instructor.)
- ANS 325 3 Credits** **Alternate Spring**
Native Self Government (3+0) s
 (Same as P.S. 325)
 Comparative study of indigenous political systems, customary law and justice in Alaska emphasizing the organization of Native governance under federal Indian Law and Alaska state chartered local government with comparisons between Alaska Native political development and those of tribes in the contiguous 48 states and northern hemisphere tribal people. (Prerequisites: Hist. 100, P.S. 263. Next offered: 1989-90.)
- ANS 340 3 Credits** **Fall**
Contemporary Native American Literature (3+0) h
 (Same as Engl. 340).
 An exploration of the contemporary Native American writing in English, including novels, short stories, poetry, and plays. Some examples of Native American film will also be introduced when related to a writing. Works discussed in relation to cultural contexts and interpretations. (Prerequisite: Engl. 111 or permission of instructor.)
- ANS 351 1-3 Credits** **Fall and Spring**
Practicum in Native Cultural Expression (0+variable)
 Continuation of ANS 251, for students actively involved in advanced organization, promotion, and expression of Alaskan Native cultural heritage projects (Festival of Native Arts leadership, Tuma Theater, Theata magazine, etc.) A maximum of 3 practicum credits can be applied toward a Native studies major or minor. (Prerequisite: Permission of instructor.)
- ANS 361 3 Credits** **Fall**
Advanced Tuma Theater (3+0) h
 (Same as THR. 361)
 Continuation of ANS/THR 161 with more advanced involvement in writing (or other production oriented creative activity), research and development of original theatrical works to be performed by the Tuma Theater touring group. (Prerequisites: ANS/THR 161 and either THR 221, THR 241, THR 343, THR 347 or permission of instructor.)
- ANS 375 3 Credits** **Alternate Spring**
Native American Religion and Philosophy (3+0) h
 Philosophical aspects of Native American world views, emphasizing systems of belief and knowledge, explanations of natural phenomena, and relations of human beings to the natural environment through ritual and ceremonial observances. (Prerequisites: Anth. 242 or permission of the instructor; Phil. 201 is recommended. Next offered: 1989-90.)
- ANS 401 3 Credits** **Fall and Spring**
Knowledge of Native Elders (3+0) h
 Intensive study with prominent Native tradition-bearers in Native philosophies, values, and oral traditions. Students elicit traditional knowledge through methods and conventions of the cultural heritage documentation process. (Prerequisites: Hist. 100 or Anth. 242 and upper division standing.)
- ANS 415 3 Credits** **As Demand Warrants**
Comparative Economic Development Processes: Applications for Native Alaska (3+0) s
 Comparative examination of economic development processes in third and fourth world societies. Emphasis is placed on the identification of different economic development theories and practices, and on their applicability to socioeconomic conditions of Alaska Native people. (Prerequisites: Anth. 242 or Hist. 100; Econ. 101; or permission of instructor.)
- ANS 425 3 Credits** **Fall**
Federal Indian Law and Alaska Natives (3+0) s
 A "special relationship" developed between the federal government and Native Americans based on land transactions and recognition of tribal sovereignty. This course examines federal Indian law and policy which evolved from this relationship with special attention to the legal rights and status of Alaska Natives. (Prerequisites: P.S. 101 and Hist. 100; or permission of instructor; P.S. 263 is recommended.)
- ANS 430 3 Credits** **Fall**
Alaska Native Education (3+0) s
 Examination of the development of different school systems historically serving Native people, current efforts toward local control, and the cross cultural nature of this education. (Prerequisites: Anth. 242 or Hist. 100; or permission of instructor.)
- ANS 475 3 Credits** **Spring**
Alaska Native Social Change (3+0) s
 Study is made of tradition and change in Native social institutions in contemporary society. Attention is given to methods of identifying and analyzing significant Native social change processes for better public understanding. (Prerequisites: ANTH 242 or permission of the instructor.)
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- ## Alaska Studies
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- ALST 103A 1 Credit** **As Demand Warrants**
Creative Response (1+0)
 Introduces students to sampling of the stories of the indigenous people of Alaska. Reviews sample work of Native Alaskan artists of the state. Examines music of Inupiat, Yup'ik and Koyukon cultures (songs and dances).
- ALST 103B 1 Credit** **As Demand Warrants**
The People (1+0)
 Deals with topics of sociology, psychology and politics found in the state of Alaska. Surveys the area of social sciences and relates issues to Alaskan culture.
- ALST 103C 1 Credit** **As Demand Warrants**
The Land (1+0)
 Introduces students to geography and branches of earth science as they related to the land mass of Alaska. Current issues related to the particular area of study are also included.
- ALST 107 1 Credit** **As Demand Warrants**
Land Resource Management (1+0)
 This course provides students with the tools necessary to become more actively involved in overseeing the use of land and the political aspects of natural resource management. Land and resource management is the application of knowledge and skills necessary to take care of the land and other natural resources for people's welfare.
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- ## American Sign Language
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- ASLG 101 3 Credits** **As Demand Warrants**
American Sign Language I (3+0)
 Visual language of signs, gestures and facial expressions used by most deaf Americans. Emphasis is on conversational skills. **ASLG 110 1 Credit** **As Demand Warrants**
American Sign Language Prac (1+0)
 A course designed to develop skill in and practice with American Sign Language. Conducted entirely in sign.
- ASLG 202 3 Credits** **As Demand Warrants**
American Sign Language II (3+0)
 A continuation of American Sign Language I, with emphasis on receptive skills. Expressive skills in using ASL will be approached by further study of grammar structure. During ASL I and II, students will be exposed to over 1,000 signs and variations in conversational settings. (Prerequisite: ASL 101 or permission of instructor.)

ASLG 203 3 Credits As Demand Warrants
American Sign Language III (3+0)
 ASLG III is a continuation of American Sign Language II. Students will learn more of the structure and develop increased skills in both expressive and receptive communication. (Prerequisite: ASL 202 or permission of instructor.)

ASLG 204 3 Credits As Demand Warrants
American Sign Language IV (3+0)
 A continuation of American Sign Language III. Students will gain a deeper understanding of the structure and gain more skill in both expressive and receptive communication. (Prerequisite: ASL 203.)

Anthropology

ANTH 101 3 Credits Fall and Spring
Introduction to Anthropology (3+0) s
 An introduction to the study of human societies and cultures based on the findings of the four subfields of the discipline: archaeological, biological, cultural and linguistic. Materials fee: \$10.00.

ANTH 102 3 Credits Fall and Spring
Faces of Culture (3+0)
 Television enhanced instruction in cultural anthropology including an introduction to methods, theories, fundamental concepts and foundations for understanding differences in cultures; provides background for more specialized courses in cultural anthropology. Telecourse fee: \$20.00.

ANTH 105 1 Credit As Demand Warrants
Introduction to the History and Culture of the Seward Peninsula (1+0)
 (Same as Hist. 105.)
 This course introduces the student to the cultural history of the peoples who have lived in or near the Seward Peninsula for the last 10,000 years. Information is presented from the disciplines of physical anthropology, ethnography, ethnohistory, linguistics, archeology, ecology and climatology. Through lectures, discussions, readings, films, guest speakers and examination of Eskimo artifacts, students gain a basic familiarity with the several Eskimo and Euroamerican cultures which have existed in western Alaska.

ANTH 111 3 Credits Alternate Spring
Ancient Civilizations (3+0) s
 A survey of the major civilizations of the Old and New World from a comparative, anthropological perspective. Antecedents and influences of these civilizations on their neighbors will be stressed. Major societal institutions to be considered include economics, science, religion, and social organization. (Next offered: 1988-89.)

ANTH 121 3 Credits Alternate Spring

ANTH 123 3 Credits Alternate Fall
Origins of Alaska's Native Peoples (3+0) s
 Origins and affinities of native Alaskan peoples are examined from an archaeological perspective. Native groups whose prehistory is examined include Yup'ik, Inupiaq, Aleut, Tlingit, and Athabaskan. (Next offered: 1989-90.)

ANTH 200 3 Credits Alternate Fall
Social/Cultural Anthropology (3+0) s
 A more advanced introduction to social and cultural anthropology designed to be of interest to majors and non-majors. Examination of a variety of social and cultural systems with emphasis on kinds of problems with which anthropologists struggle in seeking to understand the structure, process, and the role of the individual in such systems. Conceptual framework and methodology which social and cultural anthropologists employ in attempting to analyze social action will be closely examined. The course will attempt to develop in the student an awareness of the gaps between the common sense views of our culture and a scientifically adequate account of human action. (Next offered: 1988-89.)

ANTH 203 3 Credits Every Third Spring
Women in Society (3+0) s
 An examination of the nature of sex roles cross-culturally. The history of the study of sex roles, with an emphasis on female roles, in anthropology is discussed. Current research on the biological and cultural aspects of these roles is presented and various hypotheses in anthropology regarding male and female behavior cross-culturally are discussed and supplemented by in-depth studies of cultures representing different types of techno-environmental adaptation — hunting, horticultural, pastoral, agricultural, and industrial societies. (Next offered: 1989-90.)

ANTH 210 3 Credits Every Third Spring
New World Prehistory (3+0) s
 The culture history of native Americans from earliest times excluding Alaska and Canada, including those in Mexican and Peruvian states. (Prerequisites: ANTH 101 or 211 or permission of instructor. Next offered: 1989-90.)

ANTH 211 3 Credits Alternate Fall
Fundamentals of Archaeology (2+3) s
 An introduction to methods and techniques of archeological field and laboratory research. Materials fee: \$10.00. (Next offered: 1989-90.)

ANTH 212 3 Credits Alternate Fall
World Prehistory (3+0) s
 The archaeological record for the development of human culture from the very beginnings of humankind to the rise of civilization. (Prerequisites: ANTH 101 or 211 or permission of instructor. Next offered: 1988-89.)

ANTH 222 3 Credits Spring
Human Evolution (3+0) n
 The fossils — their morphology, inferred functional and ecological relationships, geochronologic and geochronometric placements. Current taxonomic and phylogenetic assessments, theories of evolutionary processes, behavioral primatology and the role of culture in hominid evolution are also major concerns.

ANTH 230 3 Credits Fall
The Oral Tradition: Folklore and Oral History (3+0) h
 An introduction to the study and collection of folklore and oral history, with focus on the importance of oral tradition in human communication and the advantages and disadvantages of recording and studying it. Methods of findings of sociocultural anthropology and anthropological linguistics in relation to oral traditions of a variety of cultures; study by folklorists and historians. Academic approaches to collection and interpretation compared to and contrasted with those whose goal is to preserve their own traditions. A field project is required.

ANTH 240 3 Credits Alternate Fall
Native Peoples of North America (3+0)
 A survey course of the cultures of the native peoples of continental United States and Canada, excluding Alaska. (Next offered: 1989-90)

ANTH 242 3 Credits Spring
Native Cultures of Alaska (3+0) s
 An introduction to the traditional Aleut, Eskimo, and Indian (Athabaskan and Tlingit) cultures of Alaska. Comparative information on Eskimo and Indian cultures in Canada is also presented. Includes a discussion of linguistic groupings as well as the cultural groups; presentation of population changes through time; subsistence patterns, social organization and religion in terms of local ecology. Precontact interaction between native groups of Alaska is also explored. This is a general introductory course presenting an overall view of the cultures of Native Alaskans. Materials fee: \$20.00

ANTH 245 3 Credits Alternate Spring
Circumpolar Cultural Traditions and Transformations (3+0) s
 Survey of traditional cultural adaptations among the indigenous peoples of northern North America and northern Eurasia. Parallels and contrasts in European colonization of northern regions and the historical responses of native societies. Economic development, government policy and the current position of circumpolar culture in Canada, the United States, Scandinavia and the Soviet Union. (Next offered: 1988-89.)

ANTH 250 3 Credits Fall and Spring
Archeological Laboratory Techniques (1+3)
 Practical experience in archeological laboratory procedures including lithic analysis and lithic tool typology. Students will examine and analyze collections from several early man sites in Alaska, and will be actively engaged in helping solve specific research problems that pertain to those collections. (Prerequisite: permission of instructor.)

ANTH 300 3 Credits As Demand Warrants
Anthropology of Religion (3+0) s
 This course focuses on one of the more fascinating subsystems of human culture and society — religion or supernatural belief. As approached from the perspective of anthropology, the study of religion is both comparative and wide ranging. While much of the material will emphasize religion in the context of "primitive" society, its role in the more complex society will also be examined. Among the various topics the student can expect to encounter are: religious practitioners, ritual, belief systems, and the relationship of religious behavior to other aspects of social behavior. (Prerequisite: Junior standing or permission of instructor.)

- ANTH 305 3 Credits As Demand Warrants**
Comparative Political and Legal Systems (3+0) s
 An examination of political systems and the law from a comparative standpoint. The primary focus will be on case studies drawn from non-industrial societies, developing nations, and parapolitical systems or encapsulated societies, such as native peoples in the U.S. Major areas of coverage will be political structures and institutions; social conflict, dispute settlement, social control and the law, political competition over critical resources; and ethnicity. (Prerequisites: ANTH 101 or 200 or permission of instructor.)
- ANTH 306 3 Credits As Demand Warrants**
Economic Anthropology (3+0) s
 This course addresses the fundamental issue of the relationship between economic and other social relations. The primary focus is on preindustrial societies because a central task of the course is to determine the relevance of formal economics to small-scale societies and developing nations. Included for study are such topics as exchange, formal and substantive economics, market economics, rationality, political economy, and the economics of development. (Prerequisites: ANTH 101 or 200 or permission of instructor.)
- ANTH 307 3 Credits Alternate Spring**
Kinship and the Family (3+0) s
 Examination through case studies of the forms and function of family and household organization, kinship and marriage in diverse human socio-cultural systems. Case studies will be drawn from tribal and complex societies including contemporary United States. (Prerequisites: ANTH 101 or 200 or permission of instructor. Next offered: 1989-90.)
- ANTH 309 3 Credits Alternate Springs**
Arctic Prehistory (3+0) s
 The archaeological cultures of the northern regions from the time of first occupation up to the ethnographic present. Particular attention will be paid to the adaptations to changing environments in time and space as seen through past technological and economic systems, as well as settlement patterns. Materials fee: \$25.00. (Prerequisites: ANTH 101 or 211, or permission of instructor. Next offered: 1989-90.)
- ANTH 315 3 Credits Alternate Fall**
Human Biology (2+3) n
 The biology of recent and modern human populations, including systematic, behavior, ecology and inter- and intrapopulation genetic and morphological variations. Human adaptations to heat, cold, high altitudes, and changing nutritional and disease patterns. Introduction to human skeletal biology, including metrical and nonmetrical variation, aging and sexing skeletal remains, and paleopathology. Materials fee: \$10.00. (Prerequisite: ANTH 222 or BIOL 103. Next offered: 1989-90.)
- ANTH 320 3 Credits Spring**
Language and Culture: Applications of Alaska (3+0) s
 (Same as ANS 320)
 Examination of aspects of language, ethnicity, and their interrelationships. Emphasis is placed on the system language uses to communicate ethnic identity and how communication between ethnic groups is affected by patterns of language use. Attention is paid to the applicability of these concepts to native/non-Native communication patterns. (Prerequisites: ANS 120 and ANL 215 or 216 or permission of instructor.)
- ANTH 321 3 Credits As Demand Warrants**
Human Population Biology (3+0) n
 An areal survey of the physical anthropology of the peoples of one major geographic region of the world. Areas to be covered during different semesters will include: Circumpolar regions, North and South America, and Oceania. The course will emphasize the analysis of patterns of biological variation within and between prehistoric and modern human populations in a given area. General problems to be considered include origins and historical relationships, analysis of microevolutionary processes and adaptation to climatic stress. (Prerequisite: ANTH 315 or permission of instructor.)
- ANTH 323 3 Credits Alternate Fall**
Archaeology of China from Earliest Times to 771 B.C. (3+0) s
 A detailed survey of weary human developments, the rise of agricultural communities, and the Golden Age states (Xia, Shang, Zhou). (Prerequisites: Any archaeology course or Asian history course or permission of instructor. Next offered: 1989-90.)
- ANTH 328 3 Credits Every Third Spring**
Historical and Contemporary Indian-White Relations (3+0) s
 Relationships between native North American and European societies from the late 15th century to the present. Changes in government policies, rural-reservation adaptations, urban migration, political movements and pan-Indianism will be discussed in the light of general processes of acculturation, underdevelopment, ethnic change and nationalism. (Prerequisite: Anth. 240 or permission of instructor. Next offered: 1988-89.)
- ANTH 329 3 Credits Alternate Fall**
Peoples of the Russian North (3+0) s
 A study of the native peoples and cultures of the northern region of the Russian Federation (R.S.F.S.R.) stressing the ethnography of the precontact societies, the historical interaction of Russian culture including the Soviet state. (Prerequisites: ANTH 101 or 200 or permission of instructor. Next offered: 1988-89.)
- ANTH 350 3 Credits Every Third Fall**
Russian Period in Alaska: 1741-1867 (3+0)
 A survey of the Russian period in Alaskan history, with emphasis on the social and cultural impacts on native Alaskans. (Prerequisites: Jr. standing or permission of instructor. Next offered: 1988-89.)
- ANTH 380 3 Credits Alternate Fall**
The People of Alaskan Southwest: Aleuts Kodiak Islanders and the Chugach (3+0)
 Cultural heritage and present conditions of the Aleuts, including people of the Aleutian archipelago, Kodiak Islanders, people of the Alaska Peninsula and the Chugach of Prince William Sound. Materials fee: \$25.00. (Prerequisites: ANTH 242 or permission of instructor. Next offered: 1989-90.)
- ANTH 381 3 Credits Alternate Spring**
The Inupiaq and Yup'ik Peoples (3+0)
 Study of the contemporary conditions and traditional heritage of the Inupiaq and Yup'ik peoples including the impact of Euroamericans on these populations and cultures. Materials fee: \$20.00. (Prerequisites: ANTH 242 or permission of instructor. Next offered: 1989-90.)
- ANTH 382 3 Credits Alternate Spring**
The People of Alaskan SE (3+0)
 The Tlingit, Haida and Tsimshian societies are discussed in the framework of Northwest Coast culture-area, including impact of Russian penetration and of the recent historical factors. Materials fee: \$15.00. (Prerequisites: ANTH 242 or permission of instructor. Next offered: 1989-90.)
- ANTH 383 3 Credits Alternate Fall**
Athabaskan Peoples of Alaska and Adjacent Canada (3+0)
 Study of the contemporary conditions and traditional heritage of the Athabaskan populations of Alaska and Canada, including the impact of Euroamericans on these populations and cultures. Materials fee: \$20.00. (Prerequisites: ANTH 242 or permission of instructor. Next offered: 1988-89.)
- ANTH 410 3 Credits Alternate Fall**
History of Social/Cultural Anthropology (3+0) s
 The major theoretical approaches in cultural/social anthropology presented chronologically from the formulation of the discipline of anthropology to current theory. The substance of the various approaches is used for discussions regarding the nature of the discipline, its goals and methods, and the relevance of theoretical perspectives to interpretations in anthropology. (Prerequisite: Junior standing or permission of instructor. Next offered: 1988-89.)
- ANTH 412 3 Credits As Demand Warrants**
Anthropology of Art (3+0)
 Anthropological study of art in cross-cultural perspective. Primary focus is on social context of art production and use, and on cross-cultural variations in definition of an artist's role. (Prerequisites: Senior standing or permission of instructor.)
- ANTH 413 3 Credits Alternate Spring**
Archaeological Method & Theory (2+3) s
 Archaeological methods and analysis will be presented as the framework for discussion and assessment of different perspectives in archaeology. These various perspectives will be illustrated through the study of their application to specific research problems. Materials fee: \$10.00. (Prerequisite: A course in archaeology or permission of the instructor. Next offered: 1988-89.)
- ANTH 414 3 Credits As Demand Warrants**
Environmental Archaeology (3+0) n
 Introduction to Quaternary environmental reconstruction through the integration of geological, archaeological, botanical, and zoological data. (Prerequisite: A course in archaeology or permission of the instructor.)
- ANTH 421 3 Credits As Demand Warrants**
Analytical Techniques (2+3)
 Classification, sampling, collection and analysis of anthropological data: parametric and nonparametric significance tests and measures of association, analysis of frequency data, estimating resemblance using multiple variables, computer simulations and methods of illustrating results of analysis. (Prerequisites: Any 200 level Anthropology course.)

- ANTH 422 3 Credits As Demand Warrants**
Human Osteology (2+3) n
 Human skeletal analysis: bone biology, skeletal anatomy, aging and sexing, metric and nonmetric traits of skeleton and dentition, paleopathology, and paleodemography. Inferences on genetic relationships between and patterned behavior within prehistoric groups derived from skeletal material. Materials fee: \$10.00. (Prerequisite: ANTH 315 or permission of instructor.)
- ANTH 428 3 Credits Every Third Fall**
Ecological Anthropology (3+0) n
 The investigation of the biological, environmental and cultural factors and their interplay in defining the human condition, with examples from Arctic and other populations. (Prerequisites: Junior standing or permission of instructor. Next offered: 1989-90.)
- ANTH 461 3 Credits Alternate Fall**
Stratigraphy (2+3)
 Sedimentation and stratification as site formational and deformational processes and documentation of sites. (Prerequisites: Geos. 101, ANTH 211. Next offered: 1989-90.)
- ANTH 465 3 Credits Alternate Spring**
Geoarchaeology (3+0)
 (Same as Geos. 465)
 The geological context of archaeological sites and the geologic factors that affect their preservation, with emphasis on Alaska. Includes a one or two-day field trip planned for a weekend in late April or early May. (Prerequisites: Geos. 101, an introductory course in archaeology, or permission of instructor. Next offered: 1989-90.)
- ANTH 600 0-1 Credits Fall and Spring**
Anthropology Colloquium (1+0)
 An interdisciplinary colloquium focusing on topics related to the north with emphasis on anthropology and related disciplines. May be repeated. (Prerequisite: Graduate standing or permission of department head.)
- ANTH 601 3 Credits Alternate Fall**
Proseminar in Social/Cultural Anthropology (3+0)
 An intensive graduate level survey on the subdiscipline of social/cultural anthropology dealing with the methods and theories in the field. Special attention will be directed at examining the substantive materials resulting from social/cultural studies. (Prerequisites: Graduate standing or permission of instructor. Next offered: 1989-90.)
- ANTH 604 3 Credits As Demand Warrants**
Seminar: Language and Culture (3+0) s
 Participants in the seminar will examine in-depth the interrelation between language and culture in the context of theories of human communication, semiotics, and maintenance of cultural boundaries. In particular, the influence of the Sapir/Whorf hypothesis in anthropological thinking today and the field of ethnohistory will be examined, as well as language change in contact situations, with emphasis on emergence of pidgins and Creole languages and effects of the introduction of writing. (Prerequisites: Graduate standing; previous credit in anthropological or descriptive linguistics or permission of instructor.)
- ANTH 608 3 Credits Every Third Spring**
Classics in Anthropology (3+0)
 Landmark contributions to anthropological literature, ethnographies and theoretical works, will be discussed. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)
- ANTH 611 3 Credits Alternate Fall**
Proseminar in Archaeology (3+0)
 An intensive coverage of advanced topics in archaeological theory and techniques of data recovery and analysis. The course will emphasize both field and laboratory aspects as well as the substantive results of archaeological research. Materials fee: \$25.00. (Prerequisites: Graduate standing or permission of instructor. Next offered: 1989-90.)
- ANTH 612 3 Credits As Demand Warrants**
Paleoecology (3+0)
 Advanced study of Quaternary environments. The influences of climatic change and the interrelationships of physical and biological factors on the distribution and evolution of biota including humans will be discussed. (Prerequisite: graduate standing or permission of the instructor.)
- ANTH 613 3 Credits As Demand Warrants**
Seminar: Problems in Arctic Archaeology (3+0)
 A seminar which focuses in depth upon topics of current interest in North American Arctic archaeology including Beringian prehistory, Interior archaeology, coastal archaeology, past arctic adaptations, etc. (Prerequisites: Graduate standing or permission of instructor.)
- ANTH 614 3 Credits Alternate Spring**
Archaeology of Siberia (3+0)
 A thorough survey of the Paleolithic, Mesolithic, Neolithic, Bronze and Iron ages of Siberia through an examination on key archaeological sites. Data from archaeology, ethnology, linguistics and paleoanthropology will be applied to ancient population changes and the ethnogenesis of Siberian peoples. (Prerequisites: Graduate standing or permission of instructor. Next offered: 1989-90.)
- ANTH 615 3 Credits As Demand Warrants**
Seminar: Archaeological Method and Theory (3+0)
 This course provides training and experience in analyzing archaeological data sets and writing site reports. It will introduce current methodological and theoretical issues in archaeology, and guide the student through the development of a research design. (Prerequisites: Graduate standing.)
- ANTH 616 3 Credits Alternate Spring**
Classics in Archaeology (3+0)
 Archaeological monographs, books, and articles which have influenced the direction of the discipline; alternately general classics and arctic-region classics. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1988-89.)
- ANTH 621 3 Credits Alternate Spring**
Proseminar in Physical Anthropology (3+0)
 An intensive graduate level survey of the subdiscipline of physical anthropology dealing with historical developments and current problems in the field. The general areas of human paleontology and human population biology will be stressed. (Prerequisites: Graduate standing or permission of instructor. Next offered: 1989-90.)
- ANTH 622 3 Credits As Demand Warrants**
Problems in Human Population Biology (3+0)
 Preview of current methodological and theoretical advances in human population biology. Problem areas to be considered will include behavior, genetic analysis, the biological basis of human social behavior, phylogenetic reconstruction, the evidence for natural selection in human populations, human ecology, and demography. Emphasis will be placed on the recent literature of the field. (Prerequisites: Graduate standing or permission of instructor.)
- ANTH 630 3 Credits Alternate Spring**
Anthropological Field Methods (3+0)
 This course concentrates on the practical concerns and aspects of doing anthropological field research. Students are exposed to the relevant literature and significant discussions on the different aspects of fieldwork. In addition, students will gain practical experience in the problems, techniques and methods of fieldwork involving people from similar or distinct cultural backgrounds. The preparation of research proposals is also given attention. (Prerequisites: Graduate standing or permission of instructor. Next offered: 1988-89.)
- ANTH 637 3 Credits As Demand Warrants**
Methods in Ethnohistorical Research (3+0)
 In the seminar, students of anthropology are introduced to the methods of historical research, particularly the critical evaluation of written documents, problems of archaic language and paleography, and methods for assessing art and folkloristic tradition as sources of history. Oral history and the data of language and archaeology are considered. (Prerequisites: Graduate standing in anthropology or permission of instructor.)
- ANTH 640 3 Credits As Demand Warrants**
Problems in Anthropology (3+0)
 Examination and criticism of exemplary landmarks in the anthropological literature. The course will be devoted to a subdiscipline during each offering. (Prerequisites: Graduate standing or permission of instructor.)
- ANTH 650 3 Credits Every Third Spring**
Anthropological Perspectives on Russian America (3+0)
 An in-depth study of Russian penetration in North America, Russian institutions, and Russian impacts on the Aleut, Tlingit and Yup'ik. (Prerequisite: Graduate standing or permission of the instructor. Next offered: 1990-91.)
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- ## Applied Art
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- APAR 100 1 Credit As Demand Warrants**
Basic Video Workshop (1+1)
 This will be a 'hands-on' course, introducing the student to basic video equipment operation and elementary equipment maintenance. Camera techniques, portable video recorders, lighting, audio, and simple video production will all be covered.

- APAR 103 1 Credit As Demand Warrants**
Editing Videotape (1+1)
 An introduction to the principles and operations in the electronic editing of videotape. This 'hands-on' course will be of particular value to the serious user, either at work or in the home. Persons successfully completing this course will qualify for access to Media Center videotape editing facilities.
- APAR 105 1 Credit As Demand Warrants**
Community TV Production (1+1)
 This course is designed for people who wish to become actively involved in producing programming for the Nome Public Access Cable Television (NPACT) channel. The class will have 'hands-on' training with a variety of video equipment and will be responsible for producing at least one 30-minute production. Participants will handle all aspects of production. Emphasis will be on using available video technology to fulfill a communications need. This will be a production lab class which will run 10 weeks.
- APAR 107 1 Credit As Demand Warrants**
Beading (1+1)
 This introductory course will teach the application of beads to various materials, three kinds of stitches, and use of a bead loom.
- APAR 157 1-2 Credits As Demand Warrants**
Skin Sewing (1+2)
 This is an introduction to skin sewing. Students will begin sewing projects dependent upon their individual ability and experience levels. After the students have been assessed, they will be introduced to larger projects (e.g. slippers, mukluks, mittens, fur hats, vests and ruffs.) Materials fee: \$35.00.
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- ## Applied Business
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- ABUS 051 3 Credits As Demand Warrants**
Bookkeeping For Business (3+0)
 Basic concepts and procedures of practical bookkeeping. Fundamental bookkeeping principles, practices, and procedures necessary in recording and reporting financial data for service and merchandising business. Covers businesses owned by one individual only (sole proprietorships.)
- ABUS 052 3 Credits As Demand Warrants**
Bookkeeping for Business II (3+0)
 Continuation of Acct. 051. Accounting for business partnerships of corporations. Covers other materials selected by teacher, based on student interest.
- ABUS 056 1 Credit As Demand Warrants**
Mathematics for the Office (1+0)
 This course reviews basic math processes applied to banking, payroll, business expense reports, commissions, and discounts.
- ABUS 080 1 Credit As Demand Warrants**
Keyboarding (0+3)
 This course provides the student an opportunity to develop keyboarding proficiency. This course will consist of computerized typing lessons to teach key locations, drills to build speed and accuracy, typing skills evaluation and word processing concepts.
- ABUS 081 3 Credits As Demand Warrants**
World of Business (3+0)
 Preparatory skills for business.
- ABUS 083 3 Credits As Demand Warrants**
Introductory Accounting (3+0)
 This course is designed for the student who has not had high school bookkeeping. This course covers fundamental accounting procedures for a one-owner service and merchandising business.
- ABUS 100 3 Credits As Demand Warrants**
Accounting For Small Business (3+0)
 Financial accounting for small businesses, particularly aimed at the practicality of local business.
- ABUS 120 1-3 Credits As Demand Warrants**
Basics of Investing
 This course covers personal financial planning, goal setting, and investing. Also, a study will be made of stocks, bonds, trusts, securities, options, real estate and other investment vehicles. The topics of inflation, taxes, interest rates, retirement, and selecting financial planners are covered.
- ABUS 130 3 Credits As Demand Warrants**
Real Estate (3+0)
 This course introduces students to the broad social and economic impact of real estate and provides fundamental preparation work for the Real Estate licensing examination. Course content includes essential details in buying, selling, leasing, and investing in residential and investment real estate. Also contracts, deeds, mortgages, leases, title insurance, sales, brokerage and other related subjects are discussed.
- ABUS 135 3 Credits As Demand Warrants**
Recordkeeping for Business (3+0)
 A course designed to teach skills in keeping business records and banking procedures as a cashier, sales clerk, purchasing agent or payroll clerk.
- ABUS 141 2 Credits As Demand Warrants**
Payroll Accounting (2+0)
 An introduction to payroll records and laws that payroll personnel need to know. It acquaints students with methods used to compile payroll information, compute earnings, figure deductions, calculate net wages, and how to prepare the necessary city, state and federal tax report forms.
- ABUS 142 2 Credits As Demand Warrants**
Office Accounting I (2+0)
 A beginning course introducing the basic accounting procedures used in service and trade businesses. It presents the complete accounting cycle including recordkeeping, posting and preparation of financial statements, bank reconciliation, payroll computations and closing books for a period. Also, accounts receivable, accounts payable, purchasing, credit and other accounting requirements common to retail, trade and service businesses are covered.
- ABUS 143 2 Credits As Demand Warrants**
Office Accounting II (2+0)
 An introduction to financial activities of partnerships and corporations with emphasis on accrual basis of accounting. Areas covered include: notes payable, notes receivables, interest transactions, bad debts, partnership equity accounting, corporate stock transactions, corporate earnings, capital transactions, bonds, long term liabilities and investments.
- ABUS 154 3 Credit As Demand Warrants**
Human Relations (3+0)
 A basic course in human relations exploring attitudes, self-concepts, personal communication styles, motivation, interactions, positive reinforcements, team building and leadership development.
- ABUS 155 2 Credits As Demand Warrants**
Business Math (2+0)
 A review of basic math computation skills applied to various business areas. Emphasis is on applications.
- ABUS 156 2 Credits As Demand Warrants**
Writing for the Office (2+0)
(Same as OP 156)
 This course will cover writing tasks encountered in typical office situations. Students will learn to write successful letters, minutes, and reports which convey their intent and get desired responses. The course is offered in two modules: Module A-1 Credit; Module B-1 Credit.
- ABUS 160 3 Credits As Demand Warrants**
Principles of Banking (3+0)
 A comprehensive introduction to banking in today's economy. Topics include language and documents of banking, check processing, teller functions, deposits, credit and payment functions, loans, investments, trust, the Federal Reserve System and other regulatory agencies.
- ABUS 161 3 credits As Demand Warrants**
Found/Structure-Credit Union (3+0)
 An introduction to credit unions, their organization and functions, financial development, regulations, insurance, bonding and management.
- ABUS 165 3 Credits As Demand Warrants**
Installment Lending (3+0)
 Principles of credit evaluations, open-end credit, marketing bank services, collection policies and procedures, financial statement analysis, and other details of installment credit.
- ABUS 166 3 Credits As Demand Warrants**
Residential Mortgage Lending (3+0)
 Provides a background in the varied real estate mortgage credit operations of commercial banks; addresses the manner in which funds are channeled into mortgage markets, the financing of residential and income producing property and administrative tasks common to most mortgage departments.

- ABUS 167 3 Credits As Demand Warrants**
Branch Management
 Presents a comprehensive overview of the branch functions and the manager's role in their operations and provides a complete introduction to the functional aspects of the branch management position.
- ABUS 179 3 Credits As Demand Warrants**
Fundamentals of Supervision (3+0)
 A course introducing effective supervisory concepts including planning, organizing, and staffing functions. Other topics include communicating and delegating effectively, morale, productivity, decision making, position discipline and performance goals development.
- ABUS 180 3 Credits As Demand Warrants**
Commercial Lending (3+0)
 This course provides an introductory overview of the commercial lending function. It is divided into four sections: commercial lending overview, the lending process, portfolio management, and regulation and business development.
- ABUS 181 3 Credits As Demand Warrants**
Law & Banking Applications (3+0)
 Examination of the legal structure that is implicit in the normal course of bank operations. Exploration of legal situations that occur in the deposit, collection, dishonor and return, and payment of checks. Legal relationships of the various parties in bank collection channels and between a bank and its depositors are discussed. (Prerequisite: Principles of Banking or Foundations & Structure of Credit Unions.)
- ABUS 185 3 Credits As Demand Warrants**
Teller Operations Training (3+0)
 Entry level job skills for work as a teller in a bank, savings loan, or credit union. Principles of banking, banking terms, and concepts, teller operations such as balancing, cash control, handling financial instruments, detecting forgery and counterfeit money, responding to robbery, and customer relations. (Prerequisite: OP 195 Pre-Employment Skills.)
- ABUS 188 2 Credits As Demand Warrants**
Personal Income Tax (2+0)
 A basic course in personal income tax, covering taxable income, deductions, credit, exemptions, and computation. Also, computer use, recordkeeping methods, tax forms and new tax laws are studied.
- ABUS 211 2 Credits As Demand Warrants**
Tax For Business Entities (2+0)
 Covers tax reports which must be submitted by a business. Taxplanning and strategies to reduce the tax bill, payroll tax reports and depository requirements, methods of compensation, acquiring and disposing of business assets, and planning for corporate reorganization or liquidation and a review of new tax laws are also studied.
- ABUS 221 1-3 Credits As Demand Warrants**
Microcomputer Accounting
 This course covers the use of computers to process accounting transactions and provides an understanding of available software packages, microcomputer systems and hardware available in today's market. Computer terminology, system analysis, and actual computer operations in accounting are introduced. (also see CAPS 221.)
- ABUS 222 3 Credits As Demand Warrants**
Computer Applications in Business (3+0)
 This course is designed to provide the student with the skills and knowledge to use a microcomputer to solve business problems. The primary tools for problem solution will be the LOTUS 1-2-3 spreadsheet program and a general ledger accounting program. Both programs are supplied and instruction in the use of each is provided. (Prerequisite: One accounting course or instructor's approval.)
- ABUS 223 3 Credits As Demand Warrants**
Real Estate Law (3+0)
 A practical course surveying the various kinds of deeds and conveyances, mortgages, liens, rentals, appraisals, and other transactions in the field of real estate and the law.
- ABUS 224 3 Credits As Demand Warrants**
Money And Banking (3+0)
 Basic economic principles as they relate to banking. Highlights are on the economy and how it works, the Federal Reserve System, the business of banking, monetary policy and its impact on financial markets and banks, alternative theories of money's role in the economy, fiscal policy and trends in banking. (Prerequisite: ABUS 160 or ABUS 161.)
- ABUS 230 3 Credits As Demand Warrants**
Applied Intermediate Accounting (3+0)
 Review of accounting principles with emphasis on working capital, plant assets, intangible assets and financial statement presentation. Introduction to current accounting pronouncements.
- ABUS 231 3 Credits As Demand Warrants**
Introduction to Personnel (3+0)
 A class on the organizational structure of a company, job analysis, staffing and organization, employee growth and development, employee supervision and developing leadership skills.
- ABUS 232 3 Credits As Demand Warrants**
Fundamentals of Management (3+0)
 An examination of the basic functions of management to include planning, organizing, staffing, directing and controlling with particular attention to the human aspects of management and decision making. (Prerequisite: BA 151 or instructor permission.)
- ABUS 233 3 Credits As Demand Warrants**
Financial Management (3+0)
 Analysis of the methods of corporate financial planning and control, asset management, capital budgeting, and financial markets and instruments. (Prerequisite: BA 151, ACCT 101.)
- ABUS 234 3 Credits As Demand Warrants**
Financial Counseling (3+0)
 Introduction to financial counseling processes, choosing and implementing actions plans, evaluation clients needs, generation of alternative solutions, problem solving, decision making and ethics in counseling relationships.
- ABUS 241 3 Credits As Demand Warrants**
Applied Business Law I (3+0)
 A survey of the legal aspects of business problems including basic principles, institutions and administration of law in contracts, agency, employment and personal sales and property ownership. (Prerequisite: BA 151.)
- ABUS 242 3 Credits As Demand Warrants**
Applied Business Law II (3+0)
 A survey of legal aspects of business problems including basic principles, institutions, and administration of law in insurance, suretyship (negotiable instruments), partnerships, corporations, trusts, wills, bankruptcy, torts and business crimes. (Prerequisite: BA 241.)
- ABUS 243 3 Credits As Demand Warrants**
Applied Cost Accounting (3+0)
 Principles and applications of cost accounting for manufacturing and non-manufacturing firms. The course covers job order and process costing with analysis of material and labor costs, overhead, inventory controls, production flow, and work in progress. Budgeting and decision making are emphasized using cost accounting methods. (Prerequisite: ACCT 101, ACCT 102 or ABUS 142 and ABUS 143.)
- ABUS 244 3 Credits As Demand Warrants**
Loan Officer Development (3+0)
 A course designed to study and develop interpersonal skills necessary for dealing with customers and bank personnel. Other areas of study include: loan interview, problem identification, credit development decision, communications, credit file reports, loan pricing, and negotiating skills.
- ABUS 250 3 Credits As Demand Warrants**
Introduction to Managerial Accounting (3+0)
 A course in the use of accounting information for managerial decisions, planning and control. Topics include the accounting process, responsibility in accounting, performance measurement, capital budgeting and analysis of financial reports. (Prerequisite: ACCT 101, 102.)
- ABUS 252 3 Credits As Demand Warrants**
Business Statistics (3+0)
 Introduces descriptive and inferential statistics. Includes measures of control, tendency and variation, partial and multiple correlation and regression, time series and forecasting. Presents computer applications. (Prerequisite: must have sophomore standing or instructor permission.)
- ABUS 253 3 Credits As Demand Warrants**
Principles of Retailing (3+0)
 A course to acquaint students with current retail practices and technologies to assist them in preparing for a career in retailing or a service business. Areas covered include merchandising, store operation, computerized inventory control and electronic cash registers, finance and credit, personnel, sales promotions and selling.
- ABUS 254 3 Credits As Demand Warrants**
Salemanship (3+0)
 Designed for both people with and without sales experience. Explores salemanship as a skill individuals use in selling themselves and their ideas as well as products and services. Topics include: personal selling, buyer behavior and communication, creative selling process, sales management, and time-use management.

- ABUS 257 1 Credit As Demand Warrants**
Accounts Receivable Management (1+0)
 Covers the entire A/R system: credit policy and management, billing cycles, A/R reporting; collections procedures and legalities, analysis of A/R reports and functions of the Credit Department.
- ABUS 258 1 Credit As Demand Warrants**
Purchasing And Cost Control (1+0)
 Covers the purchasing and accounts payable systems of an organization of business; forms design and use, accounts payable department functions, design of systems, receiving of merchandise, approving and paying of invoices, evaluating and choosing supplies, accounting for accrued expenses, cash flow management, purchasing and inventory control.
- ABUS 261 3 Credits As Demand Warrants**
Analyzing Financial Statements (3+0)
 An introduction to statement analysis, accounting data, cash flow management ratios, comparative statements, forecasting, liquidity, solvency and capital structure as they related to financial conditions and performance of modern business enterprise.
- ABUS 270 1 Credit As Demand Warrants**
Financial Statement Ratio Analysis (1+0)
 This course takes the accounting student from the preparation of financial statements to the use of these reports as Management. Information by analysis. Key ratios are studied in the context of the business decisions to which they apply. A great deal of practical problem-solving is included in the format.
- ABUS 273 3 Credits As Demand Warrants**
Managing A Small Business (3+0)
 This course covers the fundamental of entrepreneurship and management with emphasis on starting up a new business, buying an existing business or a franchise. Other topics include managing, marketing, staffing, financing, budgeting, pricing, and operational analysis and controls.
- ABUS 099, 199, 299 1-3 Credits As Demand Warrants**
Practicum In Applied Business
 An orientation to work and training with analysis of the work experience and the relationship of the job to career and academic goals. The higher levels are designed for the student seeking an associate degree and provide an opportunity for practical application of knowledge and skill. It may be essential for students to have access to the faculty advisor for extended periods of time on a regular basis. Topics may include managerial concepts, problems of working with groups and individuals, organizational structures, communications and planning. (Prerequisite: Permission of the instructor.)
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- ## Applied Mining Technology
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- AMIT 101 3 Credits As Demand Warrants**
Introduction To Mining (3+0)
 This course covers the fundamental of surface and underground mining and emphasizes economic planning, proper exploration designs, environmental concerns, and safety factors.
- AMIT 109 1 Credits As Demand Warrants**
Underground Mine Safety (1+0)
 This course fulfills the Mine Safety Health Administration requirements for new underground miner training. Topics covered include: rights of miners, self rescue devices, introduction to the work environment, escapeways, roof and ground control, ventilation, health, clean-up, hard recognition, first aid, mine gasses, and electrical hazards. Students will be awarded a MSHA certificate upon successful completion of this class. Materials fee: \$5.00.
- AMIT 110 3 Credits As Demand Warrants**
New Underground Miner Training (3+0)
 This course is designed to provide the inexperienced underground miner with the mandatory MSHA federal training to become employable. Skills taught include orientation to the mine environment, general mine inspection, scaling, staging, drilling, rock bolting, blasting, mucking, and mine rescue. Materials fee: \$5.00.
- AMIT 115 1 Credit As Demand Warrants**
Surface Mine Safety (1+0)
 This course fulfills the Mine Safety Health Administration requirements for surface miner training. Course topics include rights of miners, introduction to the work environment, ground control, hazard recognition, first aid, and explosive safety. Students will be awarded a MSHA certificate upon successful completion of the class.
- AMIT 120 2 Credits As Demand Warrants**
Explosives I (2+0)
 This course discusses the theory and safe use of explosives with a focus on blasting agents used for rock excavation. Materials fee: \$4.00.
- AMIT 125 3 Credits As Demand Warrants**
Mineral Exploration Techniques (3+0)
 This course covers the modern, scientific exploration and prospecting techniques utilized in Alaska since the 1970's. Exploration design, ore deposit models, exploration geochemistry and geophysics, drilling sampling and geostatistics will be studied.
- AMIT 130 3 Credits As Demand Warrants**
Surface Mining Operations (3+0)
 This course covers the safe operations of a surface mine. Placer gold, sand and gravel, coal, and open pit metal mines will be studied in detail. Materials fee: \$5.00.
- AMIT 140 3 Credits As Demand Warrants**
Environmental Permitting (3+0)
 This course covers the permits necessary for mineral development in Alaska. Students are encouraged to provide their own case histories.
- AMIT 151 1 Credit As Demand Warrants**
Settling Pond And Recycle Tech (1+0)
 This course covers the design of settling ponds and recycle systems. Students will work with individual case histories.
- AMIT 152 1 Credit As Demand Warrants**
Fire Assay Techniques (1+0)
 This course is an overview of the sampling, theory and practice of fire assaying. Covered in depth are such topics as fluxes, oxidation and reduction reactions, fusion of assay charges, cupellation, annealing, micro-weighting and assay charge calculation.
- AMIT 170 3 Credits As Demand Warrants**
Fundamentals of Coal Mining (3+0)
 Topics of study include the origin and types of Alaskan and other coal deposits, exploration and planning methods, extraction processes for underground and surface mines, mining safety, coal preparation, and reclamation. An optional field trip will be taken to an active coal mine. Job requirements, safety, and environmental consideration will be highlighted. Materials fee: \$5.00.
- AMIT 180 3 Credits As Demand Warrants**
Colored Stone Grading and Evaluation (3+0)
 Grading, appraisals, and identification of colored stones is the topic of this course. Formation and structure, properties, deposits and production, and the descriptions of major gemstones are major topics of this course.
- AMIT 185 1 Credit As Demand Warrants**
Diamond Evaluation & Grading (1+0)
 This course is an introduction to diamonds: colors and clarity grading, mining of raw material, and detection of stimulants.
- AMIT 205 1 Credit As Demand Warrants**
Geomagnetic Surveying (1+0)
 This course covers placer gold deposit prospecting using magnetic surveying. Students will conduct an actual survey and interpret the data.
- AMIT 210 3 Credits As Demand Warrants**
Advanced Underground Mining (3+0)
 Advanced techniques in underground mining is the topic of this course. Skill training will be conducted in safety, drilling, blasting, ground support, mucking, maintenance and utilities. Training will be conducted in the Silver Fox Mine.
- AMIT 220 1 Credit As Demand Warrants**
Explosives II (1+0)
 An advanced course in the safe use of explosives. Students will get 'hands-on' experience in blasting. Materials fee: \$20.00.
- AMIT 230 1 Credit As Demand Warrants**
Field Methods (1+0)
 Covers topographic map reading using a compass and basic field procedures.
- AMIT 280 3 Credits As Demand Warrants**
Colored Stone Evaluation II (3+0)
 This course is a continuation of Colored Stone Evaluation I. Gemstones covered in this class are stones of the garnet, pyroxene, organic, inorganic, and specialty stones. (Prerequisite: AMIT 180 Colored Stone Evaluation I.)
- AMIT 282 1-2 Credits As Demand Warrants**
Mining Coop Work Experience
 A course for the student who has mastered basic mining techniques and terminology which provides practical work experience in a professional mining environment. Placement and work assignments will vary depending upon student experience.

Applied Photography

APHO 072 1 Credit As Demand Warrants
Photography Fundamentals (1+0)

How to make colorful, well-exposed photographs taking advantage of the capabilities of modern cameras. Elements of composition, exposure and flash techniques. Students furnish their own camera and film.

APHO 073 1 Credit As Demand Warrants
Process and Print Color Slides (1+0)

Learn how to develop color film, mounted in slides for projection; make color prints and enlargements; mix color filters for special effects; and set up a small home darkroom. Students must have a camera and obtain their own film and film processing.

APHO 074 1 Credit AS Demand Warrants
Process/Print Color Negatives (1+0)

Students develop their own print film using the Kodak Flexicolor C-41 and Hobby-pac processes. Proof sheets are then made from which selected enlargements are printed using Extaprint 2, Hobby-pac and Ektaflex processes. Students must have a camera and two rolls of film.

Art

ART 100 3 Credits As Demand Warrants
Art Exploration (3+0)

Recommended for students seeking initial exposure to various areas such as design, printmaking, weaving, and sculpture. Individual studio projects, lectures, and field trips to introduce possible areas for further concentrated study.

ART 101 3 Credits As Demand Warrants
Introduction To Ceramics (3+0)

Introduction to making and firing clay objects. Study of clay methods, forming decorations, glazing and firing. For beginning students only.

ART 104 1-3 Credits As Demand Warrants
Introduction to Drawing

An introduction course emphasizing self-expression by developing spontaneous artistic ideas into a more focused style. This course employs basic drawing materials and uses student assignments in still life, portrait, interior and landscape compositions as topics for classroom study. For the student with little or no training in drawing who wishes to explore his or her drawing abilities.

ART 105 3 Credits Fall, Spring
Beginning Drawing (1+4) h

Introduction to basic elements in drawing. Emphasis on a variety of techniques and media. Materials fee: \$15.00.

ART 113 1-3 Credits As Demand Warrants
Introduction to Painting (1+2)

An investigation of basic materials, various media and techniques available for painting.

ART 122 2 Credits As Demand Warrants
Stained Glass (2+4)

This course covers the fundamental skills needed to construct stained glass pieces, with special attention given to the basics of glass cutting, leading and soldering. During this course each student will complete a square foot window, a large group project and a suncatcher.

ART 161 3 Credits Fall, Spring
Two-Dimensional Design (1+4) h

Fundamentals of pictorial form; principles of composition, organization, and structure.

ART 162 3 Credits Fall, Spring
Color and Design (1+4) h

Fundamentals of color principles and interactions. Emphasis on two dimensions. Materials fee: \$25.00.

ART 163 3 Credits Fall, Spring
Three-Dimensional Design (1+4) h

Fundamental concepts in organization of 3-dimensional forms. Introduction to various materials and construction techniques. Materials fee: \$25.00

ART 201 3 Credits Fall, Spring
Beginning Ceramics (1+4) h

An introduction to ceramics. Foundation experiences with clays, glazes, plaster, enamels, glass, kiln stacking and firing. Materials fee: \$35.00. (Prerequisites: Art 105 and Art 161 or 162 or 163, or permission of the instructor.)

ART 205 3 Credits Fall, Spring

Intermediate Drawing (1+4) h

Exploration of pictorial composition and creative interpretation of subjects. Materials fee: \$25.00. (Prerequisite: Art 105.)

ART 207 3 Credits Fall, Spring

Beginning Printmaking (1+4) h

Introduction to the concepts and techniques of printmaking. Subject areas taken from: relief, intaglio, serigraphy, lithography. Materials fee: \$25.00. (Prerequisites: Art 105 and Art 161 or 162 or 163, or permission of the instructor.)

ART 208 2 Credits As Demand Warrants

Art for the Classroom Teacher (1+2)

The course will introduce concepts in art education to persons with limited art background who are working with young children. The course will combine a philosophy of Art Education, Art History, and 'hands-on' experiences to enable the classroom teacher to more effectively integrate the visual arts into the classroom curriculum as enjoyment and enrichment. Can also be taken as ED 208.

ART 209 3 Credits Fall, Spring

Beginning Metalsmithing (1+4) h

Introduction to the basic techniques of fine metalsmithing and jewelry. Materials fee: \$35.00. (Prerequisites: ART 105 and Art 161 or 162 or 163, or permission of the instructor.)

ART 211 3 Credits Fall, Spring

Beginning Sculpture (1+4) h

An introduction to basic sculpture techniques and principles. Materials fee: \$35.00. (Prerequisites: Art 105 and Art 161 or 162 or 163, or permission of the instructor.)

ART 213 3 Credits Fall, Spring

Beginning Painting (Acrylic or Oil) (1+4) h

Basic materials and techniques in either medium. Introduction to pictorial principles and organization of paintings. (Prerequisites: Art 105 and Art 161 or 162 or 163, or permission of the instructor.)

ART 223 3 Credits Every Third Spring

Watercolor Painting (1+4) h

Painting in various transparent and opaque media (watercolor, tempera, polymer, casein). Emphasis on techniques and subjects. (Prerequisite: Art 105 and Art 161 or 162 or 163, or permission of the instructor. Next offered: 1990-91.)

ART 261 3 Credits Fall

ART 262 3 Credits Spring

History of World Art (3+0) h

Origins of art and its development from the beginning through contemporary painting, sculpture and architecture. Art 261-262 may be taken in reverse order; however, course content is presented in a chronological sequence beginning with fall semester. Term paper required each semester. (Prerequisite: Sophomore standing.)

ART 301 3 Credits Fall, Spring

Intermediate Ceramics (1+4) h

A continuation of beginning ceramics with a major emphasis on glaze calculations, and advanced plaster techniques. Materials fee: \$35.00. (Prerequisites: Art 201 or permission of instructor.)

ART 305 3 Credits Spring

Advanced Drawing (1+4) h

Development and refinement of individual problems in drawing. Can be repeated for credit with permission of instructor. Materials fee: \$25.00. (Prerequisites: Art 205 or permission of instructor.)

ART 307 3 Credits Fall, Spring

Intermediate Printmaking (1+4) h

A continuation of Art 207 with emphasis on refinement of technique and color printing. Materials fee: \$25.00. (Prerequisite: Art 207, or permission of instructor.)

ART 309 3 Credits Fall, Spring

Intermediate Metalsmithing and Jewelry (1+4) h

Further investigation of material processes and techniques for metalsmithing and jewelry with some emphasis on design. Materials fee: \$35.00. (Prerequisites: Art 209 or permission of instructor.)

ART 311 3 Credits Fall, Spring

Intermediate Sculpture (1+4) h

Exploration in materials and concepts of sculpture. Emphasis on personal creativity and skill development. Materials fee: \$35.00. (Prerequisites: Art 211 or permission of instructor.)

ART 313 3 Credits Fall, Spring

Intermediate Painting (1+4) h

Continued development of expressive skills in painting in any painting media. Emphasis on pictorial and conceptual problems. (Prerequisite: Art 213.)

- ART 324 3 Credits** Fall, Spring
Watercolor Painting and Composition (1+4) h
 Development of individual approach to watercolor media. Can be repeated for credits with permission of the instructor. (Prerequisite: Art 223. Next offered: 1988-89.)
- ART 363 3 Credits** Alternate Spring
History of Modern Art (3+0) h
 Development of modern art forms and theories in the visual arts from the late 19th century until contemporary art. Concentration on explaining the artistic pluralism of 20th century art forms: Cubism, Futurism, Surrealism, Expressionism, Constructivism, Non-objective Art, Abstract Expressionism, Pop Art, Realism and many other "ism." (Prerequisites: Art 262 or permission of instructor. Next offered: 1989-90.)
- ART 364 3 Credits** Alternate Spring
Italian Renaissance Art (3+0) h
 The development of the Renaissance from early Florentine beginnings to the High Renaissance of Venice. Study of the works of such artists as Massaccio, Michelangelo, DaVinci, Titian, etc. (Prerequisite: Art 261 or permission of instructor. Next offered: 1988-89.)
- ART 365 3 Credits** Fall
Native Art of Alaska (3+0) h
 A study of art forms of the Eskimo, Indian, and Aleut ranging from pre-history to the present. (Prerequisites: Advanced standing or permission of instructor.)
- ART 371 3 Credits** Fall
Introduction to Computer Art (1+4)
 An introduction to digital editing with an overview of the field of computer art. (Prerequisites: Introductory computer course, one from Art 105, 161, 162, or 163.)
- ART 401 3 Credits** Fall, Spring
Advanced Ceramics (1+4) h
 Advanced ceramic work with an emphasis on individual projects, plus a class project on architectural mural(s). May be repeated for credit with permission of instructor. Materials fee: \$35.00. (Prerequisites: Art 301 or permission of instructor.)
- ART 407 3 Credits** Fall, Spring
Advanced Printmaking (1+4) h
 An individual development of technical and creative processes in printmaking. May be repeated for credit. Materials fee: \$25.00. (Prerequisites: Art 307, or permission of instructor.)
- ART 409 3 Credits** Fall, Spring
Advanced Metalsmithing and Jewelry (1+4) h
 Continued investigation of materials and processes with an introduction to holloware skills and forging. May be repeated for credits with permission of instructor. Materials fee: \$35.00. (Prerequisites: Art 309 or permission of instructor.)
- ART 411 3 Credits** Fall, Spring
Advanced Sculpture (1+4) h
 Advanced investigation into the principles, practices and concepts of sculpture. May be repeated for credit. Materials fee: \$35.00. (Prerequisites: Art 311 or permission of instructor.)
- ART 413 3 Credits** Fall, Spring
Advanced Painting (1+4) h
 Individual experimentation and technical/conceptual development in painting. Can be repeated for credits with permission of instructor. (Prerequisite: Art 313.)
- ART 417 3 Credits** Every Third Fall
Lithography (1+4) h
 An exploration of stone and metal plate lithography. Materials fee: \$25.00. (Prerequisite: Art 105, 207, or permission of instructor. Next offered: Fall 1989.)
- ART 419 3 Credits** Fall, Spring
Life Drawing (1+4) h
 Drawing from life, the study of artistic anatomy. Materials fee: \$50.00. (Prerequisite: Art 305 or permission of instructor.)
- ART 427 3 Credits** Every Third Spring
Relief (1+4) h
 Woodcut and monotype with emphasis on color. Materials fee: \$25.00. (Prerequisites: Art 105, 207, and 213, or permission of instructor. Next offered: 1989-90.)
- ART 437 3 Credits** Every Third Fall
Intaglio (1+4) h
 Intaglio printmaking with emphasis on experimentation and color photo intaglio printing. Materials fee: \$25.00. (Prerequisites: Art 105, 162, 207, or permission of the instructor. Next offered: 1988-89.)
- ART 441 3 Credits** Every Third Spring
Lost Wax Casting (1+4) h
 The design and execution of jewelry and other small metal objects by lost wax casting. Materials fee: \$35.00. (Prerequisite: Art 409 or permission of the instructor. Next offered: 1988-89.)
- ART 442 3 Credits** Every Third Spring
Nonferrous Forging (1+4) h
 A study of the design and execution of hammer forged nonferrous metal objects. Materials fee: \$35.00. (Prerequisite: Art 409 or permission of instructor. Next offered: 1989-90.)
- ART 443 3 Credits** Every Third Spring
Holloware (1+4) h
 A study of the design and construction of holloware by raising, sinking, and fabrication. Materials fee: \$35.00. (Prerequisite: Art 409 or permission of instructor. Next offered: 1989-90.)
- ART 447 3 Credits** Every Third Spring
Silkscreen (1+4) h
 Silkscreen printing with photo process. Materials fee: \$25.00. (Prerequisites: Art 105, 162, 207, or permission of the instructor. Next offered: 1989-90.)
- ART 450 3 Credits** Every Third Fall
Raku Pottery (1+4) h
 A one semester experience in Raku pottery including kiln building for raku bodies, glazes and decorations. Materials fee: \$35.00. (Prerequisite: Art 201 or permission of instructor. Next offered: 1988-89.)
- ART 451 3 Credits** Every Third Spring
Earthenware (1+4) h
 A one semester experience in earthenware pottery including appropriate bodies, glazes, decorations and firing techniques. Materials fee: \$35.00. (Prerequisite: Art 201 or permission of instructor. Next offered: 1988-89.)
- ART 452 3 Credits** Every Third Fall
Porcelain (1+4) h
 A one semester experience in porcelain including appropriate bodies, glazes, decorations and firing techniques. Materials fee: \$35.00. (Prerequisite: Art 201 or permission of instructor. Next offered: 1989-90.)
- ART 453 3 Credits** Every Third Spring
Kiln Design and Construction (1+4) h
 A one semester experience in kiln design and construction including building a full sized kiln. Materials fee: \$35.00. (Prerequisite: Art 201 or permission of instructor. Next offered: 1989-90.)
- ART 454 3 Credits** Every Third Fall
Vapor Glazing (1+4) h
 A one semester experience in "salt glazing" (i.e. vapor glazing) including clay, glazes, decorative techniques and kilns. Materials fee: \$35.00. (Prerequisites: Art 201 and permission of instructor. Next offered: 1989-90.)
- ART 455 3 Credits** Spring
Studio Glass (1+4) h
 Studio participation in cold glass and limited hot glass techniques. Materials fee: \$35.00. (Prerequisites: Advanced standing or permission of instructor.)
- ART 471 3 Credits** Spring
Computer Art (1+4)
 Production and reproduction techniques for digital painting, images manipulation and typography. (Prerequisites: Art 371; or CS 201 or equivalent, Art 105 and one of Art 161, 162 or 163.)
- ART 499 1-3 Credits** Fall/Spring
Thesis Project
 Directed work toward individual exhibition, completed outside regularly scheduled classes. Required for B.F.A. candidates. (Prerequisites: Senior standing.)

Atmospheric Science

- ATM 636 3 Credits** Alternate Fall
Physics of the Lower Atmosphere (3+0)
 Small-scale physical and chemical processes in the lower atmosphere, including micrometeorology, radiative transfer and cloud physics. Subjects to be covered include the transfer of solar and thermal radiation through the atmosphere, the radiation budget at the surface of the earth, the resulting energy, momentum, and mass fluxes near the ground, water vapor and its phase changes, and the nucleation and growth of cloud droplets and precipitation particles. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)

ATM 646 3 Credits Alternate Spring
Dynamics of the Atmosphere and Ocean (3+0)
 The response of the atmosphere and ocean to mechanical and thermal forcing, mean circulation and thermal structure, the governing fluid equations and appropriate boundary conditions. Other topics include wave motions, cyclogenesis, frontogenesis, and heat, momentum and energy transport. (prerequisite: Graduate standing. Next offered 1989-90.)

ATM 656 3 Credits Alternate Spring
Atmospheric Circulation, Weather and Climate
 The circulation of the atmosphere and the weather and climate produced by that circulation. The general circulation of the atmosphere, weather systems, air-sea and air-snow interactions, circulation types and climatic anomalies, and climatic change. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1988-89.)

Automotive

AUTO 080 2 Credits As Demand Warrants
Driver and Safety Education (2+0)
 Drivers Education for the beginning driver. Course will cover the Alaska Driver's Manual and all material necessary to gain an Alaska Driver's Permit. It will also include defensive driving methods for accident-free driving and basic mechanical information.

AUTO 081 1 Credit As Demand Warrants
Behind-the-Wheel Training (0+3)
 This course will provide practical driver training in actual situations. Expected student outcome is obtaining a State of Alaska driver's license. (Prerequisite: Must have a valid Alaska Driver's Permit.)

AUTO 100 1 Credit As Demand Warrants
Introduction to Small Engine Repair (1+0)
 A course designed to teach the parts and functions of a small engine and its electrical system. Proper dismantling procedures, cleaning and reassembly techniques, gasket-making, lubrication, troubleshooting, and minor repairs will be covered.

AUTO 103 1 Credit As Demand Warrants
Auto Tune-Up (1+0)
 A dual purpose course servicing both as an introduction to a more advanced course and also as a consumer interest course. Instruction will focus attention on vehicle maintenance by the operator with tools commonly available. It will be a 'hands-on' approach to basic troubleshooting and maintenance.

AUTO 170 1 Credit As Demand Warrants
Snowmachine Maintenance and Repair (1+0)
 An introduction to the fundamental skills necessary for the operation and repair of a snow-machine. Specific areas that are covered are engine tune-up, lubrication, belt and track repair, alignment, and basic problems encountered during operation.

Aviation

AVTY 101 4 Credits As Demand Warrants
Private Pilot Ground School (4+0)
 Study of aircraft and engine operation and limitations, aircraft flight instruments, navigation, navigation computers, national weather information and dissemination service. Federal Aviation Regulations, flight information publications, radio communications, and radio navigation in preparation for FAA Private Pilot-Airplane written exam.

AVTY 102 2 Credits As Demand Warrants
Private Pilot Flight Training (2+0)
 Flight instruction will be arranged by student through approved pilot school or independent flight instructor. Training will be in accordance with current Federal Aviation Regulations. Course completion requires awarding of Private Pilot certificate. Department approval required.

AVTY 102 4 Credits As Demand Warrants
Commercial Ground Instruction (4+0)
 Advanced study of aircraft performance, airplane systems (including complex single engine, multi-engine and turboprop aircraft), navigation, regulations and meteorology. In addition, employment considerations for commercial pilots are surveyed. This course will prepare students to take the FAA Commercial Pilot-Airplane written examination.

AVTY 103 2 Credits As Demand Warrants
Commercial Flight Training (2+0)
 Flight instruction will be arranged by student through approved pilot school or independent flight instructor. Training will be in accordance with current Federal Aviation Regulation. Course completion requires awarding of Commercial Pilot certificate. (Prerequisite: Private Pilot certificate, AVTY 102 or concurrent enrollment, or passing score on FAA Commercial Pilot written exam. Department approval required.)

AVTY 105 1 Credit As Demand Warrants
Seaplane Flight Training (1+0)
 Flight instruction will be arranged by student through approved pilot school or independent flight instructor. Training will be in accordance with current Federal Aviation Regulations. Course completion requires awarding of Single-Engine Sea Rating. (Prerequisite: Private Pilot certificate or higher, department approval required.)

AVTY 107 1 Credit As Demand Warrants
Multi-Engine Flight Training (1+0)
 Flight instruction will be arranged by student through approved pilot school or independent flight instructor. Training will be in accordance with current Federal Aviation Regulations. Course completion requires awarding of Multi-Engine Rating. (Prerequisite: Private Pilot certificate or higher, department approval required.)

AVTY 108 1 Credit As Demand Warrants
Introduction to Skis (1+0)
 Pilot instruction with a certified flight instructor or flight school to introduce techniques of ski-lane operation and cold weather maintenance. The student is responsible for making arrangements for an appropriate aircraft, instructor, and financing. (Prerequisite: Private Pilot Certificate.)

AVTY 109 1 Credit As Demand Warrants
Glider Flight Training (1+0)
 Flight instruction will be arranged by student through approved pilot school or independent flight instructor. Training will be in accordance with current Federal Aviation Regulations. Course completion requires awarding of Glider and Private or Commercial Pilot Certificate with a Glider category rating. (Prerequisite: Department approval.)

AVTY 110 1 Credit As Demand Warrants
Biennial Flight Review (1+0)
 A review of Federal Aviation Regulations, air traffic control procedures, communications, normal and emergency aircraft procedures, and aircraft performance. (Prerequisite: Student must hold at least a Private Pilot certificate.)

AVTY 111 3 Credits As Demand Warrants
Fundamentals of Aviation (3+0)
 A comprehensive introduction to basic concepts associated with the airplane and its environment. The study of the airplane and its components, basic aerodynamics, factors which affect airplane performance, flight instruments, aircraft systems, radio communications and air traffic control, and aircraft weight and balance are included as major topic areas for this course.

AVTY 112 3 Credits As Demand Warrants
Fundamentals of Aviation II (3+0)
 An introduction to a number of topics associated with aviation. These include meteorology, Federal Aviation Regulations, aviation charts, radio and dead reckoning navigation and physiological factors that affect flight. Provides the opportunity to explore aviation in general as one acquires fundamental knowledge and skills related to it. This course complements AVTY 111 but does not require it as a prerequisite.

AVTY 117 3 Credits As Demand Warrants
Aviation Weather (3+0)
 Weather and its effects on air transportation and air traffic control. Aviation weather reports and forecasts. Methods of weather distribution including teletype, voice lines, broadcasts, and other systems used by the U.S. Government and airway users.

AVTY 119 1 Credit As Demand Warrants
Flight Simulator Instruction Basic Procedures (0+3)
 An introduction to the operation and use of the LINK GAT-I flight simulator and selected practice in basic flight maneuvers, procedures and techniques. This individualized simulate flight training may serve as a valuable supplement to both Private Pilot Ground School and actual flight training. (Prerequisite: AVTY 100 or concurrent enrollment in AVTY 100, AVTY 111 or AVTY 112.)

AVTY 155 1-3 Credits As Demand Warrants
Preventive Maintenance
 The course is designed for the pilot-owner who must make his/her decisions as to what maintenance should be done. A knowledge of the mechanics of the airplane, its power plant and systems will enable the student to evaluate any malfunction and will help make any decisions more accurate. (Prerequisite: AVTY 100 or permission of instructor.)

AVTY 200 4 Credits As Demand Warrants
Instrument Ground School (4+0)

Instrument operation in detail, altitude instrument flying, air traffic control and navigation facilities, pilot responsibilities. IFR enroute charts, approach plates, airspace and airway route system, ATC operations and procedures. Federal Aviation Regulations, flight planning, medical facts about pilots, meteorology, similar flights. Course includes visits to FAA RAPCO and ARTCC facilities. (Prerequisite: AVTY 100, passing score on the FAA Private Pilot Written Exam or permission of the instructor. Must complete AVTY 102- Commercial Ground School.)

AVTY 202 3 Credits As Demand Warrants
Flight Instructor Ground School (3+0)

Preparation for the FAA Certified Flight Instructor or Advanced Ground Instructor written examination. (Prerequisite: Commercial Pilot certificate or permission of instructor.)

AVTY 203 2 Credits As Demand Warrants
Flight Instructor Flight Training (2+0)

Flight instruction will be arranged by student through approved pilot school or independent flight instructor. Training will be in accordance with current Federal Aviation Regulations. Course completion requires awarding of Certified Flight Instructor Certificate. (Prerequisite: Commercial Pilot certificate with Instrument Rating, AVTY 202 or concurrent enrollment, or passing score on FAA Flight Instructor written exams. Department approval.)

AVTY 205 3 Credits As Demand Warrants
Instrument Instructor Flying (3+0)

Preparation for certification as an Instrument Flight Instructor. (Prerequisite: Commercial Flight Instructor certificate, and department approval.)

AVTY 206 4 Credits As Demand Warrants
ATP Ground Instruction (4+0)

Preparation for the FAA Airline Transport Pilot written examination. (Prerequisite: Compliance with FAR 61.151 and 61.55 or department permission.)

AVTY 207 2 Credits As Demand Warrants
ATP Flying (2+0)

Qualification for single engine or multi-engine FAA Airline Transport Pilot certificate. (Prerequisite: Commercial Pilot Certificate, 1500 hours of flight time as pilot or the equivalent (as described in FAR 61.55); AVTY 206 or passing score on FAA Airline Transport Pilot written exam; current FAA First Class Medical certificate.)

AVTY 208 Credits As Demand Warrants
Flight Simulator Operation (3+0)

Advanced training in a flight simulator. Recommended for instrument flight simulator. Recommended for instrument flight and ground instructor, airline transport pilot, and aircraft dispatcher applicants. (Prerequisite: Private Pilot certificate (or higher), Instrument Rating, Certified Flight Instructor-Instrument or Instrument Ground Instructor certificate, or department permission.)

AVTY 210 1 Credit As Demand Warrants
Simulated Flight Instruction: Advanced Procedures (0+3)

Required for persons desiring to utilize the GAT-I Flight Simulator. Use of the flight simulator must be individually scheduled through the aviation department. A flight or ground instructor approved by UAF must direct and accompany the student while the simulator is in operation. Individuals may use the time accumulated to meet the requirements of advance ratings or flight recently as specified in Part 16 of the Federal Aviation Regulations.

AVTY 211 3 Credits As Demand Warrants
Instrument Flying (3+0)

Flight instruction provided by an appropriate pilot school designed to qualify commercial pilot for Instrument Rating. Training will be in accordance with current Federal Aviation flight training directives. Approximately 40 hours flying. Course completion requires the awarding of Instrument Rating by an FAA flight inspector. (Prerequisite: Private or Commercial Pilot Certificate or AVTY 200 (concurrent enrollment allowed) or passing score on FAA Private Commercial Pilot Written Exam or permission of department.)

AVTY 226 4 Credits As Demand Warrants
Flight Engineer Ground School (4+0)

A comprehensive examination of the major systems of one of the following aircraft: Turbojet (B-727, DC-8, B-707); Turboprop (L-382, L-188); or Reciprocating (DC-6). Prepares the student for the FAA Flight Engineer written examination. (Prerequisite: FAA Commercial Pilot License & Instrument Rating, or equivalent, and department approval.)

AVTY 231 3 Credits As Demand Warrants
Arctic Survival (3+0)

Use of principles, procedures, techniques, and equipment to survive extreme arctic conditions and to assist in safe recovery. Lab time required. Materials fee: \$35.00.

AVTY 232 3 Credits As Demand Warrants
Aviation Astronomy and Navigation (3+0)

Introduction to air navigation and astronomy, including charts, equipment, star and constellation identification, and calculations.

AVTY 233 1 Credit As Demand Warrants
Loran C Navigation (1+0)

The student will gain sufficient understanding of the theory of Loran 'C' to recognize positive and adverse conditions regarding its use, to be able to enter way points already programmed into the computer and effectively navigate them and to learn to preprogram the computer for enroute and arrival points to within 100 feet.

AVTY 235 3 Credits As Demand Warrants
Elements of Weather (3+0)

Weather as it affects aircraft operators with an emphasis on Interior Alaska.

AVTY 239 4 Credits As Demand Warrants
Aircraft Dispatcher (4+0)

Coordinating functions that must be performed involving the aircraft and other departments of an airline business. (Prerequisite: Those wanting to be eligible for aircraft dispatcher certificate must be 23 years of age.)

Biology

BIOL 103 4 Credits Spring
Biology and Society (3+3) n

Introduction to the fundamental principles of biology; emphasis on their application to man in the modern world. Course is designed for non-science majors. Includes lectures, laboratory demonstrations, experiments, and discussions of contemporary biological topics. This course may not be used as biology elective credit for a major in biological science. Laboratory fee: \$35.00.

BIOL 104 3 Credits Fall and Spring
Natural History of Alaska (3+0) n

Aspects of the physical environment peculiar to the north and important in determining the biological setting; major ecosystem concepts to develop an appreciation for land use and wildlife management problems in both terrestrial and aquatic situations. This course may not be used as biology elective credit for a major in biological science.

BIOL 105 4 Credits Fall
BIOL 106 4 Credits Spring

Fundamentals of Biology I and II (3+3) n
Principles of biology for the science major. First semester: cell structure, metabolism, genetics and evolution. Second semester: plant and animal structure and function, ecology. Biol. 105 is required for Biol. 106. Laboratory fee: \$10.00. (Prerequisite: high school chemistry recommended.)

BIOL 111 4 Credits Fall
BIOL 112 4 Credits Spring

Human Anatomy and Physiology I and II (3+3) n
Integrated view of human structure and function for students in nursing, therapy, physical education, and art. Biol. 111 will cover cells, tissues and organs, skeletal and muscle systems, the nervous system, and integument. Biol. 112 examines circulatory, respiratory, digestive, excretory, endocrine, and reproductive systems. Biol. 111 is required for Biol. 112. These courses may not be used as biology elective credit for majors in biological sciences. Laboratory fee: \$10.00.

BIOL 205 3 Credits Alternate Spring
Vertebrate Anatomy (1+6) n

Anatomy of bony fishes, birds, and mammals. Laboratory dissections emphasized. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106. Next offered: 1989-90.)

BIOL 210 4 Credits Spring
Animal Physiology (3+3) n

Animal function, including respiration, digestion, circulation, nerve and muscle function, hormones, and reproduction. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106; Chem. 103 and 104 or 105 may be taken concurrently.)

BIOL 222 4 Credits Fall
Biology of the Vertebrates (3+3) n

An introduction to the fishes, amphibians, reptiles, birds, and mammals emphasizing systematics, evolution, structure, and function. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106.)

- BIOL 240 4 Credits Fall**
Beginnings in Microbiology (3+3)
 Basic and applied microbiology for students who are not majoring in biology but wish to learn about the role that microorganisms play in human health and life. Laboratory Fee: \$20.00
- BIOL 271 4 Credits Fall**
Principles of Ecology (4+0) n
 Introduction to the basic principles of ecology and evolutionary biology. Environmental factors, their causation and influence upon plants and animals. Basic population biology: population structure, growth, and regulation. The mechanisms of evolutionary change in populations. The organization of biotic communities. The structure and function of ecosystems. (Prerequisites: Biol. 105 and 106.)
- BIOL 305 4 Credits Fall**
Invertebrate Zoology (3+3) n
 Classification, structure, function, evolution, and life histories of invertebrate animals. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106, 210, and 271.)
- BIOL 307 3 Credits Fall**
Parasitology (2+3) n
 Structure, function, life history, and ecology of animal parasites. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106 and Biol. 222 or permission of instructor.)
- BIOL 308 3 Credits Spring**
Principles of Evolution (3+0) n
 An introduction to the mechanisms of, and evidence for, the evolution of living systems. The coding and transmission of genetic information in populations, population variability, change, and stabilization. (Prerequisites: Biol. 105-106, 362, 271, or permission of the instructor.)
- BIOL 317 5 Credits Alternate Spring**
Comparative Anatomy of Vertebrates (2+9) n
 Anatomy, phylogeny; CATALOGDESC1A.TXT, and evolution of the vertebrates. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106. Next offered: 1988-89.)
- BIOL 328 3 Credits Spring**
Biology of Marine Organisms (3+0) n
 Introduction to biology of marine organisms: ocean as a habitat, distribution, classification, functional morphology, and general biology of the major biological groups; man and the oceans. (Prerequisite: Upper division standing in a biologically oriented major.)
- BIOL 342 4 Credits Spring**
Microbiology (3+3) n
 A survey of morphology and physiology of microorganisms (viruses, bacteria, fungi, algae and protozoans). The role of these organisms in the environment and their relationship to humans are considered. Concepts of immunology are introduced. The laboratory stresses aseptic techniques for handling microorganisms. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106.)
- BIOL 361 4 Credits Alternate Spring**
Cell Biology (3+3) n
 Detailed structure, including ultrastructure, and function of the cell: isolation, composition, and biochemical properties of cell organelles and their integration. Laboratory fee: \$10.00. (Prerequisites: A year each of college chemistry and biology. Next offered: 1988-89.)
- BIOL 362 4 Credits Fall**
Principles of Genetics (3+3) n
 Principles of inheritance; physico-chemical properties of genetic systems. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106.)
- BIOL 406 4 Credits Spring**
Entomology (3+3) n
 Biology of insects and related arthropods, with emphasis on anatomy, physiology, behavior, ecology, and evolution. Laboratories emphasize identification. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106 and 271.)
- BIOL 407 3 Credits Alternate Spring**
Aquatic Entomology (2+3)
 Ecology, taxonomy, anatomy, physiology and evolution of aquatic insects. Laboratories emphasize identification and field/laboratory techniques. Laboratory fee: \$10.00. (Prerequisites: Biol 105-106 and 271, Biol 473 recommended or permission of instructor. Next offered: 1989-90.)
- BIOL 414 4 Credits Alternate Fall**
Comparative Physiology (3+3) n
 Functional variations and relationships among animals; respiration, cardiovascular systems, metabolism, temperature regulation, osmoregulation excretion, nerve and muscle function. Laboratory fee: \$10.00. (Prerequisites: Biol. 271, Chem. 106; Chem. 321 and Biol. 361. Next offered 1989-90.)
- BIOL 418 4 Credits Alternate Fall**
Developmental Biology (3+3) n
 Structural and biochemical aspects of development of multicellular organisms. Laboratory stresses study of vertebrate embryos. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106, 210 or permission of instructor. Next offered: 1989-90.)
- BIOL 423 4 Credits Fall**
Ichthyology (3+3) n
 Major groups of fishes, emphasizing the fishes of northwestern North America. Classification structure, evolution, general biology, and importance to man of the major groups. Laboratory fee: \$10.00. (Prerequisites: Biol. 222, and either Biol. 205, or 317; or permission of the instructor.)
- BIOL 424 3 Credits Alternate Fall**
Biology of the Freshwater Fish of Alaska (3+0)
 Life histories of Alaskan freshwater fish emphasizing species sought by fishermen. Emphasis is on reproduction, age, growth, migration, food, inter-relationships and habitat requirements. (Prerequisite: Biol 105-106 or permission of instructor. Next offered: 1989-90.)
- BIOL 425 3 Credits Fall**
Mammalogy (2+3) n
 Variety of mammals, their behavior, life histories, identification, phylogeny and systematics, morphology, distribution, and zoogeography. Laboratory fee: \$10.00. (Prerequisites: Biol. 222, and either Biol. 205, or 317; or permission of instructor.)
- BIOL 426 3 Credits Spring**
Ornithology (2+3) n
 The evolution, anatomy, physiology, distribution, migration, breeding biology of birds and their classification and identification. Laboratory fee: \$10.00. (Prerequisites: Biol. 222, and either 205 or 317, or permission of instructor. Concurrent enrollment in Biol. 479 is recommended.)
- BIOL 441 3 Credits Spring**
Animal Behavior (2+3) n
 Genetic and physiological bases of behavior, evolutionary and ecological principles of individual and social behavior, sociobiology, and the techniques of behavioral observation and analysis. Laboratory fee: \$10.00. (Prerequisites: Biol. 210 and 271; or permission of instructor; Recommended: Biol. 308.)
- BIOL 442 5 Credits Alternate Fall**
Bacteriology and Immunology (3+6) n
 Morphology, physiology and systematics of bacteria. Introduction to microbial pathogenesis and concepts of immunology. Laboratory fee: \$10.00. (Prerequisites: Biol. 342, Chem. 321 or permission of instructor. Next offered: 1988-89.)
- BIOL 443 3 Credits As Demand Warrants**
Microbial Ecology (2+3) n
 Laboratory investigation of ecological activity and impact of bacteria and fungi. Isolation and study of important genera. Laboratory fee: \$10.00. (Prerequisites: Biol. 342, 271, or 442; or permission of instructor.)
- BIOL 452 3 Credits Alternate Spring**
Cytogenetics (2+3) n
 Chromosome form and function emphasizing gene structure, DNA replication, chromosomal mutation and population cytogenetics. Laboratory fee: \$10.00. (Prerequisites: Biol. 362 or permission of instructor. Next offered: 1988-89.)
- BIOL 470 3 Credits Alternate Fall**
Ecological Genetics (2+3)
 Dynamics of gene frequencies and the quantitative genetics of ideal and natural populations, with emphasis on tools and methods of population genetics. Laboratory fee: \$10.00. (Prerequisites: Biol. 308 and Stat. 301. Next offered: 1989-90.)
- BIOL 471 3 Credits Spring**
Population Ecology (3+0) n
 The biology of populations of plants and animals, including population structure, natality, mortality, population growth, the regulation of population size, and population interactions in herbivory, predation, and parasitism. (Prerequisite: Biol. 271.)
- BIOL 472 3 Credits Fall**
Communities and Ecosystems (3+0) n
 An analysis of the structure of plant and animal communities and their organization. The structuring forces of competition, predation, herbivory, mutualisms, and the flow of energy and nutrients will be covered. Latitudinal gradients in species richness and biogeography will also be discussed. (Prerequisite: Biol. 271.)

- BIOL 473 3 Credits Fall**
Limnology (2+3)
 Physical, chemical and biological characteristics of fresh water, emphasizing ecological aspects important to fish and other organisms. Laboratory fee: \$10.00. (Prerequisites: Biol. 271, Chem 106 or permission of instructor.)
- BIOL 477 3 Credits Alternate Spring**
Ecology of Streams and Rivers (2+3)
 Natural history of organisms and biological processes in rivers and streams. Laboratories emphasize analyses of actual data and samples. Laboratory fee: \$10.00. (prerequisites: Biol. 271, Biol 473 recommended, or permission of instructor. Next offered: 1988-89.)
- BIOL 478 2 Credits Spring**
Field Ecology (0+3) n
 An intensive experience in the collection and interpretation of ecological data. The course consists of concentrated study for 10-12 days in early May. Students will engage in the design, execution, and analysis of field projects dealing with various aspects of ecology. Course is graded pass/fail. Field trip fee to be announced. Laboratory fee: \$10.00. (Prerequisites: Biol. 271, 471 or 472 [may be taken concurrently], and permission of instructor.)
- BIOL 479 2 Credits Spring**
Ornithology Field Trip (0+3) n
 Techniques of field ornithology, emphasizing identification of birds and bird-habitat relationships. The course consists of preparation during the spring semester followed by a field trip of 10-12 days in early May. Students must share in expenses. Field trip fee to be announced. Laboratory fee: \$10.00. (Prerequisites: Biol. 426, may be taken concurrently, and permission of instructor.)
- BIOL 480 3Credits Alternate Fall**
Water Pollution Biology (3+0)
 Effects of man-caused environmental stresses on the composition and dynamics of aquatic communities. Changes in diversity and matter and energy transfer. Biological indices. Water quality, standards and use classifications. (Prerequisites: Biol 271 and 473 or permission of instructor. Next offered: 1989-90.)
- BIOL 610 3 Credits Alternate Fall**
Regulation of Biological Processes (3+0)
 A consideration of regulation of biological processes at levels of organization from the molecular to society and the ecosystem. The course will use animal, microbial, and plant material and will consider control theory and its applications to biology. (Prerequisites: Graduate Standing and, in cases of highly qualified undergraduates, the instructor's permission. Next offered: 1989-90)
- BIOL 614 2 Credits Alternate Spring**
Grazing Ecology (2+0)
 (Same as WLF 614)
 The dynamics of herbivory, emphasizing the grazing process, and including mechanisms of feeding, feeding behavior, habitat and plant selection, physiological influences on feeding, plant and community level responses, plant defenses against herbivory and management of grazing systems. (Prerequisites: graduate standing or approval of instructor. Next offered: 1988-89.)
- BIOL 616 3 Credits As Demand Warrants**
Principles and Methods of Taxonomy (2+3)
 Philosophy and methodology relating to current trends in systematics, particularly morphometric and biochemical systematics. Laboratory fee: \$10.00.
- BIOL 618 2 Credits Alternate Spring**
Biogeography (2+0)
 Spatial and temporal geography of plants and animals; emphasis on environmental and historical controls of patterns of distribution. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)
- BIOL 619 2 Credits Alternate Fall**
Marine Mammals (1+3)
 Evolution, systematics, morphology, physiology, ecology, and behavior of seals and whales. Laboratory fee: \$10.00. (Prerequisites: Graduate standing or permission of instructor. Next offered: 1988-89.)
- BIOL 624 3 Credits Alternate Fall**
Physiological Ecology: Temperature Regulation and Thermal Adaptation (2+3)
 Responses of organisms to their thermal environment. Field research-oriented laboratory. Laboratory fee: \$10.00. (Prerequisites: Graduate standing, Biol. 210 or permission of instructor. Next offered: 1988-89.)
- BIOL 625 3 Credits Alternate Spring**
Physiological Ecology: Energetics and Nutrition (2+3)
 A study of physiological processes involved in the interaction of animals with their environment, with special emphasis placed on northern habitats. Energetics and nutrition will cover the nutritional ecology of animals and describe adaptation of organisms to avoid or minimize nutritional imbalance or inadequacy. Laboratory fee: \$10.00. (Prerequisites: Graduate standing and an animal physiology course, or permission of instructor. Next offered: 1988-89.)
- BIOL 626 3 Credits Alternate Fall**
Physiological Ecology: Vertebrate Reproduction (2+3)
 A study of the physiological processes involved in the interaction of organisms with their environment. Special emphasis will be placed on northern habitats. Sensory and reproductive physiological ecology will cover the physiology and ecology of reproduction, nervous and hormone systems, and circadian rhythms. Laboratory fee: \$10.00. (Prerequisites: Graduate standing and a physiological course and Biol. 271 or permission of instructor. Next offered: 1989-90.)
- BIOL 627 3 Credits Alternate Spring**
Chemical Ecology (3+0)
 Current theory and experimentation in chemical ecology, with emphasis on chemical defenses of plants and animals. (Prerequisites: Graduate standing and permission of instructor. Next offered 1989-90.)
- BIOL 629 3 Credits Alternate Fall**
Advanced Animal Behavior (3+0)
 Adaptive nature of behavior in relation to the physical, biological, and social environment. Current problems and controversies in the study of behavior. (Prerequisites: Biol. 441 and permission of the instructor. Next offered: 1988-89.)
- BIOL 637 2 Credits Alternate Fall**
Modern Evolutionary Theory (2+0)
 Contemporary ideas of and problems with the mechanics of evolution. (Prerequisites: Graduate standing or permission of instructor. Next offered: 1989-90.)
- BIOL 638 1 Credit Alternate Fall**
Seminar in Ecology and Evolutionary Biology (2+0)
 Readings and discussions of topics of current interest in ecology and evolution. (Prerequisite: Graduate standing. Next offered: 1988-89.)
- BIOL 650 3 Credits Alternate Fall**
Fish Ecology (2+3)
 The ecology of fish is examined from the community aspect. Current literature on inter- and intraspecific relationships, influence of the environment on community structure, behavior and production is emphasized. Laboratory fee: \$10.00 (Prerequisites: Biol. 473 and Fish. 429. Next offered: 1989-90.)
- BIOL 652 3 Credits Alternate Spring**
Marine Ecology (3+0)
 The sea as a biological environment, organisms in the ocean, factors influencing the growth of organisms, nutrient cycles, productivity, food web, and interdependence of organisms. Several field trips may be required. (Prerequisites: Biol. 271, Chem. 212, 322; Geol. 411 or permission of the instructor. Next offered: 1988-89.)
- BIOL 678 3 Credits Alternate Spring**
Tropical Ecology Field Course (0+3+Arr)
 Intensive field study of the ecology of selected tropical habitats, with emphasis on ecological field methods, plant-animal interactions and ecological problems and processes unique to the tropics. Course consists of two week intensive field work between the fall and spring semesters, followed by weekly lecture/labs during the spring semester. Preregistration in the preceding fall semester is required. (Field trip cost borne by student.) (Prerequisites: Biol. 271, Bot. 239 and one of: Biol. 308 or Bot. 331; graduate student standing or senior with permission of instructor. Next offered: 1989-90.)
- BIOL 680 4 Credits Alternate Fall**
Data Analysis in Biology (3+3)
 (Same as STAT 680)
 Biological applications of nonparametric statistics, including tests based on binomial and Poisson distributions, analysis of two-way and multiway contingency tables, and tests based on ranks; multivariate statistics, including principal component analysis, ordination techniques, cluster analysis, and discriminant analysis; and time-series analyses. Introduction to the use of the computer, computer programming, use of statistical packages, and plotting routines. Each student will analyze a data set appropriate to his or her research interests. Laboratory fee: \$10.00. (Prerequisites: Stat. 301, 401 and either graduate standing in a biologically oriented field or permission of instructor. Next offered: 1989-90.)

Botany

BOT 239 4 Credits Spring

Plant Form and Function (3+3) n
Structure, function, ecology, and evolutionary patterns of the major groups of plants. Laboratory fee: \$10.00. (Prerequisites: Biol. 105-106.)

BOT 331 4 Credits Spring

Systematic Botany (2+6) n
Classification of flowering plants with emphasis on Alaskan flora; discussion of taxonomic principles and both classical and experimental methods of research. Preregistration is required to insure that each student will prepare a plant collection. Laboratory fee: \$10.00. (Prerequisite: Bot. 239 or permission of the instructor. Biol. 362 recommended.)

BOT 333 3 Credits Alternate Fall

Biology of the Non-Vascular Plants (2+3) n
The structure, function, comparative development, taxonomy, phylogeny and life histories of non-vascular cryptogams (algae, excluding blue greens, fungi, lichens, mosses and hepatics). Laboratory fee: \$10. (Prerequisite: Bot. 239. Next offered: 1989-90.)

BOT 334 4 Credits Alternate Fall

Morphology and Anatomy of Vascular Plants (3+3) n
Comparative study of morphology, development anatomy, phylogenetic trends, and life histories of the major groups of vascular plants. Laboratory fee: \$10.00. (Prerequisite: Bot. 239. Next offered: 1988-89.)

BOT 416 3 Credits Alternate Spring

Plant Physiology (2+3) n
The physiology of vascular plants, including growth, development, water relations, photosynthesis, transport and metabolism. Laboratory fee: \$10.00. (Prerequisites: Bot. 239 and Chem. 106; Biol. 361 and Chem. 321 recommended. Next offered: 1988-89.)

BOT 474 4 Credits Alternate Fall

Plant Ecology (3+3) n
Principles and contemporary topics in plant ecology. Topics covered include autecology, community ecology, ecosystem ecology and evolutionary ecology. Laboratory fee: \$10.00. (Prerequisites: Bot. 239, Biol. 271, Stat. 301. Next offered: 1988-89.)

BOT 475 2 Credits Alternate Fall

Plant Communities of Alaska-Field Course (1+3)
A series of field trips to the plant communities of interior Alaska; emphasis on identification of vascular and non-vascular plants and the processes affecting the structure and evolution of Alaskan plant communities. Laboratory fee: \$10.00. (Prerequisites: Bot. 239, permission of instructor. Next offered: 1989-90.)

BOT 476 4 Credits Alternate Spring

World Vegetation and Flora (3+3)
Survey of vegetation and flora of the world; emphasis on latitudinal and elevational patterns, climatic controls, community convergence, and taxonomy and distribution of major plant families. Laboratory fee: \$10.00. (Prerequisites: Bot. 239 and Biol. 271 or Bot. 331. Next offered: 1989-90.)

BOT 674 3 Credits Alternate Spring

Advanced Plant Ecology: Populations and Communities (2+3)
Current issues and concepts of plant ecology emphasizing population and evolutionary ecology, competition, coexistence, and plant community structure and dynamics. Laboratory fee: \$10.00. (Prerequisite: Bot. 474 or permission of instructor. Next offered: 1989-90.)

BOT 675 3 Credits Alternate Fall

Plant Physiological Ecology (2+3)
Physiological ecology of dormancy, germination, growth, photosynthesis, water relations and nutrition with an emphasis on northern and other stressful environments; relationship to community and ecosystem processes. Laboratory fee: \$10.00. (Prerequisites: Biol. 210 or Bot. 416; Bot. 474 or permission of instructor. Next offered: 1989-90.)

BOT 676 3 Credits Alternate Spring

Reproductive Biology of Flowering Plants (3+0)
The biology of plant reproduction including breeding systems, pollination ecology, seed dispersal, plant-animal coevolution, reproductive interactions between plants, the effect of reproductive processes on the structure and function of biotic communities. (Prerequisites: Bot. 239 and one of: Biol. 271, Biol. 308, Bot. 331; graduate standing or consent of instructor. Next offered: 1989-90.)

Business Administration

Admittance to upper division School of Management courses will be granted only to students with junior standing or above who have completed all required 100 and 200 level courses in Accounting, Business Administration, Economics and Mathematics. The exceptions to this include BA 301, BA 331 and BA 332. Any other exceptions require the approval of the BA department head.

BA 100 3 Credits Fall and Spring

Introduction to Data Processing and BASIC Language (3+0)
A general introductory business course designed to provide students with an overview of business applications of computers. Topics covered are: machine organizations, problem formulation, utilization of BASIC programming language in business applications, information flow management, applications of automatic data processing systems to include input-output procedures, and the utilization of business application programs available to the School of Management. Materials fee: \$20.00. (Not for School of Management students. This course will not substitute for BA 101, Introduction to Management Information Systems.)

BA 101 3 Credits Fall and Spring

Introduction to Management Information Systems (3+0)
An introduction to the concepts, skills and software required for today's business education. Students will become familiar with selected current business software applications. Special emphasis will be placed on acquiring proficiency in the use of required School of Management software programs. Materials fee: \$20.00.

BA 151 3 Credits Fall and Spring

Introduction to Business (3+0)
Business organization, nature of major business functions such as management, finance, accounting, marketing, personnel administration. The opportunities and requirements for professional business careers.

BA 160 3 Credits Fall

Tourism Principles and Practices (3+0)
Forces which influence the international and domestic hospitality, leisure, travel, and recreation industries. Socio-economic models and measure of regional impact, demand, and supply.

BA 201 3 Credits Alternate Spring

COBOL (2+2)
Training and practice in writing problems in the COBOL language. Multiple file processing, editing, and report generating routines. Materials fee: \$20.00. (Prerequisite: BA 101 or permission of instructor. Next offered: 1989-90.)

BA 220 3 Credits Alternate Fall

Basic Programming Languages (3+0)
Programming in selected computer languages including ASSEMBLER, RPG, and machine language. Materials fee: \$20.00. (Prerequisite: BA 101. Next offered: 1989-90.)

BA 253 1-3 Credits Fall-Spring-Summer

Internship in Business (0+1-3)
Supervised work experience in an approved position which is related to the student's career interests or objectives. Number of credits given will depend on types of position and amount of time worked by the student. No student can count more than eight internship credits towards a degree. (Prerequisite: approval of program or department head.)

BA 301 3 Credits Fall and Spring

Processes of Management (3+0)
A systematic examination of the basic functions of management with particular attention on the human side of the organization. Modes of communication and coordination are evaluated in terms of the need for planning, controlling, and decision-making among the organizational components. An overall framework for effective integration of the distinct processes is emphasized. (Prerequisites: Junior standing or permission of instructor.)

BA 303 3 Credits Fall

Advanced Leadership (3+1)
(Same as Mil. 303)
Comprehensive analysis of leadership styles and functions applicable to formal organizations. Lab: Advanced leadership development including enrichment seminars. (Prerequisite: Junior standing.)

- BA 310 3 Credits** **Fall and Spring**
Intermediate Management Information Systems (3+0)
 The use of the micro computer for developing and using decision support systems for management analysis in business is emphasized. Concepts and skills acquired in this course are needed for other upper division business courses. Materials fee: \$20.00. (Prerequisite: BA 101.)
- BA 325 3 Credits** **Fall and Spring**
Financial Management (3+0)
 Intensive analysis of the methods of corporate financial planning and control, asset management, capital budgeting, and financial markets and instruments. (Prerequisites: Acct. 102, Econ. 201, 202, 226. Highly recommended Math 162 or equivalent, and Econ. 227.)
- BA 326 3 Credits** **Spring**
Principles of Advertising (3+0)
 (Same as J-B 326)
 Theory and practice of advertising: including strategy, media use, creation and production of advertisements, and measurement of advertising effectiveness. (Prerequisite: Junior standing.)
- BA 331 3 Credits** **Fall and Spring**
The Legal Environment of Business (3+0)
 An introduction to the legal environment of business and management. Topics include the judicial system, legal processes, administrative procedures, product safety and advertising, debtor-creditor relations, issuing and trading securities, restraints of trade, monopolies, mergers, price discrimination, labor-management relations, labor standards and employee safety, business ethics and corporate social responsibility. Materials fee: \$20.00. (Prerequisite: Junior standing or permission of instructor.)
- BA 332 3 Credits** **Fall and Spring**
Business Law (3+0)
 The legal principles essential to a business person are presented in this course and include: the law of torts, contracts, agency, property, sales transactions, commercial paper, business organizations, government regulation of business, the uniform commercial code, the uniform partnership act and the uniform limited partnership act. Materials fee \$10.00. (Prerequisite: BA 331.)
- BA 343 3 Credits** **Fall and Spring**
Principles of Marketing (3+0)
 Role of marketing in society and economy. The business firm as a marketing system, and management of the firm's marketing effort. (Prerequisite: Acct. 102, Econ. 201, 202, 226.)
- BA 350 3 Credits** **Fall**
Introduction to Real Estate and Land Economics (3+0)
 Study of processes and considerations that influence decisions of individuals and groups concerning real estate investment and utilization. Functions of various types of real estate operators are also considered in the course. (Prerequisites: Junior standing or permission of instructor.)
- BA 360 3 Credits** **Spring and Fall**
Operations Management (3+0)
 An introduction to the operational field of production with emphasis on the design of efficient operating systems. Specific areas considered are: forecasting, facilities planning, inventory management, production scheduling, and job design as applicable to all types of organizations. Materials fee: \$20.00. (Prerequisites: BA 101 or equivalent, Acct. 102, Econ. 201, 202, 226. Highly recommended, Math. 162 or equivalent and Econ. 227.)
- BA 361 3 Credits** **Fall**
Personnel Management (3+0)
 Personnel practice in industry, analysis of labor-management problems, methods and administration of recruiting, selecting, training, and compensating employees, and labor laws and their applications. Materials fee: \$10.00. (Prerequisites: BA 301 or permission of instructor.)
- BA 372 3 Credits** **Spring**
Hotel Administration (3+0)
 An extensive examination of the practices and concepts necessary for successful hotel operation in Alaska including but not limited to management systems financing of hotels, budgeting and food costing, housekeeping, and front office management. (Prerequisites: BA 160, BA 253 and BA 301.)
- BA 375 3 Credits** **Fall**
Marketing of Hospitality Service (3+0)
 Principles of marketing applied to service industries, advertising, promotion, public relations, and personal selling to achieve profitable public recognition and good will. (Prerequisites: BA 343.)
- BA 377 3 Credits** **Alternate Fall**
Food and Beverage Management (3+0)
 Students will follow the development of a successful food and beverage system from its inception to operation and will deal with the diverse subjects of menu planning, purchasing, preparation, service, and food beverage cost control. (Prerequisites: BA 160, BA 253, BA 301. Next offered: 1988-89.)
- BA 378 3 Credits** **Fall**
Passenger Transportation Management (3+0)
 Students will become familiar with all modern forms of passenger transportation. Main emphasis will be put on those carriers presently operating in Alaska and future development of transportation in Alaska. (Prerequisites: BA 160 and BA 253.)
- BA 390 3 Credits** **Fall**
Organizational Behavior (3+0)
 A study of the behavior of individuals and small groups within organizations, including motivation, leadership, communications, group dynamics, organizational development, and conflict management. (Prerequisites: Psy. 101 or Soc. 101.)
- BA 410 3 Credits** **Fall and Spring**
Systems Analysis and Design (3+0)
 The System Development Lifecycle for organizational, departmental, and individual information systems from the point of view both of users and developers. Course project required. Materials fee: \$20.00. (Prerequisite: BA 310.)
- BA 423 3 Credits** **Fall**
Investment Management (3+0)
 Principles of investing in marketable securities from the individual's perspective, the determination of value, analysis of growth, technical analysis, and portfolio management. Materials fee: \$10.00. (Prerequisite: BA 325 or equivalent.)
- BA 425 3 Credits** **Spring**
Advanced Corporate Financial Problems (3+0)
 A consideration of corporate financial problems, planning and controls, and major functions performed by corporate financial managers. (Prerequisite: BA 325.)
- BA 430 3 Credits** **Fall**
Current Topics in Finance (3+0)
 An in-depth consideration of sophisticated and specialized applications of financial management principles. The topics covered will be those most timely to the Alaskan economy. Materials fee: \$20.00. (Prerequisites: BA 325.)
- BA 436 3 Credits** **Spring**
Consumer Behavior (3+0)
 Examination of the complex system of communication in marketing. The role of culture and its effects on product discrimination. Social class, personality, symbolism, and persuasion are studied from the marketing manager's point of view. The analysis is extended to the organizational influences on corporate buyers and the impact of buyer behavior on the strategy and tactics of marketing management. (Prerequisites: BA 343, Econ. 226 and 227.)
- BA 441 3 Credits** **Spring**
Promotion Management (3+0)
 An examination of the areas of advertising, publicity, sales management, sales promotion, and the interrelationships necessary for effective promotions. (Prerequisite: BA 343.)
- BA 443 3 Credits** **Spring**
International Marketing (3+0)
 There are significant changes occurring in the world with respect to trade. Thus, comparisons of foreign markets with domestic markets are required. If the market is attractive, then it can be enlarged via direct export, direct investment, or joint ventures. All three methods will be examined. The problems of foreign pricing, communications, distribution, and advertising will also be viewed in terms of marketing management and research. (Prerequisite: BA 343.)
- BA 445 3 Credits** **Fall**
Marketing Research (3+0)
 To familiarize students with the basic processes and tools of marketing research with emphasis on utilization of research findings as an integral part of the managerial decision-making process. Students will apply technique of data-gathering and analysis to a marketing problem. (Prerequisites: BA 343 and 436.)
- BA 453 3 Credits** **Fall and Spring**
Internship in Business Administration (0+var.)
 A supervised practical work experience designed to provide students with a meaningful external involvement in their major discipline. Admission dependent upon completion of satisfactory sponsorship arrangements and permission of the instructor. (Prerequisite: Senior standing and permission of instructor.)

- BA 456 3 Credits Spring**
Small Business Management (3+0)
 The course focuses on the operations and special problems of the small business with emphasis on both existing firms and new ventures. Subjects to be covered include starting new businesses, buying going concerns, acquiring and operating franchises, establishing lines of credit, management, legal matters, profit planning, pricing, inventory levels, record systems, tax regulations, and employee supervision. Materials fee: \$20.00. (Prerequisites: Completion of all 300 level Business Administration, Accounting and Economics common body of knowledge requirements and senior standing in the School of Management.)
- BA 460 3 Credits Fall**
International Business (3+0)
 An analysis of the relationships among nations with particular emphasis on the business, economic, and sociocultural institutions that influence the performance of managers. Formulation of objectives, strategies, and organizational structures within the context of international diversity will be addressed. (Prerequisite: senior standing. All 300 level requirements completed.)
- BA 461 3 Credits Spring**
International Finance (3+0)
 A study of the financing of foreign investment projects including foreign capital markets, financing exports, hedging foreign exchange risks, and capital budgeting in an international setting. (Prerequisites: BA 325.)
- BA 462 3 Credits Fall and Spring**
Administrative Policy (3+0)
 An advanced case course which focuses on the questions of organizational purpose and design through the eyes of the general manager. Marketing, management, and financial considerations are integrated with external influences to forge strategic planning and control. (Prerequisites: Completion of all 300 level common body of knowledge requirements and senior standing.)
- BA 465 3 Credits Alternate Spring**
Tourism Destination Planning and Development (3+0)
 Tourism resource characteristics, location, and market demand considerations. Analysis of development potential, planning processes and procedures, capital and personnel requirements, and tourism destination developments. (Prerequisites: BA 160, BA 301. Next offered: 1989-90.)
- BA 471 3 Credits Alternate Spring**
Tourism Seminar (3+0)
 A senior seminar bringing together all areas of the travel-tourism industry. Lecturer, guest industry speakers, and the case study method will all be utilized. (Prerequisite: Admission by instructor's permission and upper division standing. Next offered: 1988-89.)
- BA 475 3 Credits As Demand Warrants**
Transportation and Logistics (3+0)
 The essential focus of teaching and research in transportation is on systems planning, especially multimode systems. The program builds upon basic knowledge of the properties of transportation systems components, and the ability to analyze interactions among these components and between the transportation system and its environment. Special consideration will be given to Alaskan transportation problems by experienced specialists. (Prerequisites: Econ. 226, BA 343.)
- BA 480 3 Credits Spring**
Organization Theory (3+0)
 A review of the literature on organization theory, emphasizing theoretical concepts, social science research techniques, and organizational behavior. Development and study of the various approaches to organizational change including the initiation of change and the evaluation of change programs. (Prerequisites: BA 301 or permission of instructor.)
- BA 483 3 Credits Spring**
Marketing Management (3+0)
 Analysis planning and implementation of the total marketing program of an organization: goal setting, marketing mix, problem recognition and analysis, and current issues. (Prerequisite: BA 325, 331, 360 and 445.)
- BA 603 3 Credits Fall**
The Process and Legal Environment of Management (3+0)
 A graduate level introduction to issues in management which focuses on the essentials of effective management for the practicing manager. A critical look at current operating management theory including planning, managing, staffing, and leadership skills. (Prerequisite: Graduate standing.)
- BA 605 3 Credits Fall**
Management Information Systems (3+0)
 Application of systems concepts for producing information to be used in business decision making. Use of mainframe computing (VAX) and personal computers in decision support software, e.g. spread sheets, data base systems, etc. Special projects. Materials fee: \$20.00. (Prerequisite: Graduate standing.)
- BA 606 3 Credits Spring**
Quantitative Analysis (3+0)
 An introductory study of the quantitative methods, tools, and statistics applicable to the solution of business and economic problems. Concepts, techniques, and statistical analysis, including probability, statistical inference and analysis of variance, and correlation and regression analysis. Materials fee: \$20.00. (Prerequisites: Graduate standing and Math 161-162 or equivalent.)
- BA 608 3 Credits Spring**
Organizational Theory (3+0)
 The structure and design of modern organizations, including the critical review of topics such as organization functions, design parameters, contingency factors, and structural configurations. (Prerequisite: Graduate standing.)
- BA 625 3 Credits Spring**
Financial Management (3+0)
 A broad based introduction to the theories and techniques of corporate financial management. Topics covered include capital budgeting, cost of capital, leverage and valuation. (Prerequisites: Graduate standing.)
- BA 643 3 Credits Fall**
Marketing Management (3+0)
 An introductory graduate level course in marketing including the study of product and product planning, research, distribution channels, logistics, consumer behavior, pricing, sales promotion and management, and the institutional structure of markets. (Prerequisites: Graduate standing.)
- BA 651 3 Credits Spring**
Organizational Behavior (3+0)
 A study of the behavior of individuals and small groups within organizations including the following concepts: personality, perception learning, motivation, group attraction and formation, group processes, conflict, and leadership. (Prerequisites: Graduate standing.)
- BA 661 3 Credits As Demand Warrants**
Human Resources Management (3+0)
 The study of the effective management of human resources in organizations including employee planning, employee attraction, selection and orientation, career development, evaluation, training, compensation, EEO, safety, and labor relations. (Prerequisites: Graduate standing.)
- BA 680 3 Credits Fall**
Seminar in Finance (3+0)
 A study of the finance function of the firm and the major problems faced by the financial managers, including capital investment analysis and valuation, capital budgeting, financial structure and dividend policies, working capital management, and other current topics in financial management. (Prerequisites: Graduate standing. Completion of foundation core courses. BA 325 or BA 625.)
- BA 683 3 Credits Spring**
Seminar in Marketing (3+0)
 A survey of marketing institutions, systems, policies, and practices. Review of marketing constituents in economic development, marketing theory, and current problems. (Prerequisites: Graduate standing. Completion of foundation core courses. BA 343 or BA 643.)
- BA 684 3 Credits Fall**
Production and Operations Management (3+0)
 A study of the technical management skills needed to effectively manage the activities of selecting, designing, operating, controlling, and updating the productive and operating systems in diverse types of organizations, ranging from manufacturing to service. Materials fee: \$20.00. (Prerequisite: Graduate standing in M.B.A. Program.)
- BA 690 3 Credits Spring**
Administrative Policy (3+0)
 The broad aspects of administrative policy and the major social, political, legal, economic, and international forces impacting on complex organizations. Development of an intuitive systematic scientific understanding of the design and use of formal systems for comprehensive long-range planning and policy formulation in large corporations. (Prerequisites: Graduate standing. Completion of foundation core courses. Recommended that BA 690 be taken last semester of program.)

BA 691 3 Credits **Fall**
Research Design and Methods (3+0)
 Emphasis on the general applications of the methods of business research and the scientific method of research in business administration. Topics to be considered include the planning of a research project and problem identification, scientific methods in business administration, research design and models, library, survey, and experimental research methods. The course is designed to aid the MBA student in identifying and specifying research problems prior to involvement in the preparation of the research project. Materials fee: \$20.00. (Prerequisite: Graduate standing in MBA Program.)

Chemistry

CHEM 075 3Credits **As Demand Warrants**
Introduction to Chemistry to Chemical Sciences (3+)

Introduction to chemistry for the non-science major. Includes units of measurement, atomic and molecular structure, chemical bonding, metabolism, radioactivity, oxidation-reduction reactions, solutions, acids and buffers.

CHEM 103 4 Credits **Fall**
Contemporary Chemistry: Chemistry of the Elements (3+3) n
 Introduction to the fundamentals of chemistry with the development of linguistic and mathematical skills and their application to the descriptive and quantitative study of metals, non-metals and their compounds. The course may be used to meet the general laboratory science requirement or for preparation for Chem. 105 or 121. Laboratory fee: \$15.00.

CHEM 104 4 Credits **Spring**
Contemporary Chemistry: Organic Carbon (3+3) n
 Introduction to the fundamentals of chemistry with the development of linguistic and mathematical skills and their application to the descriptive and quantitative study of carbon and its relationship to the chemistry of living systems. The course may be used to meet the general laboratory science requirement or for preparation for Chem. 105 or 121. Chem. 103 is not a prerequisite for Chem. 104. Laboratory fee: \$15.00.

CHEM 105 4 Credits **Fall and Spring**
CHEM 106 4 Credits **Fall and Spring**
General Chemistry (3+3) n

Chem. 105-106, together, constitute the standard one-year engineering and science-major general chemistry course with laboratory. Chem. 105: Measurements, calculations, atomic and molecular structure, chemical reactions and related energy changes. Chem. 106: Reaction kinetics, equilibrium (including acids and bases), nuclear chemistry, electro-chemistry, chemistry of the elements and an introduction to organic and biochemistry. Laboratory fee: \$15.00. (Prerequisites: For Chem. 105: high school algebra, high school chemistry or Chem. 103 or 104, or consent of instructor. For Chem. 106: Chem. 105.)

CHEM 120 4 Credits **Fall**
Survey of Chemistry (3+3) n
 A one semester survey of general chemistry beginning with fundamental concepts and laws and applying them to inorganic and organic chemistry. Applications are done in such a way as to prepare the student to study the chemistry of biological systems. This course is preparatory for Chem. 121, Beginnings in Biochemistry. Laboratory fee: \$15.00.

CHEM 121 4 Credits **Spring**
Beginnings in Biochemistry (4+0) n
 A freshman-level course covering the fundamentals of chemistry as applied to biological systems. It is intended to bridge the gap between a general chemistry course and the biochemical concepts of other health-related sciences. Recommended for health-science degree candidates. (Prerequisite: Chem. 120 or consent of instructor.)

CHEM 202 3 Credits **Spring**
Basic Inorganic Chemistry (2+3) n
 Survey of inorganic chemical properties and reactions with special emphasis on the environment. The laboratory includes synthesis, characterization and analysis. Laboratory fee: \$15.00 (Prerequisite: Chem. 106 or permission of instructor.)

CHEM 212 3 Credits **Fall**
Chemical Equilibrium and Analysis (3+0) n
 A systematic study of aqueous chemical equilibrium as applied to chemical analysis, separations, spectrophotometry, potentiometry, and factors considered in the analytical approach. (Prerequisites: Chem. 106, Math. 107 or equivalent.)

CHEM 213 1 Credit **Fall**
Quantitative Analysis Laboratory (0+3) n
 Laboratory training in quantitative chemical manipulation, including calibration, standardization, analysis using titrimetric and instrumental methods. Laboratory fee: \$15.00 (Prerequisites: Chem. 106 and Math. 107.)

CHEM 321 3 Credits **Fall and Spring**
CHEM 322 3 Credits **Fall and Spring**
Organic Chemistry (3+0) n
 A systematic study of the more important classes of carbon compounds, reactions of their functional groups, methods of synthesis, relations, and uses. (Prerequisite, Chem. 106 for Chem. 321; Chem. 321 for Chem. 322.)

CHEM 324 3 Credits **Fall and Spring**
Organic Laboratory (1+8) n
 A laboratory designed to illustrate modern techniques of isolation, purification, analysis, and structure determination of covalent, principally organic, compounds. Laboratory fee: \$15.00. (Prerequisites: Chem. 321 or permission of the instructor.)

CHEM 331 3 Credits **Fall**
CHEM 332 3 Credits **Spring**
Physical Chemistry (3+0) n
 Chem. 331: Principles of thermodynamics with applications to phase equilibria, solutions, chemical equilibrium and electrochemistry. Chem. 332: Kinetic theory of gases, chemical kinetics, atomic and molecular structure, and spectroscopy. (Prerequisites: Chem. 106, Math 202, Phys. 104 or 212 or permission of the instructor; Chem. 331 for Chem. 332.)

CHEM 402 3 Credits **Fall**
Inorganic Chemistry (3+0) n
 An in-depth survey of modern inorganic chemistry with application of physical chemistry to the study of the elements and their compounds. Major emphasis is on bonding, periodic properties and coordination chemistry. (Prerequisite or corequisite: Chem. 332.)

CHEM 412 3 Credits **Spring**
Instrumental Analytical Methods (3+0) n
 Theory, capabilities and limitations of instruments used in chemical analysis. Subjects include chromatography, mass spectrometry, potentiometry, optical spectroscopy, and nuclear magnetic resonance. (Prerequisites: Chem. 212 and 213; corequisite: Chem. 332.)

CHEM 433 3 Credits **Fall**
Analytical Instrumental Laboratory (1+6) n
 An analytical chemistry laboratory emphasizing quantitative instrumental measurements with atomic and molecular absorption spectrometry, gas and liquid chromatography and potentiometry. \$15.00. (Prerequisite: Chem. 212, corequisite Chem. 331, 412.)

CHEM 434 3 Credits **Fall**
Physical Instrumental Laboratory (1+6) n
 A physical chemistry laboratory emphasizing quantitative instrumental measurements: calorimetry, conductance, polarimetry; IR, NMR, x-ray, and Raman spectroscopy. Laboratory fee: \$15.00. (Prerequisite: Chem. 433.)

CHEM 451 3 Credits **Fall**
General Biochemistry (3+0)
 Chemistry of biomolecules with emphasis on the bioenergetics and control of metabolic pathways via regulation of specific enzymes. (Prerequisites: Chem. 322; Chem. 331 and 322 recommended or permission of the instructor.)

CHEM 452 3 Credits **Spring**
Biochemistry Laboratory (1+6)
 An introduction to the experimental manipulation and observation of enzymes, proteins, and nucleic acids, using chromatographic, spectroscopic, electrophoretic, and other techniques. Laboratory fee: \$15.00 (Prerequisite: Chem. 451.)

CHEM 602 3 Credits **As Demand Warrants**
Advanced Inorganic Chemistry (3+0)
 Advanced topics in inorganic chemistry. Topic Areas: solid state chemistry, bioinorganic chemistry. X-ray diffraction, thermodynamic aspects, physical methods, unusual oxidation states, etc. (Prerequisite: Chem. 402 or 431.)

CHEM 612 3 Credits **Alternate Fall**
Advanced Analytical Chemistry (3+0)
 Advanced topics in analytical chemistry with emphasis on modern instrumental analytical methodology and chemometrics. (Prerequisite: Chem. 332. Next offered: 1989-90.)



- CHEM 621 3 Credits As Demand Warrants**
Physical Organic Chemistry (3+0)
 Application of the principles of physical chemistry of organic molecules and reactions. Topics include kinetics, thermodynamics, spectroscopy, pericyclic processes, and reaction mechanisms. (Prerequisite: Chem. 322; corequisite: Chem. 332.)
- CHEM 622 3 Credits As Demand Warrants**
Advanced Organic Chemistry II (3+0)
 Contemporary topics in organic chemistry drawn from the areas of synthesis, reactivity, and bio-organic chemistry. Variable content. May be repeated for credit. (Prerequisite: Chem. 322.)
- CHEM 631 3 Credits Alternate Spring**
Advanced Physical Chemistry (3+0)
 Introduction to quantum chemistry. (Prerequisite: Chem. 332. Next offered: 1989-90.)
- CHEM 632 3 Credits As Demand Warrants**
Molecular Spectroscopy (3+0)
 Application of quantum mechanics to molecular bonding and spectroscopy. (Prerequisite: Chem. 332.)
- CHEM 652 3 Credits Alternate Spring**
Advanced Biochemistry (3+0)
 Current research in one of the major biochemical disciplines: proteins, lipids, carbohydrates; biochemical genetics; comparative biochemistry; enzymology; physical biochemistry; vitamins and hormones. Variable content. Arranged in consultation with instructor. (Prerequisites: Chem. 451 or equivalent. Next offered: 1989-90.)
- CHEM 660 3 Credits Spring**
Chemical Oceanography (3+0)
 (Same as MSL 660)
 An integrated study of the chemical, biological, and physical processes that determine the distribution of chemical variables in the sea. The distribution of stable and radio-isotopes are used to follow complex chemical cycles, with particular emphasis on the cycles of nutrient elements. The chemistry of carbon is considered in detail. The implications of the recently explored mid-ocean ridge vent system to ocean chemistry are examined. (Prerequisites: Graduate standing or permission of instructor.)
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- ## Civil Engineering
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- CE 112 3 Credits Spring**
Elementary Surveying (2+3)
 Basic plane surveying; use of transit, level, theodolite, and total station. Traverses, public land system, circular curves, cross-sectioning and earthwork. (Prerequisites: Math 108.)
- CE 326 4 Credits Fall and Spring**
Introduction to Geotechnical Engineering (3+3)
 Introduction to the fundamentals of geotechnical engineering including both soil mechanics and foundation engineering. Identification and classification of soil, physical and mechanical properties of soil, subsurface exploration and laboratory testing techniques, seepage, compaction, bearing capacity, slope stability, deep and shallow foundation design, retaining structure design, frozen ground consideration. (Prerequisites: E.S. 331, ES 341, CE 334 or permission of the instructor.)
- CE 334 3 Credits Fall**
Properties of Materials (2+3)
 Introduction to the properties of engineering materials. Bonding, crystal, and amorphous structures. Relationships between microstructure and engineering properties. Modification of properties and environmental serviceability. Concrete and asphalt mixes. Laboratory fee: \$10.00. (Corequisite: E.S. 331.)
- CE 344 3 Credits Spring**
Water Resources Engineering (3+0)
 Fundamentals of engineering hydrology and hydraulic engineering. Precipitation, runoff, statistical methods, flood control, open channels, and groundwater. Materials fee: \$10.00. (Prerequisite: E.S. 341.)
- CE 400 0 Credits Fall and Spring**
EIT Exam
 Complete the EIT application and take the State of Alaska Engineering-in-Training Exam in the same semester of course registration. (Prerequisites: Senior Standing, Civil Engineering.)
- CE 402 3 Credits Fall**
Introduction to Transportation Engineering (3+0)
 Introduction to fundamentals of transportation engineering. Transportation systems, planning, design parameters, demand and mode specific consideration. Laboratory fee: \$10.00. (Prerequisites: C.E. junior standing or permission of instructor.)
- CE 403 3 Credits Fall**
Traffic Engineering (2+3)
 Analysis and design of highways, streets and intersections for traffic consideration. (Prerequisite: C.E. 402)
- CE 404 3 Credits Spring**
Highway Engineering (2+3)
 Engineering considerations for highway design including vertical and horizontal alignment, cross sections, drainage, pavements, earthworks, signs and markings, intersection and interchange. (Prerequisites: C.E. 402, C.E. 415.)
- CE 412 3 Credits Alternate Spring**
Elements of Photogrammetry (2+3)
 Elementary study of aerial and terrestrial photography as applied to surveying and mapping. Flight planning and ground control. Analytical analysis of photography by computer. Kelsh Plotter and other related equipment will be used. (Prerequisite: permission of the instructor. Next offered: 1989-90.)
- CE 415 3 Credits Fall**
Advanced Surveying (2+3)
 Azimuth by astronomic methods. Route surveying, including horizontal and vertical curves, spirals, cross-sectioning, and earthwork. Reduction of electronic distance measurements. Alaska State Plane Coordinate System, both old (NAD27) and new (NAD83). (Prerequisite: C.E. 112)
- CE 416 1 Credit Spring**
Boundary Surveying (1+0)
 Surveying problems related to land subdivision with emphasis on the legal aspects. Both metes and bounds descriptions and platted subdivisions are considered. (Prerequisite: C.E. 112 or permission of the instructor.)
- CE 422 3 Credits Spring**
Foundation Engineering (3+0)
 Principles of foundation design, ultimate bearing capacity of soils and effects of settlements on structure, design of footings and rafts, design of pile and pier foundations, retaining walls and anchored bulkheads, foundations on frozen soils, and construction problems in foundation engineering. (Prerequisite, C.E. 326, E.S. 301.)
- CE 425 3 Credits Fall**
Advanced Soil Mechanics (2+3)
 Soil formation, identification and classification, physical and mechanical properties of soil, seepage, drainage and frost action, subsoil investigation, bearing capacity of soils, and lateral earth pressures and stability of slopes. Laboratory fee: \$10.00. (Prerequisite: C.E. 326, E.S. 301.)
- CE 431 3 Credits Spring**
Structural Engineering I (3+0)
 Analysis of statically determinate and indeterminate structures to include: beams, trusses and frames. Internal force resultants, shear and moment diagrams, deflections, internal stresses. Influence lines and criteria for moving loads. Indeterminate analysis to include methods of consistent deflections, slope deflection and moment distribution. Introduction to matrix methods. (Prerequisites: C.E. 334, E.S. 331.)
- CE 432 3 Credits Fall**
Structural Engineering II (3+0)
 The concepts of analysis/design will be examined for structural systems using advanced methods of structural analysis and computer techniques. The effects of material behavior, and modes of failure (building, bending, shear, connections) on design decisions will be examined. (Prerequisite: C.E. 431.)
- CE 433 3 Credits Fall**
Reinforced Concrete Design (2+3)
 Analysis and design of reinforced concrete components. Design philosophies and current practice. Short and long columns, beam-columns, flexural members, to include: rectangular and T-beams, one and two-way slabs. Footings. Crack control, anchorage, development lengths and deflections. Introduction to complete structural systems. Current ACI specifications used. (Prerequisite: C.E. 431.)
- CE 434 3 Credits Spring**
Timber Design (2+3)
 Essentials of structural design in timber. Design of basic components of solid and laminated timber, connections, arches, pole framing, diaphragms, stressed-skin construction, and timber shells. (Prerequisite: E.S. 331 and C.E. 431.)
- CE 436 3 Credits Spring**
Structural Steel Design (2+3)
 Analysis and design of structural steel components. Design philosophies and current practice. Columns, tension members, laterally supported and unsupported beams and beam-columns. Local and global instabilities. Welded and bolted connections. Introduction to complete structural systems. Current AISC specifications used. (Prerequisite: C.E. 431.)

- CE 438 3 Credits Spring**
Design of Engineered Systems (3+0)
 Introduction to system design methods for large scale engineering systems. The application linear and dynamic programming and statistical methods to design decisions. Emphasis on problems in civil engineering. (Prerequisite: Senior standing in an engineering program.)
- CE 441 4 Credits Fall**
Environmental Engineering (3+3)
 Introduction to fundamentals of environmental engineering including theory and application of water and wastewater engineering practice. Conservation, quality, treatment, and distribution of water supply. Wastewater characteristics, collection, treatment, and disposal. Introductory information on solid waste management and air pollution control. Laboratory fee: \$10.00. (Prerequisite: E.S. 341 or permission of instructor.)
- CE 442 3 Credits Spring**
Environmental Engineering II (3+0)
 Advanced topics in environmental engineering. Each of the following subjects will be allocated about an equal portion of time for topic coverage. Environmental law and health, air pollution, solid waste management, toxic and hazardous wastes, animal waste management, noise pollution, water quality modeling, wastewater collection systems, chemical/physical processes, theory of sedimentation, disinfection, biological processes, onsite treatment, sludge management, advanced waste treatment and other. (Prerequisites: C.E. 441 and junior C.E. standing.)
- CE 445 3 Credits Fall**
Engineering Hydrology (2+3)
 Engineering hydrology, design and analysis; extended coverage of hydrologic concepts from C.E. 344. Precipitation, evaporation analysis; groundwater hydraulics; runoff analysis and prediction; statistical hydrology; application of simulation models. (Prerequisite: C.E. 344.)
- CE 446 3 Credits Spring**
Hydraulic Engineering (2+3)
 Hydraulic design and analysis. Review of principles of fluid mechanics pipe network modeling, hydraulic systems (pumps and turbines), steady and unsteady flow in open channels, hydraulic structures, similitude. (Prerequisite: C.E. 344.)
- CE 470 1 Credit Fall and Spring**
Civil Engineering Internship (0+3)
 Designed to give students the opportunity to investigate the practical workings of engineering organizations. Assignments individually arranged with cooperating organizations and agencies. (Prerequisites: Senior standing. Permission of Department Coordinator.)
- CE 603 3 Credits Fall and Spring**
Arctic Engineering (3+0)
 Application of engineering fundamentals to problems of advancing civilization to polar regions. Logistics, foundations on frozen ground and ice thermal aspects of structures, materials, transport, and communications, and heating and ventilating. Materials fee: \$10.00. (Prerequisite: Graduate standing or permission of instructor.)
- CE 605 3 Credits Alternate Spring**
Pavement Design (3+0)
 Current design techniques for flexible and rigid pavements. Materials characterization, loading considerations, empirical design methods, mechanistic design methods, rehabilitation. (Prerequisites: Graduate standing and C.E. 402 or consent of instructor. Next offered: 1988-89.)
- CE 617 3 Credits Alternate Fall**
Control Surveys (3+0)
 Geodetic surveying, where the shape of the earth must be considered. Forward and inverse geodetic problems. Medium to long electronic distance measurements. Heavy emphasis on Alaska State Plane Coordinate System (NAD 83) and UTM Coordinate System. Adjustment of level nets. (Prerequisite, C.E. 415 or other surveying experience acceptable to the instructor. Next offered: 1989-90.)
- CE 620 3 Credits Alternate Spring**
Civil Engineering Construction (3+0)
 Construction equipment, methods, planning and scheduling, construction contracts, management and accounting, construction estimates, costs, and project control. (Prerequisites: ESM 450 or equivalent. Next offered: 1988-89.)
- CE 622 3 Credits Alternate Fall**
Foundations and Retaining Structures (3+0)
 Advanced study of shallow and deep foundations, retaining structures and buried pipes. (Prerequisites: C.E. 435 and C.E. 422 or consent of instructor. Next offered: 1989-90.)
- CE 625 3 Credits Alternate Fall**
Soil Stabilization (3+0)
 Soil and site improvement using deep and shallow compaction, additives, preloading, vertical and horizontal drains, electro osmosis and soil reinforcement. (Prerequisite: C.E. 435 or consent of instructor. Next offered: 1989-90.)
- CE 626 3 Credits Alternate Fall**
Applications in Geotechnical Engineering (3+0)
 Selected topics in geotechnical engineering studied in conjunction with case histories. (Prerequisites: C.E. 326, C.E. 422 and C.E. 425 or consent of instructor. Next offered: 1989-90.)
- CE 627 3 Credits Spring**
Earthquake Engineering I (3+0)
 Fundamentals of geotechnical earthquake engineering; wave propagation in soils; dynamic soil properties; influences of soils on ground motion; determination of soil response under strong seismic motion; causes of soil failures, soil liquefaction, soil settlement, soil-structure interaction and slope stability; analysis and design of dams, earth structures and foundation systems. (Prerequisite: C.E. 326.)
- CE 631 3 Credits Fall**
Advanced Structural Analysis (3+0)
 Derivation of the basic equations governing linear structural systems. Application of stiffness and flexibility methods to trusses and frames. Solution techniques utilizing digital computer. Introduction to structural dynamics.
- CE 632 3 Credits Alternate Fall**
Advanced Structural Design (3+0)
 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. 431. Next offered: 1988-89.)
- CE 637 3 Credits Fall**
Earthquake Engineering II (3+0)
 Fundamentals of structural earthquake engineering; strong ground motion phenomena; dynamic analysis of structural systems for seismic motion; response spectrum and time history methods, design of structural systems for lateral forces; shearwalls and diaphragms; moment-resistive frames, braced frames; current design criteria and design practice; connection details, serviceability requirement; story drift, non-structural building elements; soil-structure interaction. (Prerequisite: C.E. 432.)
- CE 661 3 Credits As Demand Warrants**
Advanced Water Resources Engineering (3+0)
 Engineering hydraulics and hydrology with emphasis on statewide topics, computer modeling for runoff and groundwater studies, reservoir mechanics, fish hatchery design, and hydro-power generation. (Prerequisite: Permission of the instructor.)
- CE 662 3 Credits Alternate Spring**
Open Channel and River Engineering (3+0)
 Principles of open channel flow, transitions and controls, unsteady flow, river engineering, stream channel mechanics, and mechanics of sedimentation. (Prerequisite: E.S. 341. Next offered: 1989-90.)
- CE 663 3 Credits Alternate Years**
Groundwater Dynamics (3+0)
 Fundamentals of geohydrology, hydraulics of flow through porous media, well hydraulics, groundwater pollution, and groundwater resources development. (Prerequisite: E.S. 341. Next offered: 1988-89.)
- CE 676 3 Credits As Demand Warrants**
Coastal Engineering (3+0)
 Review of deep and shallow water waves, littoral drift, coastal structures, pollution problems, and harbor seiches. (Prerequisite: E.S. 341.)
- CE 681 3 Credits Alternate Spring**
Frozen Ground Engineering (3+0)
 Nature of frozen ground, thermal properties of frozen soils, classification, physical and mechanical properties of frozen soils, sub-surface investigation of frozen ground, thaw settlement and thaw consolidation, slope stability, and principles of foundation design in frozen ground. (Prerequisite: Training or experience in soil mechanics. Next offered: 1989-90.)
- CE 682 3 Credits Alternate Spring**
Ice Engineering (3+0)
 In this course, the factors governing design of marine structures, which must contend with the presence of ice are discussed. Topics include ice growth, ice structure, mechanical properties and their dependence on temperature and structure, creep and fracture, mechanics of ice sheets, forces on structures, and experimental methods. (Prerequisite: E.S. 331, Math 202, training or experience in soil mechanics. Next offered: 1989-90.)

CE 683 3 Credits Alternate Years
Arctic Hydrology and Hydraulic Engineering (3+0)
 The course is designed to present material on aspects of hydrology and hydraulics unique to engineering problems of the north. Although the emphasis will be on Alaskan conditions, information from Canada and other circum-polar countries will be included in the course. (Prerequisite: C.E. 344 or equivalent. Next offered: 1989-90.)

CE 684 3 Credits Alternate Years
Arctic Utility Distribution (3+0)
 Practices and considerations of utility distribution in Arctic regions. Emphasis on proper design to include freeze protection, materials, energy conservation, and system selection. (Prerequisite, E.S. 341 or permission of instructor. Next offered: 1988-89.)

CE 685 3 Credits Alternate Spring
Topics in Frozen Ground Engineering (3+0)
 Selected frozen ground foundation engineering problems will be explored in depth including refrigerated foundations and pile foundations. (Prerequisite: C.E. 681. Next offered: 1988-89.)

College Student Personnel Administration

CSP 651 3 Credits Alternate Fall
Current Issues in Student Personnel Administration (3+0)
 The contemporary problems and issues affecting student personnel workers in higher education. Includes an examination of the changing roles of students, student diversity, students' rights, freedoms, and responsibilities; evaluation, research and accountability; financing; and relationship to central administrative services. (Prerequisite: Permission of instructor. Next offered: 1988-89.)

CSP 655 3 Credits Fall and Spring
Practicum in Student Personnel Administration (1+6)
 Supervised field experience in student service agencies. Each of two semesters will require six hours per week in the pre-arranged work setting, as well as one additional hour per week for seminar sessions with the supervisors, instructor, and other practicum students. (Prerequisite: Permission of the instructor.)

CSP 661 3 Credits Fall and Spring
Practicum in Counseling: Higher Education/Agency (0+9)
 (Same as Coun. 661.)
 Supervised field experience, including preparatory activities in a higher educational or agency setting. This course is not open to public school counselor-trainees. (Prerequisites: Couns. 623, 624 and three approved graduate credits in the area of specialization.)

Community Health Practitioner

CHP 082 1 Credit As Demand Warrants
Community Health Practitioner New Hire (1+0)
 Assists the newly employed community health aide to function in the village clinic until he/she enters Session I. (Prerequisite: Employment by health corporation as community health aide or permission of instructor.)

CHP 110 8 Credits As Demand Warrants
Community Health Practitioner, Session I (8+0)
 Introduction for the community health practitioner. Topics covered include normal anatomy and physiology; history taking; physical examination; introduction to clinical therapy; family health; communicable diseases; pharmacology; clinic management and health administration. Prepares student to be working independently in a village clinic providing basic primary health care under the medical supervision of a physician at the regional hospital.

CHP 111 8 Credits As Demand Warrants
Community Health Practitioner, Session II (8+0)
 Focus of this session is on the childbearing cycle, infant and child. Other subject matter centers on health promotion and maintenance, including topics of nutrition, mental health and health education. Upon completion student is prepared to conduct basic prenatal and well-child examinations, recognize and manage most common minor problems seen in these areas and make appropriate referrals as necessary. (Prerequisite: CHP 110.)

CHP 112 8 Credits As Demand Warrants
Community Health Practitioner, Session III
 Session focuses on clinical assessment and therapy. Attention is given to student's ability to differentiate between normal and abnormal, determine the relative seriousness of the patient's condition and to make appropriate judgments regarding the nature, locale and immediacy of treatment. Areas such as emergency care, pharmacology, environmental health, communicable disease and family health are reviewed and studied in greater depth. (Prerequisite: CHP 111.)

CHP 202 3 Credits As Demand Warrants
Emergency Care for Community Health Practitioners (3+0)
 Will learn to evaluate and respond to a wide variety of emergency situations that may arise in the village setting. Included among skills to be taught are emergency assessment and treatment, administration of intravenous fluids, application of splints, bandages and transportation of the injured. (Prerequisite: CHP Certification.)

CHP 203 2 Credits As Demand Warrants
Clinical Update for Community Health Practitioners (2+0)
 Review, update and reinforce the knowledge and skills that were taught in Basic CHP training.

CHP 206 2 Credits As Demand Warrants
Life Coping Skills (2+0)
 Designed to teach listening skills, drug therapy and family dynamics to those most likely to be involved with both crisis intervention and long term care in the area of mental health. (Prerequisite: CHP Certification.)

CHP 207 2 Credits As Demand Warrants
Maternal and Infant Health (2+0)
 Review of the anatomy of the reproductive system, family planning, pregnancy, fetal development, prenatal care, emergency delivery, maternal post-partum and infant care. (Prerequisite: CHP Certification.)

CHP 208 2 Credits As Demand Warrants
Communicable Diseases (2+0)
 Expands concepts of CHP 112 in relation to diagnosis, management and prevention of sexually transmitted diseases. Skills to conduct a village program for venereal disease control are taught including procedures involved for early detection of uterine cancer (PAP), tuberculosis and immunization procedures. (Prerequisite: CHP Certification.)

CHP 211 1 Credit As Demand Warrants
Health Education (1+0)
 Methods and philosophy of health education, use and sources of audiovisual materials, presentation planning and participation in a school health program. Variety of teaching methods including situational role playing and practice sessions are used in the application of newly acquired health education knowledge and skills. (Prerequisite: CHP Certification.)

Computer Applications

CAPS 100 1 Credit As Demand Warrants
Introduction to Personal Computers (1+0)
 Introductory course on the personal computer. Course is designed for the first time user and will give an overview of the most popular uses of the personal computer: word processing, data base management and electronic spreadsheets. Students completing this course will have a basic understanding of how the computer works and how they might put it to work for them. Materials fee: \$5.00.

CAPS 102 3 Credits As Demand Warrant
Programming in BASIC (3+0)
 Recommended as a first programming language for non-majors. Training and practice in writing programs in BASIC language for business data processing applications using microcomputers. Emphasis on problem-solving; analysis, flowcharting, testing and debugging and documentation. (Prerequisite: Math 070 or 105 or equivalent.)

CAPS 103 1-3Credits As Demand Warrants
Computer Survey (1+0 to 3+0)
 Course provides student an introduction to the world of computers with an emphasis on microcomputers. Introduces the computer and provides computer terminology. Will learn not only 'about' computers but also how to 'use' computers as a tool to make work easier and possible to extend the reach of their minds.

CAPS 104 3 Credits As Demand Warrants

Introduction to Computer Programming (3+0)
Through readings, homework computer assignments and computer project assignments the student will learn the fundamental structure of the computer language PASCAL and be able to write elementary computer programs on the IBM-PC (or compatible) computer. Will also be able to understand what a computer is and how it functions, compiles, processes and outputs information. Computer networking will be an integral part of the course. (Prerequisite: Ninth grade reading and comprehension level.)

CAPS 105 3 Credits As Demand Warrants

Programming in Fortran (3+0)
Training and practice in writing programs in FORTRAN. Emphasis on problem-solving through analysis, flowcharting, testing and debugging and documentation. (Prerequisite: Math 070 or 105 or equivalent.)

CAPS 106 3 Credits As Demand Warrants

BASIC Programming (3+0)
Training and practice in writing programs in the BASIC language for business data processing applications using microcomputers. Emphasis on problem solving with a computer. (Equivalent to CAPS 102.)

CAPS 107 3 Credits As Demand Warrants

Programming in PASCAL (3+0)
Through textbook readings, lecture/discussion sessions and nine programming assignments the student will learn the fundamental structure of the computer language PASCAL (up to data types of single dimension arrays) and be able to write elementary computer programs on the University VAXMS in PASCAL. (Prerequisite: One computer programming course or equivalent.)

CAPS 110 3 Credits As Demand Warrants

Microcomputer as Learning Tool (3+0)
Concentration on word processing and other software to facilitate education. Telecommunications will be an important part of course. Materials fee: \$15.00. (Prerequisite: Typing skill required.)

CAPS 111 2 Credits As Demand Warrants

Computer Software for Beginners (2+0)
An absolute beginners class into the world of computers -without writing programs. An overview of computer hardware and software will be presented along with demonstrations and hands-on experience with telecommunications, word-processing, spreadsheets, data base management and tutorial software. IBM-PC, APPLE, and mainframe computers will be used. This is not a lab class; some out-of-class work on computers is expected.

CAPS 120 2 Credits As Demand Warrants

Introduction to LOGO (2+0)
An introduction to programming in LOGO. Topics include; recursion, interactive graphics, primitives, procedures, managing work space, filing, debugging and editing commands.

CAPS 122 1-2 Credits As Demand Warrants

Computer Software Application (1+0 to 2+0)
Provides student with an opportunity to learn to effectively use either spreadsheet or data base management software on a microcomputer. Some of the programs available for use include VISICALC, DB MASTER, APPLE-WORKS, LOTUS 1-2-3, dBASE III.

CAPS 124 1 Credit As Demand Warrants

Apple Workshop (1+0)
Fundamentals of Apple computer operations, popular programs and DOS.

CAPS 125 3 Credits As Demand Warrants

Appleworks (3+0)
A beginning course covering the many issues of the program 'APPLEWORKS' taught on the Apple IIe. APPLEWORKS has word processing, electronic spreadsheet and data base capabilities. Materials fee: \$15.00.

CAPS 130 3 Credits As Demand Warrants

Introduction to BASIC Programming (3+0)
A beginning course in BASIC. Course will cover the arithmetic, logic, graphics, and file statements of Applesoft BASIC. Materials fee: \$5.00.

CAPS 135 1 Credit As Demand Warrants

Introduction to LOTUS 1-2-3 (1+0)
An overview on electronic spreadsheet concepts using 'LOTUS 1-2-3' taught on the COMPAQ. Materials fee: \$5.00.

CAPS 140 3 Credits As Demand Warrantes

Introduction to PASCAL (3+0)
An introduction to programming in PASCAL using Apple microcomputers with UCSD PASCAL.

CAPS 145 1 Credit As Demand Warrants

Introduction to MULTIMATE (1+0)
Course to teach business managers, program administrators, secretaries, office workers and others who require a high level of word processing productivity the preparation and revision of standard or customized business correspondence and reports using a contemporary, versatile software program and microcomputer. Students should bring two (2) double-density 5-1/4 diskettes to class. Materials fee: \$5.00.

CAPS 150 1 Credit As Demand Warrants

Computer Business Applications (1+0)
Class will investigate several possible ways to use microcomputers in a business. Software presented includes word processing, spreadsheets, data bases, graphics, project management and telecommunications. Each application will be introduced in class and possible uses in a business environment will be suggested. No previous experience necessary. Materials fee: \$5.00.

CAPS 181 2 Credits As Demand Warrants

Introduction to Microcomputers at Home (2+0)
Introduction to home computer usage by typical consumers. Overview of home computers, uses, operations and programs. Does not satisfy certificate or degree requirements.

CAPS 182 2 Credits As Demand Warrants

Introduction to Microcomputers in Small Businesses (2+0)
Introduction to microcomputers used in small business or professional practice by small business owners or employees. Overview of computers, uses and means of evaluation when purchasing equipment. Does not satisfy certificate of degree requirements.

CAPS 200 2 Credits (2+0)

Programming in Assembly Language (2+0)
A course in programming the 6502 (Apple) computer in ASSEMBLY and MACHINE language. Course will include the following topics: assembly coding, registers, stacks, indirect and indexed addressing, logic and arithmetic operations, binary and hexadecimal code.

CAPS 220 2 Credits As Demand Warrants

Microcomputer Graphics (2+0)
Practical techniques for generating computer graphics on the Apple. (Prerequisite: BASIC programming experience and Math 070 or equivalent Algebra II.)

CAPS 221 3 Credits As Demand Warrants

Microcomputer Accounting (3+0)
Introduction to accounting on the Apple IIe plus microcomputer. (Prerequisite: An introductory course in accounting or one year practical experience in accounting or permission of instructor. Also see ABUS 221.)

Computer Science

CS 101 3 Credits Fall and Spring

Computers and Society (3+0)
A course in computer literacy for everyone. An overview of computing machines and the automatic processing of data. The interaction between social institutions and automated decision making. Some programming, but as a means of understanding the process rather than skill development. (Prerequisite: Two years of high school mathematics, including at least one year of algebra.)

CS 201 3 Credits Fall and Spring

Computer Programming I (2+3)

CS 202 3 Credits Fall and Spring

Computer Programming II (3+0)
A year sequence providing an introduction to problem solving, algorithm development, structured programming, top-down design, good programming style, and concurrent programming with extensive experience in a structured language (e.g. PASCAL, ADA, MODULA). (Prerequisites: For C.S. 201: previous introduction to programming and mathematics placement at the 200-level. For C.S. 202: C.S. 201.)

CS 271 3 Credits Spring

Scientific Programming in FORTRAN (3+0)
Syntax and principles of the FORTRAN programming language. Applications to problems in science and engineering including the solution of linear and non-linear equations, interpolation, numerical integration, monte-carlo techniques and the use of mathematical subroutine libraries. (Prerequisites: One semester of calculus and previous programming experience or consent of instructor.)

CS 281 3 Credits Fall

Computer Graphics (3+0)
Study of applications, design of graphics software, survey of input and output devices, two and three dimensional geometric transformations, curves, and surfaces. (Prerequisites: C.S. 201, Math. 200, and Math. 210.)

- CS 301 3 Credits Fall**
Assembly Language Programming (3+0)
 Organization of computer registers, I/O, and control. Digital representation of data. Symbolic coding, instructions, addressing modes, program segmentation, linkage, macros, and subroutines. (Prerequisites: CS 201)
- CS 302 3 Credits Alternate Spring**
Systems Programming (3+0)
 Advanced assembly language programming including privileged instructions and system services. Applications to asynchronous I/W, process control and communication, device drivers and file management. (Prerequisite: CS 301. Next offered: 1989-90.)
- CS 311 3 Credits Fall**
Data Structures and Algorithms (3+0)
 Data structures and the algorithms for their manipulation. Arrays, tables stacks, queues, trees, linked lists, sorting, searching, and hashing. (Prerequisites: C.S. 202)
- CS 321 3 Credits Spring**
Operating Systems (3+0)
 The functions of files and operating systems, review of required architectural features. The PROCESS concept. Storage management, access methods and control, interrupt processing, scheduling algorithms, file organization and management, and resource accounting. (Prerequisite: C.S. 301)
- CS 331 3 Credits Spring**
Programming Languages (3+0)
 A study of the syntax and semantics of widely differing programming languages. Syntax specification, block structure, binding, data structures, operators, and control structures. Comparison of several languages such as ALGOL, LISP, SNOBOL, and APL. Programming assignments in each language. (Prerequisite: C.S. 311)
- CS 381 3 Credits Alternate Spring**
Advanced Computer Graphics (3+0)
 Graphics hardware, display programming, transformations, hidden line and surface elimination, approximation techniques for curve and surface representation, and project. (Prerequisites: C.S. 281 and Math 314. Next offered: 1988-89.)
- CS 401 3 Credits Spring**
Software Engineering (3+0)
 Software design as an engineering discipline. Project planning, proposal writing, and management. Program design, verification, and documentation. Additional topics from security, legal aspects of software, and validation. Students will work on group projects and produce appropriate reports and a project history. (Prerequisites: C.S. 311, C.S. 321 & senior standing)
- CS 411 3 Credits Spring**
Analysis of Algorithms (3+0)
 Analysis of classic algorithms, their implementation, and efficiency. Topics from combinatorics (sets, graphs, bit vectors), algebra (integer arithmetic, primes, polynomial arithmetic, GCD, Diophantine equations), systems (parsing searching, sorting), and theory (recursion, Turing machines). (Prerequisites: Math. 307, C.S. 311.)
- CS 425 3 Credits Alternate Fall**
Data Base Systems (3+0)
 Data independence, relationships, and organization. Hierarchical, network, and relational data models; canonical schema. Data description languages, query facilities, relational calculus. File organization and security, index organization, data integrity and reliability. (Prerequisites: C.S. 311, C.S. 321. Next offered: 1988-89.)
- CS 442 3 Credits Alternate Fall**
Computer Communication and Networks (3+0)
 Review of communication terminology, baud rates, band width, noise, and error detection. Distributed processing and local and global networks. Interfacing problems, security, and reliability. Networks, ring vs. spoke linkage, packet switching, and path optimization. Examples: The ARPA net, Airline reservation systems. (Prerequisite: C.S. 321. Next offered: 1989-90.)
- CS 448 3 Credits Alternate Fall**
System Architecture (3+0)
 Hardware, operating systems and their interaction. I/O, interrupts, memory management, concurrent processing, deadlock, modularity, system balancing, scheduling, protection, introduction to communications, and networks. (Prerequisites: E.E. 342, C.S. 321. Next offered: 1988-89.)
- CS 451 3 Credits Alternate Fall**
Automata and Formal Languages (3+0)
 Finite automata, regular languages, finite transducers, context free language, push down automata, parsing algorithms, deterministic context free languages, recursive and recursively enumerable languages, decision procedures, and undecidability. (Prerequisites: Math. 307, C.S. 201. Next offered: 1989-90.)
- CS 605 3 Credits As Demand Warrants**
Artificial Intelligence (3+0)
 The study and writing of programs that assimilate information, make inferences, and prove theorems. Representation of knowledge, pattern analysis, inference networks, and expert systems. Natural language analysis and synthesis. LISP as the basis for precise descriptions of AI processes. (Prerequisites: Consent of C.S. graduate advisor.)
- CS 611 3 Credits Fall**
Complexity of Algorithms (3+0)
 Theoretical analysis of various algorithms: topics include sorting, searching, selection, polynomial evaluation, direct vs. iterative algorithms, NP completeness, decidability. (Prerequisites: C.S. 411 or consent of C.S. graduate advisor.)
- CS 621 3 Credits As Demand Warrants**
Advanced Systems Programming (3+0)
 Multiprogramming and multiprocessing systems. File and program security. Scheduling optimization and system tuning, I/O processing, archiving and system recovery, and initialization. Study of current large systems. (Prerequisites: C.S. 311 and C.S. 321)
- CS 622 3 Credits As Demand Warrants**
Performance Evaluation (3+0)
 A survey of techniques of modeling and testing concurrent processes and the resources they share. Includes levels and types of system simulation, performance prediction, benchmarking and synthetic loading, hardware and software monitors. (Prerequisites: C.S. 321 or consent of C.S. graduate advisor.)
- CS 631 3 Credits Fall**
Programming Language Implementation (3+0)
 Formal treatment of programming language translation and compiler design. Parsing context free languages, translation specifications, machine independent code, BNF, scanners, symbol tables, parsers, and recursive descent. Programming of compiler or interpreter segments as projects. (Prerequisite: C.S. 331)
- CS 641 3 Credits Spring**
Advanced Systems Architecture (3+0)
 A study of computer systems which have been developed to make processing of programs in high level languages and special types of processing more efficient or reliable. Examples include pipeline machines, array processors, tightly coupled multiprocessors, and data flow machines. (Prerequisites: C.S. 321 or consent of C.S. graduate advisor.)
- CS 642 3 Credits As Demand Warrants**
Distributed Processing (3+0)
 A study of networks of interacting computers. The problems, rationales, and possible solutions for both distributed processing and distributed databases will be examined. Major national and international protocols including SNA, X.21, and X.25 will be presented.
- CS 651 3 Credits Spring**
The Theory of Computation (3+0)
 Formal models of algorithms: Turing machines and recursive functions. Space and time complexity of computation and complexity classes of problems. Program verification and methods of proving program correctness. (Prerequisite: C.S. 451)
- CS 661 3 Credits As Demand Warrants**
Optimization (3+0)
 (Same as Math 661)
 Linear and nonlinear programming, simplex method, duality and dual simplex method, post-optimal analysis, constrained and unconstrained nonlinear programming, Kuhn-Tucker condition. Applications to management, physical, and life sciences. Computational work with the computer. (Prerequisites: Knowledge of calculus, linear algebra, and computer programming.)
- CS 662 3 Credits As Demand Warrants**
Mathematical Software (3+0)
 A survey of techniques for using the computer for mathematical applications. Includes techniques for symbolic and numerical differentiation and integration, unlimited precision arithmetic, polynomial manipulations, and introduction to symbolic manipulation systems, mathematical software libraries and the computation of special functions. (Prerequisites: Consent of C.S. graduate advisor.)

CS 681 3 Credits **As Demand Warrants**
Topics in Computer Graphics (3+0)
 Hardware, software, and techniques used in computer graphics taken from such topics as refresh, storage, and raster scan technology, clipping, windowing, three dimensional techniques, painting and shading, image processing, computer aided design. (Prerequisite: C.S. 281 or consent of C.S. graduate adviser.)

CS 690 3 Credits **Fall**

CS 691 3 Credits **Spring**

Graduate Seminar and Project (3+0)
 A two-semester seminar in which students will, individually or in teams, work on and present the results of major programming or literature survey projects in computer science. Written and oral reports will be required. Graded pass/fail. (Prerequisites: Completion of 12 credits in graduate computer science courses or consent of C.S. graduate adviser. C.S. 690 is prerequisite for C.S. 691.)

Counseling

COUN 615 3 Credits **Spring**
Foundations of Guidance and Counseling (3+0)

Introduction to the philosophies, organization, patterns and techniques that aid counselors in preparing clients for responsible decision-making in modern society. (Prerequisite: Graduate standing.)

COUN 623 4 Credits **Fall**
Principles and Techniques of Individual Counseling (3+3)
 (Same as Psy. 660)

A survey of the major theoretical systems of counseling and a limited practice in basic techniques. Major systems include cognitive, behavioral, psychodynamic, perceptual-phenomenological, and existential approaches. Actual practice in techniques of listening, helping, session management, problem identification, and goal setting. (Prerequisites: Coun. 615 and/or permission of instructor.)

COUN 624 3 Credits **Spring**
Group Counseling (3+0)
 (Same as Psy. 674)

Kinds and types of groups with emphasis on methods, problems and needed skills in working with groups in a counseling situation. (Prerequisites: Coun. 615, 623 and/or permission of instructor.)

COUN 628 3 Credits **Fall and Spring**
Life Span Development (3+0)

The scientific study of the growth, development and behavioral changes of humans from conception through death, including an overview of the field of development, basic concepts and theories, history of the field, research in biological and biosocial influences on development. (Prerequisite: Graduate standing.)

COUN 634 3 Credits **Fall**
Counseling Practicum I (2+7)

A supervised counseling experience with an appropriate school that will provide direct and/or participant observation and interactions for the beginning counselor along with immediate feedback concerning the counseling experience. Weekly seminars will cover actual and role-playing situations concerning basic counseling skills, ethical issues, and advanced counseling techniques and interventions. (Prerequisites: Graduate standing and permission of instructor.)

COUN 636 3 Credits **Fall and Spring**
Counseling Practicum II (0+9)

Advanced-level supervised experience in public school settings emphasizing individual and group counseling methods and techniques. (Prerequisite: Coun. 634 or permission of instructor.)

COUN 645 3 Credits **Alternate Spring**
Behavioral Consultation (3+0)

Presentation of techniques developing skills in consultation with parents, teachers, and other socialization agents to solve developmental and educational problems of children in the elementary school. Through application of the models, consultants are taught to assist in defining problems and to apply psychological principles to the development of plans to solve problems. (Prerequisite: Graduate standing in Elementary Counseling Consulting Program. Next offered: 1988-89.)

COUN 660 3 Credits **Fall**
Cross-Cultural Counseling (3+0)

An examination of ethnic and cultural issues that affect the counseling setting, interaction, and outcome, including a review of the literature dealing with intercultural counseling, discussions of workable methods that have been used in such counseling, and examinations of target populations with whom the counselor may be involved, especially in Alaska. (Prerequisite: Permission of instructor.)

COUN 661 3 Credits **Fall and Spring**
Practicum in Counseling: Higher Education/Agency (0+9)
 (Same as CSP. 661.)

Supervised field experience, including preparatory activities in a higher educational or agency setting. This course is not open to public school counselor-trainees. (Prerequisites: Couns. 623, 624 and three approved graduate credits in the area of specialization.)

Cross Cultural Communication

CCC 104 3 Credits **Fall and Spring**
University Communications (3+0)
 (Same as DEVS 104)

Designed to introduce communication skills that are characteristic of university contexts (e.g., taking notes from lectures) and to address cultural differences between rural students and the university community. Links with selected lecture course. (Prerequisite: Referral from Rural Student Services.)

CCC 105 3 Credits **Fall and Spring**
Intensive Reading Development (3+0)
 (Same as DEVS 105)

Develops and refines vocabulary, comprehension, and critical reading at the college level. Instruction focuses on developing readers' ability to use a wide range of comprehension strategies to enhance reading effectiveness. (Prerequisite: Referral from Rural Student Services.)

CCC 106 3 Credits **Fall and Spring**
Intensive Writing Development (3+0)

Emphasizes differences between speaking and writing, focusing on rhetorical patterns and style appropriate for formal writing in a university context. Prepares students for English 111. (Prerequisite: Referral from Rural Student Services.)

CCC 107 3 Credits **Spring**
Intensive Writing Development II (3+0)

Designed to further prepare students for English 111 by focusing extensively on essay writing. Includes the writing and production of *Theata* magazine. (Prerequisite: Referral from Rural Student Services.)

Culinary Arts

CAH 105 3 Credits **As Demand Warrants**
Principles of Food Service I (3+0)

Introduction to food service and the principle variations which students may encounter within the industry; professional standards, kitchen safety, first aid, storeroom operation, kitchen equipment and basic culinary terminology.

CAH 140 6 Credits **As Demand Warrants**
Principles of Cooking (6+0)

Course gives the student an opportunity to learn basic food service skills in a commercial kitchen environment. Use of standardized recipes and procedures will be stressed. End product will be critiqued on a daily basis. Student assignments will rotate between a stock and soup station, vegetable station, pantry, and service line and grill. Emphasis will be on sanitary food handling practices and the development of professional work habits. Uniform cleaning fee: \$105.00.

CAH 141 6 Credits **As Demand Warrants**
Food Production I (6+0)

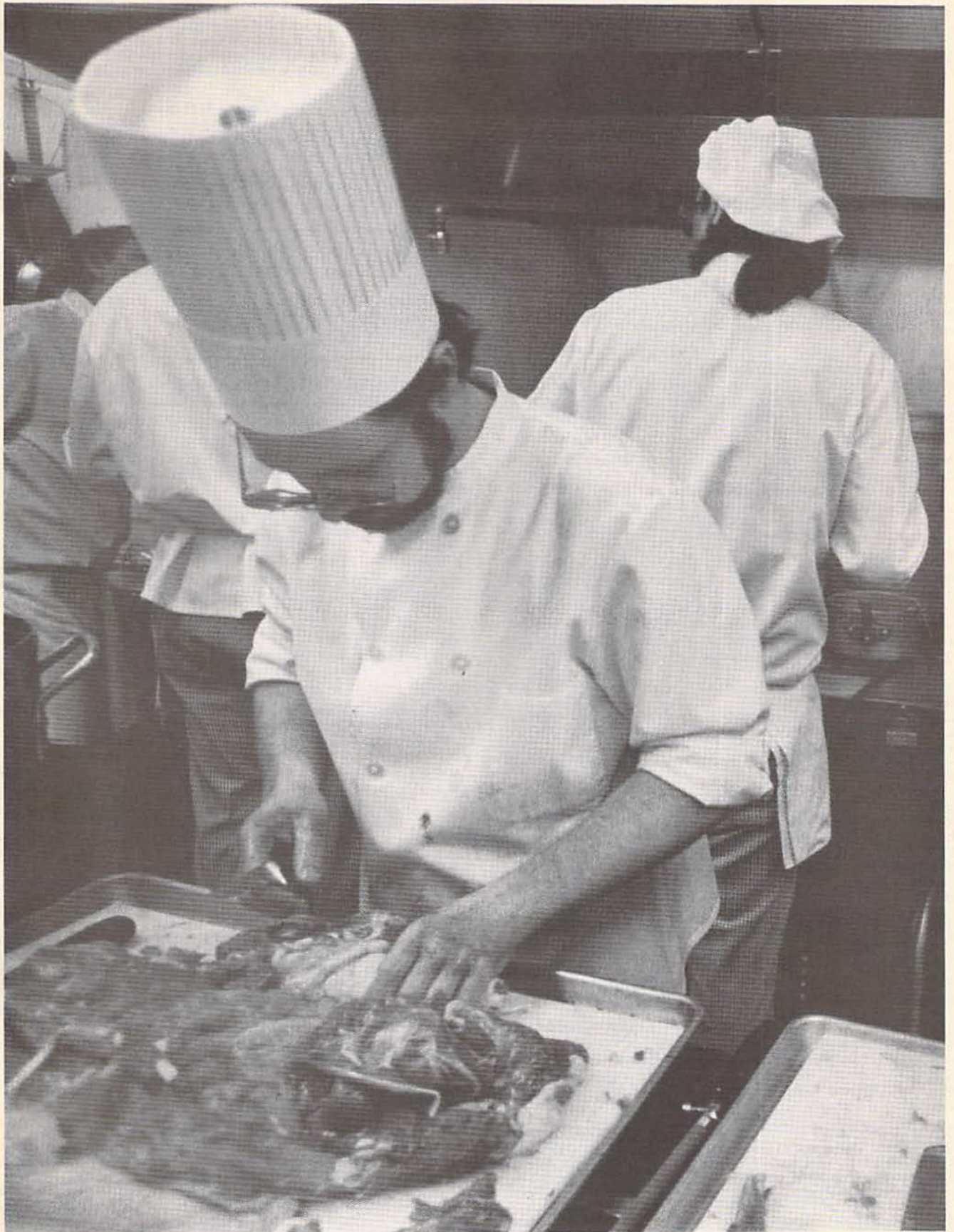
Continuation of CAH 140 with emphasis on preparation and use of small sauces, sautéing, roasting, braising, stewing and broiling. Salad bar preparation and grill service will also be covered. Uniform cleaning fee: \$105.00.

CAH 145 6 Credits **As Demand Warrants**
Principles of Baking (6+0)

Students will be taught basic commercial baking skills and procedures. Class will include lectures, demonstrations and hands-on activities. The use of standardized recipes and procedures will be stressed. End product will be critiqued on a daily basis. Emphasis will be on sanitary food handling, practices and the development of professional work habits. Uniform cleaning fee: \$105.00.

CAH 146 6 Credits **As Demand Warrants**
Bakery Production I (6+0)

Continuation of CAH 145 with emphasis on Danish and French pastries, combination breads, tortes and fancy dessert items. Uniform cleaning fee: \$105.00.



CAH 150 1 Credit As Demand Warrants
Sanitation (1+0)

Course will provide an understanding of sanitation principles essential to commercial kitchen personnel. Successful completion of the course will allow the student to receive certification by the National Institute for the Food Service Industry.

CAH 152 2 Credits As Demand Warrants
Supervisory Development (2+0)

Introduction to the problems and challenges that food service supervisors deal with every day. Course will emphasize development of personnel management methods.

CAH 154 2 Credits As Demand Warrants
Dining Room Service (2+0)

Introduction to American style table service. Students will participate in dining room service, management, controls and methods.

CAH 170 2 Credits As Demand Warrants
Gourmet Cooking (2+0)

Preparation and service of gourmet beef, poultry and seafood entrees for the home cook. Recipes represent new ideas in home entertainment, and menus change every semester. Materials fee: \$75.00.

CAH 199 1-12 Credits As Demand Warrants
Culinary Arts Workstudy Externship

Students work in a variety of food service operations, learning current cooking methods and techniques. Students are evaluated by the externship coordinator and the employer. Enrollment by special permission only.

CAH 242 4 Credits As Demand Warrants
Food Production II (4+0)

Continuation of CAH 141 with emphasis on ala carte and production cooking. Students will prepare foods for the Advance Table Service class. Foods will represent current trends in the industry with kitchen organization and professional methods stressed. Uniform cleaning fee: \$105.00.

CAH 243 4 Credits As Demand Warrants
Food Production III (4+0)

Continuation of CAH 242 with emphasis on international and new trend American Cooking. The role of the Gardé Manger in the modern kitchen will also be explored. Uniform cleaning fee: \$105.00. (Prerequisite: CAH 242 or permission of instructor.)

CAH 247 4 Credits As Demand Warrants
Bakery Production II (4+0)

Continuation of CAH 146 with emphasis on specialty breads, desserts, cakes, tortes and French pastries. Ability to plan and organize production, schedule and supervise other students will be emphasized. Uniform cleaning fee: \$105.00. (Prerequisite: CAH 146 or permission of instructor.)

CAH 248 4 Credits As Demand Warrants
Bakery Production III (4+0)

Continuation of CAH 247 with emphasis on pastry buffet. Students will produce artistic centerpieces, decorated tortes and cakes, assorted French pastries, assorted petits fours, and assorted candies. Uniform cleaning fee: \$105.00. (Prerequisite: CAH 146 and 247 or permission of instructor.)

CAH 250 2 Credits As Demand Warrants
Gardé Manger (2+0)

A course designed to give the student a hands on experience in buffet. Presentation of hot and cold foods. Students will produce pates, mousses, forcements, aspics, and other items essential to culinary expertise. Materials fee: \$10.00.

CAH 253 2 Credits As Demand Warrants
Storeroom Purchasing and Receiving (2+0)

Introduction to formal and informal methods of purchasing, receiving and storing of food and nonfood items in food service operations. Specifications, par inventory systems and controls will be emphasized. Materials fee: \$10.00.

CAH 255 2 Credits As Demand Warrants
Food Service Management (2+0)

Study of the management teams' responsibility in the food service operation. Students will assume the role of kitchen manager, dining room manager and general manager.

CAH 256 2 Credits As Demand Warrants
Food Service Accounting (2+0)

Principles and practices concerned with determination of food cost, labor cost, beverage cost and the basic accounting practices necessary to operate a successful food service operation.

CAH 257 1 Credit As Demand Warrants
Oenology-Hospitality Industry I (1+0)

An introduction to the study and evaluation of the wines of France, Germany, Italy and the California wine producing areas. Focus will be on 'point of sale' approach for first level serving staff. Special attention to selecting for individual meals. Materials fee: \$37.50.

CAH 258 1 Credit As Demand Warrants
Oenology-Hospitality Industry II (1+0)

A continuation of CAH 257 with in-depth evaluation and study of the major wine producing areas of the Pacific Northwest, California, France, Germany and Italy. Focus will be on preparing the new sommelier. Special attention to selections for building cellar and developing breadth in the restaurant. Materials fee: \$37.50. (Prerequisite: CAH 257 or permission of instructor.)

Dance

DANC 108 1 Credit As Demand Warrants
Beginning Freestyle Jazz (1+0)

Jazz dance for the beginning student.

Developmental Studies

DEVS 052 3 Credits As Demand Warrants
Reading Enhancement (3+0)

Intensive instruction in reading designed to increase vocabulary and comprehension skills necessary for successful reading in the content areas of college courses.

DEVS 058 1-3 Credits As Demand Warrants
Reading Lab (0+3-9)

Individualized instruction in improving reading comprehension and efficiency. May be repeated.

DEVS 065 1 Credit As Demand Warrants
Spelling Improvement (1+0)

A diagnostic/prescriptive approach for improving spelling skills.

DEVS 066 1 Credit As Demand Warrants
Vocabulary Development (1+)

This course is designed to increase vocabulary substantially and to provide tools for further vocabulary growth.

DEVS 104 1-3 Credits Fall and Spring
University Communications (1-3+0)
(Same as CCC 104)

Introduces the unique methods of communication required at the college level. Links with selected lecture courses. May be repeated.

DEVS 105 3 Credits As Demand Warrants
College Reading (3+0)
(Same as CCC 105)

Develops and refines vocabulary, comprehension and critical reading at the college level. Instruction focuses on developing readers' ability to use a wide range of comprehensive strategies to enhance reading effectiveness. Placement by examination.

DEVS 185 3 Credits As Demand Warrants
Straight Thinking (3+0)

A study of inductive, deductive and seductive thinking and skill building to recognize and use all three. Critical thinking skills to analyze newspaper, magazine and spoken arguments will be covered. Political speeches and other media presentation will be examined. Effective and convincing presentation of one's own ideas include formal and informal logic which will be practiced. Materials fee: \$10.00.

ENGLISH

DEVE 060 3 Credits As Demand Warrants
Elementary Exposition (3+0)

Intensive work in the process of writing and revising to improve one's writing skills. Placement by examination.

DEVE 068 1-3 Credits Fall and Spring
English Skills Laboratory (0+3-9)

The open entry/open exit lab block is designed to provide students with individualized instruction where language skill building is needed. The lab is composed of three modules (spelling/vocabulary, writing, and grammar/usage). It is not necessary for a student to enroll in all three modules. These modules may be taken for elective credit only, may not be used to fulfill written communication or humanities degree requirements and may be repeated as necessary.

DEVE 070 3 Credits As Demand Warrants
Preparation for College English (3+0)
 (Same as Engl. 070)
 Intensive practice in written composition, focusing on rhetorical patterns and style appropriate for formal writing in a college context. Prepares students for Engl. 111. Placement by examination or student desire to enroll.

MATHEMATICS

DEVM 050 3 Credits As Demand Warrants
Basic College Mathematics (3+0)
 Operations with whole numbers, fractions, decimals and signed numbers. Percents and ratios. Evaluating algebraic expressions. Introduction to geometric figures. Metric system.

DEVM 060 3 Credits As Demand Warrants
Elementary Algebra (3+0)
 First year high school algebra. Evaluating and simplifying algebraic expressions, solving first degree equations and inequalities, integral exponents, polynomials, factoring, rational expressions. (Prerequisite: DEVM 050 or placement.)

DEVM 065 Variable Credit As Demand Warrants
Mathematics Lab
 This course is an individual tutorial lab. Course content is selected according to the needs of the individual student from the topics covered in DEVM 050 and DEVM 060. (Prerequisite: placement.)

DEVM 070 3 Credits As Demand Warrants
Intermediate Algebra (3+0)
 Second year high school algebra. Operations with rational functions, radicals, rational exponents, complex numbers, quadratic equations and inequalities, Cartesian coordinate system and graphing, systems of equations, determinants and logarithms. (Prerequisite: DEVM 060 or placement.)

Diesel Technology

DSLTL 150 7 Credits As Demand Warrants
Diesel Mechanics I (7+0)
 Course covers theory and function of the diesel engine. Topics include introduction to various diesel engines, shop tools and instruments for engine disassembly, inspection, assembly, parts failure analysis and shop safety. Materials fee: \$125.00.

DSLTL 152 7 Credits As Demand Warrants
Diesel Mechanics II (7+0)
 A continuation of DSLTL 150. Topics include air intake systems, exhaust systems, lube systems, cooling systems, and fuel systems. Materials fee: \$125.00. (Prerequisite: DSLTL 150.)

Drafting Technology

DRT 100 1 Credit As Demand Warrants
Introduction to Drafting Concepts (1+0)
 An overview of the principles of architectural, civil and industrial drafting.

DRT 101 4 Credits As Demand Warrants
Beginning Drafting I (4+0)
 A beginning course designed to build skill and knowledge in technical lettering, line techniques, equipment, orthographics, dimensioning, pictorials, auxiliaries and sections. Materials fee: \$50.00.

DRT 102 2 Credits As Demand Warrants
Beginning Drafting II (2+0)
 An advanced course in drafting involving practice and skill development in geometric construction, sketching, orthographics and dimensioning, sections, auxiliaries and work on individual projects. Materials fee: \$20.00.

DRT 115 3 Credits As Demand Warrants
Graphics I (3+0)
 Study and application of methods, problems and solutions in graphic design.

DRT 121 3 Credits As Demand Warrants
Reading Construction Blueprints (2+0)
 A course to teach the reading and interpretation of two and three dimensional blueprints of residential, light commercial and heavy commercial structures using conventional symbols and representation.

DRT 123 3 Credits As Demand Warrants
Uniform Building Code (3+0)
 This course will cover the minimum required construction standards as described in the display Uniform Building Code. The course teaches the proper use of local zoning ordinances and the Uniform Building Code as comprehensive building guides and explains their principle aspects as applied to various building types and trades. This course concentrates on zoning, the UBC and some fire codes. Mechanical and electrical codes are introduced only for student familiarity. Materials fee: \$15.00. (Prerequisite: working knowledge of building systems is strongly recommended.)

DRT 125 2 Credits As Demand Warrants
Lettering I (2+0)
 A course to introduce and practice varigraphic, Leroy, Kohi-Noor, Kad II, freehand and script lettering methods and to develop commercial lettering ability.

DRT 130 4 Credits As Demand Warrants
Perspective Drafting I (4+0)
 The basics of perspective (1 pt., 2 pt., 3 pt.) and introduction to the KLOK Perspective Board.

DRT 132 4 Credits As Demand Warrants
Perspective Drafting II (4+0)
 Additional experience in 1 and 2 pt. perspectives on the KLOK perspective board in both interior and exterior perspectives (Prerequisite: DRT 130.)

DRT 140 4 Credits As Demand Warrants
Architectural Drafting I (4+0)
 The introduction and practice of architectural drafting principles including site plans, foundations, floor plans, elevations, architectural sections, framing plans, area plan, and graphic standards. Materials fee: \$40.00.

DRT 141 2 Credits As Demand Warrants
Architectural Concepts (2+0)
 An overview of architectural drafting concepts including basic site plans, foundations, floor plans, elevations, architectural sections, framing plans, area plans, and graphic standards. Materials fee: \$15.00.

DRT 150 4 Credits As Demand Warrants
Civil Drafting I (4+0)
 The introduction and practice of civil drafting principles including plotting traverse and surveys by bearing and distance, latitudes and departures, topographic drawings and maps, contours and elevations, profiles and highway curves, cross-section drawings and grading plans. Materials fee: \$30.00.

DRT 151 2 Credits As Demand Warrants
Civil Concepts (2+0)
 An overview of civil drafting concepts and survey drafting including the plotting of traverse and surveys by bearing and distance. Materials fee: \$15.00.

DRT 160 2-3 Credits As Demand Warrants
Draft Co-Op Work Experience (2-3+0)
 A course for the student who has mastered basic drafting techniques and terminology which provides a non-paid practical work experience in a professional drafting environment. Placement and work assignments will vary depending upon student experience.

DRT 250 4 Credits As Demand Warrants
Civil Drafting III-Advanced (4+0)
 Techniques of highway design, boundaries, right of way layouts, curves and grades, bridges, cut and fill detail drawings, gas and water services, sewers, culverts, signs and guard rails.

Early Childhood Development (SCCE)

ECHD 100 3 Credits As Demand Warrants
Introduction to Early Childhood (3+0)
 An introductory course in the care and education of young children. The needs and skills of young children will be determined. The skills needed by child care workers will be presented. LABS ARRANGED.

ECHD 105 3 Credits As Demand Warrants
Survey Programs/Young Child (3+0)
 Students observe and contrast past and present programs in the community and formulate their own personal philosophy of early childhood education and childcare.

ECHD 110 1 Credit As Demand Warrants
Practical Paths to Discipline & Guidance (1+0)
 Practical techniques for guidance and discipline of 2-6 year old children.

- ECHD 120 3 Credits As Demand Warrants**
Nutrition, Health and Safety (3+0)
 This course is designed for parents, care-givers and teachers of young children. It focuses on common illnesses and preventive health care, nutritional needs and safety aspects of rearing and teaching young children.
- ECHD 121 1Credit As Demands Warrants**
Physical Activities Young Child (1+0)
 Planning a center which promotes the physical development of children.
- ECHD 122 1 Credit As Demand Warrants**
Cognitive Activity/Young Child (1+0)
 Activities and experiences which encourage questioning, probing, and problem-solving skills which are appropriate for different developmental levels and various learning styles of young children.
- ECHD 123 1 Credit As Demand Warrants**
Language Activity/Young Child (1+0)
 Activities that will help children acquire and use language as a means of communicating their thoughts and feelings. It also includes non-verbal communication and understanding others.
- ECHD 124 1 Credit As Demand Warrants**
Creative Activity/Young Child (1+0)
 Activities which provide a variety of experiences and media that stimulate children to explore and express their creative ability.
- ECHD 131 1 Credit As Demand Warrants**
Group Management (1+0)
 This course emphasizes both direct and indirect guidance techniques. Theories of guidance, including body language effects, reinforcement, and logical consequences are discussed for cultural relevance and practical application.
- ECHD 135 2 Credits As Demand Warrants**
Developing Programs Infant/Toddler Care (2+0)
 Activities to stimulate development and learning of infants and toddlers individually and in a group setting. The class will cover discipline and guidance techniques, communication, health concerns and facility requirements: Weekly 2 hour lab required.
- ECHD 161 1 Credit As Demand Warrants**
Stories For Young Children (1+0)
 Keep your youngster fascinated while you increase their reading readiness! This new course will demonstrate ideas and techniques for a variety of story telling methods. Especially helpful for Early Childhood teachers.
- ECHD 162 1Credit As Demand Warrants**
Child Development Associate (1+0)
 This course is designed to introduce the care giver to the Child Development Associate credential. This is a nationally recognized credential awarded to child care givers who have successfully demonstrated their competency in working with young children. It is awarded through a grant from the United States Department of Health and Human Services.
- ECHD 163 1 Credit As demand Warrants**
Learning Centers For Young Children (1+0)
 Participants will explore how to use learning centers in preschool classrooms, how to set up learning centers and exchange ideas for learning center.
- ECHD 211 1 Credit As Demand Warrants**
Developing Positive Self-Concept (1+0)
 This course stresses helping each child develop a sense of awareness and self-esteem. Emphasis is placed on providing success-oriented feelings and developing pride as an individual and as a member of a cultural/ethnic group.
- ECHD 221 1 Credit As Demand Warrants**
Positive Home-Center Relationship (1+0)
 Stresses the importance of a positive and productive relationship between families and Child Development centers. Emphasis is on using this relationship to coordinate the child-rearing efforts of both the family and classroom teacher.
- ECHD 240 2 Credits As Demands Warrants**
Legal Management of Child Care Centers (2+0)
 This course will focus on the legal aspects of managing a day care center or pre-school program. Participants will explore some of the liability concerns in out-door environments, food service, material selections, employer/employee relationships, and more.
- ECHD 241 Credits As Demand Warrants**
Personnel Management in ECD Programs (2+0)
 Management of personnel of child care programs, including in-service training, staff meetings and communication, staff supervisor, evaluating staff, staff motivation, burn-out prevention, and termination of employees. Labor management specific to early childhood programs are explored.
- ECHD 242 1 Credit As Demand Warrants**
Observe/Record Behavior of Child (1+0) This course will emphasize techniques for accurately observing children's behavior, including several methods of observation and techniques for graphing the results.
- ECHD 243 3 Credits As Demand Warrants**
Personal Development/Child Care Workers (3+0) Students will assess their learning needs as related to their current child care position; select and prioritize goals; consider alternative learning options; and plan and evaluate their professional growth.
- ECHD 250 3 Credits As Demand Warrant**
Practicum ECHD I (3+0)
 This is a guided student teaching experience in working with a group of 3-6 year old children. The student will assume increasing responsibility for planning and lead teaching. Prerequisite: Psy 245, ECHD 100, 110, 120, 131, 255 and permission of the instructor.
- ECHD 251 3 Credits As Demand Warrants**
Practicum ECHD II (3+0)
 This is a guided field experience in working with a group of young children in a school or center with the intent of expanding on the needs and interests of the practicum student. Students who have demonstrated satisfactory competency in ECHD 250 may choose to participate in an infant toddler center, childcare center, early childhood education program or public school classroom. Schedule times and dates to be arranged. PREREQUISITE: ECHD 250 and instructor's permission.
- ECHD 255 3 Credits As Demand Warrants**
Activities for Young Children (3+0)
 Designed for parents, care-givers and teachers of children 2-6. Focus is on art, music, literature, and language experiences, science, math, food experiences, and excursions. Lab required.
- ECHD 260 3 Credits As Demand Warrants**
Introduction To the Exceptional Child (3+0)
 An overview of categories of exceptionality includes hearing and visual impairments; learning, speech and language disabilities; emotional disturbances; physical handicaps; mental retardation; and the gifted and talented. Prerequisite: Psy 245 or permission of instructor.
- ECHD 265 2 Credits As Demand Warrant**
Culture, Learning & The Young Child (2+0)
 How culture affects development and learning patterns of young children. Will explore curriculum planning with emphasis on multi-cultural and multi-ethnic resources with special attention on the Alaskan Native Cultures.

Early Childhood Education (Rural College)

- ECDD 109 1 Credit As Demand Warrants**
Orientation to Child Development (3+0)
 Students will develop an overall understanding of training programs for early childhood workers with specific training for working in a Child Development Associate program. They will, through in-class exercises, be able to perform as CDA field trainers and/or CDA candidates from on-the-job training into a career ladder leading to a profession in the field of early childhood education.
- ECDD 111 1 Credit As Demand Warrants**
A Safe Environment (1+0)
 The importance of a safe learning environment and includes the competencies which enable students to provide a safe environment for young children. Emphasis is placed on the measures necessary to reduce and prevent accidents. (CDA curriculum)
- ECDD 112 1 Credit As Demand Warrants**
A Healthy Learning Environment (1+0)
 Prepares the student to provide a learning environment for young children which is free of factors which may contribute to or cause illness. (CDA curriculum)

ECDD 113 1 Credit As Demand Warrants
Learning Environment (1+0)

The arrangement of an environment which is conducive to learning and appropriate to the developmental level and learning style of children. It includes selection of materials and equipment, room arrangement, and scheduling. (CDA curriculum)

ECDD 121 1 Credit As Demand Warrants
Physical Activities for Young Children (1+0)

The essentials of planning a center which provides space, materials, equipment, and activities which promote the physical development of children. It includes scheduling, planning, activities, and selection of equipment and materials. (CDA curriculum)

ECDD 122 1 Credit As Demand Warrants
Cognitive Activities for Young Children (1+0)

Activities and experiences which encourage questioning, probing, and problem solving skills which are appropriate for different developmental levels and various learning styles of young children (CDA curriculum)

ECDD 123 1 Credit As Demand Warrants
Communication Activities (1+0)

Activities that will help children acquire and use language as a means of communicating their thoughts and feelings. It also includes non-verbal communication and understanding of others (CDA curriculum)

ECDD 124 1 Credit As Demand Warrants
Creative Activities for Young Children (1+0)

Activities which provide a variety of experiences and media that stimulate children to explore and express their creative ability. (CDA curriculum)

ECDD 131 1 Credit As Demand Warrant
Guidance and Discipline (1+0)

Indirect and direct guidance techniques. Theories of guidance, including body language effects, reinforcement, and logical consequences are discussed for cultural relevance and practical application. (CDA curriculum)

ECDD 132 1 Credit As Demand Warrants
Social Development for the Young Child (1+0)

The development of social skills which enable children to function as productive members of a group. Emphasis is placed on the development of mutual respect and cooperative work/play between child/child and child/adult. (CDA curriculum)

ECDD 211 1 Credit As Demand Warrants
Developing Positive Self-Concepts for Young Children (1+0)

Helping each child develop a sense of awareness and self-esteem. Emphasis is placed on providing success-oriented activities, encouraging acceptance and expression of children's feelings and developing pride as an individual and as a member of a cultural/ethnic group. (CDA curriculum)

ECDD 221 1 Credit As Demand Warrants
Positive Home-Center Relationship (1+0)

The importance of a positive and productive relationship between families and the child development educator. Emphasis is on using this relationship to coordinate the child rearing efforts of both the family and the educator.

ECDD 222 1 Credit As Demand Warrants
Program Management (1+0)

The importance of coordination and communication among staff in the classroom. Emphasis is placed on effective group planning, using resources, improving communication, sharing information about children, maintaining records, and establishing and following policies, rules and regulations. (CDA curriculum)

ECDD 223 1 Credit As Demand Warrants
Professionalism (1+0)

Awareness of one's own personal qualities, feelings, and values that affect the teaching atmosphere; one's relationships with children; one's own teaching style. (CDA curriculum)

ECDD 231 1 Credit As Demand Warrants
Screening (1+0)

Activities which help the teacher to understand the purpose of screening young children and to know how to use good screening procedures. (CDA curriculum)

ECDD 232 1 Credit As Demand Warrants
Assessment/Recording (1+0)

Activities that will help the teacher to understand assessment of young children, recording of assessment information, and staffing. (CDA curriculum)

ECDD 233 1 Credit As Demand Warrants
Mainstreaming Young Children with Special Needs (1+0)

Activities that will help the teacher to understand the concept and purpose of mainstreaming special needs preschool children into the regular classroom. Emphasis is on the rights of the special needs child to service and the necessary procedures for providing the service under Public Law 94-142 (CDA curriculum)

ECDD 289 1 Credit As Demand Warrants
Final Assessment for Child Development Associate Credential (1+0)

The procedures necessary to apply and prepare for final assessment for the Child Development Associate (CDA) credential. It emphasizes needs of a group of children in a child development setting by nurturing and maintaining a proper child care environment and by promoting good relations between parents and the child development center. (CDA curriculum)

ECDD 299 1-3 Credits As Demand Warrants
Practicum in Early Childhood Education

A practical application of all previous CDA competency courses. The student will assume responsibility for seven or more children in an approved preschool program. (CDA curriculum)

*All Early Childhood Education courses must be accompanied by a lab experience in a facility for children ages 0-5.

Economics

Admittance to upper division School of Management courses will be granted only to students with junior standing or above. Others will be admitted only with the written permission of the appropriate department head.

ECON 101 3 Credits Fall and Spring
Introduction to Current Economic Problems (3+0) s

A one semester course designed primarily for the student who plans no further work in economics. The course utilizes a less theoretical approach than is customary in introductory economics courses and focuses on such current problems as unemployment, inflation, pollution, poverty, etc.

ECON 111 3 Credits As Demands Warrants
Economics of Rural Alaska (3+0)

Introduction to basic economic concepts as they relate to issues and problems of contemporary regional development in rural Alaska. Special attention is paid to socio-economic consequences of the introduction of new technologies, modern economic intra-structures and corporate relationships to traditional, small scale communities.

ECON 137 3 Credits Spring
The Alaskan Economy (3+0) s

A broad introductory examination of economic problems in Alaska; analysis of historical trends and current patterns of economic growth; particular emphasis on present and future alternative economic policies, and their potential impacts.

ECON 201 3 Credits Fall and Spring
Principles of Economics I: Microeconomics (3+0) s

Theory of prices and markets, income distribution, contemporary problems of labor, agriculture, market structure, pollution, etc.

ECON 202 3 Credits Fall and Spring
Principles of Economics II: Macroeconomics (3+0) s

Analysis and theory of national income, money and banking, and stabilization policy.

ECON 226 3 Credits Fall and Spring
Introduction to Statistics for Economics and Business (3+0)

Problems in economics and business translated into statistical terms. Topics covered include descriptive measures, probability and probability distributions, sampling methods, sampling distributions, point and interval estimation, hypothesis testing, index numbers, and time series analysis. (Prerequisite: Math. 107-108 or Math. 161.)

ECON 227 3 Credits Fall and Spring
Intermediate Statistics for Economics and Business (3+0)

Extension of topics developed in Economics 226. Development of statistical techniques and their application to economic and business problems. Topics include simple and multiple regression and correlation, analysis of variance, forecasting techniques, quality control, non-parametric methods, and decision theory. Materials fee: \$20.00 (Prerequisites: Econ. 226, Math. 162 or 200.)

- ECON 235 3 Credits Fall**
Introduction to Natural Resource Economics (3+0) s
 Introduction to microeconomic principles and their application to natural resource issues. Specific topics include supply, demand, marginality, optimality, elementary production economics, economic rent, and comparative advantage. These principles are applied to agency budget allocation decisions, multiple use, resource valuation, conservation, market failure, and public outdoor recreation problems.
- ECON 321 3 Credits Fall**
Intermediate Microeconomics (3+0) s
 Analysis of demand and supply under various market forms, cost and theory of production, factor pricing and theory of distribution, and survey of welfare economics. (Prerequisites: Econ. 201, 202 and Math. 162 or equivalent.)
- ECON 322 3 Credits Spring**
Managerial Economics (3+0) s
 Interpretation of economic data and applications of economic theory in business firms. Bridging the gap between theory and practice through empirical studies, cases, and decision problems. Particular emphasis upon decision-making based heavily upon analysis of data developed from research. Materials fee: \$10.00 (Prerequisites: Econ. 201, 202 and 227 and Math. 162 or equivalent.)
- ECON 324 3 Credits Spring**
Intermediate Macroeconomics (3+0) s
 Concepts and measurement of income, analysis of aggregate demand and supply and their relation to the level of prices, employment, and economic growth. (Prerequisites: Econ. 201, 202 and Math. 162 or equivalent.)
- ECON 335 3 Credits Spring**
Intermediate Natural Resource Economics (3+0) s
 Extension of concepts developed in Econ. 235, using a higher level of economic analysis in examining natural resource issues. Specific topics include welfare economics and economic efficiency concepts, benefit/cost analysis, resource allocation overtime, resource taxation, common property problems, externalities, public goods, valuation of non-market resources, and land use planning issues. (Prerequisites: Econ. 201 or Econ. 235.)
- ECON 350 3 Credits Fall**
Money and Banking (3+0) s
 The liquid wealth system in the United States, to include the commercial banking system, the Federal Reserve System, and nonbank financial institutions; the regulation of money and credit and its impact on macroeconomic policy objectives. (Prerequisites: Econ. 201 and 202.)
- ECON 351 3 Credits Alternate Fall**
Public Finance (3+0) s
 Economic justifications for government; federal, state and local government, taxation, spending and debt; their effects on allocation, distribution, stabilization and growth. (Prerequisites: Econ. 201 and 202. Next offered 1989-90.)
- ECON 409 3 Credits As Demand Warrants**
Industrial Organization and Public Policy (3+0) s
 The study of the relationship of market structure to the economic conduct and performance of firms and industries, the determinants, measurement and classification of market structure, public policy toward mergers, industrial concentration, and aggregate concentration. (Prerequisites: Econ. 201, 202, and 321.)
- ECON 420 3 Credits Fall**
Labor/Management Relations (3+0) s
 History of the organized labor movement, labor legislation, and cases with emphasis on Taft-Hartley, Landrum-Griffin, Railway Labor, and Alaska Public Employment Relations Acts. Labor market analysis and wage theory, collective bargaining, equal employment opportunity laws, and cases. (Prerequisites: Econ. 201 and 202.)
- ECON 421 3 Credits As Demand Warrants**
Collective Bargaining (3+0) s
 History, theory, and practice of collective bargaining. Attention will also be given to the administration of collective bargaining contracts with special emphasis in the grievance procedure and the process of grievance arbitration. (Prerequisites: Econ. 201, 202; or permission of instructor. Econ. 420 recommended.)
- ECON 436 3 Credits As Demand Warrants**
Energy Economics (3+0) s
 A course concerned with market forces and institutions affecting the allocation of energy resources. Special attention is given to intertemporal allocative decisions and the role that public policy plays in influencing the rate at which energy resources are used over time. (Prerequisites: Econ. 201 or 235.)
- ECON 437 3 Credits Alternate Fall**
Regional Economic Development (3+0)
 Determinants and effects of the spatial distribution of economic activity. Impact of public policy on regional development within the Alaska context. (Prerequisites: Econ. 201 and 202. Next offered: 1988-89.)
- ECON 438 3 Credits As Demand Warrants**
The Economics of Fisheries Management (3+0)
 The course will provide a review of theoretical economic concepts as they are applied to the management of a commercial fishery, as well as an introduction to major current management policy issues affecting United States' commercial fishing. Major emphasis will be placed on the practical application of the economic theory and policy insights derived from the course to the problems of the management of Alaska's fisheries. (Prerequisites: Econ. 201, or equivalent, or Econ 235.)
- ECON 451 3 Credits Spring**
Public Expenditure Analysis (3+0)
 Purposes and economic effects of governmental expenditures, budgeting techniques, and their effects on resource allocation. (Prerequisite: Econ. 201 and 202 or equivalent.)
- ECON 463 3 Credits Fall**
International Economics (3+0) s
 Pure theory of international trade: comparative cost, terms of trade, and factor movements. International disequilibrium: balance of payments and its impact on national economy, capital movement, economic development through international trade. (Prerequisites: Econ. 201 and 202.)
- ECON 475 1-3 Credits Fall and Spring**
Economic Internship
 Designed to give students the opportunity to do research or other practical work with business, governmental agencies, or research organizations. (Prerequisite: Admission by permission of instructor.)
- Econ. 601 3 Credits Fall**
Microeconomic Theory I (3+0)
 Analysis of consumer and producer theory, price determination, and welfare economics. (Prerequisites: Econ 321 or equivalent; Math 162, Math 200, Math 273 or equivalent.)
- ECON 603 3 Credits Spring**
Macroeconomic Theory I (3+0)
 Analysis of the underlying causes of unemployment, economic instability, inflation, and economic growth. (Prerequisites: Econ. 321 or equivalent; Econ. 324 or equivalent; Math. 162, Math. 200, Math. 273 or equivalent.)
- ECON 611 3 Credits Fall**
Principles of Economic Analysis (3+0)
 An accelerated course in economic principles and analysis with applications to business decisions. This course is designed for masters of business administration students without sufficient undergraduate preparation in economics, and engineering students desiring a rigorous one semester course in economics. This course will not be accepted for elective credit in the MBA program. (Prerequisites: Graduate standing.)
- ECON. 623 3 Credits Fall**
Mathematical Economics (3+0)
 Mathematical techniques including matrix algebra, differential and integral calculus. Particular attention is given to static and comparative statics analysis and dynamic models. (Prerequisite: Math. 162, Math. 200, Math. 273 or equivalent.)
- ECON 624 3 Credits Fall**
Managerial Economics (3+0)
 This course includes the development of basic economic concepts and their application to managerial decision-making. Major topics to be covered will include: demand and cost analysis, pricing decisions, capital budgeting and capital management, and decision-making under conditions of risk and uncertainty. The case method will be used as a principle technique for application of the concepts and tools to "real world" situations. Materials fee: \$10.00. (Prerequisites: Econ. 201 and 202; or Econ. 501; and graduate standing.)
- ECON 626 3 Credits Spring**
Econometrics (3+0)
 Introduction to econometric theory. Single equation and multiple equation system estimation, including inference and hypothesis testing and results of assumption violation. Materials fee: \$20.00 (Prerequisites: Math 162, Math 200, Math 273 or equivalent; AS 301, Econ. 227 or equivalent.)
- ECON 635 3 Credits Fall**
Resource Economics I (3+0)

ECON 636 3 Credits Spring
Resource Economics II (3+0)
 The theory, methods of analysis, and current literature of natural resource economics and policy. Topics include socially optimal intertemporal use of resources, common property resources, externalities, property rights, public goods, benefit-cost analysis, amenity values and other non-market resource services, and environmental policy. (Prerequisites: Econ. 321 or equivalent; Math. 162, 200, 273 or equivalent. For Econ. 636, Econ. 623.)

ECON 670 0 Credit Spring
Seminar in Research Methodology (1+0)
 Philosophy of research and importance of the scientific method to solution of research problems. (Prerequisite: Graduate standing.)

Education

ED 106 3 Credits As Demand Warrants
Reading Activities in the Classroom (3+0)
 Introduction to methods, materials and teaching of reading the classroom. Emphasis on techniques for working with small groups and for integrating a language experience approach, using personal language backgrounds with basal reading programs. Attention focussed on teacher's guides and participation in demonstration lessons.

ED 131 3 Credits As Demand Warrants
Implementation of an Adult Education Program (3+0)
 This course covers a variety of areas necessary for setting up a village-based adult education program and its implementation. It includes: organizing the classroom, equipment and materials; grades and record keeping, testing and assessing appropriate levels of materials for individual students; lessons plans, as well as history and functions of adult education; funding teacher education and evaluation tools.

ED 141 3 Credits As Demand Warrants
Introduction to Methods and Materials in Bilingual Education (3+0)
 Methods and problems of teaching in and preparing material for the bilingual classroom in the areas of reading, language arts, social studies, mathematics, sciences, art, music and health including lesson planning and scheduling. All materials are to be made in both the appropriate language of the children and English. Teaching teams are encouraged. Recommended: Literacy in both languages of instruction.

ED 200 2-6 Credits As Demand Warrants
Peer Tutoring (1+3 to 6)
 For students interested in the teaching profession or for those who wish to share their expertise in a content area, Peer Tutoring offers an opportunity to explore and practice tutoring issues and techniques. Students may take the Institute section (3 weeks) and/or the Learning Activities Center section (12 weeks). The course combines lecture and lab time. Lab time is arranged for variable credit; the course may be repeated for up to six credits.

ED 201 3 Credits Fall and Spring
Introduction to Education (2+3)
 The prospective teacher is acquainted with the nature of teaching including the scholastic, professional, and personality requirements for effective teaching. Involves laboratory time in public schools as teacher's aide. Open to all students. Required for all students majoring in Education. (Prerequisite: Sophomore standing.)

ED 208 3 Credits As Demand Warrants
Art for the Classroom Teacher (3+0)
 Introduce concepts in art education to persons with limited art background who are working with young children. It combines a philosophy of Art Education, Art History, and 'hands-on' experiences to enable the classroom teacher to more effectively integrate the visual arts into the classroom curriculum as enjoyment and enrichment. Can also be taken as Art 208.

ED 211 3 Credits As Demand Warrants
Methods of Materials for Teaching a Second Language (3+0)
 Intensive work in learning a broad repertoire of second language teaching methods, how to develop lesson plans (including writing and measuring instructional objectives), and discussing why these educational skills can make a marked difference in a teacher's classroom performance. The course includes designing, teaching, and assessing actual lessons. (Prerequisites: experience as an educator in a bilingual/bicultural or second language classroom or permission of instructor.)

ED 212 3 Credits As Demand Warrants
Curriculum Development for Teaching a Second Language (3+0)
 Intensive work in developing scopes and sequences for unit plans and yearly/multi-year curricula for teaching a second language. (Prerequisites: Experience in a second language classroom or permission of instructor; Ed. 211 strongly recommended)

ED 213 3 Credits As Demand Warrants
Human Development and Learning (3+0)
 Content is a synthesis of the interrelated principles of human growth, development, adjustment and learning. It is designed primarily for students preparing for a career in teaching but is also open to parents, counselors, community workers and others interested in human development and learning.

ED 214 3 Credits As Demand Warrants
Natural Approaches to Language Instruction (3+0)
 A course in which students explore modern approaches, methods, techniques, and activities which have been proven to be successful in teaching second languages.

ED 215 3 Credits As Demand Warrants
Methods of Teaching a Second Language (3+0)
 Provides student with a basic knowledge of second language acquisition theory. Students will learn to adapt materials for teaching Inupiaq, Yup'ik or English as a second language, and write and implement second language lesson plans. Attention paid to practicing different methods of instruction.

ED 216 3 Credits As Demand Warrants
Children's Literature (3+0)
 A survey of children's literature and storytelling from around the world, including a study of criteria for evaluation of books and related materials. The course emphasizes methods of encouraging children's appreciation of a variety of selections. Students may do concentrated study of materials for a specific age group within the range of 1-12 years.

ED 220 3 Credits As Demand Warrants
Culture and Learning (3+0)
 Students will acquire a basic understanding of the role of culture in human development. They will, through reading and discussion, study the learning process in various cultural contexts. Attention will be given to problems of conflicting cultures and role of education in a changing world and as an agent of change.

ED 241 3 Credits As Demand Warrants
Methods and Materials in Bilingual Education (3+0)
 An overview of bilingual instruction. Students will make and adapt materials for the classroom. Attention is paid to practicing different methods of instruction.

ED 245 3 Credits As Demand Warrants
Child Development (3+0)
 A study of the physical, emotional, cognitive, and social aspects of a child's development from the prenatal period through early adolescence. (Prerequisites: Psy. 101 or permission of instructor)

ED 262 3 Credits As Demand Warrants
Methods of Teaching English as a Second Language and Standard English as a Second Dialect (3+0)
 (Same as Ling. 262)
 Introduction to second language teaching methods, using English as a Second Language (ESL) and Standard English as a Second Dialect (SESD) for the examples. The class covers basic underlying assumptions about the nature of language, language learning, language teaching, characteristics of good language learners, optimal language learning environments, and what affect they have on how we teach. The different roles of the second language teacher and their appropriateness is covered. Several specific language teaching methods, techniques and activities consistent with these methods, and adaptation of these methods to the needs of western Alaska classrooms is also presented. (Prerequisites: Class room experience)

ED 275 3 Credits Fall and Spring
Introduction to Microcomputers for Teachers (3+0)
 This course will provide information about and understanding of computer technology and its present and potential impact on the field of education. Students will learn basic microcomputer terminology and operation, be introduced to a variety of classroom applications of computer technology, and develop judgement skills related to hardware and software utilization in the classroom. (Prerequisites: Ed. 201 or concurrent enrollment in Ed. 201.)

ED 099, 199, 299 1-3 Credits As Demand Warrants
Practicum in Education
 Individualized work experience. Credit is variable from 1 to 3 credits, depending upon the quality and quantity of the work experience. Credit may be earned in most disciplines and programs.

- ED 303 3 Credits As Demand Warrants**
Language and Literacy Development (3+0)
 (Same as Ling. 303)
 Principles, procedures, and materials for enhancing the language development of young children. (Prerequisite: Psy. 240.)
- ED 304 3 Credits Fall and Spring**
Literature for Children (3+0)
 Criteria for evaluating children's books and application of criteria to books selected by student, study of outstanding authors, illustrators and content of specific categories of literature, book selection aids, and effective use of literature to promote learning. (Prerequisite: Junior standing.)
- ED 309 3 Credits Fall**
Elementary School Music Methods (3+0)
 (Same as Mus 309)
 Principles, procedures, and materials for teaching music to children at the elementary level. (Prerequisite: Ed. 330.)
- ED 310 3 Credits Fall and Spring**
Modes of Creative Expression in Education (3+0)
 A study of a variety of modes for stimulating creative expression in an educational setting such as art, music, dance, drama, photography and creative writing. Particular emphasis will be on methods of incorporating these modes into teaching practices, to enhance the interest in, and quality of learning. (Prerequisite: Ed. 330.)
- ED 311 2 Credits Spring**
Audio-Visual Methods and Materials (1+3)
 Selection and use of audio-visual materials in teaching and learning at all levels of education. (Prerequisite: Ed. 330.)
- ED 330 3 Credits Fall and Spring**
Diagnosis and Evaluation of Learning (3+0)
 Detailed information about the teaching-learning process in the classroom emphasizing making teaching decision. The student will learn the strengths and weaknesses of various forms of diagnosis and evaluation of learning, with particular emphasis on problems encountered in cross-cultural settings. Attention will be given to informal, formal, process, and product assessment. (Prerequisites: Psy. 240; concurrent enrollment in Psy. 240/Ed. 330 permissible for students with senior standing or earned degree.)
- ED 333 3 Credits As Demand Warrants**
History of Childhood (3+0)
 Surveys child rearing practices in the major cultures of the world examining how parents and children related to each other in different time periods. Examines the central force for change in history as psychogenic changes in personality, occurring between parent-child interaction through successive generations. (Prerequisite: Junior standing.)
- ED 338 3 Credits As Demand Warrants**
Education and Economic Development (3+0)
 (Same as R.D. 338)
 An examination of both theory and evidence linking varied forms of education to economic growth and development. A comparative approach is utilized to explore similarities and differences between rural Alaskan regional development and systematic nation-building efforts in developing countries. (Prerequisite: Permission of instructor.)
- ED 345 3 Credits Fall**
Sociology of Education (3+0)
 (Same as Soc. 345)
 Examination of the ways in which social, political, and economic forces influence what happens in schools with focus on how the organization of schools affects what teachers can do in the classroom, how peer groups affect student learning, and how national political and economic concerns determine what becomes an educational issue. (Prerequisites: Soc. 101 and Junior standing.)
- ED 346 3 Credits Fall**
Structure of American Education (3+0)
 Fundamentals of public school organization, control and support in relation to federal, state and local agencies. Issues related to the structure and delivery of educational services are analyzed with particular attention given to issues in Alaska. (Prerequisite: Junior standing in Education.)
- ED 350 3 Credits Fall and Spring**
Communication in Cross-Cultural Classrooms (3+0)
 An interdisciplinary examination of communication and language in cross-cultural educational situations, including language, literacy, and inter-ethnic communication as they relate directly to classrooms in Alaska. (Prerequisites: Ling. 101 or ANL 215 or ANL 216 or permission of instructor.)
- ED 375 3 Credits Fall and Spring**
The Exceptional Learner (3+0)
 An overview course which develops the foundation for understanding, identifying and serving the exceptional learner in rural and urban settings. A special emphasis is placed on working with exceptional learners in the regular classroom. The unique needs of exceptional students in rural settings from bilingual/multicultural backgrounds is a part of the course. (Prerequisites: Ed. 201 and Psy. 240.)
- ED 380 3 Credits Spring**
Cultural Influences in Education (3+0)
 Interdisciplinary study of the educational problems, concerns and successes encountered by students and teachers in a variety of cultural contexts. Students will consider social, cultural and psychological factors inherent in the educational process and how they are affected by the multicultural setting through an investigation of a variety of cultural contact situations. Specific attention will be given to curriculum improvement and teaching strategies appropriate for the multicultural classroom and school. (Prerequisite: Ed. 330 and junior standing.)
- ED 381 3 Credits Fall and Spring**
Foundations of Literacy Development (2.5+1.5)
 The development of understanding of the process involved in becoming a literate person. Language, reading, and writing development will be explored for children of varying ages and within various social contexts, with particular emphasis on the impact of out-of-school styles on school literacy instruction. Students may be asked to tutor at least on child. (Prerequisites: Psy. 240 and Ed. 330. Should be taken the semester prior to enrolling in Ed. 421.)
- ED 402 3 Credits Fall and Spring**
Methods of Teaching in the Secondary School (2+3)
 Principles and methods of teaching appropriate for junior high and high school classrooms. Includes planning for effective teaching, classroom management, and the implementation of teaching plans in classroom settings. (Prerequisite: Ed. 201; admission to Teacher Education Program. This course should be taken the semester prior to Ed. 453.)
- ED 407 3 Credits Fall and Spring**
Reading Strategies for Secondary Teachers (3+0)
 Techniques and materials to be used in helping the secondary students acquire the skills necessary for greater comprehension of subject matter at the secondary level. Should be taken concurrently with Ed. 402. (Prerequisites: Ed. 330 and junior standing.)
- ED 419 6 Credits Fall and Spring**
Integrated Methods and Curriculum Development (3+9)
 The study of the unique and common concepts, content, methods and materials which characterize the teaching of mathematics, science, social studies and language arts; the development of written plans and units; and practical experience in the elementary schools. (Prerequisites: Math 205, Psy. 240, Ed. 330, concurrent enrollment with Ed. 423. Should be taken semester prior to student teaching.)
- ED 421 3 Credits As Demand Warrants**
Multi-Cultural Classrooms (2.5+1.5)
 Methodology, instructional materials, and language arts content relevant to the instruction of developmental language, reading and writing in diverse K-8 classrooms. Includes limited field experience. (Prerequisites: Psy. 240, Ed. 330 and Ed. 381. Should be taken the semester after completing Ed. 381 and the semester prior to student teaching. Concurrent enrollment with Ed. 419 required.)
- ED 424 3 Credits Fall**
Small High School Programs (2+3)
 After examining secondary programs in general, students will be exposed to alternative approaches to the design of small high school programs, with particular emphasis on the problems of designing secondary programs for the small rural communities of Alaska. (Prerequisites: Ed. 201; admission to Teacher Education Program. This course should be taken the semester prior to Ed. 453.)
- ED 425 3 Credits Spring**
Community as an Educational Resource (2+3)
 Practical experience to assist the student in developing greater awareness of the community as an educational resource. Methods and techniques for developing and implementing a community-oriented curriculum with practical experience in determining and using community resources will be provided. (Prerequisites: Ed. 201; admission to Teacher Education Program. This course should be taken the semester prior to Ed. 453.)
- ED 429 3 Credits Spring**
Microcomputer Application in the Classroom (2+2)
 Strategies for the effective use of microcomputers in the classroom; understanding of the potentials and limitations of the computer in the schools; developing classroom plans to take advantage of computer potentials; and evaluation of educational software. (Prerequisites: Upper-division undergraduate or certified teacher status.)

- ED 430 3 Credits** **Fall and Spring**
Multicultural Teaching Techniques (2+3)
 Development of effective teaching strategies for implementation in cross-cultural and multicultural classrooms with particular attention to instructional practices for secondary schools (small school design, computer-based instruction, telecommunications, community-based education, interdisciplinary linkages of coursework, experiential education, productive thinking skills, and individual programmed instruction). Guest lectures and field trips. There will be weekly participation in a practical experience in multicultural classrooms. (Prerequisites: Ed. 201; admission to Teacher Education Program. This course should be taken the semester prior to Ed. 453.)
- ED 450 3 Credits** **Spring**
Education and Cultural Transmission (3+0)
 Education as a process of transmitting culture with examination of various issues related to cultural transmission in a multi-cultural environment, with particular emphasis on the dynamics of cultural change. (Prerequisite: Ed. 330 and junior standing.)
- ED 451 1-9 Credits** **Fall and Spring**
Practicum in Education
 Practical application of general ideas and techniques addressed in the methods courses in which the student is currently enrolled or previously completed. (Prerequisites: Ed. 201; Ed. 330; Ed. 402 or equivalent; concurrent enrollment permitted with Ed. 402; and permission of instructor.)
- ED 452 12 Credits** **Fall and Spring**
Elementary Student Teaching (1+33)
 Supervised teaching in elementary schools approved by the department of education. The school may limit registration, determine assignments, and cancel the registration of students doing unsatisfactory work. Students should expect to be involved in the public school setting for the entire school day for the duration of the university semester in fulfilling their assignment. (Prerequisites: See requirements for admission to student teaching.)
- ED 453 12 Credits** **Fall and Spring**
Secondary Student Teaching (1+33)
 Supervised teaching in secondary schools approved by the department of education. The school may limit registration, determine assignments, and cancel the registration of students doing unsatisfactory work. Students should expect to be involved in the public school setting for the entire school day for the duration of the university semester in fulfilling their assignment. (Prerequisites: See requirements for admission to student teaching.)
- ED 454 12 Credits** **Fall and Spring**
Student Teaching K-12 (1+33)
 Supervised teaching in both elementary and secondary schools approved by the department of education. Open only to Music and P.E. majors seeking K-12 certification or to graduate students seeking K-12 small school certification. The department may limit registration, determine assignments, and cancel the registration of students doing unsatisfactory work. Students should be expected to be involved in the public school setting for the entire school day for the duration of the university semester in fulfilling their assignment. (Prerequisites: See requirements for admission to student teaching.)
- ED 456 3 Credits** **Summer**
Orientation to Teaching in Rural Alaska (2+3)
 A study of the needs of rural schools, their environments and the recipients of school services with special attention given to cross-cultural educational issues. (Prerequisite: permission of instructor.)
- ED 462 3 Credits** **Fall**
Alaskan Environmental Education (3+0)
 (Same as A.L.R. 462)
 Environmental concepts, motivational and discovery techniques, and practical skills for utilizing the environment inside and outside the formal classroom in all subject areas. Course content includes information on curriculum materials (K-12), interpretive and audiovisual aids facilities, environmental problem solving and applications of environmental education to situations from the public schools to summer campus, short courses, and workshops for individuals of any age. (Prerequisites: Junior standing or permission of instructor.)
- ED 470 3 Credits** **As Demand Warrants**
Human Resource Development (3+0)
 Strategies and approaches which emphasize the mobilization and utilization of human resources within the general processes of socio-economic change and development in historical and cross-national contexts. (Prerequisite: Junior standing.)
- ED 473 3 Credits** **Spring**
Marine Education (3+0)
 Instructional techniques and methods for integrating marine and freshwater programs into schools and communities. The elementary school Alaska Sea Week Curriculum Guides, plus a variety of secondary level marine education materials, their design and implementation will be highlighted as well as a survey of marine biology, oceanography, fisheries, birds, marine mammals, freshwater ecology and the social and political implications of coastal and river issues. (Prerequisites: Biol. 105-106 and Ocn. 111 or its equivalent.)
- ED 475 3 Credits** **Alternate Spring**
LOGO: A Computer Language for Teachers (3+0)
 The study of the use of the LOGO language with Apple computers including the implications of this language for education and ways in which it can be incorporated into the curriculum. (Prerequisite: Upper division undergraduate or certified teacher status. Next offered; 1988-89.)
- ED 490 3 Credits** **Fall and Spring**
Curriculum Development in Cultural Perspective (3+0)
 An examination of issues related to the development of curriculum programs and materials in a cross-cultural environment. Emphasis will be on process, context, and content of curriculum as well as curriculum change and evaluation strategies. Students will work on a curriculum development project applicable to their individual circumstances. (Prerequisite: Ed. 330.)
- ED 582 4 Credits** **Fall**
Teaching as Reflective Inquiry (3+3)
 Reflective inquire into the social organization and cultures of large and small schools. Study of motivations of teachers and stages of professional development. Study of context of teaching: legal framework, school finance, history of American education and education in Alaska. (Prerequisites: Baccalaureate degree; admission to Teacher Education Program.)
- ED 583 8 Credits** **Fall**
Teaching as Decision-Making and Invention (4+0+8)
 Considers appropriate educational purposes in such subjects as English, mathematics, social studies, cultural studies and science. Study of methods and research concerning teaching of major subject areas. Exploration of lesson design, curriculum development, social organization of classroom, evaluation and testing, and needs of special students. Examines these issues in multicultural contexts. (Prerequisites: Baccalaureate degree; admission to Teacher Education Program.)
- ED 584 3 Credits** **Fall**
Practicum: Teaching in Small and Large Schools (0+6)
 Accompanies Ed 583 and serves as laboratory where students can explore concepts and methods of teaching such subjects as English, mathematics, social studies, cultural studies, and science. Students observe, assist teachers, and prepare lessons in the public schools. Should be taken concurrently with Ed. 583. (Prerequisites: Baccalaureate degree; admissions to Teacher Education Program.)
- ED 601 3 Credits** **Fall**
Introduction to Educational Research Methods (3+0)
 Techniques of selection and evaluation of educational research methods. Use of library reference tools, review of research studies, and critical communication of quantitative and qualitative research procedures. (Prerequisite: Graduate standing in education.)
- ED 602 3 Credits** **Spring**
Proseminar in Applied Educational Research (1+6)
 The application of educational research methods and techniques to educational issues and problems. Using Education 601 as a foundation, the student will conduct a research project under direct supervision of faculty. Proposal development and application of research to practical problems is stressed. (Prerequisite: Ed. 601.)
- ED 603 3 Credits** **As Demand Warrants**
Field Study Methods in Educational Research (3+0)
 Techniques for conducting field research in a cross-cultural setting with particular attention given to research in education or a related field. Students must have access to a field setting in which to conduct a research project. (Prerequisite: Ed. 601, Ed. 610, or concurrent with Ed. 610)
- ED 610 3 Credits** **Fall**
Education and Cultural Processes (3+0)
 Advanced study of the function of education as a cultural process and its relation to other aspects of a cultural system. Students will be required to prepare a study in which they examine some aspect of education in a particular cultural context. (Prerequisite: the course may be taken concurrently with Ed. 601, Ed. 602 or Ed. 603.)

- ED 611 3 Credits As Demand Warrants Spring**
Learning, Thinking, and Perception in Cultural Perspective (3+0)
 An examination of the relationships between learning, thinking and perception in multicultural contexts. Particular emphasis will be on the implications of these relationships for schooling. Content will focus on cultural influences on perception, conceptual processes, learning, memory and problem solving. Content will also reflect concern for practical teaching problems. (Prerequisite: Graduate standing in education, Ed. 610 recommended.)
- ED 612 3 Credits Spring**
Cultural and Philosophical Foundations of Education (3+0)
 Students will be introduced to the nature of philosophical inquiry and apply a philosophical perspective to examining assumptions inherent in cultural systems and culturally organized behavior. Education as a function of culturally organized behavior is based upon assumptions which are not always explicit. The philosophical perspective provides a framework and approach for explicitly subjecting these assumptions to analysis. (Prerequisite: Graduate standing in education.)
- ED 615 3 Credits Fall**
Social Organization of Classrooms and Learning (3+0)
 An examination of the social organization of participants (school staff and students) within the institutional framework of American Public Education with particular emphasis focused on everyday life features of the social organization that accommodate and maintain the institutional framework. Dilemmas inherent in transplanting this institutional framework and social organization to sociocultural environments different from that of their origins are also examined. [Prerequisite: Ed. 601, Ed. 610.]
- ED 616 3 Credits As Demand Warrants**
Education and Socio-Economic Change (3+0)
 An examination of social change processes, particularly in relation to the deliberate development of new institutions and resulting forms of new consciousness. Emphasis is placed on the role of education and schooling in this development dynamic. [Prerequisite: Ed. 601, Ed. 610, or permission of instructor.]
- ED 618 3 Credits Spring**
Higher Education: Basic Understandings (3+0)
 Historical and philosophical foundations of higher education, both in America and abroad. Examination of curriculum development, instruction, administration, and interinstitutional cooperation, with emphasis on trends and innovations in higher education. (Prerequisites: Graduate standing and permission of the instructor.)
- ED 619 3 Credits Spring**
Reflective Inquire into Multicultural Classrooms and Communities (1+6)
 Gives student teachers the opportunity to reflect on the classroom and community contexts. Study of behavior of adolescents and young children, cultural patterns of communication, economic and political organization of communities, and student pathways to adult life. Should be taken concurrently with student teaching. (Prerequisites: Baccalaureate degree; admission to Teacher Education Program; Ed. 582, Ed. 583, Ed. 584.)
- ED 620 3 Credits Spring**
Language, Literacy and Learning (3+0)
 This course examines the relationships among language, culture, and thinking as issues of literacy and learning. Specific areas of emphasis include linguistic relativity, discourse, role of context in communications, variant language learning strategies and styles, speech community, open and closed linguistic systems, cognitive styles, and literacy as a cultural and cognitive phenomenon. (Prerequisite: Graduate standing.)
- ED 621 3 Credits Fall**
Cultural Aspects of Language Acquisition (3+0)
 A focus on cultural differences in a child's acquisition of language and culture. The notion that specific language/learning/teaching strategies are also general learning/teaching strategies is stressed. Verbal and nonverbal behavior, cultural formats for learning through interaction and social dimensions of second language acquisition are considered. (Prerequisite: Graduate standing.)
- ED 630 3 Credits Fall**
Curriculum Theory (3+0)
 A comprehensive theoretical view of curriculum as a field which integrates the related phenomena in such a way that is possible to describe, predict, explain and serve as a guide for curriculum activities. (Prerequisite: Graduate standing in education.)
- ED 631 3 Credits Spring**
Small Schools Curriculum Design (3+0)
 A focus on the salient issues involved with the development of effective programs of instruction in small schools including foundational design, conceptual models, organizational strategies, technical skills, current issues and trends, and their implications and application to the environment of rural Alaska. (Prerequisite: Graduate standing in education.)
- ED 633 3 Credits Fall**
Computer Tools for Teachers: Word Processing and Telecommunications (1+6)
 Development of strategies for using microcomputer word processing and telecommunications to facilitate the learning of elementary and secondary school students. Methods for utilizing word processing within the regular classroom setting and exploration of the potentials of computer bulletin board systems (BBS's), information utilities, and bibliographic data bases are included. (Prerequisites: Ed. 275 or equivalent.)
- ED 635 3 Credits Fall and Spring**
Strategies for Cooperating Teachers (3+0)
 Study of effective teaching using alternative strategies appropriate to differing goals. Consideration will also be given to teaming with and/or supervising student teachers as a technique for improving instruction. (Prerequisite: Certified teacher employed in a school district.)
- ED 636 3 Credits Alternate Spring**
The Improvement of Elementary Teaching (3+0)
 Emphasis on improvement of elementary teaching: a re-evaluation of teaching practices, relating of principles of learning, instructional procedures, and recent developments in education to situations made meaningful through the student's teaching experience. (Prerequisites: Graduate standing in education and elementary teaching experience. Next offered 1989-90.)
- ED 645 3 Credits Summer**
Small Schools Institute (2+3)
 A forum for experienced elementary and secondary rural school teachers. Discussions and seminars held with University and guest faculty, whose fields of expertise have direct applicability to small school concerns, will provide an environment for participants to share and refine different inter-ethnic communicative styles, culturally congruent teaching methodologies and curricula, and contextual understandings of the Native pupil's world. (Prerequisites: Recent prior rural Alaskan small schools teaching experience.)
- ED 650 3 Credits Fall**
Organizational Behavior in Schools (3+0)
 Responsibility pertaining to the organization of a school and the direction of personnel. Functions of instructional leadership in cross-cultural perspective. Public school organization in both urban and rural settings. Problems incidental to public school administration in Alaska. (Prerequisites: Graduate standing, teaching experience.)
- ED 651 3 Credits Spring**
Large and Small School Management Processes (3+0)
 A comparative and analytical perspective of management processes used in dispersed educational organizations and in centralized educational organizations. Particular attention is given to management problems that confront Alaskan administrators. Case studies used reflect the nature of Alaskan schools. (Prerequisite: Graduate standing in education.)
- ED 652 3 Credits Spring**
Effective Schooling Practices (3+0)
 An examination of school improvement procedures, including the history of school improvement and the analysis of contemporary methods and procedures in effective schooling practices. (Prerequisite: Graduate standing in Education.)
- ED 653 3 Credits Spring**
Instructional Leadership in Public Schools (3+0)
 A study of the analytical and practical competencies necessary to understand and exercise instructional leadership in the public schools. Leadership is examined in its historical and theoretical contexts. Supervision and interpersonal communications are emphasized as they relate to instructional leadership. (Prerequisite: Graduate standing in education.)
- ED 654 3 Credits Fall**
School Law (3+0)
 Rights and responsibilities of teachers and pupils, rulings of the Attorney General, decisions of the courts, and regulations of the State Board of Education. (Prerequisite: Graduate standing in education.)

- ED 655 3 Credits** Alternate Spring
Public School Finance (3+0)
 Contemporary basis for raising and distributing federal, state and local education funds; problems of school financing in Alaska. (Prerequisite: Graduate standing in education. Next offered: 1989-90.)
- ED 660 3 Credits** Spring
Educational Administration in Cultural Perspective (3+0)
 The course will examine issues related to the social organization and socio-political context of schools, administrative and institutional change processes and the changing role of administrators in education, using a cross-cultural framework for analysis. (Prerequisite: Graduate standing.)
- ED 664 3-6 Credits** Fall and Spring
Internship: Principal's Endorsement (0+9)
 Field work in an appropriate educational or agency setting. Each student will complete an approved field study project. (Prerequisite: Approval of student's advisory committee.)
- ED 665 3-6 Credits** Fall and Spring
Internship: Superintendent's Endorsement (0+9)
 Field work in an appropriate educational or agency setting. Each student will complete an approved field study project. (Prerequisites: Approval of student's advisory committee and admission to candidacy for the Ed.S. degree in School Administration.)
- ED 682 3 Credits** Spring and Summer
Designing Learning Environments (2+3)
 Brings students together at conclusion of student teaching for a full week of study. Explores in depth specific problems students experienced during student teaching. Includes summer project in which students design learning environments for the classroom in which they expect to teach. (Prerequisites: Baccalaureate degree; admissions to Teacher Education Program; Ed. 582, Ed. 583, Ed. 584; Completion of student teaching and Ed. 619.)
- ED 690 3 Credits** Spring
Seminar in Cross-Cultural Studies (3+0)
 An investigation of current issues in cross-cultural contexts. The seminars will provide an opportunity for students to synthesize their prior graduate studies and research, and shall be taken near the terminus of their graduate programs. (Prerequisites: Advancement to candidacy, permission of student's graduate committee.)
- ED 691 3 Credits** Fall
Contemporary Issues in Education (3+0)
 A critical overview of the current status of the field of education. Students will participate in a thorough investigation of select problems, trends, and issues that presently characterize the institution of public education. Seminar sessions will focus on student research regarding the development, present impact and potential implications of each topic discussed. (Prerequisite: Graduate standing.)

Electrical Engineering

- E.E. 102 3 Credits** Spring
Introduction to Electrical Engineering (3+0)
 Basic modern devices, concepts, technical skills, and instruments of electrical engineering. (Corequisite: Math. 200.)*
- E.E. 203 4 Credits** Fall and Spring
Electrical Engineering Fundamentals I (3+3)
 Analysis of alternating-current circuits using complex notation and phasor diagrams, resonance, transformers, Fourier analysis, the complex frequency plane, and three-phase circuits. Introduction to network and system analysis. Laboratory fee: \$25.00. (Prerequisites: Math. 200. E.E. 102.)*
- E.E. 204 4 Credits** Fall and Spring
Electrical Engineering Fundamentals II (3+3)
 Electronics of vacuum and solid state devices, amplifier design, digital circuits, energy conversion, electromechanics, control systems, and instrumentation. Laboratory fee: \$25.00. (Prerequisite: E.E. 203.)*
- E.E. 303 4 Credits** Fall
Electrical Machinery (3+3)
 Electromechanical energy conversion principles, characteristics and applications of transformers, DC machines, synchronous and induction machines. Introduction to electric power systems. Laboratory fee: \$25.00. (Prerequisite: E.E. 204.)*
- E.E. 311 3 Credits** Fall
Applied Engineering Electromagnetics (3+0)
 Analysis and design of transmission lines and distributed linear circuits using impedance concepts. Development of electromagnetic field equations and their relation to circuit models. Magnetostatics and the magnetic circuit. Electromagnetic wave propagation. Application of the wave equation to engineering systems. (Prerequisites: Phys. 211, Math 302, E.E. 204.)
- E.E. 312 3 Credits** Spring
Electromagnetic Waves and Devices (3+0)
 Theory and design of antennas, waveguides and other periodic structures. Antenna arrays, broadband design techniques and related topics. Theory and design of practical communication links. (Prerequisites: E.E. 311, E.E. 331, Math 302.)
- E.E. 331 1 Credit** Fall
High Frequency Lab (0+3)
 Laboratory experiments in transmission lines, impedances, bridges, scattering parameters, hybrids, and waveguides. Laboratory fee: \$25.00. (Corequisite: E.E. 311.)*
- E.E. 332 1 Credit** Spring
Electromagnetics Laboratory (0+3)
 Use of Maxwell's equations in the analysis of waveguides, cavity resonators, transmission lines, antennas, and radio propagation. Laboratory fee: \$25.00. (Corequisite: E.E. 312.)
- E.E. 333 4 Credits** Fall
Physical Electronics (3+3)
 Basic properties of semiconductors. Principles of semiconductor devices diodes, transistors, and integrated circuits. Laboratory fee: \$25.00. (Prerequisite: E.E. 204.)*
- E.E. 334 4 Credits** Spring
Electronic Circuit Design (3+3)
 Application of semiconductor devices in the design of circuits used in computation, automatic control, and communication. Laboratory fee: \$25.00. (Prerequisite: E.E. 333.)*
- E.E. 341 4 Credits** Fall
Computer Organization I (3+3)
 Modular structure of computer systems: hardware and firmware techniques of realizing logical functions and types and purposes of peripherals with methods of interface. Laboratory fee: \$25.00. (Prerequisites: C.S. 201 and one year of college physics.)
- E.E. 342 4 Credits** Spring
Computer Organization II (3+3)
 Techniques of constructing input/output device drivers, dedicated signal processors, and central processor unit microprogrammable bit slice devices. Laboratory fee: \$25.00. (Prerequisite: E.E. 341.)
- E.E. 353 3 Credits** Fall
Circuit Theory I (3+0)
 Transient analysis by Laplace transform, state variable, and Fourier methods, filter networks, and computer aided analysis. (Prerequisite: E.E. 204.)*
- E.E. 354 3 Credits** Spring
Engineering Signal Analysis (3+0)
 Analysis of both continuous and discrete-time signals and systems. Fundamentals and applications of probability, statistics and stochastic processes to linear, time-invariant systems. Development and applications of convolution, z-transform and Laplace transform theory to filters, modulation, multiplexing, sampling, interpolation, and related processes. (Prerequisite: E.E. 353, Math 302.)
- E.E. 404 4 Credits** Spring
Electrical Power Systems (3+3)
 Alternate energy sources, transmission system components, elements of control, system protection, and interconnections. Laboratory fee: \$25.00. (Prerequisite: E.E. 303.)*
- E.E. 406 4 Credits** Fall
Electrical Power Engineering (3+3)
 Symmetrical and unsymmetrical faults, load flow, economic operation of power systems, dynamic power system, stability, and computer aided fault and load flow analysis. Laboratory fee: \$25.00. (Prerequisites: E.E. 404 or equivalent.)
- E.E. 434 3 Credits** Spring
Instrumentation Systems (2+3)
 Analysis and design of instrumentation systems: static and dynamic characteristics; accuracy, noise, reliability; sensors; signal conditioning; typical measurement systems. Laboratory fee: \$25.00. (Prerequisites: E.E. 334, E.E. 354, E.E. 442.)

- E.E. 442 4 Credits Fall**
Digital Systems Analysis and Design I (3+3)
 Combinational and Sequential logic implementation with Medium Scale Integration (MSI) Algorithmic State Machine (ASM) design and implementation with Medium and Large Scale Integration (MSI/LSI) and microprocessors; Central Processor Unit (CPU) analysis and implementation with microprogrammable, "bit-slice" hardware; basic microcomputer input/output (I/O); digital data transmission techniques. Laboratory fee: \$25.00.** (Prerequisites: E.E. 204 and E.E. 333 - may be taken concurrently.)
- E.E. 443 4 Credits Spring**
Digital Systems Analysis and Design II (3+3)
 Microcomputer interfacing; timing/transmission line effects in logic design; analog-digital and digital-analog converters; basic digital filtering with microcomputers; 8 bit and 16 bit microprocessor organization, operation and programming; computer peripherals; digital signal processing hardware. Laboratory fee: \$25.00.** (Prerequisite: E.E. 442.)
- E.E. 451 3 Credits Fall**
Digital Signal Processing (2+3)
 Discrete Fourier Transform (DFT) analyses and applications; FFT implementations; discrete convolution/correlation/statistical theory with application; errors and noise analysis; FIR/IIR filter design and implementation techniques. Laboratory fee: \$25.00. (Prerequisites: E.E. 354 or equivalent.)
- E.E. 454 4 Credits Spring**
Advanced Digital Systems Application and Design (3+3)
 Advanced, topical applications of digital techniques in the areas of high speed signal processing, process control, data transmission and speech synthesis. Emphasis on recent developments and custom design. Laboratory fee: \$25.00. (Prerequisites: E.E. 442 and senior standing.)
- E.E. 461 4 Credits Fall**
Communication Systems (3+3)
 Utilization of communication theory in the design and implementation of communication systems. Laboratory measurement of modulation, noise, channel spectrum, satellite link budget, and microwave path design. Laboratory fee: \$25.00. (Prerequisites: E.E. 354 and senior standing.)
- E.E. 462 4 Credits Spring**
Communication Systems (3+3)
 Theory and practice of communications systems, introduction to probability, statistics, and information theory, systems design and laboratory experience in analog and digital communication. (Prerequisite: E.E. 354, E.E. 334.)*
- E.E. 464 3 Credits Spring**
Communication Networks (3+0)
 Design of voice and data communication networks. Traffic measurement, network topology, circuit sizing, and network performance measures. Tariffs and economic considerations. Cost-performance relationships. (Prerequisites: E.E. 354 and senior standing.)
- E.E. 471 4 Credits Spring**
Fundamentals of Automatic Control (4+0)
 Linear system representation by transfer functions and state variables. The concept of feedback. Time and frequency response of linear systems. Identification. Controllability and observability. Stability by Routh-Hurwitz criterion and frequency plane methods. Specifications of higher order linear systems. System design and compensation; introduction to sampled data systems. (Prerequisites: E.E. 353 and Math 302.)*
- E.E. 481 3 Credits Fall**
Electronics and Instrumentation for Scientists and Engineers I (2+3)
 Theory and design of solid state electronic circuitry for practicing engineers and scientists in the physical and life sciences. Diodes, transistors, field effect transistors, integrated circuits, and other solid state devices. Analysis of modern electronic systems. Laboratory fee: \$25.00. (Prerequisites: 1 year of college physics; Corequisite: Math 200.)*
- E.E. 482 3 Credits Spring**
Electronics and Instrumentation for Scientists and Engineers II (2+3)
 Instrumentation theory and concepts, transducers, data transmission, recording, and reducing. Digital electronics. Electrical measurement of physical variables and error analysis. Laboratory fee: \$25.00. (Prerequisite: E.E. 481 or equivalent.)*
- E.E. 603 3 Credits As Demand Warrants**
Advanced Electric Power Engineering (3+0)
 Selected advanced topics in electric power generation, transmission, utilization, optimization, stability, and economics. (Prerequisite: E.E. 404 or equivalent.)*
- E.E. 604 3 Credits As Demand Warrants**
Electric Power System Modeling and Transients (3+0)
 Power system transient analysis, use of the Electromagnetic Transients Program (EMTP), insulation coordination, transient recovery voltage phenomena, and resonance conditions. (Prerequisites: E.E. 406 or permission of instructor.)
- E.E. 610 3 Credits Alternate Fall**
Linear Systems (3+0)
 Methods of representation and analysis for discrete time and continuous time systems. Topics include deterministic, random, continuous and discrete inputs, two-sided Laplace and Z-transforms, discrete and fast Fourier transformers, and state variable theory. (prerequisites: E.E. 354, Math. 302 or permission of instructor. Next offered: 1989-90)
- E.E. 632 3 Credits As Demand Warrants**
Quantum Electronics (3+0)
 Principles of operation of microwave tubes, microwave semiconductor devices, parametric amplifiers, nonlinear elements, and ferromagnetics. (Prerequisite: E.E. 332.)*
- E.E. 635 3 Credits As Demand Warrants**
Advanced Electronic Circuit Design (3+0)
 Low noise level design, networks for extraction of signals from noise, environmental design, and signal conditioning networks. (Prerequisite: E.E. 334.)*
- E.E. 662 3 Credits As Demand Warrants**
Communication Theory (3+0)
 Generalized harmonic analysis, probability in communication systems, random variables, power spectral density, characterization of signals, sampling theory, detection, optimum filtering, coded systems, and channel models. (Prerequisite: E.E. 461.)*
- E.E. 664 3 Credits As Demand Warrants**
Data Communication Techniques (3+0)
 Examination of techniques used in modern data communications systems. Analysis and design of data networks. Routing, traffic control, and error control techniques. (Prerequisites: E.E. 464 or permission of instructor.)
- E.E. 671 3 Credits As Demand Warrants**
Digital Control Systems (3+0)
 Study of digital control theory. Topics will include signal conversion, Z-transforms, state variable techniques, stability, time and frequency domain analysis and system design. (Prerequisites: E.E. 471 or permission of instructor.)

Electronics Technology

- ELT 101 4 Credits As Demand Warrants**
Basic Electronics: DC Physics (3+0)
 Basic terms and units. Use of test equipment, hand tools and techniques of soldering. Ohm's law, fundamentals of magnetism, DC circuit analysis, inductance and capacitance in DC circuits.
- ELT 102 4 Credits As Demand Warrants**
Basic Electronics: AC Physics (3+0)
 Principles of alternating current, vectors, phase relationships, inductive and capacitive reactance, and impedance. AC circuit analysis, series and parallel resonant circuits. Transformers, network analysis.
- ELT 108 3 Credits As Demand Warrants**
Arithmetic for DC Circuits (3+0)
 Review of arithmetic. Selected topics in algebra, trigonometry, graphs, analytic geometry, waveform analysis and decibel calculations. Calculations necessary for DC theory and continued study of electronics.
- ELT 109 3 Credits As Demand Warrants**
Arithmetic for AC Circuits (3+0)
 Selected topics in algebra, trigonometry, graphs analytic geometry, waveform analysis and decibel calculations. Calculations necessary for AC theory and continued study of electronics.

*Certain prerequisites may be waived by instructor under special circumstances.

** A student registering for both E.E. 442 and E.E. 443 will be assessed a fee of \$150.00 at the beginning of the Fall Semester for E.E. 442. The \$150.00 fee does not apply to a student registering for only E.E. 442; however, a student who does not take E.E. 442 at UAF, but who enrolls in E.E. 443 will be assessed the \$150.00 fee at the time of registration. In all cases, the \$150.00 fee is in addition to the standard \$25.00 lab fee.

ELT 111 1-3 Credits As Demand Warrants**Amateur Radio Licensing**

This course provides an overview of amateur radio. Specific code and radio theory will be provided for the Novice and General Amateur License Examination. For those already licensed, there will be opportunities in the areas of community emergency communications, net operations, repeaters, use in the public classroom, etc.

ELT 122 3 Credits As Demand Warrants**Introduction to Electronic Devices (3+0)**

Fundamentals of vacuum tubes and transistors. Emphasis on types of construction, interpretation of design parameters and applicability to electronic circuits.

ELT 123 3 Credits As Demand Warrants**Electronic Circuit Fundamentals (3+0)**

An Analysis of basic electronic circuits. Power supplies, amplifiers, and oscillators. Operational and failure analysis of basic circuits with troubleshooting procedures for each type.

ELT 171 3 Credits As Demand Warrants**National Electric Code Study (3+0)**

Systematic study of the National Electric Code and the rules governing the minimum requirements for the installation of electrical services, feeders and branch circuits and the requirements for the construction and installation of electrical equipment.

Emergency Medical Technology

EMTT 103 3 Credits As Demand Warrants**EMT: Emergency Trauma Training First Responder (3+0)**

Provide training in emergency medical care for those who are apt to be the first person responding to an accident. Upon successful completion of the program, the student will be proficient not only in providing basic emergency medical care to victims of emergencies, but also in taking any actions necessary to minimize patient suffering and prevent further injury. Materials fee: \$10.00.

EMTT 110 1 Credit As Demand Warrants**EMT: Cardiopulmonary Resuscitation (1+0)**

This course is based on the Basic Life Support course offered by the American Heart Association. This course is recommended for anyone interested in knowing what to do in case of an emergency involving the interference with breathing and/or heart function

EMTT 119 4 Credits As Demand Warrants**EMT: Emergency Medical Technician I (4+0)**

Designed to train professional emergency care providers in techniques to administer life-saving first aid and run an ambulance. Upon the successful completion of this course, the student will meet the Alaska requirements for certification as an Emergency Medical Technician. Materials fee: \$119.00.

EMTT 120 4 Credits As Demand Warrants**EMT: Emergency Medical Technician - Ambulance (4+0)**

120 hours of didactic and practical skills training, to provide competency in the life saving skills of an Emergency Medical Technician-Ambulance including basic patient assessment, advanced shock management, trauma management, CPR, extrication and immobilization techniques. Similar to Emtt. 119- but emphasizing ambulance techniques.

EMTT 121 2 Credits As Demand Warrants**EMT: Emergency Medical Technician II (2+0)**

Designed to improve the skills of basic EMTs in the area of trauma intervention to help decrease the possibility of mortality and morbidity for the seriously injured patient by acquainting the student with advanced techniques in fluid therapy. The use of MAST pants, utilization of specific drug therapy and advanced airway care. Materials fee: \$85.00.

EMTT 124 1 Credits As Demand Warrants**EMT: Emergency Medical Technician- Refresher (1+0)**

This course will assist the EMT in maintaining the basic skills and knowledge of emergency medical procedures at the Basic EMT level; update EMT's on emergency medical care procedural changes; introduce them to newly developed equipment and train them in its use, and expose them to changes in State licensure or other medico-legal requirements.

EMTT 247 A, B 2 Credits As Demand Warrants**Arctic Survival (1+2)**

Study and acquisition of basic survival skills and techniques needed in northern latitudes. Prepares students to face survival situations in an arctic environment and enables them to maintain equipment, skills, and attitudes in a state of readiness. Includes 1 credit in lecture, 1 in practicum - students must take lecture portion to be eligible for practicum.

Engineering Science

E.S. 101 2 Credits Fall and Spring**Descriptive Geometry for Engineers (1+4)**

Orthographic, isometric, oblique and perspective drawing, descriptive geometry, graphic solutions, computer graphics and computer aided drawing (CAD) (Corequisite: Math. 107)

E.S. 201 3 Credits Fall and Spring**Computer Techniques (2+3)**

Basic computer programming, in both FORTRAN and BASIC, with considerable applications from all fields of engineering. Laboratory fee: \$10.00. (Prerequisite: Math 107-108 or enrollment in Math. 200.)

E.S. 208 4 Credits Fall and Spring**Mechanics (3+3)**

A standard engineering-oriented coverage of statics and dynamics. Vector methods are used where appropriate. (Prerequisites: Math. 201 and Phys. 211.)

E.S. 209 3 Credits Fall and Spring**Statics (3+0)**

Study of force systems in two and three dimensions. Composition and resolution of forces and force systems; principles of equilibrium applied to various bodies, simple structures, friction, centroids, moments of inertia. Vector algebra used where appropriate. (Prerequisite: Math 201; Corequisite: Phys. 211.)

E.S. 210 3 Credits Fall and Spring**Dynamics (3+0)**

Study of the motion of particles, kinematics and kinetics of plane motion of rigid bodies, and principles of work and energy, impulse and momentum. Vector methods used where appropriate. (Prerequisite: E.S. 209.)

E.S. 301 3 Credits Fall**Engineering Analysis (3+0)**

Application of mathematical tools to engineering with emphasis on the mathematical formulation of typical engineering problems. Selected topics from all fields of engineering. (Prerequisites: Math. 302, E.S. 210.)

E.S. 307 3 Credits Fall**Elements of Electrical Engineering (2+3)**

Electrical fundamentals: elementary circuits and theorems, natural, forced and steady state response, principles of electronics, circuit models and system parameters, and characteristics of AC and DC machines. Laboratory fee: \$25.00. (Prerequisite: Math. 202, or permission of the instructor.)

E.S. 308 3 Credits Spring**Instrumentation and Measurement (2+3)**

Instrumentation theory and concepts of digital and analog devices, transducers, data sensing transmission, recording, and display, instrumentation system, remote sensing, and hostile environmental conditions. Laboratory fee: \$25.00. (Prerequisite: E.S. 307.)

E.S. 331 3 Credits Fall and Spring**Mechanics of Materials (2+3)**

Analysis of internal forces in members subjected to axial, torsional, and flexural loads, singly and in combination. Stress-strain relationships and material property definitions; shear and moment diagrams, Mohr's Circle. Applications include beams, columns, connections, indeterminate cases. (Prerequisites: E.S. 208 or E.S. 209, and Math. 201.)

E.S. 334 3 Credits Fall**Elements of Material Science/Engineering (2+3)**

Introduction to properties of engineering materials, crystal structure, defect structure, structure and properties, aspects of metal processing, heat treatment, joining, testing, and failure analysis for engineering applications and design. (Prerequisites: Chem. 106 and Physics 212.)

E.S. 341 4 Credits Fall and Spring**Fluid Mechanics (3+3)**

Statics and dynamics of fluids; energy and momentum principles. dimensional analysis; flow in open channels, closed conduits and around submerged bodies. Laboratory fee: \$10.00. (Prerequisites: Math. 201, and E.S. 208 or E.S. 210.)

E.S. 346 3 Credits Fall and Spring**Basic Thermodynamics (3+0)**

Systems, properties, processes, and cycles. Fundamental principles of thermodynamics (first and second laws), and elementary applications. (Prerequisites: Math 201 and Phys. 211.)

E.S. 429 3 Credits **Fall**
Ethics and Liability in Professional Practice (2+3)
 The professional, moral, ethical, and legal responsibilities of a professional in today's society and workplace. (Prerequisite: Senior or graduate standing or consent of instructor.)

Engineering and Science Management

E.S.M. 401 Credits Arr. **Fall**
Construction Cost Estimating and Bid Preparation (3+0)
 Compilation and analysis of the many items that influence and contribute to the cost of projects to be constructed. Preparation of cost proposals and study of bidding procedures.

E.S.M. 450 3 Credits **Spring**
Economic Analysis and Operations (3+0)
 Fundamentals of engineering economy, project scheduling, estimating, legal principles, professional ethics, and human relations. (Not offered for credit toward the Master of Science in Engineering Management or Science Management. Prerequisites: E.S. 201 and senior standing in engineering or permission of instructor.)

E.S.M. 601 3 Credits **Fall**
Engineers in Organizations (3+0)
 Development of organizations and techniques appropriate to engineering and scientific activity and personnel to organize, motivate, evaluate, develop and coordinate for maximum effectiveness, with due consideration to the goals of individuals. (Prerequisite: B.S. degree in engineering or physical science or consent of instructor.)*

E.S.M. 605 3 Credits **Fall**
Engineering Economy (3+0)
 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.S.M. 608 3 Credits **Fall**
Legal Principles for Engineering Management (3+0)
 A course devoted to those aspects of law specifically related to technical management. Contracts, sales, real property, business organization, labor, patents, and insurance. (Prerequisites: Graduate standing.)*

E.S.M. 609 3 Credits **Alternate Fall**
Project Management (3+0)
 Organizing, planning, scheduling and controlling projects. Use of CPM and PERT computer applications. Case studies of project management problems and solutions. (Prerequisite: Graduate standing in Engineering Management or permission of instructor. Next offered: 1989-90.)*

E.S.M. 620 3 Credits **Every Third Semester**
Statistics for E.S.M. (3+0)
 Forecasting applications and techniques - technological, time series, judgmental and regression; decision trees; Bayesian statistics; utility theory with trade-offs between expected value and risk in decision making; bidding strategies; data analysis emphasizing goodness-of-fit; and the use of statistical software. (Prerequisites: A.S. 301 or equivalent and Math. 202 or equivalent. Next offered: Fall 1989.)*

E.S.M. 621 3 Credits **Spring**
Operations Research (3+0)
 Mathematical techniques for aiding managerial decision-making. Waiting line theory, inventory models, linear programming, transportation problem, dynamic programming, PERT/CPM, machine scheduling, and simulation. Emphasis on application of techniques to actual management situations.*

E.S.M. 623 3 Credits **Fall and Spring**
Computer Programming for Engineering Managers (3+0)
 A course in basic FORTRAN programming, with applications to engineering management problems. (Not offered for credit toward the Master of Science in Engineering Management or Science Management.)*

E.S.M. 684 3 Credits **Spring and Fall**
Engineering Management Project (3+0)
 Individual study of an actual engineering management problem resulting in a report which includes recommendations for action.*

*Undergraduate engineering students who are taking graduate E.S.M. courses as technical electives should have completed or be concurrently enrolled in E.S.M. 450.

English

The written communication requirement for any baccalaureate degree is the successful completion of Engl. 111 and Engl. 211 or 213 or equivalent.

A student may elect to fulfill one half of the composition requirement by completing credit by examination in one of the required English courses. Permission of the Director of Communications in the English Department is required to begin all challenge procedures.

Students with extensive backgrounds in literature and composition or with outstanding test scores on nationally recognized examinations (an ACT score of 26 or higher, for example) may challenge both Engl. 111 and 211 or 213. Normally students will be required to complete a successful challenge of Engl. 111 before taking or challenging Engl. 211 or 213.

Required composition courses may also be taken through the University of Alaska Fairbanks Correspondence Study department.

DEVE 060 3 Credits **As Demand Warrants**
Elementary Composition (3+0)
 Intensive work in the process of writing and revising to improve one's writing skills. Placement by examination.

DEVE 068 1-3 Credits **As Demand Warrants**
English Skills Laboratory (0+3+9)
 The open entry/open exit lab block is designed to provide students with individualized instruction in areas where language skills building is needed. The lab is composed of three modules (spelling/vocabulary, writing and grammar/usage) into which a student might be advised based upon diagnosed need or student desire to improve skills in a particular area. It is not necessary for a student to enroll in all three modules. These modules may be taken for elective credit only, may not be used to fulfill written communication or humanities degree requirements, and may be repeated as necessary.

DEVE 070 3 Credits **As Demand Warrants**
Preparation for College English (3+0)
 Intensive practice in a variety of language skills to prepare students for Engl. 111.

ENGL 104 3 Credits **As Demand Warrants**
Institute on Language & Thought (3+0)
 An intensive Institute for developing critical thinking, writing, and reading skills using the Bard College model. The Institute establishes and nurtures learning communities which support bold thinking, risk-taking, collaboration, and independence.

ENGL 111 3 Credits **Fall and Spring**
Methods of Written Communication (3+0) w
 Instruction in writing expository prose, including generating topics as part of the writing process. Practice in developing, organizing, revising, and editing essays. (Prerequisite: Placement examination or English 070.)

ENGL 190H 3 Credits **Fall**
Honors English Composition (3+0)
 Extensive readings in a variety of disciplines. Frequent writing assignments addressing a wide range of topics for specific purposes and audiences. Emphasis upon writing as a tool for learning across the curriculum. (prerequisites: Admission to the Honors Program or recommendations of instructor.)

ENGL 211 3 Credits **Fall and Spring**
Intermediate Exposition, with Modes of Literature (3+0) w
 Instruction in writing through close analysis of literature. Research paper required. (Prerequisites: Sophomore standing and completion of Engl. 111 or its equivalent.)

ENGL 212 3 Credits **As Demand Warrants**
Business, Grant, and Report Writing (3+0)
 This course will cover forms and techniques of business, grant, and report writing. (It may put special emphasis on one or another of these topics in a given semester.) It will not fulfill the second half of the baccalaureate requirements in written communication. (Prerequisite: Engl. 111.)

- ENGL 213 3 Credits** **Fall and Spring**
Intermediate Exposition (3+0) w
 Instruction in writing through close analysis of expository prose from the social and natural sciences. Research paper required. (Prerequisites: Sophomore standing and completion of Engl. 111 or its equivalent.)
- NOTE:** Neither English 211 nor English 213 is to be considered or is to be used as a prerequisite for any other course or for any particular course of study. Because both of these courses will be primarily courses in writing, either one of them will fulfill the second half of the requirement in written communication for the baccalaureate degree. A student who has taken one of these courses before declaring a major in which the other course may be considered more appropriate, or a student who changes major from a field in which one of these courses is considered more appropriate than the other, will not be required to take the other course.
- ENGL 215 3 Credits** **Fall**
Introduction to Poetry (3+0) h
 Analysis and appreciation of the various kinds of writing in verse (lyric, narrative, and other poetry), including the terminology used to describe poetic techniques. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 216 3 Credits** **Fall and Spring**
Introduction to Fiction (3+0) h
 Analysis and appreciation of selected novels and short stories, including the terminology used to describe fictional techniques. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 218 3 Credits** **Spring**
Themes in Literature (3+0) h
 Exploration of literary themes in various genres of literature, including fiction, poetry and drama. Such themes as 'Women in Literature,' 'Literature of the North,' and 'Detective Stories in Literature and Film' may be offered. Specific content to be announced at time of registration. Course may be repeated for credit when content varies. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 230 3-7 Credits** **Fall**
ENGL 231 3-7 Credits **Spring**
English Language Proficiency (3+Var.)
 Intensive listening, speaking, reading, and writing in English. Especially recommended for all students for whom English is a foreign language. These courses do not meet general degree requirements in written communications and are not classified as humanities. (Prerequisite: Open only to students for whom English is a foreign language. Permission of instructor required.)
- ENGL 271 3 Credits** **Fall and Spring**
Introduction to Creative Writing-Fiction (3+0) h
 A study of the forms and techniques of fiction for beginning students; discussion of students' work in class and in individual conferences. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 272 3 Credits** **Spring**
Introduction to Creative Writing-Poetry (3+0) h
 A study of the forms and techniques of poetry for beginning students; discussion of students' work in class and in individual conferences. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 290H 2 Credits** **Fall**
Summer Reading Program (Honors) (2+0)
 A summer reading course of selected readings in a variety of disciplines. Group discussions and written responses to the readings follow in the fall. Students are required to keep a summer journal. The course may be repeated for credit. (Prerequisite: Engl. 111 or enrollment in the Honors Program.)
- ENGL 301 3 Credits** **Fall**
Continental Literature in Translation: From the Ancient World through the Renaissance (3+0) h
 Readings in Greek plays, *The Iliad*, *The Aeneid*, Bible, Dante; the classical background out of which the western literary tradition has sprung. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 306 3 Credits** **Spring**
Survey of American Literature (3+0) h
 Comprehensive study of American thought as reflected in its major writers, including works representative of American Calvinism, Rationalism, Transcendentalism, Romanticism, Realism, Naturalism, and Modernism. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 308 3 Credits** **Fall**
Survey of British Literature: Beowulf to the Romantic Period (3+0) h
 Survey of writers and works in Old and Middle English, including Chaucer, through the Elizabethan period (Shakespeare), the Restoration, and the Neoclassical Period of the 18th Century. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 309 3 Credits** **Spring**
Survey of British Literature: Romantic Period to the Present (3+0) h
 Survey of writers and works from the early Romantic Period (Blake and Burns), through the Victorian period, James Joyce, and Stream-of-Consciousness, to the present. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 310 3 Credits** **Spring**
Literary Criticism (3+0) h
 Introduction to the history and principles of literary criticism, from the earliest days to the end of the 19th century. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 313 3 Credits** **Spring**
Writing Non-Fiction Prose (3+0)h
 Instruction in writing for students who wish to develop proficiency in organizing and composing essays on factual material in which they have genuine interest. Readings and research paper required. (Prerequisites: Junior standing, Engl. 211 or 213 or permission of instructor.) Course does not fulfill the second half of the general degree requirement in written communication.
- ENGL 314 3 Credits** **Fall and Spring**
Technical Writing (2+0+1)h
 Instruction in writing job applications with resumes, as well as letters of inquiry, complaint, and evaluation. Practice in preparing tables, graphs, process descriptions, technical instructions, abstracts, grant proposals. Practice in writing technical reports, such as progress, laboratory, survey, incident, inspection, feasibility, and research reports. (Prerequisites: Junior standing and Engl. 211 or 213 or permission of instructor.) Course does not fulfill the second half of the general degree requirement in written communication.
- ENGL 318 3 Credits** **Fall and Spring**
Modern English Grammar (3+0) h
 Study of the structure of current English as seen through traditional and contemporary grammatical theories. (Prerequisite: English 111 or permission of instructor.)
- ENGL 340 3 Credits** **Fall and Spring**
Contemporary Native American Literature (3+0)h
(Same as ANS 340)
 An exploration of contemporary Native American writing in English, including novels, short stories, poetry, and plays. Some examples of Native American film will also be introduced when related to a writing. Works discussed in relation to cultural contexts and interpretations. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 349 3 Credits** **Fall**
Narrative Art of Alaska Native Peoples (in English Translation) (3+0) h
 Survey of traditional and historical tales by Aleut, Eskimo, Athabaskan, Eyak, Tlingit, Haida, and Tsimshian storytellers. Attention to bibliography, Alaska Native genres and viewpoints, and structural and thematic features of tales. (Prerequisite: Engl. 111 or permission of instructor.)
- ENGL 350 3 Credits** **Alternate Fall**
Literature of Alaska and the Yukon Territory (3+0) h
 Study of representative works of fiction, verse, and non-fiction which deal with Alaska and the Yukon Territory. (Prerequisite: Engl. 111 or permission of instructor. Next offered: 1989-90.)
- ENGL 371 3 Credits** **Fall and Spring**
Intermediate Creative Writing (3+0) h
 Practice and guidance in writing fiction, poetry, drama, and essays. Students' work will be read and discussed in class and in conference with the instructor. Close study of the techniques of established writers. (Prerequisite: Engl. 271 or Engl. 272 or permission of instructor.)
- ENGL 403 3 Credits** **Every Third Spring**
American Renaissance (3+0) h
 Study of American Literature of the mid-nineteenth century: Poe through Whitman. (Prerequisite: Engl. 111 or permission of instructor. Next offered: 1989-90.)
- ENGL 404 3 Credits** **Every Third Spring**
American Realism (3+0) h
 Study of American literature from the Civil War to World War I: Twain through James. (Prerequisite: Engl. 111 or permission of instructor. Engl. 307 desirable but not required. Next offered: 1990-91.)
- ENGL 405 3 Credits** **Every Third Fall**
British Writers of the 19th Century: Romantic Period (3+0) h
 Study of English literary romanticism including authors such as Byron, Keats, Shelley, Coleridge, Wordsworth, Austen, the Bronte sisters, and Scott. (Prerequisite: Engl. 111 or permission of instructor. Engl. 308 desirable but not required. Next offered: 1990-91.)

- ENGL 406 3 Credits** **Every Third Fall**
British Writers of the 19th Century: Victorian Period
 (3+0) h
 Study of the impact of industrialization, social reformation, religious controversy, and philosophical attitudes on literature. Authors to include (but not limited to): Browning, Tennyson, Thackeray, Eliot, Arnold, Dickens, Hazlitt, Ruskin, and Meredith. (Prerequisite: Engl. 111 or permission of instructor. Engl. 309 desirable but not required. Next offered: 1988-89.)
- ENGL 407 3 Credits** **Every Third Fall**
British Writers of the Restoration and 18th Century: Neo-Classical Period (3+0) h
 Study of new developments in drama, verse, and prose reflecting new forces in government, religion, and society during the Augustan Age. Attention to the mode of satire and to the fashion of sentimentalism in all genres. Authors to include (but not limited to): Dryden, Defoe, Addison, Steele, Swift, Pope, Johnson, Boswell, Goldsmith, and Sheridan. (Prerequisites: Engl. 111 and junior standing or permission of instructor. Engl. 308 recommended. Next offered: 1989-90.)
- ENGL 408 3 Credits** **Every Third Spring**
American Origins. (3+0) h
 Study of the writers who contributed to the development of a national literary identity: Bradstreet through Cooper. (Prerequisites: Engl. 111 and junior standing or permission of instructor. Engl. 307 recommended but not required. Next offered: 1988-89.)
- ENGL 414 3 Credits** **Fall**
Research Writing (3+0) h
 Practice in reporting primary and secondary research in the forms and styles appropriate to the student's field. Preference given to seniors. (Prerequisite: Engl. 111 and 211 or 213 or their equivalent.)
- ENGL 421 3 Credits** **Every Third Spring**
Chaucer (3+0) h
 Major poetry, with emphasis on *The Canterbury Tales*, and survey of Chaucerian criticism. (Prerequisite: Engl. 111 or permission of instructor; Engl. 308 desirable but not required. Next offered: 1989-90.)
- ENGL 422 3 Credits** **Fall**
Shakespeare: History Plays and Tragedies (3+0) h
 Major chronicle plays and tragedies, including significant criticism. (Prerequisite: Engl. 111 or permission of instructor. Engl. 308 desirable but not required.)
- ENGL 425 3 Credits** **Spring**
Shakespeare: Comedies and Non-Dramatic Poetry (3+0) h
 Major comedies and non-dramatic poems, including significant criticism. (Prerequisite: Engl. 111 or permission of instructor. Engl. 308 desirable but not required.)
- ENGL 426 3 Credits** **Every Third Fall**
Milton (3+0) h
 Major poetry and prose, and survey of Miltonian criticism. (Prerequisite: Engl. 111 or permission of instructor; Engl. 308 desirable but not required. Next offered: 1990-91.)
- ENGL 444 3 Credits** **Every Third Spring**
Fiction in Translation (3+0) h
 Major fiction in English translation. (Prerequisite: Engl. 111 or permission of instructor. Next offered: 1990-91.)
- ENGL 445 3 Credits** **Alternate Fall**
20th-Century Drama: From Chekhov to Ionesco (3+0) h
 The major dramatists and their achievements. (Prerequisite: Engl. 111 or permission of instructor. Next offered: 1989-90.)
- ENGL 446 3 Credits** **Alternate Spring**
Major Modern and Contemporary Poetry (3+0) h
 Yeats to the present. (Prerequisite: Engl. 111 or permission of instructor. Next offered: 1989-90.)
- ENGL 447 3 Credits** **Alternate Spring**
20th-Century British Prose (3+0) h
 Study of fiction and nonfiction prose, modern and contemporary. (Prerequisite: Engl. 111 or permission of instructor. Next offered: 1989-90.)
- ENGL 448 3 Credits** **Alternate Spring**
20th-Century American Prose (3+0) h
 Study of fiction and nonfiction prose, modern and contemporary. (Prerequisite: Engl. 111 or permission of instructor. Next offered: 1989-90.)
- ENGL 452 3 Credits** **Every Third Fall**
The British Novel to 1900 (3+0) h
 Origin and development of the novel with concentration on significant novelists from Daniel Defoe to Thomas Hardy. (Prerequisite: Engl. 111 or permission of instructor. Next offered: 1990-91.)
- ENGL 462 3 Credits** **Alternate Spring**
Applied English Linguistics (3+0) h
 The topic(s) for each offering of the course will be announced. Examples are teaching English as a second language, dialects and education, dictionaries, stylistics, and composition. (Prerequisite: English 111 or permission of instructor. Next offered: 1989-90.)
- ENGL 471 3 Credits** **Fall and Spring**
Undergraduate Writers' Workshop (3+0)h
 Discussion of craft and techniques and student work intended for advanced students who will prepare a brief, finished manuscript as a final project. May be repeated one time for credit. (Prerequisites: Engl. 371 or permission of instructor.)
- ENGL 472 3 Credits** **Alternate Spring**
History of the English Language (3+0) h
 Origin and development of the English language from prehistoric times to the present. (Prerequisite: Engl. 111 or permission of instructor. Engl. 318 or a linguistics course is desirable, but not required. Next offered: 1989-90.)
- ENGL 485 3 Credits** **Spring**
Teaching Composition in the Schools (3+0)
 Theoretical background and workshop experience for teaching composition in middle and high schools with current pedagogy on teaching of writing stressed. A variety of teaching methods will be demonstrated and discussed. Writing, teaching demonstrations, reports, group and class discussions are required. (Prerequisites: Completion of university composition requirement with grade of B or higher, or permission of instructor.)
- ENGL 601 3 Credits** **Spring**
Bibliography, Methods, and Criticism (3+0)
 A study of the basic reference works for research in literature, the methods for conducting research, and the principles of literary criticism. (Prerequisite: Graduate standing or permission of instructor.)
- ENGL 603 3 Credits** **As Demand Warrants**
Studies in British Literature: Old and Middle English (3+0)
 Variable subject matter in significant topics in Anglo-Saxon and Middle English literature. (Prerequisite: Graduate standing or permission of instructor.)
- ENGL 604 3 Credits** **Every Third Fall**
Studies in British Literature: Renaissance and 17th Century (3+0)
 Variable subject matter in significant topics in 16th and 17th-Century British Literature. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1988-89.)
- ENGL 607 3 Credits** **Every Third Spring**
Studies in British Literature: Restoration, 18th and 19th Centuries (3+0)
 Variable subject matter in significant topics in British literature of the Augustan, Romantic, and Victorian periods. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1990-91.)
- ENGL 608 3 Credits** **Every Third Spring**
Studies in British Literature: 20th Century (3+0)
 Variable subject matter in significant topics in modern British literature. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1988-89.)
- ENGL 609 3 Credits** **Every Third Spring**
Studies in American Literature: Colonial Period and 19th Century (3+0)
 Variable subject matter in significant topics in American literature to the end of the 19th Century. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)
- ENGL 612 3 Credits** **Every Third Fall**
Studies in American Literature: 20th Century (3+0)
 Variable subject matter in significant topics in modern American literature. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)
- ENGL 671 Credits Arr.** **Fall and Spring**
Writers' Workshop
 The writing of verse, fiction, drama, or non-fiction prose in accordance with the individual student's needs and the instructor's specialization. Depending on available staff, the workshop may be limited during any semester to work in a particular genre. (Prerequisites: Engl. 313 and 371 and permission of instructor; or, permission of the head of Department of English and of instructor. Preference will be given to M.F.A. candidates in creative writing.)
- ENGL 681 3 Credits** **Alternate Fall**
Forms of Poetry (3+0)
 Intensive study of the forms and techniques of poetry writing. Includes readings and poetry writing exercises. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)

ENGL 682 3 Credits Alternate Fall
Forms of Fiction (3+0)
 Advanced study in narrative technique through analysis of selected fiction and the students' own writing. Variable content in terms of the writers to be studied, and the kinds of narrative writing to be assigned. (Prerequisite: Graduate status or permission of instructor. Next offered: 1989-90.)

ENGL 683 3 Credits As Demand Warrants
Forms of Drama (3+0)
 Advanced study in dramatic technique through analysis of selected plays and the students' own writing. Variable content in terms of the playwrights to be studied, and the kinds of dramatic writing to be assigned. (Prerequisite: Graduate status or permission of instructor.)

ENGL 684 3 Credits Alternate Spring
Forms of Non-Fiction Prose (3+0)
 Intensive study of the forms and techniques of non-fiction. Includes readings and writing exercises. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)

ENGL 685 3 Credits Fall
Teaching College Composition (3+0)
 An investigation into current practice and theory with demonstrations and reports on pedagogy. Required of all teaching assistants in English. (Prerequisite: Graduate standing.)

ENGL 692 Credits Arr. Fall and Spring
Graduate Seminar
 Intensive study of selected topics in the discipline.

English as a Second Language

ESLG 051 1-3 Credits As Demand Warrants
Speaking English as a Second Language
 For students who do not speak English as their first language, but who can understand and follow simple instructions in English, this class provides ample opportunity to engage in English conversation. The emphasis is on large quantities of comprehensible English, and building student confidence in understanding and speaking it. May be repeated up to nine credits.

ESLG 061 1-3 Credits As Demand Warrants
Reading English as a Second Language
 For students whose first language is not English, this class provides an opportunity to develop the skills involved in reading simple passages in English. Language experience approach and other methods are used to increase students' abilities and to build their confidence in reading English as it is encountered everyday. May be repeated up to nine credits.

ESLG 071 1-3 Credits As Demand Warrants
Writing English as a Second Language
 For students whose first language is not English, this class provides an opportunity to develop skills at writing simple English compositions. The emphasis is on writing large quantities of English which is understandable to native English speakers, and on building students' confidence in communicating through written English. May be repeated up to nine credits.

Environmental Quality Engineering/ Science

EQS 201 3 Credits Fall
Environmental Protection (3+0)
 The study of pollution control and abatement with emphasis on air, water and land pollution; health protection; and environment impact. Other topics to be presented include pesticides, hazardous wastes, radioactive wastes, energy, population control, ecology and environmental law. This course will supplement and complement ALR 101 - Conservation of Natural Resources.

EQE 601 3 Credits Every Third Semester
Environmental Quality Science Measurements (2+3)
 Theory and laboratory procedures for determining quality of water supplies. Natural water quality, pollution loads, and water and wastewater treatment plant parameters. Familiarization with *Standard Methods for the Examination of Water and Wastewater*. Experiments on unit processes of treatment systems are included along with consideration for solid waste air pollution monitoring. Laboratory fee: \$20.00. (Prerequisite: Permission of instructor. Next offered: Fall 1989.)

EQE 602 3 Credits Every Third Semester
Engineering Management of Water Quality (3+0)
 Concepts, rationale, theory, institutions, and engineering aspects of water quality management. Methods of water quality management: low flow augmentation, in-stream aeration, stream and estuarine analysis, ocean disposal systems, land disposal, control of thermal effluents, industrial discharges, and arctic applications. Materials fee: \$10.00. (Prerequisite: Permission of instructor. Next offered: Fall 1990.)

EQE 603 3 Credits Every Third Semester
Solid Waste and Air Pollution (3+0)
 Planning, collecting, and disposing of refuse. Techniques of open dumping, land filling, sanitary land filling, composting, incineration, and resource recovery. Solid waste environmental relationships to water, air, and land pollution. Economics and case studies are included. Air pollution topics will include quantity and quality of atmospheric emissions and their effects on the human environment. Identification and location of sources, and measurement of quality and standards. Materials fee: \$15.00. (Prerequisite: Permission of instructor. Next offered: Fall 1989.)

EQE 604 3 Credits Every Third Semester
Environmental Quality Evaluation (3+0)
 Topics of environmental impact statements, environmental law (local, state and federal), and environmental quality. Impact from projects of mining, highways, airports, pipelines, industrial development, water, wastewater and solid waste, and others - theoretical considerations and case studies. (Prerequisite: Graduate standing or permission of the instructor. Next offered: Spring 1989.)

EQE 605 3 Credits Every Third Semester
Chemical and Physical Water and Wastewater Treatment Processes (3+0)
 The theory and design of chemical and physical unit processes utilizing the treatment of water and wastewater. Sedimentation and flotation, ion exchange, adsorption, coagulation, precipitation, filtration, disinfection, reverse osmosis, and aeration theories will be studied. Design problems for all unit processes. (Prerequisite: Graduate standing or permission of the instructor. Next offered: Spring 1989.)

EQE 606 3 Credits Every Third Semester
Biological Treatment Processes (3+0)
 Study of the theoretical and applied aspects of wastewater treatment by biological processes including activated sludge, trickling filters, lagoons, sludge digestion and processing, septic tanks, analysis and design, nutrient removal processes, biology of polluted waters, economics, state, and federal regulations. (Prerequisite: Graduate standing or permission of the instructor. Next offered: Fall 1990.)

EQE 607 3 Credits Alternate Spring
Biotechnology (3+0)
(Same as ALR 607)
 Theory and applications of bioconversion and bioengineering processes for foods, agriculture, pharmaceuticals, and industrial chemicals. The use of microbiological methods (recombinant DNA, immobilized enzymes, and cells, hybridomas, and mutation and selection) for the production of conventional bioproducts and in the development of new bioproducts. (Prerequisite: Biol. 442, Chem. 322. Next offered 1989-90)

Eskimo

ESK 101 5 Credits Fall
ESK 102 5 Credits Spring
Elementary Yup'ik Eskimo (5+0) h
 Introduction to Central Yup'ik, the language of the Yukon and Kuskokwim deltas and Bristol Bay. Open to both speakers and non-speakers. For speakers the course provides literacy and grammatical analysis. For others, it provides a framework for learning to speak, read, and write the language. Consideration given to dialect differences.

ESK 103 3 Credits As Demand Warrants
Yup'ik Made Easy (3+0)
 This is an entry-level course for those wishing to learn the Yup'ik language. The very popular and highly successful TPR (Total Physical Response) methods, through commands and actions is used. The study of grammar, reading and writing will not be covered in this course. The focus will be on teaching comprehension of the language in everyday situations, with speech being delayed until the student is ready.

ESK 104 3 Credits As Demand Warrants**Yup'ik Made Easy II (3+0)**

This is a continuation of ESK 103 for those wishing to learn the Yup'ik language. The very popular and highly successful TPR (Total Physical Response) method, whereby students learn to comprehend the language through commands and actions, is used. Reading and writing will only be covered indirectly in this course. The focus will be on teaching comprehension of the language in everyday situations. Vocabulary from ESK 103 will be briefly reviewed.

ESK 105 1-3 Credits As Demand Warrants**ESK 106 1-3 Credits As Demand Warrants****Conversational Central Yupik (1+3)**

These are introductory courses for students who wish to acquire the ability to speak Central Yupik, the language of Norton Sound, the lower Yukon and Kuskokwim Rivers and the Delta, and Bristol Bay. Students first learn to understand simple spoken language, then to speak simple Central Yupik, developing a beginning level of communicative competence in the language. (Prerequisite: ESK 105 for 106.)

ESK 108 3 Credits Spring**Yupik Literacy (3+8)**

Literacy training for speakers of Yupik languages (Central Yupik, St. Lawrence Island Yup'ik, and Alutiiq). Learning to read and write the language.

ESK 109 3 Credits As Demand Warrants**Yup'ik Orthography (3+0)**

Yup'ik orthography is an entry level-class designed for those how are fluent in Central Yup'ik. The course will cover reading, silent and oral, and writing, emphasizing specific skills and practical application of those skills through writing assignments. Dialect differences in the Central Yup'ik region will be used to demonstrate standardization of the writing systems. (Prerequisite: demonstrated conversational Yup'ik skills).

ESK 111 5 Credits Fall**ESK 112 5 Credits Spring****Elementary Inupiaq Eskimo (5+0) h**

Introduction to Inupiaq, the language of Unalakleet, Seward Peninsula, Kotzebue Sound, and North Slope. Open to both speakers and non-speakers. For speakers the course provides literacy and grammatical analysis. For others it provides a framework for learning to speak, read, and write the language. Consideration given to dialect differences.

ESK 115 1-3 Credits As Demand Warrants**ESK 116 1-3 Credits As Demand Warrants****Conversational Inupiaq (1+3)**

These are introductory courses for students who wish to acquire the ability to speak Inupiaq, the language of Norton Sound, the Seward Peninsula, Kotzebue Sound, the North Slope, and the arctic portions of Canada and Greenland. Students first learn to understand simple spoken language, then to speak simple Inupiaq, developing a beginning level of communicative competence in the language. (Prerequisite: ESK 115 for 116.)

ESK 118 3 Credits Spring**Inupiaq Literacy (3+0)**

Literacy training for speakers of Alaskan Inupiaq. Learning to read and write the language.

ESK 130 3 Credits As Demand Warrants**Beginning Yup'ik Grammar (3+0)**

Literacy and grammatical analysis of the Central Yup'ik language are introduced in this course. Both Yup'ik speakers and nonspeakers are eligible since the framework for learning to speak and write the language is offered. Considerations are given to dialect differences. (Prerequisite: ESK 103 or basic conversational Yup'ik skills).

ESK 155 1-3 Credits As Demand Warrants**ESK 156 1-3 Credits As Demand Warrants****Conversational Siberian Yupik (1+3)**

These are introductory courses for students who wish to acquire the ability to speak in Siberian Yupik, the language of St. Lawrence Island and parts of the Chukchi Peninsula in Siberia. Students first learn to understand simple spoken language, then to speak simple Siberian Yupik, developing a beginning level of communicative competence in the language.

ESK 158 1-3 Credits As Demand Warrants**Siberian Yupik Orthography (1+3)**

This course provides students with an introduction to the standard writing system (orthography) of Siberian Yupik. Students learn the skills of spelling, reading, and writing words in Siberian Yupik, which are the fundamentals of basic literacy. (Prerequisite: ability to speak Siberian Yupik or permission of the instructor.)

ESK 201 3 Credits Fall**ESK 202 3 Credits Spring****Intermediate Yup'ik (3+0) h**

Continuation of Eskimo 101-102. Increasing emphasis on speaking, reading, and writing.

ESK 208 3 Credits As Demand Warrants**Yup'ik Composition (3+0)**

In this course students examine the development of written Yup'ik and explore writing for entertainment, information, transcription of oral narratives and note taking in meetings where Yup'ik is the dominant language. This course will be open to new writing styles, rather than simply translating the standard categories of English composition. Students will receive extensive practice in Yup'ik orthography and participate in the evaluation of each other's writings. (Prerequisite: Esk 108)

ESK 211 3 Credits Fall**ESK 212 3 Credits Spring****Intermediate Inupiaq Eskimo (3+0) h**

Continuation of Eskimo 111-112, concentrating on development of conversational ability, with presentation of additional grammar and vocabulary.

ESK 218 3 Credits As Demand Warrants**Inupiaq Composition (3+0)**

Students will examine the development of written inupiaq and explore the many possible uses of Inupiaq writing, to entertain, inform, persuade, transcribe oral narratives and take notes on such occasions as city council meetings. The course will be open to new genres, rather than simply translating the standard categories of English composition. Students will receive extensive practice in the Inupiaq orthography and will actively participate in the evaluation of each other's writing (Prerequisite: Esk 118 or equivalent.)

ESK 301 3 Credits Fall**Advanced Yup'ik Eskimo (3+0) h**

Continuation of Esk. 201-202. Completes the basic study of the Yup'ik grammar. (Prerequisites: Esk. 101, 102, 201-202 or permission of instructor.)

ESK 415 3 Credits Spring**Additional Topics in Advanced Yup'ik Eskimo (3+0) h**

Further study of Yup'ik linguistics. Includes text transcription, editing, analysis, and discussion. Yup'ik dialectology. Study of related Eskimo languages from the standpoint of Central Yup'ik. Additional topics to be studied depending upon the interests of the students and the instructor. (Prerequisites: Esk. 101, 102, 201-202 or permission of instructor.)

ESK 417 3 Credits Spring**Advanced Inupiaq Eskimo (3+0) h**

Advanced study in Inupiaq Eskimo. A continuation of Esk. 212. (Prerequisites: Completion of Esk. 111, 112, 211, 212 or permission of instructor.)

Fire Science

FSCI 101 3 Credits As Demand Warrants**Introduction to Fire Science (3+0)**

An introduction to Fire Science and Fire Protection; career opportunities in fire protection and related fields; history of fire protection; fire loss analysis; public, quasi-public and private fire protection services; specific fire protection functions; fire chemistry and physics.

FSCI 105 3 Credits As Demand Warrants**Fundamentals of Fire Prevention (3+0)**

Organization and function of fire prevention; inspections; surveying and mapping procedures; recognition of fire and life hazards; engineering a solution of a fire hazard; enforcing the solution of a fire hazard; fire safety education.

FSCI 107 3 Credits As Demand Warrants**Fire Tactics and Strategy (3+0)**

Principles of fire control through utilization of manpower, equipment and extinguishing agents. (Prerequisite Fsci 101 or equivalent or permission of instructor)

FSCI 111 3 Credits As Demand Warrants**Fire Company Organization & Management (3+0)**

Review of fire department organization; planning, organizing and supervising to meet the needs of the fire department, with emphasis on the company officer's role.

FSCI 115 3 Credits As Demand Warrants**Fire Apparatus and Equipment (3+0)**

Fire apparatus design, specifications and performance capabilities, effective utilization of apparatus in fire emergencies

- FSCI 117 3 Credits As Demand Warrants**
Rescue Practices (3+0)
 Rescue problems and techniques; emergency rescue equipment; toxic gases; chemicals and diseases; radiation hazards; care of the victims, including emergency childbirth, respiration and resuscitation, extrication, and other emergency conditions.
- FSCI 121 3 Credits As Demand Warrants**
Introduction to Fire Chemistry & Physics (3+0)
 Introduction to nomenclatures, principles and procedures of chemistry as related to fire problems.
- FSCI 123 3 Credits As Demand Warrants**
Fire Investigation (3+0)
 Determining cause of fires (accidental, suspicious and incendiary); types of fires; related laws; introduction to arson and incendiarism; recognizing and preserving evidence; interviewing witnesses and suspects; arrest and detention procedures; court procedures and giving court testimony.
- FSCI 151 3 Credits As Demand Warrants**
Wildland Fire Control I (3+0)
 A course designed to provide the employed fireman or fire science major with a fundamental knowledge of the factors affecting wildland fire prevention, fire behavior, and control techniques.
- FSCI 153 3 Credits As Demand Warrants**
Wildland Fire Organization and Management (3+0)
 A review of fire organization, the steps involved in organizing for suppression, and a study of management functions.
- FSCI 155 3 Credits As Demand Warrants**
Fire Behavior I (3+0)
 Course includes fire triangle, ignition temperatures, sources of heat, heat transfer, weather factors, forest fuel factors and topography, interplay of fuels and prediction of fire behavior on our wildland fires.
- FSCI 156 3 Credits As Demand Warrants**
Fire Planning Function (3+0)
 A course designed to provide the student with an overview of the planning process, organizational relationships with other functions, use of planning matrix board, check-in and resource status procedures, evaluation, analysis and display of incident information, documentation, demobilization, use of technical specialist and components of an incident action plan.
- FSCI 157 3 Credits As Demand Warrants**
Aircraft Operations (3+0)
 Use of aircraft for suppression of wildland fires and support of the service function-emphasis on air safety.
- FSCI 158 3 Credits As Demand Warrants**
Fire Operation Function (3+0)
 A course designed to provide the student with an overview of the operation function including organization, implementation of the incident action plan, tactical use of resources, ordering additional resources, appointment of geographical and functional supervisors, support and operations of fixed wing and rotor aircraft.
- FSCI 161 3 Credits As Demand Warrants**
Fire Logistics Functions (3+0)
 Contains basic organization and procedures of the support function. Includes study of the Service Chief position and its subordinate positions.
- FSCI 162 3 Credits As Demand Warrants**
Methods/Instruction For Fire Service Training (3+0)
 A course designed to provide the student with the skills necessary to instruct fire service courses including adult education techniques, classroom setup, use of audio-visual equipment, presentation, and evaluation methods of students and instruction.
- FSCI 163 3 Credits As Demand Warrants**
Wildland Air Attack (3+0)
 Proper use and management of aircraft as a tool in fire support, specifically the use of helicopters and fixed wing tanker attack.
- FSCI 202 3 Credits As Demand Warrants**
Fire Hydraulics (3+0)
 Review of applied mathematics; hydraulic laws as applied to fire service; applications of formulas and mental calculations; hydraulics and water supply problems.
- FSCI 204 3 Credits As Demand Warrants**
Hazardous Materials I (3+0)
 An introduction to basic fire chemistry and physics. Problems of flammability as encountered by firefighters when dealing with fuels and oxidizers. Elementary fire fighting practices pertaining to hazardous materials in storage and transit.
- FSCI 205 3 Credits As Demand Warrants**
Hazardous Materials II (3+0)
 A second semester course in Hazardous Materials covering handling, identification and fire fighting practices involving explosive, toxic, and radioactive materials in storage and transit. (Prerequisite Fsci 204 or instructor's permission)
- FSCI 206 3 Credits As Demand Warrants**
Building Construction/Fire Protection (3+0)
 Fundamentals of building construction as it relates to fire protection. (Prerequisite: FSCI 101 or employment or experience in related field, such as Fire Protection, insurance, construction architecture, or engineering.
- FSCI 208 3 Credits As Demand Warrants**
Fire Service Records and Reporting (3+0)
 A course designed for all members to the fire service in the use of typical records and report systems. Involves knowledge and understanding of fire department records systems, principles of report writing, applications in the area of pre-fire survey, post-fire reporting, research and planning.
- FSCI 212 3 Credits As Demand Warrants**
Codes and Ordinances (3+0)
 Familiarization and interpretation of national, state and local codes, ordinances and laws which influence the field of fire prevention. (Prerequisites Fsci 101 or permission of instructor.)
- FSCI 214 3 Credits As Demand Warrants**
Fire Protection Equipment and Systems (3+0)
 A study of portable fire extinguishing equipment; protection systems for specific hazards; sprinkler systems; and fire detection and alarm systems.
- FSCI 252 3 Credits As Demand Warrants**
Wildland Fire Prevention/Law Enforcement (3+0)
 The organization and functions of fire prevention; objectives and policy, education and enforcement, analysis and inspection techniques; public relations as affected by fire prevention; fire investigation; basic law enforcement techniques.
- FSCI 254 3 Credits As Demand Warrants**
Wildland Fire Business Management (3+0)
 A course covering the duties and responsibilities of a fire officer as they relate to fire management practices and programs. Promotes professionalism and effects a sound fire management program. Covers procedures required in identified finance jobs in a wildland organization, including the financial management of a large complex wildland fire.
- FSCI 256 3 Credits As Demand Warrants**
Wildland Fire Plan/Multi Use Management (3+0)
 Fire management and its role in a multiple use resource management program. Includes resource management, prescribed fire wildfire practices, environment, management goals and objectives, and fire planning.
- FSCI 258 3 Credits As Demand Warrants**
Prescribed Burning/Fuels Management (3+0)
 Course analyzes different fuels and evaluates benefits and effect of management practices. Includes prescribed fire procedures and objectives.
- FSCI 260 3 Credits As Demand Warrants**
Fire Research & Development (3+0)
 Research and development in the area of fire prevention, detection, prescribed burns, fire suppression, and post suppression.
- FSCI 262 3 Credits As Demand Warrants**
Wildland Fire Control II (3+0)
 A course designed to provide the student with advanced management skills and techniques. Topics included are political and environmental considerations as they apply to wildland fires, line officer/incident management team roles and responsibilities, available technology and the problems involved with the wildland-urban interface.
- FSCI 266 3 Credits As Demand Warrants**
Wildland Fire Environment Considerations (3+0)
 Course covers ecosystems, erosion, soil properties and revegetation, fire ecology, fuel and the environment, fire control practices, and smoke management.
- FSCI 270 3 Credits As Demand Warrants**
Incident Command Function (3+0)
 A course designed to provide the student with an overview of the command function including use of single and unified command, roles and responsibilities of the incident commander and staff, development and implementation of strategic decision, providing information to the media, and managing the incident.

Fisheries

FISH 411 Credits Arr As Demand Warrants
Fisheries Field Trip

A trip to acquaint students with some of the principal fisheries of the state and problems involved in their management. (Prerequisite: major in fisheries biology or admission by arrangement.)

FISH 429 3 Credits Fall
Introduction to Fisheries Science (2+3)

The general biology of fishes in relation to their management. Methods of collecting, analyzing, and interpreting field and laboratory data. Laboratory fee: \$10.00. (Prerequisites: Biol 271, 423 and A.S. 301.)

FISH 430 3 Credits Spring
Fisheries Management (3+0)

The principles, concepts and techniques of fisheries management are reviewed. To show relevance of the biological, economic, social, and political aspects of management, examples of several fisheries are used. (Prerequisites: Biol. 271 and Biol. 423.)

FISH 630 3 Credits Alternate Fall
Quantitative Fishery Science (3+0)

Quantitative analysis and modeling of exploited fish populations. Emphasis is placed on estimates of abundance, recruitment, growth, mortality, and yield. Method and theory are presented in relation to management needs. (Prerequisites: A.S. 301 and Fish 429 or equivalents or permission of instructor. Next offered: 1988-89.)

Foreign Languages

F.L. 110 2 Credits As Demand Warrants
How to Pronounce French, German, Italian, and Spanish (2+0)

Designed to meet the needs of students and others in radio, television, journalism, drama, music (esp. voice), etc. who want to pronounce French, German, Italian and Spanish correctly and with confidence. The method is practical and direct. Concrete examples are used.

French

(For UAF program in France, see International Programs.)

FREN 075 3 Credits As Demand Warrants
FREN 076 3 Credits As Demand Warrants

Conversational French II (3+0)
An introductory course for students who wish to acquire the ability to speak French. Students first learn to understand simple spoken language, then to speak simple French, developing a beginning level of communicative competence in the language. (Prerequisite: Fren 075 for 076.)

FREN 101 5 Credits Fall
FREN 102 5 Credits Spring

Elementary French I and II (5+0) h
Introduction to the language and culture: development of competence and performance in the language through understanding, recognition and use of linguistic structures, increasing emphasis on listening comprehension and speaking, basic vocabulary of approximately 1,000 words, exploration of the cultural dimension, implicitly through language, and explicitly through texts and audio-visual materials; use of Foreign Language Learning Center.

FREN 201 3 Credits Fall
FREN 202 3 Credits Spring

Intermediate French I and II (3+0) h
Continuation of Fren. 102. Increasing emphasis on reading ability and culture material. Conducted in French. (Prerequisite: Fren. 102 or equivalent.)

FREN 288 2 Credits Spring
Individual Study: Reading French h

Emphasis on rapid expansion of passive vocabulary and immediate recognition of frequent idiomatic expressions and grammatical structures, development of true reading skills, modern literary and/or non-literary texts. (Prerequisites: Fren. 201, equivalent training or permission of instructor. Recommended to be taken concurrently with Fren. 202.)

FREN 301 3 Credits Alternate Fall
FREN 303 3 Credits Alternate Fall

Advanced French (3+0) h
Discussions and essays on more difficult subjects or texts, and translations, stylistic exercises, and special grammatical problems. Conducted in French. (Prerequisite: Fren. 202 or equivalent. Fren. 301 next offered: 1989-90; Fren. 303: 1988-89.)

FREN 387 2 Credits Alternate Fall
Individual Study: Semantics h

Systematic expansion of passive and active vocabulary through analysis of word fields, series of synonyms and antonyms, principles of word formation, derivation, composition, etc. Conducted in French. (Prerequisites: Fren. 202 or permission of instructor. Next offered: 1989-90.)

FREN 432 3 Credits Spring
Studies in French Literature and Culture (3+0) h

Intensive study of authors, literary movements, periods, and/or genres. Analysis of cultural material other than texts. Conducted in French. Student may repeat course for credit when topics vary. (Prerequisites: French 301 or 303 or equivalent and at least sophomore standing, or permission of instructor.)

FREN 487 2 Credits Alternate Fall
Individual Study: Translation of French Texts h

Expansion of vocabulary and grammatical knowledge, emphasis on understanding precise shades of meaning, stylistics, artistic expression and cultural values in language, and literary and non-literary texts. Student may repeat course for credit if materials vary. Conducted in French. (Prerequisites: Fren. 301 or 303 or equivalent and at least sophomore standing, permission of instructor. Next offered: 1989-90.)

FREN 488 3 Credits As Demand Warrants
Individual Study: Senior Project h

Designed to permit the student to demonstrate ability to work with the language and the culture through the analysis and presentation, in the language, of a problem chosen by the student in consultation with the department. The student must apply for senior project and submit a project outline by the end of the 6th week of the semester preceding the semester of graduation. Conducted in French. (Prerequisites: At least 10 credits in upper division French or permission of instructor.)

Geography

GEOG 101 3 Credits Fall and Spring
Introductory Geography (3+0) s

World regions, an analysis of environment, with emphasis on major culture realms.

GEOG 103 3 Credits Fall and Spring
World Economic Geography (3+0) s

Study of the world's major economic activities: their physical and cultural bases, spatial growth and distribution patterns, and their significance in interregional and international development.

GEOG 202 3 Credits Alternate Fall
Geography of United States and Canada (3+0) s

Regional geography of Anglo-America. Introductory systematic study of the area as a whole, followed by detailed study of the physical and cultural landscape forms, patterns, and associations of each major region in turn. Consideration of Anglo-America in current world economic and political geography. (Next offered: 1989-90.)

GEOG 205 3 or 4 Credits Fall
Elements of Physical Geography (3+0 or 3+3) n

Analysis of the processes that form the physical environment and the resulting physical patterns. Study of landforms, climate, soils, water resources, vegetation, and their world and regional patterns. Optional laboratory for one additional credit. (Prerequisite: Geog. 101 or 103.)

GEOG 301 3 Credits Alternate Fall
Geographic Field Research Techniques

Theory and application of geographic methods of conducting field investigations. Collection, analysis, synthesis, and interpretation and reporting of data concerning the natural and human environments. (Permission of instructor. Next offered: 1989-90.)

GEOG 302 3 Credits Spring
Geography of Alaska (3+0) s

Regional, physical and economic geography of Alaska. Special consideration of the state's renewable and nonrenewable resources, and of plans for their wise use. Frequent class study of representative maps and visual materials. (Prerequisite: Geog. 101 and 205.)

GEOG 305 3 Credits Alternate Fall
Geography of Europe (except U.S.S.R.) (3+0) s

Regional, physical, economic and cultural geography of Europe, except U.S.S.R. (Prerequisite: Geog. 101 and 205. Next offered: 1989-90.)

GEOG 306 3 Credits Alternate Spring**Geography of the Soviet Union (3+0) s**

The physical, cultural and historical geography of the U.S.S.R. with special emphasis on the geographic bases of the expansion of the Great Russians and the contemporary foundation of Soviet national power. (Prerequisite: Geog. 101 or 103 or 205 or permission of the instructor. Next offered: 1989-90.)

GEOG 309 3 Credits Alternate Spring**Cartography (1+6) s**

Graphic techniques for presenting geographic data through the construction of maps, projections and charts. (Prerequisite: Permission of instructor. Next offered: 1989-90.)

GEOG 311 3 Credits Alternate Fall**Geography of Asia (3+0) s**

Regional geography of Asia, exclusive of the Soviet Union. A study of the physical framework, natural resources, peoples, major economic activities, and characteristic landscapes of the major regions of Japan, China, Southeast Asia, India-Pakistan, and the Asiatic countries of the Middle East. (Prerequisite: Geog. 101 or 103 or 205 or permission of the instructor. Next offered: 1989-90.)

GEOG 315 3 Credits As Demand Warrants**Geography of Africa (3+0) s**

Physical and cultural geography of Africa, by regions. Significance of Africa in current world cultural, economic, and political geography. Major emphasis on regions south of the Sahara. (Prerequisite: Geog. 101 and 205.)

GEOG 327 3 Credits Spring**Cold Lands (3+0) s**

The comparative physical, human, and economic geography of cold regions, with particular attention to Siberia, Greenland, Scandinavia and Canada. Special attention is given to the different approaches which have been taken toward economic development in cold regions. (Prerequisite: Geog. 101 or 103 or 205 or permission of the instructor.)

GEOG 339 3 or 4 Credits Spring**Advanced Physical Geography (3+0) or (3+3) n**

Application of methodology of physical geography to analysis of regional landscapes. Optional laboratory for one additional credit. (Prerequisites: Geog. 101 or 103, 205.)

GEOG 401 3 Credits Alternate Fall**Weather and Climate (3+0) n**

Introduction to the study of weather and classification of climates. (Prerequisite: permission of the instructor. Next offered: 1989-90.)

GEOG 402 3 Credits Alternate Fall**Man and Nature (3+0) s**

The relationship of cultures with the land they have occupied over time, in the context of the world's major regions. Consideration will be given to the significance of cultural diversity, differing patterns of livelihood, settlement, and population change. (Prerequisite: Geog. 101 and 205. Next offered: 1989-90.)

GEOG 404 3 Credits Alternate Fall**Urban Geography (3+0) s**

A world survey of urbanization with particular emphasis on the accelerating urban revolution in modern times. Conditions favoring the rise of cities: locational and site factors, regional and interregional resource availability, and human factors. Changing functions and patterns of urban areas. National and international problems inherent in trends toward a predominantly urbanized economy and culture. Implications of urbanization in Alaska. (Prerequisite: Geog. 101. Next offered: 1989-90.)

GEOG 405 3 Credits Alternate Fall**Political Geography (3+0) s**

Geographical analysis of the evolution, structure, internal coherence, and sources of strength of individual nation states, with emphasis on nations of the Pacific realm and Arctic periphery. Consideration of regional blocs, spheres of influence, and potential for international cooperation. (Prerequisite: Geog. 101. Next offered: 1989-90.)

GEOG 408 3 Credits Alternate Spring**Quantitative Research Techniques (2+3)**

Philosophy and methodology in geography. Theories, laws, and models for measurement, analysis and explanation of geographic patterns and associations. Applications of findings to solution of geographic problems. (Prerequisites: Junior standing and college-level mathematics, or permission of the instructor. Next offered: 1989-90.)

Geological Engineering**G.E. 101 1 Credit Fall****Introduction to Geological Engineering (1+0)**

An introduction to the many facets of geological engineering as a profession, the area and scope of the field. Graded pass/fail.

G.E. 261 3 Credits Spring**General Geology for Engineers (2+3)****(Same as Geos. 261)**

Study of common rocks and minerals, landforms, erosion. Geologic materials and engineering application of geology. (Prerequisite: Geology, science, or engineering majors, or permission of instructor.)

G.E. 365 3 Credits Fall**Geological Engineering I (3+0)**

Geological and geotechnical factors for the solution of engineering problems. Special emphasis on soils and permafrost. Some fieldwork and student report. (Prerequisites: Geos. 101 or Geos./G.E. 261 and E.S. 208 or E.S. 209.)

G.E. 372 3 Credits Spring**Rock Engineering (3+0)**

Rock engineering related to tunnels, slope design, and strata control. Some field work and student report. (Prerequisites: Geos. 101 or Geos./G.E. 261 and E.S. 208 or E.S. 209.)

G.E. 375 3 Credits Fall**Terrain Analysis (3+0)**

Evaluation of terrain characteristics using basic geomorphic and engineering principles. Consideration given to Alaskan applications. (Prerequisites: G.E./Geos. 261 or Geos. 101.)

G.E. 405 4 Credits Spring**Exploration Geophysics (3+3)**

Introduction to the theory and application of gravity, magnetic, electrical, electro-magnetic, radioactive, and seismic methods as used for geophysical exploration. Some field work required. (Prerequisites: Math. 200 and Phys. 211 or equivalent.)

G.E. 420 3 Credits Spring**Subsurface Hydrology (2+3)**

Study of hydraulic characteristics of earth materials, engineering problems and models related to subsurface fluids, and properties of water. (Prerequisites: G.E./Geos. 261 and Phys. 211.)

G.E. 431 2 Credits Alternate Fall**Applied Ore Microscopy (1+3)**

Preparation of polished sections of ores. Identification of ore minerals in reflected light by physical, optical, and chemical methods. Applications to ore genesis, drill core interpretation, beneficiation, and process control. (Prerequisite: Geos. 213 or permission of the instructor. Next offered: 1989-90.)

G.E. 435 3 Credits Spring**Exploration Design (3+0)**

Geologic, engineering, and economic considerations applied to the design and development of mineral exploration programs. (Prerequisites: Geos. 314 and Geos. 214 or permission of instructor.)

G.E. 440 3 Credits Alternate Spring**Slope Stability (3+0)**

Slope design for open pit mining and other excavations. Stability analysis by various methods and on-site measuring and monitoring techniques. (Prerequisites: E.S. 331 or permission of instructor. Next offered: 1989-90.)

G.E. 471 3 Credits Spring**Remote Sensing for Engineering (3+0)**

Applications of remote sensing to geological engineering problems. Introduction to digital satellite image processing with hands-on practice. (Prerequisites: Geos. 101 or Geos./G.E. 261, Geos. 408, Physics 212.)

G.E. 480 2 Credits Spring**Geological Engineering II (1+3)**

A detailed study of geological and engineering factors for the solution of engineering problems. A term project is required. (Prerequisites: G.E. 365, G.E. 375 or permission of instructor.)

G.E. 630 3 Credits Alternate Fall**Advanced Applied Mining Geology (2+3)**

Investigative procedures used in mining geology from preproduction to terminal phases of an operation. Models ranging from open-pit to deep underground mining will be examined. Methods of mapping, sampling, on-going evaluation, and geotechnical aspects of water and ground control are examined. (Prerequisites: G.E. 435, Geos. 432, and Geos. 432L. Next offered: 1989-90.)

G.E. 631 3 Credits Spring**Electron Microprobe Methods (2+3)**

Applications of electron micro-analysis to mineralogy, petrology, mineral exploration development, evaluation and processing. Physics of x-rays, x-ray spectrometry and measurement; qualitative and quantitative elemental analysis using wave length and energy dispersive spectra are considered. (Prerequisites: M.Pr. 418B)

**G.E. 633 3 Credits Fall
Fluid Inclusion Methods in Mineral and Petroleum Exploration (2+3)**

Study of fluid inclusions in minerals. Thermodynamics, chemical and physical properties of fluids trapped in rock forming minerals or petroleum bearing rocks. Laboratory work includes sample preparation, thermometric and direct-current plasma emission spectrographic analysis. (Prerequisites: Chem. 331)

**G.E. 635 3 Credits Spring
Geostatistical Ore Reserve Estimation (2+3)
(Same as Min. 635)**

Introduction to the theory and application of geostatistics in the mining industry. Review of conventional methods of ore reserve estimation, sampling design and computer applications. Review of classical statistics, log normal distributions and global estimation. Presentation of fundamental geostatistical concepts including: variogram, estimation variance, block variance, kriging, geostatistical simulation. Emphasis on the practical application to mining. (Prerequisites: Min. 408 or equivalent, A.S. 451 or equivalent.)

**G.E. 666 3 Credits Alternate Fall
Advanced Engineering Geology (2+3)**

The interaction between geology and engineering case histories, student reports. (Prerequisites: Graduate standing, G.E. 365 and G.E. 372 or permission of instructor. Next offered: 1989-90.)

**G.E. 668 3 Credits Alternate Spring
Tunneling Geotechniques (3+0)**

Tunnel design, case histories, student report. (Prerequisites: Graduate standing in geological engineering or permission of instructor. Next offered: 1989-90.)

**G.E. 671 3 Credits Alternate Spring
Engineering Applications of Digital Image Processing (2+3)**

Quantitative methods of utilizing digital image processing and engineering information system. Applications include, but are not limited to, evaluation of the engineering properties of geo-materials, characterization of joint surface conditions, enhancement of photoelastic stress patterns, and identification of critical slope failure surfaces. (Prerequisite: G.E. 471 or equivalent or permission of instructor. Next offered: 1988-89.)

Geoscience (Geology and Geophysics)

**GEOS 100 4 Credits Spring
Introduction to Earth Science (3+3) n**

A survey of four main disciplines of earth science-geology, oceanography, meteorology, and astronomy. The lab portion has two main goals, one to provide students with a vehicle to learn scientific methodology and two, to provide students with lab evidence to support theories presented in lecture. (prerequisite: English placement test)

**GEOS 101 3 Credits Fall and Spring
General Geology (3+0) n**

Introduction to physical geology: a study of the earth, its materials, and the processes that effect changes upon and within it. Optional laboratory training in the use of topographic maps and the recognition of common rocks and minerals. Concurrent enrollment in the laboratory class Geos. 101L is required for geology majors and encouraged for others.

**GEOS 101L 1 Credit Fall and Spring
General Geology Laboratory (0+3) n**

Students are given basic training in the use of topographic maps and the recognition of common minerals and rocks. Optional lab with Geos. 101. Lab is required for Geology/Geophysics majors. Laboratory fee: \$10.00. (Prerequisite: Concurrent registration or credit in Geos. 101.)

**GEOS 103 3 Credits As Demand Warrants
Lanscapes and Resources of Alaska (3+0)**

Geological origins of the physical features of Alaska-mountains, volcanoes, islands and glaciers. Designed for those who want to learn more about the geology of Alaska and of the processes that formed it.

**GEOS 105 3 Credits As Demand Warrants
Geology of America's National Park (3+0)**

Explanations of prominent geologic features and landforms for which national parks and monuments have been selected. Brief descriptions of their geologic history.

**GEOS 112 3 Credits Spring
Historical Geology (3+0) n**

An introduction to the principles of historical geologic interpretation, the development of the geologic time scale, the stratigraphic record and its interpretation, geosynclinal theories and plate tectonics, the fossil record and its utilization, biostratigraphy, and the evolution of the North American continent through geologic time. Concurrent registration in Geos. 112L required for geology majors, optional but recommended for others. (Prerequisites: Geos. 101 or Geos. 261.)

**GEOS 112L 1 Credit Spring
Historical Geology Laboratory (0+3) n**

Laboratory instruction reviews mineral and rock identification and the use of topographic maps and introduces exercises on the ordering of geologic events, physical stratigraphy, facies, correlation, invertebrate fossils, geologic map interpretation, regional geology, and applied geology. Laboratory fee \$10.00. (Prerequisites: Geos. 101 and Geos. 101L or Geos. 261 plus concurrent registration or credit in Geos. 112.)

**GEOS 120A 1 Credit Spring
Earthquakes (1+0) n**

A course for the non-specialist on the causes, effects, measurements and prediction of earthquakes. Topics include the distribution of earthquakes and relation to plate tectonics, catastrophic events in historic times, size and frequency of earthquakes, man-made earthquakes and earthquake prediction and control.

**GEOS 120B 1 Credit Spring
Volcanos (1+0) n**

A survey course on volcanos for the non-specialist. Topics will include the type of volcanic eruptions and characteristics deposits, volcanic rocks, size and frequency of eruptions, the distribution of volcanos in relations to plate tectonics, volcanism and geothermal energy, assessment of volcanic hazards, prediction and control of eruptions.

**GEOS 120C 1 Credit Spring
Glaciers: Past, Present and Future (1+0) n**

The distribution of glaciers in space and time and their effects on the landscape and humans. topics include the cause of an ice age, current distribution of glaciers in relation to climate, glacial flow, glacial deposits, interaction of humans with glaciers and glacial deposits.

**GEOS 212 3 Credits Spring
Geology of Alaska (3+0)**

An overview of the geology of Alaska for non-majors. Modern geologic processes in Alaska will be used as a basis for understanding past geologic evolution of the region. The origin and recovery of Alaska's petroleum and mineral resources will be discussed. (Prerequisites: Geos. 101.)

**GEOS 213 4 Credits Fall
Mineralogy (2+6) n**

Introduction to mineral chemistry, atomic structure, elementary crystallography, and descriptive and determinative mineralogy. Includes introduction to instrumental determinative techniques (x-ray, diffraction) and simple qualitative chemical tests. (Prerequisites: Geos. 101 or 261; Chem. 105 and concurrent registration in Math. 107-108.)

**GEOS 214 3 Credits Spring
Petrology of Igneous and Metamorphic Rocks (2+3) n**

Systematic study of the origin, occurrence, and classification of igneous, and metamorphic rocks. Laboratory work involves hand lens identification of representative igneous and metamorphic rocks. Laboratory Fee: \$10.00. (Prerequisite: Geos. 213.)

**GEOS 261 3 Credits Spring
General Geology for Engineers (2+3) n
(Same as G.E. 261)**

Study of common rocks and minerals, landforms, erosion. Geologic materials and engineering application of geology. (Prerequisite: Geology, science, or engineering majors, or permission of instructor.)

**GEOS 262 3 Credits Fall
Mineralogy and Petrology for Engineers (2+3)**

Principles and practice of classification and description of rock, ore and soil forming minerals commonly encountered in mining and geotechnical engineering. Physiochemical, genetic, environmental, economic and engineering aspects are considered. Course may not be used to satisfy degree requirements in Geology and Geological Engineering. (Prerequisites: G.E./Geos. 261, Geos. 101 or equivalent.)

**GEOS 302 3 Credits Alternate Spring
Marine Geology (3+0) n**

Survey of marine geology, including structure and composition of ocean basins and continental margins, chemical and physical properties of marine sediments, geological processes in the oceans, physical resources, and conservation/pollution concerns (Prerequisite: Geos. 101, 112, or permission of instructor. Next offered: 1989-90.)

- GEOS 304 3 Credits** Fall
Geomorphology (3+0) n
 Study of the Earth's surface features and the processes which create or modify them. Application to Quaternary history, environmental science, and related fields. Materials fee: \$10.00. (Prerequisite: Geos. 101.)
- GEOS 314 4 Credits** Spring
Structural Geology (3+3) n
 Origin and interpretation of primary and secondary geologic structures. Graphical solution of structural problems. Laboratory Fee: \$10.00. (Prerequisites: Geos. 112, Phys. 103 or 211, Math. 201, Geos. 214 [or concurrent registration].)
- GEOS 316 4 Credits** Fall
Optical Mineralogy and Petrography (2+6) n
 An introduction to optical mineralogy and petrography. Petrographic study of representative igneous, metamorphic, and sedimentary rocks, including recognition of the important rock-forming minerals is stressed. Laboratory Fee: \$15.00. (Prerequisite: Geos. 214.)
- GEOS 321 3 Credits** Fall
Sedimentology (2+3) n
 Broad survey of sediments, including origin, classification, composition, transportation, deposition, and diagenesis. Laboratory instruction covers identification and description of hand specimens as well as techniques of textural and compositional analysis. Laboratory fee: \$10.00. (Prerequisite: Geos. 213 or permission of instructor.)
- GEOS 322 4 Credits** Spring
Stratigraphic Principles (3+3) n
 Methods of modern stratigraphic analysis, including principles of litho-, bio-, and chronostratigraphy. Surface and subsurface stratigraphic procedures utilizing outcrop and geophysical methods, with emphasis on the interpretation of ancient depositional environments. Laboratory instruction in geologic map interpretation, surface-to-surface correlation and basin analysis. (Prerequisites: Geos. 101 or 261, 112, and 321.)
- GEOS 350 2 Credits** Spring
Geologic Field Methods (1+3) n
 An introduction to geologic field techniques as a spring preparation for field geology (Geos. 351). It includes an introduction to basic field mapping techniques, library research, data presentation, and report writing. Approximately two thirds of the course will be devoted to lecture on geologic mapping techniques, use of instruments, and making field observations. The course ends with completion of a plane table surveying project and various field mapping and observational exercises. Laboratory Fee: \$10.00. (Prerequisites: Junior standing in geology or permission of instructor.)
- GEOS 351 4 or 6 Credits** Summer
Field Geology (Arranged) n
 Practical experience in the procedures employed in collecting and presenting the basic data obtained from the field. Includes field mapping of stratigraphic and structural problems on topographic maps, aerial photographs, plane table maps, and presentation of results in a professional report and finished geologic map. Students pay own transportation, subsistence and course tuition fee. Entrance by preregistration only; apply through the department. Class usually is filled to capacity by February of current year. Geophysics option students may elect to take this course for 4 credits if they also register for Geos. 451, Field Geophysics. All others must take 6 credits. (Prerequisites: Junior standing in geology, GEOS 350 or equivalent and permission of instructor.)
- GEOS 370 4 Credits** Spring
Sedimentary and Structural Geology for Petroleum Engineers (3+3) n
 Origin and distribution of sedimentary rocks including depositional environments, stratigraphic relationships, and structures. Emphasis on the relationship to petroleum occurrences and petroleum exploration. Laboratory exercises on mapping, structural problems and facies relationships in petroleum exploration. (Prerequisite: Geos. 101 or Geos./G.E. 261.)
- GEOS 401 4 Credits** Fall
Invertebrate Paleontology (3+3) n
 Study of the invertebrate phyla with fossil records. Emphasis on soft-part anatomy and classification, followed by study of hard-part anatomy of fossil groups and their classification. Recurrent emphasis on relevant biologic principles. Laboratory study on fossil materials. (Prerequisites: Geos. 101 or by permission of instructor; Biol. 305 recommended.)
- GEOS 408 2 Credits** Spring
Photogeology (1+3) n
 Use of topographic maps, geologic maps, aerial photographs, and satellite imagery in the interpretation of geological structures, landscapes, landforms, and geomorphic processes. Techniques included are map compilation, photo mapping, statistical treatment of map data, and composite mapping for planning purposes. Laboratory fee: \$10.00 (Prerequisite: Geos. 304 or permission of instructor.)
- GEOS 410 2 Credits** Fall
Potential Methods in Geophysics (1+3) n
 The fundamental theory of potential methods and the application to geophysical exploration will be studied along with the basic techniques and methods of interpretation of gravimetric and magnetic measurements. Class meets for one-half of the semester only. (Prerequisites: Math. 201, Phys. 212, or permission of instructor.)
- GEOS 411 3 Credits** Spring
Seismic Exploration (2+3) n
 The study of the fundamental principles of seismic exploration techniques, beginning with the basic laws of seismic wave propagation and ending with the practical application of the techniques, including both reflection and refraction methods. Class meets for one-half of the semester only. (Prerequisites: Math. 201, Phys. 212, or permission of instructor.)
- GEOS 412 2 Credits** Fall
Electrical Methods in Geophysics (1+3) n
 The fundamental principles of electrical resistivity and current flow in the earth and the practical application in the realm of geophysical exploration will be studied. Class meets for one-half of the semester only. (Prerequisites: Math. 201, Phys. 212, or permission of instructor.)
- GEOS 414 3 Credits** Alternate Fall
Introduction to Glaciology (3+0) n
 A broad survey of and introduction to glaciology including thermodynamics of phase relations, supercooling, nucleation, and freezing of water in the laboratory and in rivers, lakes, oceans, cloud droplets, soil, and animal and plant tissue. Physical processes in seasonal and perennial snow and transformation of snow to glacier ice will be examined, as well as distribution and classification of glaciers, mass balance of glaciers, glacier flow and causes of glaciation. Physical properties of and processes in frozen ground and sea ice will be studied. (Prerequisite: Math 201 or permission of instructor. Next offered: 1989-90.)
- GEOS 417 3 Credits** Fall
Introduction to Geochemistry (3+0) n
 Introduction to chemistry of the earth. (Prerequisites: Chem. 105, 106, or permission of instructor.)
- GEOS 418 3 Credits** Fall
Basic Geophysics (3+0) n
 The basic concepts and techniques of geophysics as applied on a global scale. Topics covered will include the origin of the earth, its structure, and the large scale dynamic processes responsible for its surface features. Geophysical techniques including seismology, gravity, magnetometry, and electrical methods will be discussed along with measurements of the earth's thermal structure, rotation rates, and the effects of the tides. (Prerequisites: Permission of the instructor.)
- GEOS 419 4 Credits** Alternate Spring
Continuum Mechanics (4+0) n
 Mechanics of continuous deformable media; analysis of stress and strain using tensor notation; elastic, viscous, plastic and visco-elastic constitutive laws with examples from the geophysical environment including hydrology, geology, glaciology and meteorology. (Prerequisite: Phys. 211 212 and Math. 302 or permission of instructor. Next offered: 1989-90)
- GEOS 420 4 Credits** Alternate Fall
Elements of Seismology (3+3) n
 Global distribution of earthquakes; causes and effects of earthquakes with reference to Alaska; instrumentation utilization for the determination of earthquake sources and subsurface structures; introduction to the techniques used for studies of seismotectonics and earthquake prediction. (Prerequisites: Geoscience students: Math 201; Civil Engineering students: E.S. 331. Next offered: 1989-90)
- GEOS 422 3 Credits** Fall
Geoscience Applications of Remote Sensing (3+0) n
 Introduction to the scope of remote sensing and its applications to geologic, environmental and physical sciences. Includes explanation of nomenclature, a review of types of remote sensing systems, and study of the forms in which remote sensing data is available. Emphasis placed on the use of LANDSAT, radar imagery, thermal imagery and color infrared photography. (Prerequisites: Geos. 101, Phys. 103 or 211, junior standing or consent of the instructor.)

- GEOS 430 3 Credits Spring**
Statistics and Data Analysis in Geology (3+0) n
 An introduction to the use of the computer and statistics in geology and related sciences. The course stresses geologic applications of elementary statistics, Markov chains, time-series analysis, trend-surface analysis, factor analysis, cluster analysis, discriminant analysis, and multiple regression. (Prerequisites: Math. 200 or A.S. 301; senior standing or permission of instructor.)
- GEOS 432 3 Credits Fall**
Geology of Mineral Resources (3+0) n
 An introduction to the occurrence and characteristics of metallic and selected non-metallic mineral deposits, geographic locations, petro-tectonic settings, mineralogic and petrologic features, and theories of genesis, with applications to exploration and development. (Prerequisites: Geos. 214, Geos. 314, Geos. 322, Geos. 401)
- GEOS 432L 2 Credits Fall**
Geology of Mineral Resources Laboratory (1+3) n
 Laboratory work includes identification, characterization and systematic description of major ore types. Laboratory fee: \$10.00. (Prerequisites: Geos. 214)
- GEOS 451 2 Credits Summer**
Practical Field Geophysics n
 Designed to be a "hands-on" practical geophysics course involving both data acquisition and reduction. Techniques used will include gravimetric, radiometric, resistivity, magnetic, electro-magnetic and seismic. Taught concurrently with the last two weeks of Geos. 351, Field Geology. Entrance by preregistration only; apply through the department. Class usually is filled to capacity by February of current year. (Prerequisite: Math. 201, Phys. 212, and introductory exploration geophysics, and permission of instructor.)
- GEOS 462 4 Credits Alternate Fall**
Glacial and Periglacial Geology (3+3) n
 An introduction to glaciers and their geological processes. The course emphasizes recognition and understanding of glacial landforms, sediments, and stratigraphic relations, and their implications for paleoclimatology, and paleogeography. Non-glacial techniques and methods for interpreting Quaternary sediments are also emphasized. Laboratory fee: \$10.00. (Prerequisite: Geos. 304. Next offered: 1989-90.)
- GEOS 465 3 Credits Alternate Spring**
Geoarcheology (3+0)
 (Same as Anth. 465)
 The geological context of archeological sites and the geologic factors that affect their preservation, with emphasis on Alaska. Includes a one or two-day field trip planned for a weekend in late April or early May. (Prerequisites: Geos. 101, an introductory course in archeology, or permission of instructor. Next offered: 1989-90.)
- GEOS 470 4 Credits Alternate Fall**
Petroleum Geology (3+3)
 The study of the basic elements required for hydrocarbon accumulation: source, maturation, migration, reservoir, seal, and trap. These elements, and exploration and production practices will be illustrated using examples of oil and gas fields throughout the world. The lab will provide practical experience with the tools and techniques of surface and subsurface exploration. (Prerequisites: Geos. 314, Geos. 321, Geos. 322. Next offered: 1989-90.)
- GEOS 482 1 Credit Fall and Spring**
Geology Seminar (1+0)
 A weekly seminar series designed to explore a geologic theme of current interest for a complete semester. (Prerequisite: Senior or graduate standing or permission of instructor.)
- GEOS 601 1 Credit Spring**
Scanning Electron Microscopy (1/2+1)
 The theory and use of the scanning electron microscope. Each student will prepare his/her own samples and will view them in the scanning electron microscope. The X-ray energy dispersive microanalyzer and other special techniques will be introduced. A written project report will be required. (Prerequisites: Graduate Standing and permission of instructor.)
- GEOS 603 1-2 Credits As Demand Warrants**
Advanced Field Mapping (0+3)-(1+3)
 Practical experience in advanced field mapping techniques with accompanying instruction in the regional and local geology of the study area. (Prerequisite: Geos. 351.)
- GEOS 605 3 Credits Spring**
Geochronology (3+0)
 The application of the most commonly used radiometric dating methods to geologic problems. Fundamentals of the K-Ar, Rb-Sr, fission-track, U-Th-C-Pb and C methods. Laboratory training in K-Ar and fission-track dating techniques. (Prerequisites: Graduate standing or permission of the instructor.)
- GEOS 606 2 Credits Spring**
Volcanology (2+0)
 Physical processes of volcanism. Specific topics to be discussed include global tectonic setting, physical properties of magmas, eruption mechanisms, volcanic hazards, volcano geophysics. Special emphasis will be on explosive volcanism and its products, the pyroclastic rocks. Geochemistry and petrology will not be emphasized in this course. (Prerequisite: permission of instructor.)
- GEOS 607 2 Credits Spring**
Advanced Paleomagnetism (1+3)
 An advanced course in the theory and practice of paleomagnetism including the basic magnetic properties of rocks, paleomagnetic techniques, and interpretation of paleomagnetic data. (Prerequisites: Senior or graduate standing.)
- GEOS 608 2-4 Credits As Demand Warrants**
Advanced Exploration Geophysics (2-4+0)
 An advanced course covering aspects of the seismic, gravimetric, magnetometric and magneto-electric techniques in geophysical exploration. (Prerequisite: Senior or graduate standing in geophysics or permission of instructor.)
- GEOS 609 2-4 Credits Fall-Spring**
Advanced Geomorphology (2-4+0-3)
 An advanced course providing a detailed treatment of geomorphology. Specific topics to be covered in different semesters include A. quantitative geomorphology, B. landscape evolution, C. periglacial geology, and D. geomorphology of Alaska. Each time the course is offered only one topic will be considered. (Prerequisites: Geos. 304 or permission of instructor.)
- GEOS 610 3 Credits Alternate Spring**
Advanced Seismology (3+0)
 Characteristics of seismic sources; general properties of seismic wave forms; near field and far field of seismic radiation; characteristics of seismic wave propagation media; free oscillations of the earth. (Prerequisites: Math. 421, Phys. 312, elementary course in basic seismology or permission of instructor. Next offered: 1989-90.)
- GEOS 611 3 Credits Alternate Fall**
Tectonics and Sedimentation (3+0)
 A survey of sedimentary basins in various plate-tectonic settings. Emphasis on the evolution of sedimentary basins, tectonic setting as reflected in sandstone composition, and techniques of basin analysis. (Prerequisites: Geos. 402 or permission of instructor. Next offered: 1989-90.)
- GEOS 612 3 Credits Fall**
Geologic Evolution of Alaska (3+0)
 An overview of the geologic provinces of Alaska and neighboring continental and oceanic regions. Emphasis will be on the geologic history and tectonic evolution of Alaska. (Prerequisites: Geos. 214, 314, 321, and 322, or equivalents.)
- GEOS 613 3 Credits As Demand Warrants**
Advanced Marine Geology (3+0)
 A global study of the geology and structure of the ocean floors and continental margins. Geophysical signatures, including heat flow, seismicity, gravity, magnetics, and seismic structures of the major tectonic elements which make up oceanic crustal plates. (Prerequisite: Graduate standing or permission of instructor.)
- GEOS 615 3 Credits Alternate Spring**
Sea Ice (3+0)
 A study of sea ice in the natural environment including sea ice properties and processes on the microscale and the macroscale, freezing processes and sea ice growth, ice decay, and ice dynamics. (Prerequisite: Permission of the instructor. Next offered: 1989-90.)
- GEOS 616 3 Credits Alternate Spring**
Permafrost (3+0)
 The study of the occurrence, thickness, environmental problems, and mass and energy transport of permafrost, including soil and ice interaction, freezing and thawing processes, and mechanical and electrical properties and processes. (Prerequisite: Permission of the instructor. Next offered: 1989-90.)
- GEOS 617 3 Credits Alternate Fall**
Glaciers (3+0)
 The mechanisms responsible for the existence, motion and variations of present day glaciers and ice sheets, the paleoclimate information which they contain, and their role in engineering hydrology. (Prerequisite: Permission of instructor. Next offered: 1989-90.)
- GEOS 618 2 Credits Spring**
Topics in Alaskan Geology (2+0)
 Advanced study addressing specific regions or topical problems in Alaskan geology. Subject matter will vary from semester to semester. Seminar format. (Prerequisite: Permission of instructor.)

- GEOS 621 3-4 Credits Fall-Spring**
Advanced Petrology (2-3+3-6)
 An advanced course providing a detailed treatment of various aspects of petrology. Specific topics to be considered in different semesters include: A. metamorphic petrology, B. igneous petrology, and C. igneous and metamorphic petrography. Each time the course is offered, only one topic will be presented. Laboratory fee: \$15.00. (Prerequisites: Geos. 214, 316.)
- GEOS 622 4 Credits Fall**
Advanced Clastic Petrology (3+3)
 The study of clastic sedimentary rocks, focusing on the methodology, utility and limitations of petrographic modal analysis. (Prerequisites: Geos. 321 and Geos. 316 or instructor's permission.)
- GEOS 624 1-4 Credits Fall-Spring**
Advanced Structural Geology and Geotectonics (1-4+0)
 An advanced course giving a detailed treatment of structural geology. Topics offered in different semesters are: (A) structural geology of metamorphic rocks; (B) advanced structural geology; (C) geotectonics. Laboratory fee: \$10.00. (Prerequisite: Geos. 314 or permission of instructor.)
- GEOS 625 3 Credits Alternate Fall**
Mountain Belts of the World (3+0)
 Characteristics and evolution of mountain belts throughout the world. Geologic processes important in the evolution and architecture of mountain belts will be examined first, including plate tectonics, deformation, magmatism, metamorphism, and sedimentation. Then well-documented examples of mountain belts will be studied to illustrate the similarities and variations in the world's mountain belts. (Prerequisites: Geos. 314, Geos. 624C or equivalents. Instructor permission required. Next offered: 1988-89)
- GEOS 631 3 Credits Alternate Spring**
Advanced Geochemistry (1-3+0)
 An advanced course providing an in-depth treatment of physical geochemistry. Specific topics to be presented in different semesters include: A. geochemistry of hydrothermal fluids, B. thermodynamics, and C. phase equilibria. Each time the course is offered only one such topic will be presented. (Prerequisites: Geos. 417, or Chem. 331, or MSL. 660, or permission of instructor. Next offered: 1989-90.)
- GEOS 632 4 Credits Spring**
Advanced Study of Mineral Deposits (3+3)
 A study of regional metallogeny and metallotectonics, ore genesis, geochemical exploration, and application of isotopes and trace elements. Laboratory exercises consist of integrated studies of drill core and hand specimens with reflected light and transmitted light petrography and x-ray diffraction analysis. Field mapping exercises will be held in late spring. Laboratory fee: \$10.00 (Prerequisites: Geos. 316, 407, and 417.)
- GEOS 635 1-4 Credits Fall-Spring**
Advanced Economic Geology (1-4+0-3)
 An advanced course providing an in-depth treatment of various aspects of economic geology. Specific topics will be considered in different semesters or sequentially within one semester. They include: A. ore microscopy, B. industrial minerals, C. economics of minerals, D. geochemistry of ore deposits, E. modern fossil fuel exploration, and F. detailed study of particular ore deposit type. Only one topic will be presented at a time. (Prerequisite: Permission of instructor.)
- GEOS 640 4 Credits Alternate Spring**
Petrology of Carbonate Rocks (3+3)
 Origin, depositional environments, diagenesis and classification of limestones, dolostones and related rocks. (Prerequisites: Geos. 321 and 322. Next offered: 1989-90.)
- GEOS 641 1-3 Credits As Demand Warrants**
Advanced Paleontology (1-3+0)
 An advanced course providing a detailed treatment of various topics in paleontology. Specific topics to be presented in different semesters include: A. vertebrate paleontology, B. invertebrate paleontology, C. micropaleontology, and D. paleobotany. Each time the course is offered only one such topic will be presented. (Prerequisite: Geos. 401 or permission of instructor.)
- GEOS 642 3 Credits Spring**
Advanced Sedimentary Petrology (2+3)
 Description and interpretation of sediments and sedimentary rocks with emphasis on the major types and current ideas regarding their processes of formation. Laboratories are designed to provide familiarity with a broad spectrum of sedimentary rock features as seen in hand specimens and thin sections. (Prerequisites: Previous coursework in sedimentation and sedimentary petrology; graduate standing or permission of the instructor.)
- GEOS 643 3 Credits Alternate Fall**
Sandstone Depositional Environments (3+0)
 An advanced course stratigraphy treating the hydrodynamics, sediment dispersal patterns, and preservation potential of modern terrigenous clastic depositional environments and criteria for recognizing their ancient counterparts in the geologic record. (Prerequisites: Geos. 321, Geos. 322. Next offered: 1989-90.)
- GEOS 644 3 Credits Spring**
Advanced Stratigraphy (3+0)
 An advanced course covering concepts of stratigraphic classification and stratigraphic units, physical stratigraphy, biostratigraphy, and chronostratigraphy. Emphasis on theory and on discerning geologic time from stratified rocks. (Prerequisites: Undergraduate stratigraphy and graduate standing or permission of instructor.)
- GEOS 645 3 Credits Alternate Fall**
Advanced Carbonate Sedimentology (3+0 or 2+3)
 An advanced course providing detailed treatment of various topics in carbonate sedimentology. Specific topics to be considered in different semesters include: A. carbonate petroleum reservoirs, B. evolution of carbonate platforms, C. deep-water carbonates, and D. dolomitization and diagenesis. (Prerequisite: Course in carbonate sedimentology or permission of instructor. Next offered: 1989-90.)
- GEOS 646 3 Credits Alternate Spring**
Seismic Stratigraphy (2+3)
 A practical course treating the stratigraphic analysis of reflection seismic data as applied to regional basin analysis and petroleum exploration. Lectures describe the geologic basis for interpreting reflection profiles, the nature of acoustic velocity impedance contrasts along geologic horizons, the record and effect of sea-level variation and the global correlation of seismic sequences. Laboratory exercises are designed to provide "hands on" experience in reconstructing basin architecture using seismic sections from Alaska's North Slope and other basins from around the world. (Prerequisites: Geos. 411 or permission of instructor. Geos. 643 recommended. Next offered: 1989-90.)
- GEOS 647 3 Credits Alternate Fall**
Advanced Sedimentology (3+0)
 An advanced treatment of basic principles of sediment transport, deposition, bedform evolution, and the development and preservation of primary sedimentary structures. Emphasis on character, physical basis, and recognition of sedimentary structures and textures. (Prerequisites: Graduate standing and permission of instructor. Laboratory fee: \$10.00. Next offered: 1989-90.)
- GEOS 648 3 Credits Alternate Fall**
Sedimentary Basin Analysis (3+0 or 2+3)
 Application of stratigraphic, sedimentologic, geophysical, and tectonic principles to the analysis of sedimentary basins and their evolution. The course begins with a review of pertinent methods of analysis and then focuses on their application to specific sedimentary basins. (Prerequisites: Geos. 321, Geos. 322, or equivalent. Next offered: 1989-90.)
- GEOS 649 3 Credits Alternate Spring**
Geomorphology of the Unglaciated Arctic and Subarctic (3+0)
 A study of the processes that shape northern landscapes and of the distinctive morphology that they produce. Application to environmental planning, soils engineering, ecology and paleo-ecology, Quaternary history, and economic geology. (Prerequisites: Geos. 101 and 304 desirable, but not required. Next offered: 1989-90.)
- GEOS 650 3 Credits Alternate Fall**
Paleoecology of Beringia (3+0)
 Reconstruction of the landscape, climate, biota, and ecology of Beringia between 40,000 and 8,000 years ago through literature surveys. (Prerequisite: Permission of instructor. Next offered: 1989-90)
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- ## German
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- (For UAF program in Germany, see International Programs.)
- GER 075 3 Credits As Demand Warrants**
GER 076 3 Credits As Demand Warrants
Conversational German I and II (3+0)
 An introductory course for students who wish to acquire the ability to speak German. Students first learn to understand simple spoken language, then to speak simple German developing a beginning level of communicative competence in the language. (Prerequisite: Ger 075 for 076.)

- GER 101** 5 Credits Fall
GER 102 5 Credits Spring
Elementary German I and II (5+0) h
 Introduction to the language and culture; development of competence and performance in the language through understanding, recognition, and use of linguistic structures; increasing emphasis on listening comprehension and speaking; basic vocabulary of approximately 1,000 words, exploration of the cultural dimension, implicitly through language, and explicitly through texts and audio-visual materials; use of Foreign Language Learning Center.
- GER 201** 3 Credits Fall
GER 202 3 Credits Spring
Intermediate German I and II (3+0) h
 Continuation of German 102. Increasing emphasis on reading ability and cultural material. Conducted in German. (Prerequisite: Ger. 102 or equivalent.)
- GER 288** 2 Credits Spring
Individual Study: Reading German h
 Emphasis on rapid expansion of passive vocabulary and immediate recognition of frequent idiomatic expressions and grammatical structures, development of true reading skill, modern literary and/or non-literary texts. (Prerequisites: Ger. 201, equivalent training or permission of instructor. Recommended to be taken concurrently with Ger. 202.)
- GER 301** 3 Credits Alternate Fall
GER 303 3 Credits Alternate Fall
Advanced German (3+0) h
 Discussions and essays on more difficult subjects or texts. Translations, stylistic exercises, and special grammatical problems. Conducted in German. (Prerequisite: Ger. 202 or equivalent. Ger. 301 next offered: 1989-90; Ger. 303: 1988-89.)
- GER 387** 2 Credits Fall
Individual Study: Semantics h
 Systematic expansion of passive and active vocabulary through analysis of word fields, series of synonyms and antonyms, principles of word formation, derivation, composition, etc. Conducted in German. (Prerequisites: Ger. 202 or permission of instructor.)
- GER 432** 3 Credits Alternate Spring
Studies in German Literature and Culture (3+0) h
 Intensive study of authors, literary movements, periods, and/or genres. Analysis of cultural material other than texts. Conducted in German. Student may repeat course for credit when topics vary. (Prerequisites: Ger. 301 or 303 or equivalent and at least sophomore standing, or permission of instructor. Next offered: 1989-90.)
- GER 487** 2 Credits Alternate Fall
Individual Study: Translation of German Texts h
 Expansion of vocabulary and grammatical knowledge, emphasis on understanding precise shades of meaning, stylistics, artistic expression and cultural values in language; and literary and non-literary texts. Student may repeat course for credit if material varies. Conducted in German. (Prerequisites: Ger. 301 or 303 or equivalent and at least sophomore standing, or permission of instructor. Next offered: 1989-90.)
- GER 488** 3 Credits As Demand Warrants
Individual Study: Senior Project h
 Designed to permit the student to demonstrate ability to work with the language and the culture through the analysis and presentation, in the language, of a problem chosen by the student in consultation with the department. The student must apply for senior project and submit a project outline by the end of the 6th week of the semester preceding the semester of graduation. Offered normally in the semester preceding the student's graduation. Conducted in German. (Prerequisites: At least 10 credits in upper division German or permission of instructor.)

Health

- HLTH 120** 1 Credit As Demand Warrants
Industrial First Aid (1+0)
 This course includes CPR training, control of bleeding and shock, recognizing heart problems, stroke, poisoning, sugar diabetes, epileptic seizures, and dealing with major trauma injuries such as fractures, head, neck and back injuries. Also covered are hypothermia, frostbite, and cold water near-drowning. Students need to purchase text (\$5.00) at first class meeting. Upon satisfactory completion of course, students will receive a Mines Safety Health Administration Certificate, a State Industrial First Aid Card, and the American Heart Association CPR card.

- HLTH 281** 1 Credit As Demand Warrants
Pharmacology Update (1+0)
 Update on pharmacology including review of old drugs and information on new drugs. Review of Pharmaceutical calculations and pharmacodynamics. (Prerequisite: Practicing or licensed nurse.)

History

- HIST 101** 3 Credits Fall
Western Civilization (3+0) s
 The origins and major political, economic, social, and intellectual developments of western civilization to 1500.
- HIST 102** 3 Credits Spring
Western Civilization (3+0) s
 Major political, economic, social, and intellectual developments of western civilization since 1500.
- HIST 103** 3 Credits As Demand Warrants
History of the Yukon-Kuskokwim Delta (3+0)
 This course covers the history of the Yukon-Kuskokwim Delta beginning with oral traditions about the creation of the area, and ending with the passage of the Alaska Native Land Claims Act in 1971. The course concentrates on Yup'ik social, economic, and educational changes that have occurred, including both native and non-native accounts of these changes.
- HIST 105** 1 Credit As Demand Warrants
Introduction to the History and Culture of the Seward Peninsula (1+0)
(Same as Anth 205)
 This course introduces the student to the cultural history of the people who have lived on or near the Seward Peninsula for the last 10,000 years. Information is presented from the disciplines of physical anthropology, ethnography, ethnohistory, linguistics, archaeology, social anthropology, ecology, and climatology. Through lectures, discussions, readings films, guest speakers, and examination of Eskimo artifacts, students gain a basic familiarity with the several Eskimo and Euro-American cultures which have existed in western Alaska.
- HIST 110** 3 Credits Fall and Spring
History of Alaska Natives (3+0) s
 The history of Alaska Natives from contact to the signing of the Claims Settlement Act.
- HIST 115** 3 Credits Spring
Alaska, Land and Its People (3+0) s
 A survey of Alaska from earliest days to present, its peoples, problems, and prospects.
- HIST 121** 3 Credits Alternate Fall
East Asian Civilization (3+0) s
 Origin and development of the civilizations of China, Japan and Korea from the beginning to 1800, with emphasis on traditional social, political, and cultural institutions. (Next offered: 1989-90.)
- HIST 122** 3 Credits Alternate Spring
East Asian Civilization (3+0) s
 East Asia from 1800 to the present with emphasis on patterns of social cohesion, transition, and revolutionary change. (Next offered: 1989-90.)
- HIST 123** 3 Credits As Demand Warrants
Japan: The Changing Tradition (3+0)
 Focuses on the history and changing cultural traditions of Japan's modern era, the brief period during which Japan has developed its own distinctive form of an urbanized, industrialized, and democratic society.
- HIST 131** 3 Credits Fall
HIST 132 3 Credits Spring
History of the U.S. (3+0) s
 Fall semester: The discovery of America to 1865: colonial period, revolution, formation of the constitution, western expansion, Civil War. Spring semester: from the reconstruction to the present.
- HIST 200** 3 Credits As Demand Warrants
Heritage of Alaska Natives (3+0)
 Students will acquire a basic understanding of Alaska Native cultures through readings and lectures and research. The class will explore kinship systems, world views, social organizations, etc., throughout the course. The course will cover pre-contact days to the present including a surface look at the results of the Native Land Claims Act.

- HIST 201 3 Credits As Demand Warrants**
History of the Bering Straits (3+0) s
 This course covers the multi-faceted history of this region, including prehistory, exploration and permanent settlement, in addition to material culture, religion, education and other topics. This class will focus on the means by which factors in each of these areas have influenced the development of the region as it exists today. Analysis of the perceptions of others as they appear in writings about the region are an integral part of the class.
- HIST 221 3 Credits Alternate Fall**
HIST 222 3 Credits Alternate Spring
English History (3+0) s
 Fall semester: pre-Roman Britain to the end of the Puritan Revolution, emphasizing constitutional developments. Spring semester: from the restoration of 1660 to the present, emphasizing social and economic developments. (Next offered: 1988-89)
- HIST 244 3 Credits As Demand Warrants**
Movies: Mirror of the World (3+0)
 An introduction to world history using the medium of film to highlight cultural, economic and political conditions of each country. Films will be from the USA, Mexico, Central America, South America, England, France, Russia, Turkey, India, China, Japan, Australia, Africa, and the Arctic.
- HIST 250 3 Credits As Demand Warrants**
Alaska History for Local Historians (3+0)
 This is a course in Alaskan history with a strong local focus. Students will begin by studying the history of their region and then concentrate on their community. assignments are designed to introduce the local historian to a variety of resources and research methods including exploration accounts, oral history, education reports, census studies, newspapers, etc. A final project of original research is required. This local history course is currently available with emphasis on the Bering Straits, Bristol Bay, and Aleutian/Pribilof regions.
- HIST 257 3 Credits As Demand Warrants**
Gold Rush Era: Myth and Reality (3+0)
 A general investigation into Gold Rush Era of 1880-1905 in Alaska and the Yukon. The major emphasis will be on the Klondike, but Juneau, Nome and Fairbanks will also be investigated. Both fact and fiction will be utilized to understand the myth and reality of the era.
- HIST 305 3 Credits Alternate Fall**
Europe: 1789-1850 (3+0) s
 The French Revolution, Napoleon, the Industrial Revolution, the Revolutions of 1848, their impact on political, economic, social and intellectual history. (Prerequisite: Hist. 102 or permission of instructor. Next offered: 1989-90.)
- HIST 306 3 Credits Alternate Spring**
Europe: 1850-1900 (3+0) s
 The European Imperium—industrialization, nationalism, imperialism and their impact on political, economic, social and intellectual history. (Prerequisite: Hist. 102 or permission of instructor. Next offered: 1989-90.)
- HIST 315 3 Credits Alternate Fall**
Europe: 1900-1945 (3+0) s
 Europe through two world wars, the Russian Revolutions, the depression, the development of fascism, the evolution of Russian Communism. (Prerequisites: Hist. 101, 102 or permission of instructor. Next offered: 1989-90.)
- HIST 316 3 Credits Alternate Spring**
Europe since 1945 (3+0) s
 Germany and problems of the Peace, the Soviet Union and the Satellites, the Cold War, Economic Problems and Recovery, European Integration and the Common Market, Europe and the World. (Prerequisites: History 101, 102 or permission of instructor. Next offered: 1989-90.)
- HIST 320 3 Credits Every Third Spring**
Modern Scandinavia (3+0) s
 Scandinavia (Denmark, Finland, Iceland, Norway, and Sweden) from the 19th Century to the present: the development of Scandinavian parliamentary democracy and welfare systems, Scandinavian cooperation and neutrality, and Scandinavia's experience in the world wars. (Prerequisites: Hist. 101 or 102, or permission of the instructor. Next offered: 1989-90.)
- HIST 330 3 Credits Alternate Fall**
Modern China (3+0) s
 From 1800 to the present: resistance to change, rebellion, reform, revolution, and the rise of the People's Republic. (Prerequisite: Hist. 121 or 122, or permission of instructor. Next offered: 1989-90.)
- HIST 331 3 Credits Alternate Spring**
Modern Japan (3+0) s
 From 1600 to the present: change within tradition, rise to world power, and the position of Japan in the modern world. (Prerequisite: Hist. 121 or 122, or permission of instructor. Next offered: 1989-90.)
- HIST 341 3 Credits Fall**
History of Alaska (3+0) s
 Alaska from prehistoric times to the present. Research methodology and use of archival resources relating to Alaska's past. (Prerequisite: Junior standing.)
- HIST 344 3 Credits Every Third Spring**
Modern Russia (3+0) s
 Origin and development of modern Russia from the nineteenth century to the present: the development of the Soviet Union and Soviet government, stages of economic development, and Soviet foreign policy. (Prerequisites: Hist. 101, 102, or permission of the instructor. Next offered: 1989-90.)
- HIST 350 3 Credits Alternate Spring**
History of the People's Republic of China (3+0) s
 Political, economic, and social developments, from 1949 to the present. (Prerequisite: Hist. 121 or 122, or permission of instructor. Next offered: 1989-90.)
- HIST 354 3 Credits Alternate Fall**
Canadian History to 1867 (3+0) s
 The political, social, and economic development of Canada from the founding of New France to Confederation. (Next offered: 1989-90.)
- HIST 355 3 Credits Alternate Spring**
Canadian History: 1867 to Present (3+0)
 The political, social, and economic development of Canada from Confederation to the present. (Next offered: 1989-90.)
- HIST 375 3 Credits Alternate Fall**
History of the Northern Pacific (3+0) s
 The historical development and interrelationships and problems of the North Pacific (Siberia, Canada, Alaska) from the 18th century to the present. (Prerequisite: Junior standing or permission of instructor. Next offered: 1989-90.)
- HIST 380 3 Credits Alternate Spring**
Polar Exploration and its Literature (3+0) s
 A survey of polar exploration efforts of all Western nations from A.D. 870 to the present and a consideration of the historical sources of this effort. (Prerequisite: Junior standing or permission of instructor. Next offered: 1989-90.)
- HIST 401 3 Credits Every Third Fall**
Renaissance and Reformation Europe (3+0) s
 Political, economic, and intellectual developments during the 15th and 16th centuries in Europe. (Prerequisites: Hist. 101 or 102 and junior standing, or permission of instructor. Next offered: 1989-90.)
- HIST 402 3 Credits Every Third Fall**
Seventeenth and Eighteenth Century Europe (3+0) s
 Political, social, economic, and cultural developments during the 17th and 18th centuries in Europe. (Prerequisites: Hist. 101 or 102 and junior standing, or permission of instructor. Next offered: 1989-90.)
- HIST 405 3 Credits Alternate Fall**
Modern Germany (3+0) s
 1848 to present: Unification, the Second Empire, WWI, the Weimar Republic, National Socialism, WWII, the Holocaust, and the creation of two post-war German states with different societies. Emphasis on political, social and economic developments. (Prerequisite: Hist 101 or 102. Next offered: 1989-90)
- HIST 420 3 Credits Every Third Spring**
Approaches to Women's History (3+0) s
 A theoretical and topical approach to the study of the history of women: the role of women in politics, the economy, the family, wartime, the influence of industrialization, and changing social structures on women. (Prerequisites: Hist. 102, 132, or permission of the instructor. Next offered: 1990-91.)
- HIST 430 3 Credits Alternate Fall**
American Colonial History (3+0) s
 Early America European settlement: economic and social development of the American community establishment of political independence. (Prerequisites: Hist. 131, 132 or permission of instructor. Next offered: 1989-90.)
- HIST 435 3 Credits Alternate Spring**
Civil War and Reconstruction (3+0) s
 Political, economic, social and diplomatic history of 1860-77, disruption and re-establishment of the Union. (Prerequisites: Hist. 131, 132 or permission of instructor. Next offered: 1989-90.)

- HIST 440 3 Credits** **Alternate Fall**
U.S. Westward Expansion 1763-1867 (3+0) s
 Westward expansion and acquisition of territory, admission of new states, development of land policy, treatment of native people. (Prerequisites: Hist. 131 or permission of instructor. Next offered: 1989-90.)
- HIST 441 3 Credits** **Alternate Spring**
The Development of the American and Canadian West 1867-Present (3+0) s
 Building of transcontinental railroads and plains settlement in U.S. and Canada and Klondike gold rush. Theories of frontier development, statehood movements and views of the West as a 'colonial' region in the 20th century. (Prerequisite: Hist. 132 or Hist. 440 or permission of instructor.)
- HIST 450 3 Credits** **Alternate Spring**
Twentieth Century America (3+0) s
 United States from the progressive movement to the present day, with emphasis on domestic developments. (Prerequisites: Hist. 131, 132 or permission of instructor. Next offered: 1989-90.)
- HIST 455 3 Credits** **Alternate Fall**
Military History (3+0) s
 Warfare from classical times to the present: the interrelationships of warfare and society, the role of technology and the development of tactics and strategy. (Prerequisites: Junior standing or permission of instructor. Next offered: 1989-90.)
- HIST 475 3 Credits** **Fall**
HIST 476 3 Credits **Spring**
Historiography and Historical Method (3+0) s
 A two-semester sequence given as a tutorial for each student. The first semester is devoted to a comparison of the historical treatment of a particular subject by different historians. Three short papers are required. In the second semester the student writes a lengthy research paper on a topic of his or her own choosing. (Those students needing only 3 credits of Hist. 475-476 will do the work outlined for the first semester. This can be done either the fall or the spring term.) (Prerequisite: Senior standing or permission of instructor.)
- HIST 484 Credits Arr.** **Alternate Spring**
Seminar in Northern Studies s
 An interdisciplinary seminar focusing on topics relating to the North with emphasis on the physical sciences, the peoples, and the socio-economic and political aspects of the area. Specialists in the various fields will assign readings and conduct discussions. (Prerequisite: At least junior standing or permission of instructor. Next offered: 1989-90.)
- HIST 490 3 Credits** **Alternate Spring**
Researching and Writing Academic and Public Northern History (3+0) s
 The practical aspects of publication and problem solving in public history. Research will familiarize students with source materials in both the Archives and governmental agencies. (Prerequisite: Hist. 475. Next offered 1989-90)

Human Services

- HMSV 201 3 Credits** **Fall**
Introduction to Human Services (3+0)
 The purpose of this course is to acquaint students with the various social programs and human services which constitute society's organized response to social problems. Federal programs authorized by the Social Security Act and other legislation are presented, and various community services are described, including those directed at child welfare, alcohol and drug abuse, mental health, juvenile delinquency, and discrimination. Local human service agencies are discussed, as well as regional offices located in the rural areas. (Prerequisites: Soc. 101 or Psy. 101.)
- HMSV 205 3 Credits** **Fall**
Factors in Health and Disease (3+0)
 Introduction to the phenomenon of human disease. Cases will be presented to demonstrate the way the normal healthy state may be disrupted by external or internal influences. The natural histories of major types of disease will be reviewed.
- HMSV 210 3 Credits** **Alternate Spring**
Crisis Intervention (3+0)
 An examination of theoretical foundations and appropriate techniques and strategies to deal with individuals, families, and groups during stressful situations. Application of the crisis approach is made in several categories of stress-induced situations, such as natural disasters, developmental life crises, rapid social change, and situational crises such as illness and personal loss. (Prerequisites: Psy. 101, Soc. 101. Next offered: 1989-90.)

- HMSV 225 2 Credits** **As Demand Warrants**
Case Management (2+0)
(Same as Swk. 225)
 Introduction to basic knowledge and skills needed to develop service plans in human service work and to maintain appropriate case records. Legal and ethical issues in case management are considered and discussed.

- HMSV 230 3 Credits** **Fall**
Alcoholism: Causes and Consequences
 An examination of the theories concerning the causes of alcoholism to include physical and psychological factors, such as personality disorders or disease states. Data supporting these theories will be evaluated. (Prerequisites: Psy. 101, or Soc. 101 or permission of instructor.)

- HMSV 255 3 Credits** **Fall**
Foundations of Counseling I (3+0)
(Same as Psy. 255)
 This course is a survey of counseling philosophy and the various types of counseling systems that are used in most settings. An examination of the appropriate approach and system match will be undertaken so that the student will be able to make intelligent decisions concerning which approach to use. Some of the approaches examined will be psychoanalysis, behavior therapy, and humanistic approaches. Offshoots of these approaches will also be surveyed if they are in fairly wide use. Counseling ethics will be studied and ethical problems illustrated and discussed. (Prerequisites: Psy./Soc. 340.)

- HMSV 284 Variable Credits** **As Demand Warrants**
Human Services Seminar
 Identification and discussion of issues relevant to the human services field. Specific topics to be announced. (Prerequisite: permission of instructor.)

- HMSV 330 3 Credits** **Spring**
Alcoholism: Treatment and Prevention
 A survey and evaluation of treatment and prevention attempts in dealing with alcoholism and alcohol abuse with emphasis placed on prevention strategies. (Prerequisites: HMSV 230.)

- HMSV 351 3 Credits** **Spring**
Foundations of Counseling II (3+0)
(Same as Psy. 356)
 This course is a continuation of HMSV 350 — Foundations of Counseling I. Specific counseling strategies will be studied in-depth such as crisis intervention, individual techniques such as the rational therapies and specific behavioral approaches. The role of the counselor in community education and consultation will be explored as will methods of promoting community change. Issues in cross-cultural counseling will be studied to include those likely to be encountered in Alaska. (Prerequisite: HMSV 255 or Psy. 355.)

- HMSV 410 3 Credits** **Fall**
Management of Human Services Programs (3+0)
 Human service personnel at the baccalaureate level are often required to supervise associates or aides with less training. In rural areas such personnel may also assume responsibilities for program development and management. This course is designed to prepare students for supervisory and managerial tasks at a beginning level. It is anticipated that additional in-service training would be made available to provide techniques that are agency-specific. (Prerequisites: HMSV 255.)

- HMSV 415 3 Credits** **Spring**
Group Processes (3+0)
 An examination of various group types to include problem solving/task-oriented groups; encounter groups; therapy groups; career guidance groups; and assertive training groups. Different theoretical orientations to groups counseling will also be discussed. (Prerequisites: HMSV 255 and HMSV 351.)

- HMSV 445 3 Credits** **Fall**
Community Psychology (3+0)
(Same as PSY 445)
 An examination of community psychology foundations to include community assessment consultation as edited in psychology. Topics covered during the community assessment include identification of areas for study, surveys, evaluation of services, and use of results for programming. During the community consultation portion, education, prevention, and service issues are covered. Particular attention will be given to rural and small community assessment and change especially as it applies to Alaska. (Prerequisites: Psy. 101, Soc. 101 and HMSV 201.)

HMSV 488 3-6 Credits **Fall and Spring**
Practicum in Human Services
 This course teaches the student skills with which to work in a human service agency either concurrently with an agency placement or prior to placement. Skills covered include interviewing, assessment, facilitating, intervening, and in general, case management. Students will be meeting with an instructor from the Department weekly to learn counseling skills through use of instruction, role-playing, video tapes, and various types of feedback. In addition, an instructor will be appointed by the university from the agency for practicum supervision of the student. (Prerequisites: HMSV 255. Student must be a major in the program.)

Humanities

HUM 101 3 Credits **As Demand Warrants**
The Humanities: A Cultural Perspective (3+0)
 This course examines the humanities using both Western Civilization and the Yup'ik cultures as bases. It introduces fundamental principles as displayed in Yup'ik and Non-Native student with ideas and cultural enriched civilization. It considers stern Culture to help students develop affect them

As Demand Warrants
ature (3+0)
 Provide an introduction to literature, use the student's appreciation of Alaskan and non-Natives. Students will addition, the frontier era, and meet the audioconference.

HUM 161 3 Credits **As Demand Warrants**
In Our Own Image (3+0)
 Focuses on some very basic notions about people-how they see things and what they care about-and some very basic notions about the fine arts-how they are created, how they communicate, and how they can be evaluated.

HUM 201 3 Credits **Fall**
Unity in the Arts (3+0) h
 Concentration on the interdependence of the visual arts, the performing arts, and literature, as set against a specific social, political, and cultural background of selected eras. (Prerequisite: Open to students beyond the freshman level or by permission of the instructor.)

HUM 202 3 Credits **Spring**
Unity in the Sciences (3+0) h
 A detailed treatment of the scientific rudiments, methods, and principles as they emerged from within a larger cultural context. Explanation of the roles of mathematics and logic in the structure of the scientific enterprise. (Prerequisite: Open to students beyond the freshman level or by permission of the instructor.)

HUM 211 3 Credits **As Demand Warrants**
Introduction to Humanities I (3+0)
 Integrated exploration of fundamental principles of literature, music, and visual arts.

HUM 212 3 Credits **As Demand Warrants**
Introduction to Humanities II (3+0)
 Study of specific historical period or periods with reference to philosophy, literature, science, art and music.

HUM 220 3 Credits **As Demand Warrants**
Film: Aesthetics, Criticism, History (3+0)
 This course examines the roles played by the city and the wilderness in contemporary imagination. The movies and books will introduce students to thought on the subject and teach them the skills of movie reviewing.

HUM 241 3 Credits **As Demand Warrants**
HUM 242 3 Credits **As Demand Warrants**
Eskimo and World Literature (3+0)
 These courses examine the literature of the Eskimo peoples as well as that of other Native North Americans, Asians, and Europeans. Universal and timely themes are found and compared which communicate aspects of the human experience which are valid across cultures and across times. Hum. 241 is not prerequisite to 242.

HUM 329 3 Credits **Alternate Fall**
The Modern Media: Search for Communication (3+0) h
 Review of effects and trends in mass media relating society, media, and culture. (Prerequisites: 6 credits in communication, written or oral, or permission of instructor. Next offered: 1989-90.)

HUM 332 3 Credits **Alternate Spring**
Varieties of Visual Expression: Art as Image and Idea (3+0) h
 Discussion of the visual elements of art, principles of visual organization, the process of artistic perception and its evaluation by the viewer. (Prerequisites: 3 credits in the visual arts or permission of instructor. Next offered: 1989-90.)

HUM 342 3 Credits **Alternate Spring**
Synthesis in Musical Expression (3+0) h
 In-depth study of one of the classical composers to show culmination of generic efforts and inter-arts relationships. (Prerequisites: Mus. 123 or 124, or permission of instructor. Next offered: 1989-90.)

HUM 411 3 Credits **Alternate Fall**
Dimensions of Literature (3+0) h
 Systematic discussion of the medium of literary creation, of the organization of literary texts and the functions of literature. (Prerequisites: 6 credits in literature courses, or permission of the instructor. Next offered: 1989-90)

HUM 492 3 Credits **Alternate Spring**
Senior Seminar (3+0) h
 Report by the instructor on the state of the humanities at the University of Alaska and on alternate approaches elsewhere. Oral presentation and defense by the student, of their humanities project paper. (Prerequisites: Open requirements, or by permission of the instructor. Next offered 1989-90.)

Japanese

(For UAF program in Japan, see International Programs.)

JPN 101 5 Credits **Fall**
JPN 102 5 Credits **Spring**
Elementary Japanese I and II (5+0) h
 Introduction to spoken and written Japanese. The student will acquire a vocabulary of approximately 1,000 words and will learn to read and write the two syllabaries, hiragana and katakana, as well as 150 kanji. The cultural dimension will be explored implicitly through language and explicitly through audiovisual materials. Courses are taught in Japanese.

JPN 201 4 Credits **Fall**
JPN 202 4 Credits **Spring**
Intermediate Japanese I and II (4+0) h
 The student will learn to read and write an additional 250 kanji. Conversational ability and listening comprehension will be enhanced through the use of videotape materials. Courses are taught in Japanese. (Prerequisite: Jpn. 102 or equivalent.)

JPN 301 3 Credits **Fall**
JPN 302 3 Credits **Spring**
Advanced Japanese (3+0)
 These courses serve to develop advanced conversational and reading skills. Topics may include; modern Japanese prose fiction; newspaper Japanese; advanced conversation through the study of common contractions and idiomatic usage in the standard Tokyo dialect; and a study of television drama series. May be repeated with different topics. (Prerequisites: Jpn. 202 or equivalent.)

JPN 332 3 Credits **Alternate Spring**
Japanese Cultural Traditions (3+0)
 A study of Japanese cultural traditions as revealed in the literary, visual, and performing arts. Discussion of literature in English translation will be integrated with slide-lectures on Buddhist painting and sculpture, picture scrolls, castle decoration, woodblock prints, the tea ceremony, gardens, and the No, Kabuki, and puppet theatres. Course is taught in English. (Prerequisites: Junior standing or consent of instructor. Next offered: 1989-90.)

JPN 333 3 Credits **Alternate Fall**
Twentieth Century Japanese Prose Fiction (3+0)
 A study of selected novels, short stories, and film scripts in translation representative of styles and themes which characterize twentieth century Japanese literature. Class discussion will invite a close analysis of each work in terms of characterization, themes, structure, style, and as an expression of social problems or intellectual issues in modern Japanese society. Course is taught in English. (Prerequisites: Junior standing or consent of instructor. Next offered: 1989-90.)

Journalism — Broadcasting

J-B 101 3 Credits Fall and Spring

Introduction to Mass Communications (3+0) h
History and principles of mass communications and the role of information media in American society. Introduction to professional aspects of mass communications, including print and broadcast.

J-B 102 3 Credits Fall and Spring

Broadcasting and Society (3+0) h
Principles of broadcasting as they relate to the people of the United States, including history, government involvement, and social effects.

J-B 203 3 Credits Fall and Spring

Basic Photography (2+3)h
Photography fundamentals, including use of an adjustable camera, film and exposure techniques, filters, flash techniques, and an introduction to color. Black and white darkroom procedures including film processing and printing. Design and composition as they apply to photography. Students who enroll must have use of an adjustable camera. Laboratory fee: \$30.00. (Course may not be used to meet major or minor requirements in Journalism - Broadcasting.)

J-B 204 3 Credits Fall and Spring

Basic Photojournalism (2+3)h
Photographic communications including use of an adjustable camera, film developing and printmaking, flash and design elements applied to visual communications. Students will make candid photos of people involved in news events and learn how to document news visually. Course emphasizes preparation of pictures for publication. Students who enroll must have the use of an adjustable camera. Laboratory fee: \$30.00.

J-B 215 3 Credits Fall and Spring

Audio Production (2+3)
Sound production for radio, television, film, and stage amplifications. Emphasis on writing, recording, control room techniques, and editing. Laboratory fee: \$10.00.

J-B 240 3 Credits Spring

International Communications (3+0) h
Historical development of different mass communication systems around the globe. The relationship between press philosophies and their practical implementation. Mass communication systems of selected countries as representative examples of generalized systems.

J-B 301 4 Credits Fall and Spring

Basic Newsgathering and Processing (2+4) h
News reporting, writing, and editing, including news evaluation and news story structure, editing copy, writing headlines and captions, and cropping and sizing of pictures. Laboratory fee: \$10.00. (Prerequisites: Engl. 111 and Engl. 211, 213, or 311, junior standing, or permission of instructor.)

J-B 303 3 Credits Spring

Intermediate Photography (2+3)h
Continuation of J-B 203 and J-B 204 with emphasis on the picture story and freelance photography. Laboratory fee: \$30.00. (Prerequisite: J-B 203, J-B 204 or permission of instructor.)

J-B 311 3 Credits Fall and Spring

Magazine Article Writing (2+1)h
Writing articles for publication. Students repeating the course limited to six credits. (Prerequisites: J-B 301 or permission of instructor.)

J-B 316 3 Credits Fall

Television Productions (2+4)
Television production, floor directing, audio, camera, film chain, staging, lighting, and switching. (Prerequisites: J-B 215 or permission of instructor.)

J-B 317 3 Credits Spring

Broadcast Journalism (3+0)
Preparation of announcements, commercials, interviews, music continuity, special events programs, documentaries, commentaries, news, and other basic broadcast continuity. Administrative aspects included. (Prerequisite: J-B 301, or permission of instructor.)

J-B 320 3 Credits Spring

Journalism in Perspective (3+0) h
Present problems and trends in mass communication with emphasis on historical development, including survey of world press coverage and problems. (Prerequisite: Junior standing.)

J-B 323 3 Credits Fall

Magazine Editing (3+0)
Magazine management and editing: content selection, design, editorial responsibility, and economics of publishing. (Prerequisite: Junior standing.)

J-B 324 3 Credits Spring

Typography and Publication Design (2+2)
Typography, layout, and design, coupled with a study of the methods of printing production. (Prerequisite: Permission of instructor.)

J-B 326 3 Credits Spring

Principles of Advertising (3+0)
(Same as B.A. 326)
Advertising: including strategy, media use, creation and production of advertisements and measurement of advertising effectiveness. (Prerequisite: Junior standing.)

J-B 340 3 Credits Fall

Approaches to the Study of Mass Communication (3+0) s
Development of mass communication theory and research in the U.S. in the twentieth century. Relationship between theoretical assumptions and concerns of investigators, questions posed, methodological frameworks adopted, findings reached, and integration of new knowledge into the existing corpus.

J-B 372 3 Credits Alternate Fall

Methods of Instructional Broadcasting (3+0)
Studio practices and procedures for producing instructional programs. Underlying educational philosophy and actual in-studio practice. (Prerequisite: J-B 215 or permission of instructor. Next offered: 1989-90.)

J-B 400 3 Credits Fall and Spring

Advanced Media Practicum (1+6)
Practical training in print or electronic communication. Participation at an approved publication or broadcast station required. (Prerequisite: Permission of instructor.)

J-B 402 3 Credits Fall

Advanced Photography (2+3)
Special techniques in publications photography. Student concentrates on one or more areas: special lighting, special effects, freelance photography, studio photography, sports, color photography, etc. Laboratory fee: \$30.00. (Prerequisite: J-B 303.)

J-B 407 3 Credits Spring

Programming and Production (3+0)
Programming practices at radio and TV stations, networks, cable companies and relationship of the practices with sales, audience, and government. (Prerequisites: J-B 215 and J-B 316 or permission of instructor.)

J-B 411 3 Credits Fall and Spring

Advanced Writing for Publication (3+0)h
Writing advanced prose for publication in books or magazines. May be repeated for credit with permission of instructor. (Prerequisite: J-B 311, or permission of instructor.)

J-B 413 3 Credits Fall

Mass Media Law and Regulation (3+0)s
Common law, statutory law and administrative law that affects the mass media, including libel, copyright, access to the media, constitutional problems, privacy, shield laws, and broadcast regulations. (Prerequisite: J-B 301, or permission of instructor.)

J-B 415 3 Credits Fall

News/Documentary Television Production (2+2)
Electronic news gathering, electronic field production using remote videotape equipment. Develop skills in scriptwriting, budgets, location sound recording, interview techniques, editing, videography, and other aspects of field production. (Prerequisites: J-B 204 and J-B 215.)

J-B 416 3 Credits Alternate Fall

Advanced Broadcast Production (1+6)
Advanced broadcast production in either TV or radio. Each student produces, directs, and writes productions of a quality to air on either KUAC-TV or KUAC-FM. Students repeating the course limited to a total of six credits. (Prerequisites: J-B 215, 316, or permission of instructor. Next offered: 1989-90.)

J-B 424 3 Credits Spring

Magazine Production (2+3)
Magazine publication experience, including writing, photography, editing, design, layout, advertising, and circulation. Students edit and produce *Alaska Today* magazine, under journalism faculty supervision. (Admission by arrangement; editorial positions open to students who have completed J-B 323.)

J-B 433 3 Credits Fall

Public Relations (3+0) h
Techniques, causes and consequences of influencing public opinion; propaganda, mass communication and public relations as instruments of economic, political, and social change. (Prerequisites: J-B 301, or permission of instructor.)

J-B 444 4 Credits **Fall and Spring**
Advanced Newsgathering and Processing (2+4)h
 Advanced reporting, writing and editing of news with emphasis on public affairs. Develops sophisticated skills in copy editing, headline writing, news judgment and positioning, page layout and use of pictures. Laboratory fee: \$10.00. (Prerequisites: J-B 301, junior standing, or permission of instructor.)

Justice

JUST 110 3 Credits **Fall and Spring**
Introduction to Justice (3+0) s
 Survey of the structure and process of the agencies of criminal justice. Includes introduction to criminology, criminal law, and the juvenile justice system.

JUST 221 3 Credits **Spring**
Justice Organization and Management (3+0)
 Survey of organizational structure and management styles of criminal justice agencies. Includes application and critique of major theoretical models.

JUST 250 3 Credits **Fall**
History of the Law (3+0) s
 (Same as P.S. 250)
 An introduction to the history of the law in Western civilization with an emphasis on the development of Anglo-American law in America.

JUST 251 3 Credits **Spring**
Criminology (3+0) s
 The study of the major areas of deviant behavior and its relationships to society, law, and law enforcement, including the theories of crime causation. (Prerequisites: Soc. 101.)

JUST 258 3 Credits **Alternate Fall**
Juveniles and the Law (3+0) s
 Survey of the structure and process of the juvenile justice system and the major theories of juvenile delinquency. (Next offered: 1989-90.)

JUST 259 3 Credits **Alternate Spring**
Introduction to Public Administration (3+0) s
 (Same as P.S. 212)
 Theories and practices of public administration, especially as applied to federal agencies. Study of organization planning, and decision making in implementing public policy. (Next offered: 1988-89.)

JUST 303 3 Credits **Fall**
Introduction to Legal Processes (3+0)
 (Same as P.S. 303)
 The purpose and functions of law in society, with a focus on legal reasoning and decisionmaking in civil cases. (Prerequisites: P.S. 101, Just. 110.)

JUST 310 3 Credits **Spring**
Principles of Corrections (3+0) s
 An introduction to adult institutions, community-based programs, and theories of incarceration. Correctional programs are examined. (Prerequisite: Just. 251 or permission of instructor.)

JUST 320 Variable Credit **Fall and Spring**
Practicum
 A research oriented course directed at the resolution of a specific problem within an agency of the criminal justice system. (May be repeated to a maximum of 6 credits.)

JUST 330 3 Credits **Spring**
Law and Society (3+0) s
 (Same as P.S. 330)
 Study of moral issues related to the proper reach, extent, and enforcement of the law. (Prerequisites: P.S. 101 or Just. 110.)

JUST 352 3 Credits **Fall**
Criminal Law (3+0)
 A study of elements, purposes, and functions of the substantive criminal law with emphasis upon historical and philosophical concepts. (Prerequisite: Just. 110.)

JUST 354 3 Credits **Spring**
Procedural Law (3+0)
 Emphasis upon the legal limitations of the police and the right of the people to be secure from the government under the protections of the Constitution and the Rules of Evidence. (Prerequisite: Just. 110.)

JUST 404 3 Credits **Spring**
Introduction to Legal Research and Writing (3+0)
 (Same as P.S. 404)
 The methods of legal research and preparation of legal materials, to the resources of law libraries and the techniques of presenting issues in legal form. (Prerequisites: P.S. 101, Just. 110, Just./P.S. 303.)

JUST 451 3 Credits **Fall**
Research Methods (3+0)
 Application of social science research methods to solving scientific and non-scientific questions arising in Justice. Basic methods include experimentation and survey research.

JUST 452 3 Credits **Spring**
Comparative Criminal Justice (3+0) s
 Study of police, courts, and corrections in selected countries throughout the world. Includes Soviet Union, Japan, France and others. (Prerequisites: Just. 110, senior standing or permission of instructor.)

JUST 460 3 Credits **Fall**
Justice Processes (3+0) s
 Major concepts of the structure and process of criminal justice revisited with emphasis on current issues. (Prerequisite: Just. 110, Just. 251, or senior standing.)

JUST 475 3 Credits **Fall and Spring**
Internship
 On site experience in criminal justice agencies. (Prerequisite: Permission of director of intern program.)

JUST 492 Variable Credit **Fall and Spring**
Seminar
 Various topics of current interest and importance to the justice major will be presented. Topics will be announced prior to each offering. (Prerequisites: Just. 110, senior standing or permission of instructor.)

Library Science

LS 101 1 Credit **Fall and Spring**
Library Skills (0+0)
 An independent study course in college library skills and some resources and facilities common to academic libraries in general and to the Rasmuson Library in particular. After one introductory class meeting no further class sessions are held; the student works at his individual rate and on his own time schedule.

LS 307 1 Credit **Spring**
Information Sources for Educators (1+0)
 A self-paced study course providing a survey of major library reference sources and computer databases for education/education related majors. Class meets for an introductory session and a computer literatures search demonstration; otherwise, the student works at his individual rate and on his own time schedule.

LS 309 1 Credit **As Demand Warrants**
Information Resources (1+0)
 Information organization, scholarly communication and research reporting for a specific discipline, including major disciplinary reference sources and bibliographic databases in the disciplines. This course should be taken the semester before or during which the student takes an upper division course requiring a term paper. Course may be repeated when there is a change in discipline. (Prerequisite: Junior standing in specific discipline or permission of the instructor. LS 101 recommended.)

Linguistics

LING 101 3 Credits **Fall**
Nature of Language (3+0) h
 The study of language: systematic analysis of human language and description of its grammatical structure, distribution, and diversity.

LING 210 3 Credits **As Demand Warrants**
Second Language Acquisition (3+0)
 This course presents an intensive introduction to the study of how people acquire second languages, i.e., ones in addition to the ones they learn as young children in the home. We examine psychological, social and cultural aspects of second language acquisition including theory of second language acquisition, applied linguistic and sociolinguistic research, and insights of teachers and students of second languages. We also observe, analyze, and compare the acquisition of languages by people in the students' own communities. Throughout, the emphasis is on how second language acquisition studies can enlighten the practice of second language teaching and promoting bilingualism in western Alaska.

LING 262 3 Credits **As Demand Warrants**
Methods of Teaching English as a Second Language and Standard English as a Second Dialect (3+0)
 (Same as ED 262)

This course is an introduction to second language teaching methods, using English as a Second Language (ESL) and Standard English as a Second Dialect (SESD) for the examples. The class covers basic underlying assumptions about the nature of language, language learning, language teaching, characteristics of good language learners, optimal language learning environments, and what affect they have on how we teach. The different roles of the second language teacher and their appropriateness is covered. Several specific language teaching methods, techniques and activities consistent with these methods, and adaptation of these methods to the needs of western Alaskan classrooms is also presented. (Prerequisite: Classroom experience.)

LING 216 3 Credits **Alternate Fall**
Languages of the World (3+0) h

A comprehensive survey of the world's languages — both past and present. Topics to be covered include genetic relationships among languages, linguistic change, language universals, language classification, and language families, as well as the interaction of culture and language. (Next offered: 1989-90.)

LING 303 3 Credits **As Demand Warrants**
Language and Literacy Development (3+0)
 (Same as Ed. 303)

Principles, procedures, and materials for enhancing the language development of young children. (Prerequisite: Psy 240.)

LING 318 3 Credits **Alternate Spring**
Introduction to Phonetics and Phonology (3+0)

An introduction to scientific study of human speech sounds, the mechanism of their production, and the sound systems of languages. (Prerequisites: Upper division standing or permission of instructor. Next offered: 1989-90.)

LING 320 3 Credits **Alternate Spring**
Intro. to Syntactic Theory (3+0) h

An introduction to the study of the principles and processes of sentence construction in language. (Prerequisites: Ling. 101 or its equivalent, at least junior standing or permission of the instructor. Next offered: 1989-90.)

LING 350 3 Credits **Alternate Fall**
Historical Linguistics (3+0)

Introduction to comparative and historical linguistics: methods of linguistic reconstruction, historical change, genetic relationships, dialectology. Includes Indo-European and Alaskan languages. (Prerequisite: Ling. 318. Next offered: 1989-90.)

LING 410 3 Credits **Alternate Fall**
Theory and Methods of Second Language Teaching (3+0)

Theory and practice of teaching a second language, including methodological approaches, second language acquisition theory, materials, and testing. (Next offered: 1989-90.)

LING 450 3 Credits **Every Third Spring**
Language Policy and Planning (3+0)

Consideration of minority languages, including Alaskan Native Languages, in light of their histories, current status, and factors affecting future maintenance. (Next offered: 1988-89.)

LING 482 3 Credits **Every Third Year**
Seminar in Linguistics (3+0)

Current issues in various subfields of linguistics including semantics and pragmatics, discourse analysis, bilingualism, lexicography, language philosophy, and issues within a particular language or language group, e.g. Eskimo phonology, Athabaskan morphology. May be repeated once. (Next offered: 1988-89.)

Marine Science and Limnology

MSL 111 3 Credits **Spring**
The Oceans (3+0) n

This course examines in an introductory way the classic disciplines of ocean science beginning with important definitions and a general history of oceanography. Emphasis is on descriptive biological, physical, chemical, and geological marine science. Additional topics of special interest including scuba, demonstrations of marine research instrumentation, and films of current oceanographic topics such as coastal upwelling and polar oceanography will supplement the lecture.

MSL 411 3 Credits **Alternate Fall**
Current Topics in Oceanographic Research (3+0)

Study of current oceanographic research problems from biology, chemistry, geology, and physics. Topics will include sea floor hydrothermal vents and their indigenous communities, manganese nodules, tsunami prediction, radioisotopes in the sea, Bering Sea productivity, and the role of the ocean in global warming due to fossil fuel carbon dioxide. (Prerequisites: Four semesters of natural sciences at 100 level or above or permission of the instructor. Next offered: 1989-90.)

MSL 435 3 Credits **Alternate Fall**
Acoustical Oceanography (3+0)

Principles and applications of underwater sound in solving oceanographic problems related to chemistry, physics, geology and biology, including hydroacoustical methods, acoustical phenomena, bioacoustics and fisheries acoustics, environmental noise and signal processing. (Prerequisites: college physics and calculus. Next offered: 1989-90.)

MSL 610 3 Credits **Alternate Spring**
Marine Biology (3+0)

A study of the biology of the major plant and animal groups in the sea and their roles in pelagic and benthic systems. Physical, chemical, and geological features affecting marine organisms. The role of bacteria in the sea. Zooplankton and nekton—basic biology and adaptations of selected species. The benthos—shore biota, shelf and deepsea organisms: basic biology, trophic roles, and adaptations of selected species. (Prerequisites: Degree in biology or permission of instructor. Highly recommended: courses in invertebrate zoology, ichthyology, vertebrate zoology. Next offered: 1989-90.)

MSL 611 5 Credits **Alternate Summer**
Field Problems in Marine Biology (0+Arr)

Study of pelagic and benthic ecosystems emphasizing distribution, abundance and ecology of dominant species. Students will also complete a research project of their choosing. Five-week course offered at the Seward Marine Center. (Prerequisites: Graduate standing or permission of the instructor; invertebrate zoology or equivalent. Next offered: Summer 1989.)

MSL 615 2 Credits **Alternate Fall**
Physiology of Marine Organisms (2+0)

A study of the physiological adaptation of the marine environment. inter-tidal, pelagic, and deep benthos environment and energy flows will be discussed. (Prerequisite: Graduate standing or permission of the instructor. Next offered: 1989-90.)

MSL 620 4 Credits **Fall**
Physical Oceanography (3+3)

Physical description of the sea, physical properties of sea water, methods and measurements, boundary processes, currents, tides and waves, and regional oceanography. (Prerequisite: Science or engineering degree, or permission of the instructor.)

MSL 621 3 Credits **Alternate Fall**
Polar Marine Science (3+0)

Physical, biological, chemical and geological oceanography of the Polar oceans with emphasis on comparing and contrasting the Arctic and Antarctic. (Prerequisites: MSL 620, 630, 650, 660, or concurrent registration, or permission of instructor. Next offered: 1989-90.)

MSL 622 3 Credits **Alternate Fall**
Satellite Oceanography (3+0)

A broad introduction to satellite oceanography from first principles to techniques for applying satellite data to oceanography. (Prerequisite: Upper division or graduate study in a science or consent of instructor. Next offered: 1989-90.)

MSL 625 2 Credits **Spring**
Shipboard Techniques (1+3)

A comprehensive introduction to modern oceanographic shipboard sampling and analysis techniques. (Prerequisites: Graduate standing and permission of instructor.)

MSL 629 3 Credits **Alternate Fall**
Methods of Numerical Simulation in Fluids and Plasma (3+0)
 (Same as Phys. 629)

The fundamentals of computer simulation including time and spatial differencing and stability theory applied to partial differential equations describing convective and diffusive transport in fluids. The second part of the course will be separated into two tracks: One specializing in ocean and atmospheric dynamics and the other in the plasma state of matter. (Prerequisites: Math. 310, 421, 422 or equivalent; baccalaureate degree in physics, engineering or mathematics or equivalent; for plasma physics track: baccalaureate degree in physics including Phys. 311, 312, 331, 332 or equivalent; experience with FORTRAN. Next offered: 1989-90.)

MSL 630 3 Credits Spring
Geological Oceanography (3+0)

Topography and structure of the ocean floor. Ocean basins, continental slope, shelf and coastal environments. Major sediment types and distributions. Hydrodynamics and sediment transport and deposition, including actions of waves, currents, and submarine gravity flows. (Prerequisite: Introductory college geology or permission of instructor.)

MSL 640 3 Credits Alternate Spring
Fisheries Oceanography (3+0)

Oceanographic processes supporting marine fish and shellfish populations. Natural mortality, and recruitment. Prey-predator relationships during early life history. Migration and swimming behaviors related to fishing. Fishing grounds in oceanic front and upwelling regions, and on shelf and banks. Prediction of fishing ground, fishing season and abundance using physical, chemical, biological and geological oceanic variables. (Prerequisite: MSL 650 or permission of instructor. Next offered: 1989-90.)

MSL 650 3 Credits Fall
Biological Oceanography (3+0)

Biological processes including organic matter synthesis and transfer. Primary and secondary productivity in the plankton and benthos. Nutrients and nutrient cycling. Emphasis on principles and concepts applied to understanding the biological form and function of specific oceanic provinces. (Prerequisites: Introductory college biology and chemistry.)

MSL 652 3 Credits Alternate Spring
Management of Marine Ecosystems (3+0)

The sea as a biological environment, organisms in the ocean, factors influencing the growth of organisms, nutrient cycles, productivity, food web, and interdependence of organisms. Several field trips may be required. (Prerequisites: Biol 271, Chem. 212, 322, Geol. 411 or permission of instructor. Next offered: 1989-90.)

MSL 660 3 Credits Spring
Chemical Oceanography (3+0)
 (Same as Chem 660)

An integrated study of the chemical, biological, and physical processes that determine the distribution of chemical variables in the sea. The distribution of stable and radio-isotopes are used to follow complex chemical cycles, with particular emphasis on the cycles of nutrient elements. The chemistry of carbon is considered in detail. The implications of the recently explored mid-ocean ridge vent system to ocean chemistry are examined. (Prerequisites: Graduate standing or permission of instructor.)

MSL 661 2 Credits Alternate Spring
Isotope Techniques for Aquatic Sciences (2+0)

An examination of the use of added or naturally occurring isotope tracers in ecological studies. Demonstration of equipment and modern techniques. (Prerequisite: MSL 660 or permission of instructor. Next offered: 1989-90.)

MSL 662 3 Credits Alternate Spring
Fjord Oceanography (3+0)

A comprehensive, interdisciplinary treatment of fjords and fjord environments within the context of estuarine oceanography. Emphasis on Alaskan examples. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)

MSL 665 3 Credits Alternate Spring
Microbial Biochemistry (2+3)

Quantitative and mechanistic aspects of the biochemical processes that micro-organisms effect in the aquatic environment. Processes will be formulated in terms of biochemical structures and specified in terms of equations derived. Although intended for students of aquatic processes, the level is appropriate to follow the first semester course in biochemistry. Modern techniques for analysis of enzyme kinetics will provide the foundation for consideration of the processes of membrane transport. (Prerequisites: Chem. 425 or equivalent; permission of instructor. Next offered: 1989-90.)

MSL 670 2 Credits Alternate Fall
Nutrient Dynamics (2+0)

The dynamics of nitrogen, phosphorus and silicon cycles of the world oceans and the specific processes which transfer nutrients between ecosystems compartments will be studied. Analytical techniques employed in measurement of nutrient transfer rates will also be studied. (Prerequisite: MSL 660 and 650 or permission of instructor. Next offered: 1989-90.)

MSL 680 3 Credits Alternate Spring
Physical-Chemical Limnology (3+0)

A comprehensive course in physical and chemical limnology covering the basic processes and cycles in freshwater systems, including a consideration of arctic and subarctic lakes. (Prerequisites: Graduate standing, calculus, quantitative analysis or permission of instructor. Next offered: 1989-90.)

Mathematics

No student will be permitted to enroll in a course having prerequisites if a grade lower than C is received in the prerequisite course.

DEVM 050 3 Credits As Demand Warrants
Basic College Mathematics (3+0)

Operations with whole numbers, fractions, decimals and signed numbers. Percents and ratios. Evaluating algebraic expressions. Introduction to geometric figures. Metric system.

DEVM 060 3 Credits As Demand Warrants
Elementary Algebra (3+0)

First year high school algebra. Evaluating and simplifying algebraic expressions, solving first degree equations and inequalities, integral exponents, polynomials, factoring, rational expressions. (Prerequisite: DevM. 050 or placement.)

DEVM 065 Variable Credit As Demand Warrants
Mathematics Lab

This course is an individual tutorial lab. Course content is selected according to the needs of the individual student from the topics covered in DevM. 050 and DevM. 606. (Prerequisite: placement.)

DEVM 070 3 Credits As Demand Warrants
Intermediate Algebra (3+0)

Second year high school algebra. Operations with rational functions, radicals, rational exponents, complex numbers, quadratic equations and inequalities, Cartesian coordinate system and graphing, systems of equations, determinants and logarithms. (Prerequisite: DevM. 060 or placement.)

MATH 080 3 Credits As Demand Warrants
Mathematics for the Trades (3+0)

Designed for students in diesel and welding areas. Topics from algebra, geometry and trigonometry are applied to Voc-Tech problems.

MATH 107 3 Credits Fall and Spring
Elementary Functions (3+0) m

A study of algebraic, logarithmic, and exponential functions, together with selected topics from algebra. (Prerequisite: Two years of high school algebra and Math. 107 placement or higher.)

MATH 108 2 Credits Fall and Spring
Trigonometry (2+0) m

A study of the trigonometric functions. (Prerequisite: Math. 107 or concurrent registration in Math. 107.)

MATH 109 3 Credits As Demand Warrants
Analytic Geometry (3+0) m

Rectangular coordinate system, the straight line, conic sections, transcendental curves, polar coordinates, parametric equations, and solid analytic geometry. (Prerequisite: Two years of high school algebra.)

MATH 110 3 Credits Fall and Spring
Mathematics of Finance (3+0) m

Simple and compound interest, discount, annuities, amortization, sinking funds, depreciation, and capitalization. (Prerequisite: Two years high school mathematics, including at least one year of algebra.)

MATH 131 3 Credits Fall
MATH 132 3 Credits Spring
Concepts of Mathematics 3(3+0) m

A study of mathematical thought and history designed for students with a limited mathematical background. Mathematical reasoning rather than formal manipulation is emphasized. Topics may be chosen from number theory, topology, set theory, geometry, algebra and analysis. Note: These courses do not provide technical preparation for, nor are they prerequisites for, any other college level mathematics courses. (Prerequisite for Math 131 - Two years high school mathematics, including at least one year of algebra; for Math 132: Math 131 or consent of instructor.)

MATH 161 3 Credits Fall and Spring
Algebra for Business and Economics (3+0) m

Functions of one and several variables studied with special attention given to linear, polynomial, rational, logarithmic, and exponential relationships. Geometric progressions as applied to compound interest and present value. Linear systems of equations and inequalities. All applications are from the fields of economics and business. (Prerequisites: Two years of high school algebra and Math. 161 placement or higher.)

- MATH 162 4 Credits** Fall and Spring
Calculus for Business and Economics (4+0) m
 Ordinary and partial derivatives. Maxima and minima problems, including the use of Lagrange multipliers. A brief introduction to the integral of a function of one variable. Applications include marginal cost, productivity, revenue, point elasticity of demand, competitive/complementary products, consumer's surplus, etc. (Prerequisites: Math. 161.)
- MATH 171 3 Credits** Spring
Mathematics for Life Sciences (3+0) m
 Algebraic, trigonometric, exponential, and logarithmic functions with applications to problems arising in the life sciences. (Prerequisite: Two years of high school algebra and Math. 171 placement or higher.)
- MATH 181 3 Credits**
Finite Math for Business (3+0)
 Topics used to solve business and economic problems including matrix theory, linear programming, simplex method, counting techniques and probability distributions. (Prerequisite: DevM. 060 or placement.)
- MATH 200 4 Credits** Fall and Spring
MATH 201 4 Credits Fall and Spring
MATH 202 4 Credits Fall and Spring
Calculus (4+0) m
 Techniques and application of differential and integral calculus, vector analysis, partial derivatives, multiple integrals, and infinite series. (Prerequisites: Math. 107-108.)
- MATH 203 4 Credits** Fall
Finite Math. (4+0) m
 Topics covered include: symbolic logic, partitions, binomial and multinomial theorems, probability, finite stochastic processes, linear algebra, Markov chains, linear programming, and game theory. (Prerequisite: Math. 162, or 272, or 200.)
- MATH 205 3 Credits** Fall
Mathematics for Elementary School Teachers I (3+1) m
 Elementary set theory, numeration systems, and algorithms of arithmetic, divisors, multiples, integers, introduction to rational numbers. (Prerequisites: two years high school mathematics, including at least one year of algebra.)
- MATH 206 3 Credits** Spring
Mathematics for Elementary School Teachers II (3+1) m
 A continuation of Math. 205. Real number systems and sub-systems, logic, informal geometry, metric system, probability, and statistics. (Prerequisite: Math. 205.)
- MATH 210 1 Credit** Fall and Spring
Calculus and the Computer (1+0) m
 Computer implementation of numerical methods of elementary calculus. Functions, limits, roots, differentiation, maxmin, integration, and differential equations. Emphasis is on problem analysis and interpretation of results. (Prerequisite: Concurrent registration in Math. 162 or 200 or 272 or completion of one of these courses.)
- MATH 211 1 Credit** Spring and Fall
Linear Algebra and the Computer (1+0) m
 Computer implementation of numerical methods of elementary linear algebra. Solution of systems of linear equations, matrix inversion, determinants, characteristic roots, linear optimization, and iterative methods. (Prerequisite: Math. 210.)
- MATH 272 3 Credits** Fall
Calculus for Life Sciences (3+0) m
 Differentiation and integration with applications to the life sciences. (Prerequisites: Math. 171 or Math. 107 and Math. 108.)
- MATH 273 3 Credits** Spring
Calculus for Life Sciences (3+0) m
 Applications of integration. Differential and difference equations as models of real life processes. Partial differentiation. (Prerequisite: Math. 272.)
- MATH 302 3 Credits** Fall and Spring
Differential Equations (3+0)
 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, and applications. (Prerequisite: Math. 202.)
- MATH 305 3 Credits** As Demand Warrants
Geometry (3+0)
 Topics selected from such fields as Euclidean and non-Euclidean plane geometry, affine geometry, projective geometry, and topology. (Prerequisite: Math. 202 or permission of instructor.)
- MATH 306 3 Credits** Alternate Spring
Introduction to the History and Philosophy of Mathematics (3+0)
 A concise survey of the history and philosophy of mathematics for students of mathematics, science, history and philosophy as well as a detailed study of certain important periods of that history as examined by such thinkers as Plato, B. Russell, D. Hilbert, L.E.J. Brouwer and K. Godel. (Prerequisites: Math. 202 or permission of instructor. Next offered: 1989-90.)
- MATH 307 3 Credits** Fall
Discrete Mathematics (3+0)
 Logic, counting, sets and functions, recurrence relations graphs and trees. Additional topics may be chosen from probability theory. (Prerequisites: Math 201 or 203 or permission of instructor.)
- MATH 308 3 Credits** Spring
Abstract Algebra (3+0)
 Theory of groups, rings, and fields. (Prerequisites: Math. 307 or 314 or permission of instructor.)
- MATH 310 3 Credits** Fall
Numerical Analysis (3+0)
 Direct and iterative solutions of systems of equations, interpolation, numerical differentiation and integration, numerical solutions of ordinary differential equations, and error analysis. (Prerequisite: Math. 302 or permission of instructor. A knowledge of FORTRAN or BASIC is desirable.)
- MATH 314 3 Credits** Spring
Linear Algebra (3+0)
 Linear equations, finite dimensional vector spaces, matrices, determinants, linear transformations, and characteristic values. Inner product spaces. (Prerequisite: Math. 202 or Math. 211.)
- MATH 371 3 Credits** As Demand Warrants
Probability (3+0)
 Probability spaces, conditional probability, random variables, continuous and discrete distributions, expectation, moments, moment generating functions, and characteristic functions. (Prerequisite: Math. 202.)
- MATH 401 3 Credits** Fall
MATH 402 3 Credits Spring
Advanced Calculus (3+0)
 A rigorous treatment of one and several dimensional calculus. Includes the study of mappings from n-space and their continuity, differentiability and integrability properties as well as sequences and series. (Prerequisites: Math. 314 or 421 for Math. 401; Math. 401 for Math. 402.)
- MATH 404 3 Credits** As Demand Warrants
Topology (3+0)
 Introduction to topology, set theory, open sets, compactness, connectedness, product spaces, metric spaces, and continua. (Prerequisite: Math. 308 or Math. 314.)
- MATH 408 3 Credits** As Demand Warrants
Mathematical Statistics (3+0)
 Distribution of random variables and functions of random variables, interval estimation, point estimation, sufficient statistics, order statistics, and test of hypotheses including various criteria for tests. (Prerequisites: Math. 371 and A.S. 301.)
- MATH 421 4 Credits** Fall
Applied Analysis I (4+0)
 Vector calculus, including gradient, divergence, and curl in orthogonal curvilinear coordinates, ordinary and partial differential equations and boundary value problems, and Fourier series and integrals. (Prerequisites: Math. 302 or concurrent enrollment in Math. 302.)
- MATH 422 4 Credits** Spring
Applied Analysis II (4+0)
 Topics in multi-variate calculus, including boundary value problems and partial differential equations of mathematical physics complex functions, including series, integrals, residues, conformal mapping, and potential theory. (Prerequisite: Math. 421.)
- MATH 423 3 Credits** As Demand Warrants
Applied Mathematics (3+0)
 Topics to be determined at the time of registration to fit the needs of the students. (Prerequisite: Senior standing or permission of instructor.)
- MATH 460 3 Credits** Fall
Mathematical Modeling (3+0)
 Analysis, construction, and interpretation of mathematical models. Applications to the physical, biological, and social sciences. Topics will be selected from combinatorics, probability, statistics, perturbation, numerical analysis, and differential equations. Students will develop a modeling project. (Prerequisites: A.S. 301, Math. 201, Math. 211.)

MATH 603 3 Credits Fall
Real and Complex Analysis I (3+0)
 General theory of measure and integration for real and complex-valued functions, convergence theorems, product measures and Fubini's Theorem, and Radon-Nikodym Theorem. Metric and Banach spaces and the Riesz Representation Theorem for the real line. (Prerequisites: Math 401-402 or permission of instructor.)

MATH 604 3 Credits Spring
Real and Complex Analysis II (3+0)
 Analytic functions, power series, Cauchy integral theory. Basic topology of the complex plane and structure of analytic functions. Applications to illustrate the interplay between real and complex analysis, e.g., the Poisson integral of complex Borel measures on the circle, analytic measures and the F. and M. Riesz Theorem. Applications and special topics to be selected on the basis of instructors' interests and students' interests and may vary each time course is offered. (Prerequisite: Math. 603.)

MATH 608 3 Credits As Demand Warrants
Partial Differential Equations (3+0)
 First and second order differential equations, boundary value problems, and existence and uniqueness theorems. Green's functions, and principal equations of mathematical physics. (Prerequisite: Math. 422 or permission of instructor.)

MATH 611 3 Credits Alternate Fall
MATH 612 3 Credits Alternate Spring
Mathematical Physics (3+0)
 (Same as Phys. 611, 612)
 Advanced consideration of such topics as transform methods, asymptotic methods, Green's function, Sturm-Liouville theory, conformal mapping, and calculus of variations with applications to problems arising in physics. (Prerequisite: Math. 422 or consent of instructor. Next offered: 1989-90.)

MATH 615 3 Credits Alternate Spring
Applied Numerical Analysis (3+0)
 Review of numerical differentiation and integration, and the numerical solution of ordinary differential equations. Main topics to include the numerical solution of partial differential equations; curve fitting, splines, and the approximation of functions. Supplementary topics such as the numerical method of lines, the fast Fourier transform, and finite elements may be included as time permits and interest warrants. (Prerequisites: C.S. 201, Math. 310, Math. 314, Math. 421, Math. 422 or consent of the instructor. Next offered: 1988-89.)

MATH 621 3 Credits Alternate Fall
Advanced Applied Analysis (3+0)
 Topics covered may include conformal mapping, Fourier, Laplace, and Z transforms and impulse functions with applications to solving differential equations which arise in science and engineering. Other topics as time permits include asymptotic expansions, local analysis of O.D.E.'s and special functions. (Prerequisites: Math. 421-422 or Math. 604 or permission of instructor. Next offered: 1989-90.)

MATH 622 3 Credits As Demand Warrants
Topics in Applied Analysis (3+0)
 Topics in applied analysis to be determined at the time of registration to fit the needs of the students. (Prerequisites: permission of instructor.)

MATH 630 3 Credits Fall
Advanced Linear Algebra and Its Applications (3+0)
 Selected topics from matrix theory and matrix inequalities, canonical forms, finite dimensional vector spaces, eigenvalue problems, non-negative matrices and quadratic forms. (Prerequisites: Math. 314 and graduate standing or permission of instructor.)

MATH 631 3 Credits Spring
Theory of Modern Algebra (3+0)
 The Sylow Theorems, normal series and other topics from group theory. The theory of rings and fields including polynomial rings, unique factorization domains and Galois Theory. (Prerequisites: Math. 308 and graduate standing or permission of instructor.)

MATH 651 3 Credits Every third year
Topology (3+0)
 Treatment of the fundamental concepts of topology. Topologies on a set, connectedness, compactness, paracompactness, metrization problems, maps, convergence via nets and filters, homotopy, fundamental groups and covering spaces, homology theory, degree theory. (Prerequisites: Math. 401-402 or Math. 404 or permission of instructor. Next offered: Spring 1990.)

MATH 660 3 Credits Alternate Spring
Advanced Mathematical Modeling (3+0)
 An examination of models and procedures reflecting problems arising in the physical and social sciences. Derivation of model equations and methods for solution. Heat conduction problems, random walk processes, simplification of equations, dimensional analysis and scaling, perturbation theory, and a discussion of self-contained modules that will illustrate the principal modeling ideas. Students will normally be expected to develop a modeling project as part of the course requirements. (Prerequisites: Consent of instructor. Next offered: Spring 1989-90.)

MATH 661 3 Credits As Demand Warrants
Optimization (3+0)
 (Same as CS 661)
 Linear and nonlinear programming, simplex method, duality and dual simplex method, post-optimal analysis, constrained and unconstrained nonlinear programming, Kuhn-Tucker condition. Applications to management, physical, and life sciences. Computational work with the computer. (Prerequisites: Knowledge of calculus, linear algebra, and computer programming.)

MATH 663 3 Credits Alternate Spring
Applied Combinatorics and Graph Theory (3+0)
 A study of combinatorial and graphical techniques for complexity analysis including generating functions, recurrence relations, theory of counting, planar directed and undirected graphs, and applications to NP complete problems. (Prerequisites: Consent of instructor. Next offered: Spring 1989.)

Mechanical Engineering

ME 150 1 Credit Fall
Aerodynamics for Pilots (1+1)
 Nature of the atmosphere, elementary airfoil theory, drag and power requirements, performance computations, and introduction to stability. For those who desire a basic understanding of flight with minimum mathematical background. (Prerequisite: High school algebra and general science.)

ME 302 4 Credits Spring
Mechanical Design (3+3)
 Kinematics and dynamics of mechanisms. Analysis and design of displacements, velocities, accelerations, and forces in linkages, cams, and gear systems by analytical, experimental, and computer methods. (Prerequisites: E.S. 208 and E.S. 210.)

ME 313 3 Credits Spring
Mechanical Engineering Thermodynamics (3+0)
 Continuation of E.S. 346 including power and refrigeration cycles (Rankine, Brayton, Otto, and Diesel), compressible flow (isentropic, shock waves, and flow in ducts with friction), combustion and gas vapor mixtures. (Prerequisites: E.S. 341 and E.S. 346.)

ME 321 3 Credits Fall
Industrial Processes (2+3)
 Introductory course covering a wide spectrum of manufacturing processes used in modern industry, primary and secondary manufacturing processes, casting, hot and cold forming, machining, welding, and mass production tools and techniques as related to economic and efficient product design. Laboratory fee: \$25.00.

ME 403 4 Credits Fall
Mechanical Design II (3+2)
 Design and analysis of machines by analytical, experimental and computer methods. Identification of requirements and conceptual design of mechanical systems, detailed design of components, strength, life, reliability, and cost analysis. Laboratory fee: \$15.00. (Prerequisites: M.E. 302 and E.S. 331.)

ME 404 3 Credits Spring
Stress Analysis (3+0)
 Analysis of the strength, stability and rigidity of machine components by analytical and computer methods. (Prerequisites: E.S. 331, Math. 302, E.S. 201.)

ME 408 3 Credits Spring
Dynamics of Systems (2+2)
 Response of mechanical, fluid, and thermal systems to internal, external, and control forces. Free and forced vibration, random vibration, self-excited vibration, control systems, and stability criteria. Non-linear systems. (Prerequisites: E.S. 201 and E.S. 301.)

ME 409 3 Credits Spring
Controls (2+2)
 Analysis and design of mechanical, electrical, and human control systems. (E.S. 201, E.S. 301.)

- ME 414 3 Credits** Fall
Thermal Systems Design (3+0)
 Introduction to the design of power and space conditioning systems, energy conversion, heating, ventilating, air conditioning, total energy systems, and introduction to thermal system simulation and optimization. (Prerequisite: E.S. 346.)
- ME 415 2 Credits** Fall
Thermal Systems Laboratory (1+3)
 Testing and evaluation of components and energy systems such as pumps, fans, engines, heat exchangers, refrigerators, and heating/power plants. Laboratory fee: \$15.00. (Prerequisites: E.S. 341 and M.E. 313.)
- ME 416 3 Credits** Fall
Design of Mechanical Equipment for the Petroleum Industry (3+0)
 Design, selection, and operation of mechanical equipment used in the production and processing of crude oil and gas. Instrumentation and control systems used with the mechanical equipment. (Prerequisites: E.S. 341 and E.S. 346.)
- ME 441 3 Credits** Spring
Heat and Mass Transfer (3+0)
 Fundamental concepts of heat and mass transfer including steady state and transient conduction, laminar and turbulent free and forced convection, evaporation, condensation, ice and frost formation, black body and real surface radiation, and heat exchangers. (Prerequisite: E.S. 346.)
- ME 450 3 Credits** As Demand Warrants
Theory of Flight (3+0)
 Airfoil theory in subsonic and supersonic flow. Propulsion systems, stability and performance of aircraft. (Prerequisite: Consent of instructor.)
- ME 464 3 Credits** Spring
Corrosion Engineering (3+0)
 Principles and forms of corrosion and factors that affect it. Methods of testing and measurement, control and prevention are examined. (Prerequisite: Senior standing in engineering.)
- ME 487 3 Credits** Spring
Design Project
 A real or simulated engineering design project selected jointly by student and instructor. Emphasis on design of practical mechanical engineering systems and/or components which integrate students' engineering knowledge and skills. (Prerequisite: Senior standing.)
- ME 601 3 Credits** Alternate Fall
Finite Element Analysis in Engineering (3+0)
 Formulation of the finite element method. Applications to problems of engineering in solid mechanics, fluid mechanics, and heat transfer. Use and development of codes for computer solution of problems. (Prerequisites: Graduate standing in engineering, ES 201 and Math. 302 or equivalent. Next offered: 1989-90.)
- ME 604 3 Credits** Alternate Spring
Experimental Mechanics (2+3)
 Theory and application of the methods of experimental mechanics. Primary emphasis on photoelasticity, strain gages and brittle coating. Methods of collecting and processing data, and calculation of stresses and strains from such data. (Prerequisites: Graduate standing in engineering. Next offered: 1989-90.)
- ME 617 3 Credits** As Demand Warrants
Power Analysis (3+0)
 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. 313.)
- ME 631 3 Credits** Alternate Fall
Advanced Mechanics of Materials (3+0)
 Theories of elasticity and plasticity for small and large deformations. Applications to engineering problems. (Prerequisites: Graduate standing in engineering, ES 331 or equivalent. Next offered: 1989-90.)
- ME 634 3 Credits** Alternate Spring
Advanced Materials Engineering (3+0)
 Atomic bonding, crystal structure, crystal imperfections, phases and interfaces, micro-structures, phase diagrams, phase transformation, transport and diffusion, metal deformation, fracture of materials, deterioration of materials, electronic and physical properties of materials. (Prerequisites: Graduate standing in engineering, ES 334, Math. 302 or equivalent. Next offered: 1989-90.)
- ME 641 3 Credits** Alternate Spring
Advanced Fluid Mechanics (3+0)
 Introduction to viscous flows, laminar boundary layers, turbulent boundary layers, turbulent jets and wakes, applications to heat transfer and drag. (Prerequisites: Graduate standing in engineering. Next offered: 1989-90.)
- ME 642 3 Credits** Alternate Spring
Advanced Heat Transfer (3+0)
 Heat conduction in two and three dimensions under steady and transient conditions. Free and forced convection in internal and external flows. Radiation from black and gray surfaces and gas-filled enclosures. Both analytical and numerical methods are covered. (Prerequisites: Graduate standing in engineering. Next offered: 1989-90.)
- ME 685 3 Credits** Alternate Spring
Arctic Heat and Mass Transfer (3+0)
 An introduction to the principles of heat and mass transfer with special emphasis on application to problems encountered in the Arctic such as ice and frost formation, permafrost, condensation, and heat loss in structures. (Prerequisite: C.E. 603. Next offered: 1989-90.)
- ME 687 3 Credits** Alternate Spring
Arctic Materials Engineering (3+0)
 A study of engineering material performance at low temperatures. (Prerequisites: Senior or graduate standing in science or engineering and C.E. 603 or equivalent. Next offered 1989-90.)
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- ## Mechanics — Diesel/Heavy Equipment
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- MECN 101 7 Credits** As Demand Warrants
Heavy Equipment I
 Introduction to suspension systems, wheel bearings, brakes, air systems, clutches, transmissions (auto. and mech.), driveshafts, and differentials. Topics include disassembly, inspection, and assembly of components, use of tools and instruments, use of fixtures, and shop safety. Materials fee: \$100.00.
- MECN 102 7 Credits** As Demand Warrants
Heavy Equipment II
 Introduction to electrical and hydraulic systems, and crawler tractor undercarriage final drive and steering clutches. Materials fee: \$100.00.
- MECN 112 1 Credit** As Demand Warrants
Basic Auto Maintenance (1+0)
 This course, designed for the person without mechanical experience, will cover basic automobile system functions, owner maintenance of electrical, cooling, and fuel systems, auto lubricants and fluids, tires and wheels, tune-ups, and cold weather maintenance and operation. Materials fee: \$10.00.
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- ## Military Science
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- MILS 100, 200 1 Credit** Fall and Spring
Outdoor Skills Laboratory (0+2)
 Introduction to the fundamentals of various outdoor skills such as mountaineering, orienteering, marksmanship, arctic survival, skiing, and snowshoeing. Emphasis is on practical work. The same skills are not taught both semesters. (Corequisite: Concurrent registration in another basic military science course [111, 112, 201 or 202])
- MILS 111 2 Credits** Fall
U.S. Army and Society I (2+0)
 Survey and analysis of the origin, development, organization and function of the American military. Focus is on the structure and purpose of the U.S. Army and ROTC program and the civilian-military relationship. An introduction to chain of command and small unit organization is provided to include characteristics of officers and their relation to subordinate leaders and enlisted men and women.
- MILS 112 2 Credits** Spring
U.S. Army and Society II (2+0)
 Survey of human behavior and leadership in the organizational context of the army and military environment. The role of the soldier, military training, discipline, ethics, and professionalism are presented. Students are introduced to behavioral dimensions and management techniques used by successful officer-leaders.

MILS 113 2 Credits Spring**Map Reading and Orienteering (2+0)**

Introduction to military and civilian topographical maps and their related informational content, use of the lensatic compass and map as navigational instruments. Practical exercises in orienteering complete academic instruction.

MILS 201 2 Credits Fall**U.S. Defense and World Affairs (2+0)s**

A study of current world events and how they affect the military leader and defense structure. Historical as well as political events are studied to learn their relationships to the decision making processes. Geography is considered as an influential factor affecting the economic base of a nation, and both are considered in terms of socio-political influence on military thought. Current military strengths and weaknesses of power groups are discussed and analyzed.

MILS 202 2 Credits Spring**Communications Arts for the Military Leader (2+0)**

A study of the principles of public speaking and instructional techniques. Emphasis is upon the development of functional skills through rehearsed and unrehearsed presentations. Instructional techniques, to include the use of audio-visual aids, provides intensive practice in developing lesson plans and skill in presentation.

MILS 250 3 Credits Summer**Basic Camp**

Six week practical field work to prepare students who did not take basic course for entrance into the advanced course. Camp prepares student in basic military skills and leadership experience. (Prerequisite: At least two years of schooling remaining upon completion of camp. Admission by arrangement with professor of military science.)

MILS 300, 400 1 Credit Fall and Spring**Outdoor Skills Laboratory (0+2)**

Advanced training in mountaineering, orienteering, marksmanship, arctic survival, skiing and snowshoeing. Students assist in giving instruction and in organizing and managing the lab. Emphasis is on practical work. May be repeated for a maximum of two credits at each level. (Prerequisite: Junior or senior standing in military science.)

MILS 301 3 Credits Spring**Theory and Dynamics of Tactical Operations (3+1)**

Detailed examination of the concepts, principles, and techniques applicable to the current doctrine of tactical operations. The course emphasizes the role of the small unit leader in planning, directing, and controlling the efforts of individuals and small units to accomplish offensive, defensive, and specialized combat operations. Practical application of performance objectives and the integration of support functions are emphasized. Laboratory consists of practical leadership development. (Prerequisites: Junior standing in Mils. or permission of instructor.)

MILS 303 3 Credits Fall**Advanced Leadership (3+1)
(Same as B.A. 303)**

An interdisciplinary approach to the study of effective leadership in the contemporary environment. Analysis of individual skills, emphasizing a behavioral approach to effective decision making. For ROTC cadets, class and laboratory includes preparation for advanced camp (Mils. 350). (Prerequisites: Junior standing in Mils. or permission of instructor.)

MILS 350 3 Credits Summer**Advanced Camp**

Six week practical field work for students enrolled in the advanced course. Camp is structured as a leadership workshop allowing students to utilize leadership skills in a variety of situations in a military environment. (Prerequisite: Must be enrolled as an advanced course cadet and have completed MS III.)

MILS 351 2 Credits Summer**Cadet Troop Leadership Training**

Three week full-time leadership training and development. Serving in leadership positions with the Active Army. Applying leadership and management principles in real life junior officer situations/positions in a military environment. (Prerequisite: Must be enrolled as an advanced course cadet and completed MS III and Advanced Camp, Mils. 350.)

MILS 401 3 Credits Fall**Seminar on Tactical Operations (3+1)s**

A study of the conduct of tactical operations from the time of Hannibal to the present. The course is designed to introduce the student to a wide variety of historical examples where application or violation of sound tactical principles, or various styles and types of leadership have produced success or failure. Laboratory consists of practical leadership roles and seminars. (Prerequisites: Senior standing in Mils. or permission of instructor.)

MILS 402 3 Credits Spring**Seminar in Leadership and Management (3+0)**

A study and overview of management principles, management practices, and military justice. Emphasis is on the review of management principles and skills through advanced readings and case studies. Students will receive an orientation on the various administrative, training, logistical, and maintenance tools used in the military. Class includes preparation for commissioning. (Prerequisites: Senior standing in Mils. or permission of instructor.)

Mineral Preparation Engineering

MPR 304 3 Credits Alternate Fall**Introduction to Metallurgy (3+0)**

Definitions and principles of basic science and engineering principles as applied to process and adaptive metallurgy. (Prerequisites: Chem. 211, Phys. 212. Next offered: 1989-90.)

MPR 313 3 Credits Alternate Fall**Introduction to Mineral Preparation (2+3)**

Elementary theory and principles of unit processes of liberation, concentration, and solid-fluid separation as applied to mineral beneficiation. (Prerequisite: Junior standing or permission of the instructor. Next offered: 1989-90.)

MPR 314 3 Credits Alternate Spring**Unit Preparation Processes (1+6)**

Liberation and concentration by gravity, electro-magnetic, and electrostatic methods. Economic analysis and flowsheets for different ores are developed. (Prerequisite: M.Pr. 313. Next offered: 1989-90.)

MPR 410 3 Credits Alternate Fall**Surface Materials Handling Systems (2+3)**

The techniques and design of systems to move ore, concentrates, and waste materials in mining and milling operation. (Prerequisite: Senior standing or permission of the instructor. Next offered: 1989-90.)

MPR 418 3 Credits Spring**Emission Spectroscopy, X-Ray Spectroscopy, and Atomic Absorption (2+3)**

Can be taken for any combination of parts A, B, C as demand warrants. (Admission by special arrangement.)

MPR 418A — Theory and application of emission spectrography: two one-hour classes and one three-hour lab per week for five weeks. One credit.

MPR 418B — Theory and application of x-ray spectrography and diffractometer: two one-hour classes and one three-hour lab per week for five weeks. One credit.

MPR 418C — Theory and application of atomic absorption spectrophotometry: two one-hour classes and one three-hour lab per week for five weeks. One credit.

MPR 433 3 Credits Alternate Fall**Coal Preparation (2+3)**

Units operations, flowsheets, washability characteristics, and control by sink-float methods for coal preparation plants. Market requirements and economics of preparation. (Prerequisite: M.Pr. 313. Next offered: 1989-90.)

MPR 601 3 Credits Spring**Froth Flotation (2+3)**

Theory and application of bulk and differential froth flotation to metallic minerals, non-metallic minerals, and coal. (Admission by arrangement.)

MPR 606 3 Credits Spring**Plant Design (1+6)**

Selection, design and layout of equipment for erection and operation of mineral and coal beneficiation plants for specific custom and milling problems. (Admission by arrangement.)

MPR 684 3 Credits Fall**Mineral Preparation Research (1+6)**

Familiarizes students with the concept of basic research and its needs in the field of mineral beneficiation. (Admission by arrangement.)

MPR 688 1 Credit Fall**Graduate Seminar I (1+0)****(Same as MIN 688)**

Preparation and presentation of research outlines by graduate students and participation in regularly organized Mineral Engineering Department seminars. (Prerequisite: Admission to graduate program.)

Mining Engineering

- MIN 101 3 Credits Fall**
Minerals, Man and the Environment (3+0)
 A general survey of the impact of the mineral industries on man's economic, political, and environmental systems.
- MIN 102 1 Credit Spring**
Introduction to Minerals Industry (1+0)
 Fundamentals of the mineral industry.
- MIN 103 2 Credits Fall**
Introduction to Mining Engineering (2+0)
 Concepts and methods utilized in mining engineering. Practical training in safety and mining unit operations.
- MIN 104 1 Credit Fall**
Mining Safety and Operations Laboratory (0+3)
 Practical training at the Silver Fox Mine in mining operations and safety. Course complies with Mine Safety and Health Administration (MSHA) 40 Hour New Miner Training.
- MIN 202 3 Credits Spring**
Mine Surveying (2+3)
 Surveying principles for surface and underground control of mining properties. Field and office procedures for preparation of maps and engineering data. (Prerequisites: Math. 107-108.)
- MIN 301 3 Credits Spring**
Mine Plant Design (3+0)
 Quantitative study and design of various systems and equipment used in haulage, hoisting, drainage, pumping and power (compressed air and electricity). The importance of the natural conditions and production level in the equipment selection procedure is emphasized. (Prerequisites: E.S. 208, E.S. 307, E.S. 341.)
- MIN 302 3 Credits Spring**
Underground Mine Environmental Engineering (2+3)
 Analysis of underground mine ventilation systems, ventilation planning, design and engineering control, mine ventilation network. (Prerequisite: Min. 103.)
- MIN 370 3 Credits Spring**
Rock Mechanics (2+3)
 Strength and deformation characteristics of rock, stress distribution in the vicinity of mining openings, design criteria and support for structures in rock mass, instrumentation and monitoring of opening's stability as well as strata control and surface subsidence. (Prerequisites: E.S. 331 and A.S. 451 or equivalent.)
- MIN 400 1 Credit As Demand Warrants**
Practical Engineering Report
 Twelve weeks of practical work in some industry or project related to the students' option, or equivalent. Performed during one or more of the summer vacations prior to the fourth year.
- MIN 407 2 Credits Alternate Spring**
Mineral Industry and the Environment (2+0)
 Principles and practices of mining reclamation and waste disposal. Impact of regulations on the mineral industry and the environment. (Prerequisite: Permission of instructor. Next offered: 1989-90)
- MIN 408 3 Credits Spring**
Mineral Valuation and Economics (3+0)
 Theory of sampling techniques, deposit and reserve calculations, and analysis of mineral economic problems. (Prerequisite: Permission of the instructor.)
- MIN 409 3 Credits Spring**
Operations Research and Computer Applications in Mineral Industry (3+0)
 Use of operations research and computer techniques for understanding, analysis, forecasting and optimization of mining operations and systems. (Prerequisites: Min. 301 or concurrent registration, E.S. 201, and A.S. 451 or A.S. 301.)
- MIN 433 3 Credits Alternate Fall**
Mining Access, Safety, and Environmental Law (3+0)
 History of mining law. Access to property, safety and environmental laws (and court decisions) as they pertain to mining. (Prerequisite: Senior standing or permission of instructor. Next offered: 1989-90.)
- MIN 443 3 Credits Fall**
Rock Fragmentation (3+0)
 Selection and design of modern mining rock disintegrating techniques. In particular, cutting, drilling, blasting, water jets and other methods are covered. (Prerequisite: Min. 370.)
- MIN 445 3 Credits Fall**
Design of Surface Mines for Conventional and Arctic Conditions (3+0)
 Surface mining methods. Principles and reclamation techniques, design of surface mine infrastructure. (Prerequisites: Min. 443 or concurrent registration.)
- MIN 446 3 Credits Fall**
Underground Mining Methods and Their Design (3+0)
 Design of main development openings; mining methods such as room and pillar, open stoping, supported stopes and caving systems; selection of mining method and mine planning processes will be covered. (Prerequisites: Min. 301, Min. 302, and Min. 370.)
- MIN 447 3 Credits Fall**
Mining Methods for Placer and Offshore Deposits (3+0)
 Design of placer and offshore mining methods. Occurrence properties and mineral content of placer and offshore deposits. Underground mining of frozen placer deposits. (Prerequisites: Min. 301, senior standing or permission of the instructor.)
- MIN 472 3 Credits Alternate Spring**
Design, Construction and Stability of Mining Openings (3+0)
 Stability and design of excavating methods, reinforcement and monitoring systems for openings constructed in rock mass. Construction in swelling rock and frozen ground, underground hazards (bursts and water inflow) as well as monitoring of deformation and stresses associated with the opening's presence are covered. (Prerequisites: Min. 370, Min. 443. Next offered: 1989-90.)
- MIN 490 2 Credits Spring**
Mining Design Project (1+3)
 Design of mine layout including extraction and beneficiation and economic evaluation of the complete mining cycle. (Prerequisites: Min. 408, Min. 445, Min. 446, and Min. 447; Min. 408 can be taken concurrently.)
- MIN 621 3 Credits Fall**
Advanced Mineral Economics (3+0)
 Economics of mineral exploitation and utilization. International trade, state and federal policies; financial control, and research methods. (Admission by arrangement.)
- MIN 631 4 Credits Alternate Fall**
Research Methods in Mineral Engineering (3+3)
 Research problem definitions, design of experiment, collection and processing of data. Review of theoretical and experimental research methods with examples. (Prerequisites: Math. 302 or equivalent, Min. 370 or C.E. 435 or permission of instructor. Next offered: 1989-90.)
- MIN 635 3 Credits Spring**
Geostatistical Ore Reserve Estimation (2+3)
 (Same as GE 635)
 Introduction to the theory and application of geostatistics in the mining industry. Review of conventional methods of ore reserve estimation, sampling design and computer applications. Review of classical statistics, log normal distributions and global estimation. Presentation of fundamental geostatistical concepts including: variogram, estimation variance, block variance, kriging, geostatistical simulation. Emphasis on the practical application to mining. (Prerequisites: Min. 408 or equivalent, Stat. 451 or equivalent.)
- MIN 637 3 Credits Alternate Fall**
Mine Systems Simulation (2+3)
 Application of computer simulation to the analysis of static and dynamic mine systems. Design of simulation experiments in mining engineering. (Prerequisites: Min. 409; or ESM 621 and a course in computer programming; or equivalent. Next offered: 1989-90.)
- MIN 646 3 Credits Alternate Spring**
Mining Engineering in the Arctic (3+0)
 An in-depth treatment of mining engineering problems encountered in arctic conditions. Design and construction of mine openings in frozen ground, mechanical and thermal properties of rocks at subfreezing temperatures, fragmentation and excavation of frozen ground, surface mining problems in the arctic climate, equipment maintenance, mined land reclamation and economic evaluation of mineral properties in arctic regions. Case studies also are presented. (Prerequisites: Min. 301, Min. 302, Min. 370, Min. 445 or equivalent or permission of instructor. Next offered: 1989-90.)
- MIN 647 2 Credits Alternate Fall**
Advanced Underground Mine Design (1+3)
 Design of underground mining methods based upon the geological and physical descriptions of mineral deposits. Design and layout of underground mines. Design of room and pillar, sublevel caving, block caving and open stoping systems. Equipment selection, production scheduling, ventilation design and mining costs. Engineering drawings. (Prerequisites: Min. 301 or equivalent, Min. 302 or equivalent, Min. 370 or equivalent. Next offered: 1989-90.)

MIN 652 3 Credits **Alternate Spring**
Numerical Methods in Mine Ventilation (2+3)
 Differencing schemes for the partial differential equations of flow in mine networks, boundary conditions for mine ventilation systems, computer-aided solution techniques. (Prerequisites: Min. 302 or equivalent, a course in computer science and a course in differential equations. Next offered: 1989-90.)

MIN 673 3 Credits **Alternate Fall**
Theoretical and Experimental Methods in Rock Mechanics (2+3)
 Theoretical and experimental methods in rock mechanics. State of stress and potential failure zone around two and three dimensional structures in rock based on theoretical and experimental techniques and failure criteria. (Prerequisite: Min. 370 or equivalent. Next offered: 1989-90.)

MIN 674 3 Credits **Alternate Spring**
Selected Topics in Rock Mechanics (2+3)
 Current rock mechanic problems which are related to advances in mining and construction technologies, with particular emphasis on the importance of rock and frozen ground properties and stress evaluation in designing and monitoring stability of structures for gas, oil and radioactive materials storage, geothermal energy recovery, solution mining, and those exposed to rock outbursts and earthquakes. (Prerequisites: Min. 370 or equivalent, Min. 673 or equivalent, or permission of instructor. Next offered 1989-90.)

MIN 688 1 Credit **Fall**
Graduate Seminar I (1+0)
 (Same as M.Pr. 688)
 Preparation and presentation of research outlines by graduate students and participation in regularly organized Mineral Engineering Department seminars. (Prerequisite: Admission to graduate program.)

MIN 689 1 Credit **Spring**
Graduate Seminar II (1+0)
 Presentation of graduate research by graduate students and participation in regularly organized Mineral Engineering Department seminars. (Prerequisite: Admission to graduate program.)

Museum Studies

MSM 211 3 Credits **Alternate Fall**
Fundamentals of Museum Studies I (3+0)
 An integrated view of the origin, structure and development of museums, types of museums and their functions, professional directions and ethics. Overview of collection management systems and techniques, and the role and ethics of museum conservation. (Prerequisite: Sophomore standing or permission of the instructor. Next offered: 1988-89.)

MSM 212 3 Credits **Alternate Spring**
Fundamentals of Museum Studies II (3+0)
 Museum education, including educational goals and objectives, the museum visitor, program development and publicity. A comprehensive survey of exhibits theory and practices, management practices in a museological context including types of museum administrative frameworks, legal considerations, and financial management. (Prerequisite: MSM 211. Next offered: 1988-89.)

MSM 311 3 Credits **Alternate Fall**
Museum Administration (3+0)
 An exploration of the administrative philosophy and procedures found in both public and private, large and small museums; the types and sources of support and the types of interactions with local and national supportive groups. (Prerequisites: MSM 211 and 212 or permission of the instructor. Next offered: 1989-90.)

MSM 312 3 Credits **Alternate Spring**
Museum Collection Management (3+0)
 Basic curatorial techniques and problems; major aspects of collection management will be studied, from field collecting and other forms of acquisition through accessioning, cataloging, preparation, exhibit, teaching, and research requirements. (Prerequisites: MSM 211 and 212 or permission of the instructor. Next offered: 1989-90.)

MSM 487 3 Credits **As Demand Warrants**
Museum Practicum
 Student participation in one or more phases of museum operations or disciplines. Special projects are to be developed by the student under the supervision of the appropriate museum personnel. (Prerequisites: MSM 211 and 212 and permission of the instructor.)

MSM 488 3 Credits **As Demand Warrants**
Individual Research: Field Collecting Museum Specimens
 Collection of specimens in the field, addresses philosophies, purposes and goals of field collection, procedures for collecting museum specimens, and methods of handling materials before it reaches the museum. Field trips may be required. By arrangement with the appropriate curator(s). May be repeated for credit with permission of instructor. (Prerequisites: MSM 211 and 212 and prior disciplinary preparation or permission of the instructor.)

MUSIC

Music Ensembles And Class Lessons

MUS 101 1 Credit **Fall and Spring**
Choral Society (0+3) h

MUS 151 1 Credit **Fall and Spring**
Class Lesson (0+3) h
 Class instruction in piano, voice, orchestral instrument, or guitar. Class lesson fee: see below. (Mus. 151 may be repeated for credit. Course may not be audited.)

MUS 153 1 Credit **Fall and Spring**
Functional Piano (1+0) h
 Piano laboratory: instruction designed to help music majors obtain the performance, sight-reading, and harmonization-transposition skills needed to pass the Piano Proficiency Examination. It also provides non-music majors with an opportunity to study basic piano skills on a space-available basis. Lesson fee: see below. (Prerequisites: Music majors — Mus. 131 or equivalent or concurrent enrollment in Mus. 131; non-music majors: permission of instructor. Course may not be audited.)

MUS 203 1 Credit **Fall and Spring**
Orchestra (0+3) h
 (Admission by audition.)

MUS 205 1 Credit **Fall and Spring**
Concert Band (0+3) h
 (Admission by audition.)

MUS 211 1 Credit **Fall and Spring**
"Choir of the North" (0+3) h
 (Admission by audition.)

MUS. 253 0 Credit **Fall and Spring**
Piano Proficiency (0+1)
 Final phase of completion of piano proficiency examination. (Prerequisite: Mus. 153 and permission of instructor.)

MUS. 307 1 Credit **Fall and Spring**
Chamber Music (0+3) h
 String, brass, or woodwind chamber music; piano chamber music and accompanying; stage band, and Madrigal singers. (Prerequisite: Permission of instructor.)

MUS. 313 1, 2, 3 Credits **Fall and Spring**
Opera Workshop (0+3, 6 or 9) h

MUS. 317 1 Credit **Fall and Spring**
Arctic Chamber Orchestra (0+3) h
 Chamber Music. (Admission by audition.)

MUS. 606 1-2 Credits **As Demand Warrants**
Advanced Chamber Music (0+3)-(1+3)
 Advanced string, woodwind, brass, vocal chamber music, piano chamber music and accompanying. (Prerequisite: Mus. 307 or permission of instructor.)

Applied Music

MUS. 161, 162 2 or 4 Credits **Fall and Spring**
MUS. 261, 262 2 or 4 Credits **Fall and Spring**
MUS. 361, 362 2 or 4 Credits **Fall and Spring**
MUS. 461, 462 2 or 4 Credits **Fall and Spring**

Private Lessons h
 Private instruction in piano, organ, voice, orchestral and band instruments, or guitar. Private instruction shall consist of one private lesson and one master class per week. Music performance majors may enroll for four credits. All others will normally enroll for two credits. Private lesson fee: see below. (Prerequisite: Admission by audition. Course may not be audited. Credit-No Credit grading not permitted.)

MUS. 190 0 Credit **Fall and Spring**
Recital Attendance (1+0)
 Recital and concert attendance.

MUS. 390 0 Credit **Fall and Spring**
Junior Recital
 Half-length solo music performance recital. (Prerequisites: Mus. 262 or equivalent, junior standing in music study, permission of instructor.)

MUS. 490 0 Credit **Fall and Spring**
Senior Recital
 Full length music solo recital. (Prerequisites: Mus. 362 or equivalent, senior standing in music study, Mus. 390 or equivalent, permission of instructor.)

MUS. 661 2 or 4 Credits **Fall and Spring**
Advanced Private Lessons
 Private instruction in piano, organ, voice, or orchestral and band instrument consisting of one private lesson and one master class per week. Repeatable for credit. Private lesson fee: see below. (Prerequisites: Mus. 462 or equivalent and by audition. Credit-No Credit grading not permitted.)

CLASS LESSONS AND APPLIED MUSIC FEES

Mus. 151 - Class Lessons - Lesson fees for non-music majors and music majors enrolled in 11 or fewer credits: \$70.00

Lesson fees for music majors enrolled in 12 or more credits: \$35.00

Mus. 153 - Functional Piano - Lesson fees for non-music majors and music majors enrolled in 11 or fewer credits: \$70.00

Lesson fees for music majors enrolled in 12 or more credits: \$35.00

Mus. 161-462, 661 - Private Lessons - Lesson fees for non-music majors and music majors enrolled in 11 or fewer credits: \$145.00

Lesson fees for music majors enrolled in 12 or more credits: \$75.00

For music majors, any combination of the above fees shall not exceed a maximum charge of \$105.00

Music Theory, Music History, and Music Education

MUS 103 3 Credits **Fall and Spring**
Music Fundamentals (3+0) h
 An introductory study of the language of music. Includes basic notation, melodic and rhythmic writing, scales, bass and treble clefs, and basic harmony.

MUS 123 3 Credits **Spring**
Appreciation of Music (3+0) h
 A guide to the richer enjoyment of classical music through a study of the main periods, styles, and composers from the time of the Gregorian chant to the present.

MUS 124 3 Credits **Fall**
Music in World Cultures (3+0) h
 A survey of traditional and folk music around the world, with an emphasis on Oriental and African music. The course examines the different uses of music in various societies, and includes demonstration of ethnic musical instruments.

MUS 131 2 Credits **Fall**
MUS 132 2 Credits **Spring**
Basic Theory (1+2) h
 First semester: Intensive training in fundamentals of music, pitch and rhythm notation, scales, modes, triads, and techniques of harmonization. Second semester: Concentration upon acquisition of skills in harmonization and techniques of formal and harmonic analysis. (Prerequisites: Concurrent enrollment in Mus. 133 for 131 and 134 for 132 required unless exempted by music theory placement test.)

MUS 133 2 Credits **Fall**
MUS 134 2 Credits **Spring**
Basic Ear Training (2+0) h
 Ear training skills including sight reading, sight singing, error detection, and dictation. Use will be made of programmed materials in a laboratory situation in addition to classroom instruction. Concurrent enrollment in Music 131 or 132 required unless exempted by music theory placement examination.

MUS 221 3 Credits **Fall**

MUS 221 3 Credits **Fall**
MUS 222 3 Credits **Spring**
History of Music (3+0) h
 Fall semester: Music before 1750. Spring semester: Music since 1750. (Prerequisite: Mus. 131-132 or permission of the instructor.)

MUS 223 3 Credits **Spring**
Native Alaskan Music (3+0) h
 Eskimo and Indian dance and song styles in Alaska. Emphasis on the sound, effect, and purpose unique to each and the collection methods, analysis, and the development of a broad musical perspective.

MUS 231 2 Credits **Fall**
MUS 232 2 Credits **Spring**
Advanced Theory (1+2) h

Continued study of harmony and musical form through analysis of representative works from the standard repertoire. The second semester will be devoted to study and synthesis of 20th century stylistic and harmonic idioms. (Prerequisites: Concurrent enrollment in Mus. 233 for 231 or 234 for 232 unless exempted by music theory placement test.)

MUS 233 1 Credit **Fall**
MUS 234 1 Credit **Spring**
Advanced Ear Training (0+2)

Continued training in sight singing and melodic dictation skills begun in Mus. 133 and 134. Harmonic dictation and error detection skills also included. (Prerequisites: Concurrent enrollment in Mus. 231 for 233 or 232 for 234 required unless exempted by music theory placement test.)

MUS 309 3 Credits **Fall**
Elementary School Music Methods (3+0)
 (Same as Ed. 309)
 Principles, procedures, and materials for teaching music to children at the elementary level. (Prerequisite: Ed. 330.)

MUS 315 2 Credits **Fall and Spring**
Music Methods and Techniques (1+2)
 Instruction in voice and the basic instruments of band and orchestra. Emphasis on teaching methods in these areas. This course number is repeatable for credit. See Music Department Handbook. (Prerequisite: Permission of instructor.)

MUS 331 3 Credits **Alternate Spring**
Form and Analysis (3+0) h
 Formal and stylistic musical elements in historical context with special application to problems of proper stylistic performance. (Prerequisite: Mus. 232 or permission of the instructor. Next offered: 1989-90.)

MUS 351 3 Credits **Fall**
Conducting (3+0) h
 Principles of conducting; interpretation of vocal and instrumental ensemble music. (Prerequisite: Mus. 232.)

MUS 405 3 Credits **Spring**
Secondary School Music Methods (2+3)
 Principles and methods of teaching music in junior and senior high school with emphasis on philosophies, management, objectives, teaching techniques, choral, and general music programs. Includes the implementation of teaching plans in classroom and rehearsal settings. (Prerequisite: Permission of instructor. Should be taken prior to Ed. 453 — Secondary Student Teaching.)

MUS 421 3 Credits **Alternate Fall**
Music before 1620 (3+0) h
 Music from its origins in Greek antiquity through the Middle Ages and the Renaissance up to and including the emergence of opera at the turn of the seventeenth century. Includes study of prominent composers, early musical forms, original sources in translation, development of musical notation, and development of early musical instruments. (Prerequisites: Mus. 221 and 222 or permission of instructor. Next offered: 1989-90.)

- MUS 422 3 Credits Alternate Spring**
Music in the Seventeenth and Eighteenth Centuries (3+0) h
 Music from the turn of the seventeenth century through Beethoven. Examination of style and performance practices relating to opera, oratorio, cantata, sonata, and concerto, as well as chamber music. Development of keyboard instruments as well as other instrumental genres: strings, winds, and brasses. Intensive music listening as well as reading contemporary sources in translation. Style study of representative works from early Baroque composers through Bach, Handel, Bach's sons, Haydn, Mozart, Beethoven, and others. Musical developments in Italy, England, France, Germany, Austria, and cross-cultural influences. (Prerequisites: Mus. 221 and 222 or permission of instructor. Next offered: 1989-90.)
- MUS 423 3 Credits Alternate Fall**
Music of the Nineteenth Century (3+0) h
 Musical trends in the 19th century. Romanticism, Nationalism, Italian Opera, and Wagnerian Music Drama, as exemplified by representative works, chosen from the music of Weber, Berlioz, Mendelssohn, Schumann, Brahms, Wagner, Chopin, Tchaikovsky, and others. Related readings in other aspects of the Romantic movement. (Prerequisite: Mus. 221 or 222 or permission of the instructor. Next offered: 1989-90.)
- MUS 424 3 Credits Fall**
Music in the Twentieth Century (3+0) h
 Music since 1900. Style studies of significant works from the modern repertoire. Hindemith, Bartok, Schoenberg, Stravinsky, the avant-garde, and others. (Prerequisite: Mus. 221 or 222 or permission of the instructor.)
- MUS 431 3 Credits Alternate Spring**
Counterpoint (3+0) h
 Contrapuntal techniques by means of analysis and synthesis of pieces in contrapuntal idioms. (Next offered: 1989-90.)
- MUS 432 3 Credits Alternate Fall**
Orchestration and Arranging (3+0) h
 Instrumentation and arranging for vocal and instrumental ensembles. (Next offered: 1989-90.)
- MUS 433 2-3 Credits Alternate Fall**
Seminar in Musical Composition (2+0, 3+0) h
 Development of compositional skills based upon the works of predominantly twentieth-century composers. Repeatable for credit. (Prerequisites: Mus. 232 or equivalent and/or permission of instructor. Next offered: 1989-90.)
- MUS 441 3 Credits Alternate Fall**
Alaska Native Music and Social Change (3+0) h
 A consideration of cultural persistence and of differential change in musical form and function. (Prerequisites: Mus. 232 or equivalent and/or permission of instructor. Next offered: 1988-89.)
- MUS 601 3 Credits Fall**
Introduction to Graduate Study (3+0)
 Materials, techniques, and procedures for research in music. Examination of bibliographic sources. Required of all graduate students in Music. (Prerequisites: Provisional admission to graduate study and permission of instructor.)
- MUS 607 3 Credits As Demand Warrants**
Seminar in Elementary and Secondary General Classroom Music (3+0)
 Discussion of the theoretical bases for developing objectives for general and classroom music in the elementary and secondary schools. Evaluation of current curricula, methods, and materials with respect to stated objectives. Evaluative methods in music. (Prerequisite: Permission of instructor.)
- MUS 608 2 Credits As Demand Warrants**
Seminar in Secondary Music Ed. (2+0)
 An examination of current trends and problems in all aspects of secondary music education. Emphasis will be placed on curriculum development, philosophy and goals, instrumental and choral program administration, and aspects of music learning and evaluation. (Prerequisite: Permission of instructor.)
- MUS 625 1-3 Credits As Demand Warrants**
Topics in Music History (1-3+0)
 Selected topic in music history and/or literature. Specific topic and number of credits to be announced in advance of course offering.
- MUS 631 3 Credits Alternate Fall**
Seminar in Music Theory: History and Pedagogy (3+0)
 Study of 1) historical development of music theory, and 2) music theory pedagogy (current teaching practices, and survey of available teaching materials). (Prerequisite: Permission of instructor. Next offered: 1989-90.)
- MUS 641 3 Credits Alternate Fall**
Methods of Ethnomusicological Research (3+0)
 Bibliography and research methods in non-Western musics. New ethnomusicological research and approaches. (Prerequisites: Mus. 441 and/or permission of instructor. Next offered: 1989-90.)
- MUS 651 2-3 Credits As Demand Warrants**
Advanced Conducting and Rehearsal Techniques (2-3+0)
 Conducting style and techniques and their application to representative compositions for different instrumental and vocal mediums. Repeatable for credit. (Prerequisites: Mus. 351 or equivalent and/or permission of instructor.)
- MUS 671 3 Credits As Demand Warrants**
Psychology of Music (3+0)
 Relationship of music to the human mind emphasizing such factors as musical perception, pattern recognition, psychoacoustics, and related topics. (Prerequisites: Mus. 232 or equivalent and/or permission of instructor.)
- MUS 690 0 Credit Fall and Spring**
Graduate Recital
 Full length solo performance recital. (Prerequisites: Mus. 490 or equivalent, graduate standing in applied music study, permission of instructor.)

Office Professions

- OP 071 2 Credits As Demand Warrants**
Business Correspondence (2+0)
 This course is designed to acquaint students with the basic skills they need in preparing written communications that meet the standards of business. Covers basic skills in writing effective business letters, memos, and reports of various types.
- OP 072 1 Credit As Demand Warrants**
Alphabetic Filing (1+0)
 Organizing records alphabetically according to standard indexing rules for names of individuals, organizations and business firms.
- OP 073 1 Credit As Demand Warrants**
Spelling and Vocabulary (1+0)
 Designed to help the student develop skill in spelling correctly and using general and specialized terms in business.
- OP 082 1 Credit As Demand Warrants**
Clerical Accounting I (1+0)
 Acquaints student with the relationship between accounting and business; develops an understanding of the steps of the accounting cycle; and develops an understanding of the principles and procedures involved in handling cash.
- OP 083 1 Credit As Demand Warrants**
Clerical Accounting II (1+0)
 Acquaints student with an understanding of accounting systems and develops competence in the use of journals, subsidiary ledgers and in preparing financial statements as well as an understanding of end-of-the-period procedures. (Prerequisite: OP 082.)
- OP 090 2 Credits As Demand Warrants**
Calculating Machines (2+0)
 Provides the student with basic operating knowledge of the electronic calculator in order to perform such business applications as discounting, amount and percent of change, prorating interest, commissions and payroll; to develop an occupational proficiency in the use of machines for initial job placement. (Prerequisite: Abus. 155 strongly recommended.)
- OP 100 3 Credits As Demand Warrants**
Alphabetic Shorthand (3+0)
 Introduces alphabetic shorthand, including alphabet, shortcuts, phrasing, and other abbreviating devices.
- OP 101 4 Credits As Demand Warrants**
Shorthand Principles I (4+0)
 Provides student with instruction and practice in the use of Gregg Shorthand, Series 90 in order to develop ability to read shorthand and transcribe dictation taken at a minimum of 60 wpm on practiced material.
- OP 102 4 Credits As Demand Warrants**
Shorthand Principles II (4+0)
 Development of ability to construct new outlines from dictation under stress of dictation at 80 to 100 wpm. (Prerequisite: OP 101 and 103 or permission of instructor.)

- OP 103 3 Credits As Demand Warrants**
Keyboarding I/Beginning Typewriting (3+0)
 Basic keyboarding skills with emphasis on correct techniques and development of speed and accuracy. Introduction to centering, typing of personal and business letters, envelopes, simple tables and manuscripts. For those with no previous typing training. May be taken in 1-credit segments (103A, B, C) in the Office Professions lab.
- OP 104 1 Credit As Demand Warrants**
Typing Skill Building (1+0)
 This course will help improve speed and/or accuracy on straight and numerical copy. May be repeated up to 3 credits. (Prerequisite: OP 103 or permission of instructor.)
- OP 105 3 Credits As Demand Warrants**
Keyboarding II/Intermediate Typewriting (3+0)
 Course is designed to attain at least minimal typing skill, experience and knowledge necessary for typist beginning an office career. Lab arranged. (Prerequisite: OP 103 or one year high school typing or permission of instructor.)
- OP 106 3 Credits As Demand Warrants**
Keyboarding III/Advanced Typewriting (3+0)
 Course designed to achieve level of typing skill, experience, knowledge and production output that will assure successful typing performance in business office position. Lab arranged. (Prerequisite: OP 105 or permission of instructor.)
- OP 107 3 Credits As Demand Warrants**
Medical Terminology (3+0)
 Study of medical terminology, including analysis of its roots and origins. Anatomical, diagnostic, operative, and laboratory terminology of the human body systems, and selected medical specialties. Emphasis on spelling and pronunciation.
- OP 108 4 Credits As Demand Warrants**
Medical Office Procedures I (4+0)
 Introduction and orientation to business aspects of medical offices. Includes medical law and ethics, reception and telephone procedures, medical economics, orientation to medical profession and patient care.
- OP 110 3 Credits As Demand Warrants**
Office Procedures (3+0)
 Duties and responsibilities of general office employees areas such as filing, effective processing of mail, telephone communication, meeting the public, office supplies, banking, employment procedures and grooming.
- OP 111 1 Credit As Demand Warrants**
Alphabetic Filing (1+0)
 Study of filing procedures and basic records management principles. Practice using alphabetic filing rules.
- OP 112 2 Credits As Demand Warrants**
Introduction to Word Processing (2+0)
 Course designed to teach how to type documents on microcomputer using a word processing program.
- OP 121 2 Credits As Demand Warrants**
Electronic Printing Calculator (2+0)
 Teaches the touch control operation of the electronic printing calculator, and various math functions as applied to business. Recommended for all students in clerical, bookkeeping or accounting.
- OP 128 2 Credits As Demand Warrants**
Word Processing/Displaywriter (2+0)
 Word processing training. All machine functions are covered and applied to revision and application problems in simulated word processing setting. Should type 35 wpm prior to entry. Materials fee: \$10.00. (Prerequisite: OP 103 or permission of instructor.)
- OP 131 3 Credits As Demand Warrants**
Business English (3+0)
 Comprehensive review of grammar, punctuation, capitalization and spelling, with emphasis on business and office occupations.
- OP 140 1 Credit As Demand Warrants**
Word Processing Using Personal Computer (1+0)
 Instruction and practice in use of a personal computer and commercially developed program to do standard word processing operations. (Prerequisite: OP 103 or equivalent.)
- OP 151 1 Credit As Demand Warrants**
Microcomputer Wordprocessing (1+0)
 Provides practice on an IBM compatible microcomputer using Wordperfect, Multimate or Displaywriter software to create, edit, and store documents as well as perform spell-checking, simple merges and printing. Should type 35 wpm prior to entry. Materials fee: \$5.00.
- OP 155 3 Credits As Demand Warrants**
Business Math with Machines (3+0)
 Integrates concepts of business math and instruction for solving problems with calculating machines. Business applications in banking, consumer credit, payroll taxes, discounts, and interest. May use own calculator.
- OP 156 2 Credits As Demand Warrants**
Writing for the Office (2+0)
(Same as ABUS. 156)
 Covers writing tasks encountered in typical office situations. Will learn skills needed to write successful letters, minutes and reports which convey their intent and get desired responses. Offered in two modules, A and B for 1 credit each. (Prerequisite: English placement test.)
- OP 171 1 Credit As Demand Warrants**
Business Letterwriting (1+0)
 Covers practical guides for writing, proofing and correcting business correspondence.
- OP 195 1 Credit As Demand Warrants**
Pre-Employment Skills (1+0)
 Basic keyboarding, 10-key and business computations skills; employer/employee relations; hiring process; effective interview techniques; learning skills development such as problem solving, improving concentration, mastering your memory; personal grooming and appropriate working wardrobe; personal time management.
- OP 201 3 Credits As Demand Warrants**
Shorthand III-Speed Dictation and Transcription (3+0)
 Strengthen typing and shorthand skills to improve speed and accuracy of transcription and to develop a high degree of shorthand skills.
- OP 203 1 Credit As Demand Warrants**
Calculating Machines (1+0)
 Basic operation of electronic calculators and their application in solving business problems.
- OP 207 2 Credits As Demand Warrants**
Machine Transcription (2+0)
 Training in machine transcription with emphasis on mailable copies. Review of language skills and vocabulary included. (Prerequisites: OP 105 or permission of instructor.)
- OP 209 2 Credits As Demand Warrants**
Records Management (2+0)
 Records management and general filing systems; alphabetic, numeric, geographic and subject; how to organize for efficiency and decision-making in maintaining records.
- OP 210 3 Credits As Demand Warrants**
Legal Typewriting (3+0)
 Provides legal procedures background as well as sharpen and refresh typewriting and transcription skills. Emphasis on understanding legal processes as well as developing expertise in legal typewriting and legal office procedures. (Prerequisite: OP 105 or permission of instructor.)
- OP 212 2 Credits As Demand Warrants**
Intermediate Word Processing (2+0)
 Practice in producing typical office communications and reports using a microcomputer and word processing program. (Prerequisite: OP 111.)
- OP 213 4 Credits As Demand Warrants**
Advanced Shorthand (4+0)
 Development of speed in shorthand and transcription of large quantities of new-matter dictation, graded in difficulty. Includes problems of transcription. (Prerequisite: OP 102 and 105 or equivalent.)
- OP 214 1 Credit As Demand Warrants**
Medical Machine Transcription (1+0)
 Instruction and practice needed to develop competency in formatting medical papers including a Medicare form, an admission form, a dental patient; preparing patient histories, medical reports, file cards and other medical documents. Develop competence in transcribing from machine dictation and in using medical terminology correctly. (Prerequisite: OP 105 and 207.)
- OP 215 2 Credits As Demand Warrants**
Machine Transcription (2+0)
 Builds skills needed for success in transcribing business correspondence. Material is presented in the recording of someone else's voice and will consist of various forms of letters, memos, and reports. Spelling, grammar, punctuation and vocabulary will be stressed.
- OP 216 3 Credits As Demand Warrants**
Administrative Secretarial Procedures (3+0)
 Records management, effective procedures for meeting the public and office communications. Library science, employment procedures, date processing, stocks and bonds, executive travel, secretarial planning and job manuals.

- OP 219 1 Credit As Demand Warrants**
Legal Maching Transcription (1+0)
 Instruction and practice needed to develop competency in formatting legal papers including a lease, bill of sale, subpoena, stipulations, interrogatories, notices and various types of orders. Develop competency in transcribing from machine dictation and in using the language of the law correctly.
- OP 221 3 Credits As Demand Warrants**
Filing/Records Management (3+0)
 Introduction to records management including basic alphabetic storage with filing rules and cross-referencing and procedures for retrieving records manually. Includes adaptations of the alphabetic storage method including geographic, numeric and subject; storing and retrieving special records (card files, visible records, microrecords); organization and operation of records management programs and control of records systems.
- OP 225 1-6 Credits As Demand Warrants**
CPS Review
 Prepares students for the CPS (Certified Professional Secretary) examination. Review sessions will be offered in the six areas covered by the exam: Behavioral Science in Business, Business Law, Economics and Management, Accounting, Office Administration and Communication. Special Fee: \$5.00.
- OP 228 1 Credit As Demand Warrants**
Wordprocessing/Reportpack (1+0)
 For operators using the IBM Displaywriter System. The Reportpack Feature will be used to create, maintain and print files. (Prerequisite: OP 128 or permission of instructor.) materials fee: \$10.00.
- OP 231 3 Credits As Demand Warrants**
Business Communications (3+0)
 Introduces composition and evaluation of various kinds of communications that commonly pass between a business person and associates, customers and dealers. Included will be inter-office memos, letters, reports and oral communications. (Prerequisite OP 131 or permission of instructor.)
- OP 244 3 Credits As Demand Warrants**
Office Procedures (3+0)
 Procedures, basic attitudes and skills required of a secretary in any type office. Range of opportunities for secretarial advancement as well as preparation for job hunting will be introduced. (Prerequisite: OP 105 or permission of instructor.)
- OP 282 3 Credits As Demand Warrants**
Cooperative Work Experience
 On-the-job training related to occupational objectives. Weekly seminar with coordinator required. (Prerequisite: Permission of instructor and 12 credits in OP courses.)

Paraprofessional Counseling

- PPC 101 3 Credits As Demand Warrants**
Basic Models Personality-Counseling I (3+0)
 Introduction to basic personality theories and theoretical approaches to counseling.
- PPC 102 3 Credits As Demand Warrants**
Basic Models Personality-Counseling II (3+0)
 Theoretical approaches to personality theory, ideal and problematic functioning and relevant intervention by the counselor. (Prerequisite: PPC 101.)
- PPC 103 3 Credits As Demand Warrants**
Basic Human Problems and Evaluation I (3+0)
 Introduction to adjustment psychology, inter-personal problems, intra-personal problems and an overview of assessment devices used in the helping profession.
- PPC 104 3 Credits As Demand Warrants**
Basic Human Problems and Evaluation II (3+0)
 Continuation of PPC 103 with focus on understanding the difference between constructive and destructive behavior. (Prerequisite: PPC 103.)
- PPC 105 3 Credits As Demand Warrants**
Basic Helping Skills (3+0)
 Introduction to the principles, skills and role of the helping process. A practical how-to-do-it course focusing on communications.
- PPC 106 3 Credits As Demand Warrants**
Advanced Helping Skills (3+0)
 Development of relationship skills with emphasis on specialized methods of crisis intervention, behavioral techniques, and other methods of intervention. (Prerequisite: PPC 105.)

- PPC 130 1 Credit As Demand Warrants**
Stress Management (1+0)
 Addresses the various techniques of stress management. Topics will include psycho-physiology of stress, acute and chronic stress and assessment of individual stress levels.
- PPC 141 1 Credits As Demand Warrants**
Adult Child of the Alcoholic (1+0)
 Examines special characteristics and skills which are developed by children who grow up in homes with an alcoholic parent. Effect of these learned roles in adulthood will be explored in depth. Suggestions for intervention (helping) strategies with both children and adults will be addressed.
- PPC 151 1 Credit As Demand Warrants**
Blended Families (1+0)
 Provides a close look at YOURS, MINE and OURS by exploring the relationship formation and development of children and parents as they try to form a new family unit. Type of problems which can be expected and alternative solutions will be discussed.
- PPC 201 3 Credits As Demand Warrants**
Basic Principles/Group Counseling (3+0)
 Introduction to concepts and techniques of counseling, methods for establishing effective group goals, objectives and group organization.
- PPC 202 3 Credits As Demand Warrants**
Advanced Group Counseling (3+0)
 Advanced exploration and application of the group process with emphasis on a team facilitation approach. (Prerequisite: PPC 201.)
- PPC 203 3 Credits As Demand Warrants**
Alcohol/Drug Abuse (3+0)
 Special difficulties of working with the drug/alcohol abusing person will be explored.
- PPC 204 3 Credits As Demand Warrants**
Marriage/Family Problems (3+0)
 Exploration of multiple factors affecting marriage today. Sources of marriage problems and specific skills in their assessment and treatment will be covered. Emphasis on systems approach.
- PPC 205 3 Credits As Demand Warrants**
Counseling People of Other Cultures (3+0)
 This course is designed to provide an in-depth examination of counseling processes and practices in multi-cultural, multi-lingual settings.
- PPC 206 3 Credits As Demand Warrants**
Paraprofessional Roles-Ethics (3+0)
 Basic ethics of counseling necessary for the professional.
- PPC 207 3 Credits As Demand Warrants**
Personal Awareness and Growth (3+0)
 Individual and group experiences to help the individual become more aware of self and other.
- PPC 229 3 Credits As Demand Warrants**
Practicum Paraprofessional
 Supervised on-the-job counseling experience in a community agency. (Prerequisite: Permission of instructor and 12 credits in PPC courses.)

Petroleum Engineering

- PETE 103 2 Credits Fall**
Survey of the Energy Industries (2+0)
 Overview of global energy supply and demand, alternate energy options, and petroleum production technology.
- PETE 205 3 Credits Fall**
Introduction to Petroleum Drilling and Productions (3+0)
 Fundamental principles of drilling, well completions, production engineering; field trips to Alaskan oil fields if possible. (Prerequisite: Math. 200.)
- PETE 211 1-2 Credits Spring**
Drilling Laboratory (0+3 or 6)
 Measurement of physical properties of drilling mud; optional BOP certification and drilling rig operation experience during spring break. (Prerequisite: Pet.E. 205 or permission of instructor.)
- PETE 301 3 Credits Fall**
Reservoir Rock Properties (2+3)
 Definition and measurement of the physical properties of reservoir rocks; porosity, permeability, lithology, fluid saturations, relative permeability.

- PETE 302 3 Credits Spring**
Well Logging (3+0)
 Comprehensive treatment of modern well logging methods including formation and production logging tools and techniques and basic concepts of log interpretation. (Prerequisite: Junior standing in engineering or geoscience.)
- PETE 305 4 Credits Spring**
Underground Fluids Behavior (3+3)
 Chemical, physical, and thermodynamic properties of water, oil, and gas in petroleum formations; classification of petroleum reservoirs by fluid phase contents, and interpretation of PVT reports for reservoir fluid samples. (Prerequisites: Pet.E. 301, E.S. 346.)
- PETE 321 3 Credits Fall**
Advanced Thermodynamics for Petroleum Engineers (3+0)
 A thorough study of the thermodynamics involved in the transport of petroleum fluids from the formation to the surface with an emphasis on multi-phase, multi-component equilibrium processes. (Prerequisites: Math. 302, Chem. 321 and E.S. 346 and concurrent registration in E.S. 341.)
- PETE 400 1 Credit Fall**
Practical Engineering Report (0+3)
 Report on practical experience from petroleum engineering summer job. (Prerequisite: Senior standing in engineering or geoscience, or permission of instructor.)
- PETE 407 4 Credits Fall**
Petroleum Production Engineering (3+3)
 Well completion, workovers, surface and subsurface equipment design, sucker-rod pumping, gas lift, stimulation techniques, sand control. Laboratory includes measurement of gas and oil streams. (Prerequisite: E.S. 346 and concurrent enrollment in E.S. 341.)
- PETE 421 3 Credits Fall**
Subsurface Engineering (3+0)
 Application of well logs to delineate reservoir rock properties and its spatial variations. Estimation of petroleum in place. Impact of facies variation and depositional models for the design of production policies. Impact of formation structure on enhanced oil recovery methods. Reservoir surveillance. (Prerequisites: Pet.E. 301, 302, and Geos. 370)
- PETE 426 4 Credits Spring**
Drilling Engineering and Laboratory (3+3)
 Principles of drilling, drilling fluids, drilling mud, drilling problems, mud logging, drill stem testing, rig types, rig design and selection. Drilling optimization. Well control. (Prerequisites: E.S. 331 and E.S. 341.)
- PETE 431 2 Credits Fall**
Natural Gas Engineering (2+0)
 The production of natural gas and condensate reservoirs. Design of processing, transportation, distribution and flow measurement systems. (Prerequisite: Pet.E. 301.)
- PETE 456 3 Credits Spring**
Petroleum Evaluation and Economic Decisions (3+0)
 Economic appraisal methods for oil field developmental project evaluations including risk analysis, probability, and statistics in decision making and evaluations. Case studies. (Prerequisites: Math. 202 and Pet.E. 476.)
- PETE 466 3 Credits Spring**
Petroleum Recovery Methods (3+0)
 Discussion of flow and physicochemical principles of oil recovery by water, chemical, thermal and miscible floods. Prediction of recovery for each of these methods. (Prerequisites: Pet.E. 476 and M.E. 441.)
- PETE 476 3 Credits Fall/Spring**
Petroleum Reservoir Engineering (3+0)
 Quantitative study and prediction of the behavior of oil and gas reservoirs under primary, secondary, and tertiary recovery mechanisms. (Prerequisites: Pet.E. 301 and Pet.E. 405.)
- PETE 478 2 Credits Spring**
Well Test Analysis (2+0)
 Transient flow of fluids through porous media, application of solutions of the diffusivity equation to pressure buildup, drawdown, interference testing and log-log type curve analysis and effect of reservoir heterogeneities on pressure behavior. (Prerequisites: Pet.E. 476 and Math. 302)
- PETE 489 2 Credits Fall/Spring**
Reservoir Simulation (2+0)
 The theory and use of computer reservoir simulation in petroleum reservoir and production engineering. (Prerequisites: Math. 310 and Pet.E. 476.)
- PETE 610 3 Credits Fall**
Advanced Reservoir Engineering (3+0)
 Advanced treatment of topics in reservoir engineering, derivation and solution of the diffusivity equation, the real gas pseudo potential, and applications of material balance equations to water influx calculations. (Prerequisite: Pet.E. 476 or permission of instructor.)
- PETE 620 1 Credit Fall**
Graduate Research Seminar (1+0)
 Introduction to research methodology including structuring of research programs, literature review, methods of experimental design, and technical report writing. (Prerequisite: Graduate standing in Petroleum Engineering.)
- PETE 650 2 Credits Spring**
Advanced Topics in Petroleum Engineering (2+0)
 A series of lectures by the faculty and outside speakers covering "state of the art" technology in selected topics of interest to petroleum engineers. Among others, topics will include the subject matter of graduate courses not offered during the semester at hand. (Prerequisite: Graduate standing in petroleum engineering or permission of instructor.)
- PETE 661 3 Credits Spring**
Advanced Well Testing (3+0)
 Transient flow of single phase and multiphase fluids through porous media, isolated and developed multi-well flow, conventional drawdown and buildup analysis, log-log type curve analysis, interference testing, fractured wells, pulse tests, and drill stem tests. (Prerequisite: Pet.E. 476 or Pet.E. 610.)
- PETE 662 3 Credits Every Third Semester**
Enhanced Oil Recovery (3+0)
 Secondary and tertiary oil recovery processes, including waterflooding and chemical and thermal recovery methods. (Prerequisite: Pet.E. 476 or Pet.E. 610. Next offered: Spring 1989)
- PETE 663 3 Credits Fall**
Advanced Reservoir Simulation (3+0)
 Mathematical description of the reservoir, history matching, and prediction of reservoir performance, class project application to simulation of an Alaskan reservoir. (Prerequisites: Advanced engineering mathematics elective and Pet.E. 610.)
- PETE 664 3 Credits Every Third Semester**
Geothermal Reservoir Engineering (3+0)
 Quantitative treatment of broad problems associated with development of a geothermal fluid reservoir system. (Prerequisite: Graduate standing in engineering discipline or approval of the instructor. Next offered: Fall 1989.)
- PETE 665 3 Credits Every Third Semester**
Advanced Phase Behavior (3+0)
 The development and application of phase equilibrium simulators to predict fluid properties for reservoir fluids. (Prerequisite: Pet.E. 321 or permission of instructor. Next offered: Fall 1988.)
- PETE 666 3 Credits Every Third Semester**
Arctic Drilling and Well Completions (3+0)
 Offshore and onshore methods for drilling and completing oil and gas wells in the Arctic; problems of permafrost and ice flow, environmental considerations. (Prerequisite: Graduate standing in engineering discipline or permission of instructor. Next offered: Fall 1988.)
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- ## Philosophy
- PHIL 201 3 Credits Fall and Spring**
Introduction to Philosophy (3+0) h
 Terms, concepts, and problems as reflected in writings of great philosophers. (Prerequisite: Sophomore standing or permission of the instructor.)
- PHIL 202 3 Credits Spring**
Introduction to Eastern Philosophy (3+0) h
 Basic assumptions, problems and conclusions of the major philosophical traditions of the Far East. (Prerequisite: Phil. 201 or permission of the instructor.)
- PHIL 204 3 Credits Fall and Spring**
Introduction to Logic (3+0) h
 Principles of deductive and inductive logic and application of these laws in science and other fields; brief introduction to symbolic logic and its application. Materials fee: \$10.00. (Prerequisite: Sophomore standing.)
- PHIL 321 3 Credits Alternate Fall**
Aesthetics (3+0) h
 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. (Prerequisite: Phil. 201. Next offered: 1989-90.)

- PHIL 322 3 Credits** Alternate Spring
Ethics (3+0) h
Examination of ethical theories and basic issues of moral thought. Prerequisite: Phi. 201. Next offered: 1989-90.)
- PHIL 341 3 Credits** Alternate Fall
Epistemology (3+0) h
The nature of knowledge, truth and certainty. (Prerequisite: Phil. 201 next offered: 1989-90.)
- PHIL 342 3 Credits** Alternate Spring
Metaphysics (3+0) h
The nature of reality comprising both ontology and cosmology. (Prerequisite: Phil. 201. Next offered: 1989-90.)
- PHIL 351 3 Credits** Fall
History of Philosophy and Science (3+0) h
Ancient and medieval periods. (Prerequisite: Six credits in philosophy or social science.)
- PHIL 352 3 Credits** Spring
History of Philosophy and Science (3+0) h
Renaissance, modern, and recent periods. (Prerequisite: Six credits in philosophy or social science.)
- PHIL 471 3 Credits** Alternate Fall
Contemporary Philosophical Problems (3+0) h
Ideological issues facing the modern world. (Prerequisite: Nine credits philosophy or permission of the instructor. Next offered: 1989-90.)
- PHIL 481 3 Credits** Alternate Spring
Philosophy of Science (3+0) h
Comparison and discussion of various contemporary methodological positions. (Prerequisite: Junior standing. Next offered: 1989-90.)
- PHIL 482 3 Credits** Alternate Fall
Comparative Religion (3+0) h
Seven world faiths represent answers to questions of man's duty, his destiny and his nature. (Prerequisite: Permission of the instructor. Next offered: 1989-90.)
- PHIL 483 3 Credits** Alternate Spring
Philosophy of Social Science (3+0) h
Comparison and analysis of various contemporary methodological positions in the social sciences. (Prerequisite: Junior standing. Next offered: 1989-90.)
- PHIL 484 3 Credits** Alternate Spring
Philosophy of History (3+0) h
Critical examination of the nature of history and historical inquiry. (Prerequisite: Nine credits in philosophy or social science. Next offered: 1989-90.)
- PE 211 1 Credit** Alternate Fall*
Fundamentals of Softball (1+3)
Basic skills in softball will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1988-89.)
- PE 212 1 Credit** Alternate Fall*
Fundamentals of Basketball (1+3)
Basic skills in basketball will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1988-89.)
- PE 213 1 Credit** Alternate Spring*
Fundamentals of Ice Sports (1+3)
Basic skills in ice sports will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1988-89.)
- PE 214 1 Credit** Alternate Spring*
Fundamentals of Snow Sports (1+3)
Basic skills in snow sports will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1989-90.)
- PE 215 1 Credit** Alternate Fall*
Fundamentals of Volleyball (1+3)
Basic skills in volleyball will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week sessions. Next offered: 1989-90.)
- PE 216 1 Credit** Alternate Fall*
Fundamentals of Rhythms (1+3)
Basic skills in rhythms will be presented with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1990-91.)
- PE 217 1 Credit** Alternate Spring*
Fundamentals of Recreational Activities (1+3)
Basic skills in recreational activities will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1989-90.)
- PE 218 1 Credit** Alternate Fall*
Fundamentals of Soccer (1+3)
Basic skills in soccer will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1989-90.)
- PE 219 1 Credit** Alternate Spring*
Fundamentals of Aquatics (1+3)
Basic skills in aquatics will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1989-90.)
- PE 220 1 Credit** Every third semester*
Fundamentals of Wrestling (1+3)
Basic skills in wrestling will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: Spring 1988.)
- PE 221 1 Credit** Alternate Fall*
Fundamentals of Gymnastics (1+3)
Basic skills in gymnastics will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1989-90.)
- PE 222 1 Credit** Alternate Spring*
Fundamentals of Track and Field (1+3)
Basic skills in track and field will be presented, with appropriate consideration for adult and youth groups. Emphasis will be on developing personal performance skills and safety procedures for effective class management. *(7 week session. Next offered: 1990-91.)
- PE 232 3 Credits** Alternate Spring
Analysis of Human Movement (3+0)
Qualitative analysis of sport and dance through principles derived from the biological and physical sciences and directed towards understanding and improving human performance. (Next offered: 1988-89)

Physical Education

- PER 100 1 Credit** Fall and Spring
Physical Activities and Instruction (0+3)
Instruction, practice, and activity in a variety of physical activities, sports, and dance in separate sections. Laboratory fees for the following courses are: Swimming classes -\$4.00; physical conditioning, weightlifting and bodybuilding -\$5.00; cross country skiing - \$10.00; Marksmanship, rifle marksmanship and bowling - \$35.00.
- PE 205 2 Credits** Alternate Fall
Introduction to the Human Movement Sciences (2+0)
An overview of the human movement sciences that includes the interrelationship of the biological sciences, sociopsychological, historical and philosophical foundations and the role of the humanities in physical activity, fitness, sport and dance. Clarification of career possibilities is included. (Next offered: 1988-89)
- PE 208 2 Credits** Alternate Fall
Advanced Life Saving (1+3)
Knowledge and skills necessary to provide aid and treatment in aquatic emergencies. Instruction in American Red Cross Cardio-Pulmonary Resuscitation, Advanced Lifesaving, Advanced Swimmer, and Basic First Aid. (Prerequisite: Swim Test.) Certification fee: \$5.00 covers American Red Cross Advanced Life Saving Certification. (Next offered: 1989-90.)
- PE 210 1 Credit** As Demand Warrants
Water Safety (1+3)
Includes review of courses instructors are eligible to teach, teaching methods relative to those courses, general teaching methods, and practice teaching. Review and practice of swimming and lifesaving skills.

- PE 246 3 Credits** **Fall and Spring**
Advanced First Aid (3+0)
 Knowledge and skills necessary to provide efficient aid and treatment in emergencies. Progresses through the Basic, Standard, and Advanced First Aid packages of the American Red Cross. Successful completion of requirements leads to certification by the American Red Cross in Advanced First Aid. Materials Fee: \$10.00.
- PE 300 1 Credit** **Every third Fall**
Advanced Theory and Techniques for Teaching Gymnastics (1+3)*
 In-depth study of advanced skills, strategies, and analysis in gymnastics. *Meets for 7 weeks. (Prerequisite: P.E. 221. Next offered: 1989-90)
- PE 302 1 Credit** **Every third Fall**
Advanced Theory and Techniques for Teaching Basketball (1+3)*
 In-depth study of advanced skills, strategies, and analysis in basketball. *Meets for 7 weeks. (Prerequisite: P.E. 212 Next offered: 1990-91.)
- PE 303 1 Credit** **Every third Fall**
Advanced Theory and Techniques for Teaching Ice Sports (1+3)*
 In-depth study of advanced skills, strategies, and analysis in teaching ice sports. *Meets for 7 weeks. (Prerequisite: P.E. 213. Next offered 1990-91.)
- PE 304 1 Credit** **Every third Spring**
Advanced Theory and Techniques for Teaching Snow Sports (1+3)*
 In-depth study of advanced skills, strategies, and analysis in teaching snow sports. *Meets for 7 weeks. (Prerequisite: P.E. 214. Next offered 1990-91.)
- PE 305 1 Credit** **Every third Fall**
Advanced Theory and Techniques for Teaching Volleyball (1+3)*
 In-depth study of advanced skills, strategies, and analysis in volleyball. *Meets for 7 weeks. (Prerequisite: P.E. 215. Next offered: 1988-89.)
- PE 306 1 Credit** **Alternate Spring**
Techniques in Teaching Creative Dance (1+3)*
 Skill and practice in organizing creative dance experiences for all age groups. Emphasis is on learning techniques which will free people to create from their own movement vocabularies. Some emphasis on correct body alignment and techniques of moving. *Meets for 7 weeks. (Prerequisite: P.E. 216. Next offered: 1989-90.)
- PE 307 1 Credit** **Alternate Spring**
Techniques in Camping and Outdoor Recreation (1+3)*
 In-depth study of advanced skills and organizational techniques in camping and outdoor recreation. *Meets for 7 weeks. One weekend campout will be required. (Prerequisite: P.E. 217. Next offered: 1988-89.)
- PE 308 1 Credit** **Every third Fall**
Techniques in Track and Field (1+3)*
 In-depth study of advanced skills and analysis of track and field. *Meets for 7 weeks. (Prerequisite: P.E. 222. Next offered: 1990-91.)
- PE 309 2 Credits** **Alternate Spring**
Aquatic Instructor (1+3)
 Knowledge and skills necessary to teach swimming to children and adults, beginner through advanced swimmer and lifesaving. (Prerequisites: current American Red Cross Lifesaving Certificate and swim test.) Certification fee: \$5.00. Covers administrative fee for American Red Cross Water Safety Instructor Certificate. (Next offered: 1989-90)
- PE 310 1 Credit** **Every third Spring**
Techniques in Teaching Folk and Square Dance (1+3)*
 Techniques and practical application in organizing and teaching varying age and ability levels in folk and square dance. Dances will include partner and non-partner folk dances, some fad dances and traditional square dance, and some practice in cueing and calling will be provided. *Meets for 7 weeks. (Prerequisite: P.E. 216. Next offered: 1988-89.)
- PE 316 3 Credits** **Alternate Fall**
Motor Development (3+0)
 Motor skill and behavior development, infancy through old age. Individual differences, issues, applications and appraisal techniques. (Prerequisites: Psy. 101 and junior standing. Next offered: 1989-90)
- PE 317 3 Credits** **Every third Spring**
Motor Learning (3+0)
 Physical skills learning processes, patterns, issues, programs, applications, and evaluation. (Prerequisites: Psy. 101 and junior standing. Next offered: 1989-90)
- PE 321 1 Credit** **Fall/Spring**
Practicum in Physical Education (0+3)
 Student will serve as apprentice instructor or leader in university class or with approved supervisor within the community and will assume increasing responsibility for planning and conducting activities under supervision. Class may be repeated. Only 2 credits may count toward department requirement. (Prerequisites: Appropriate 300 level technique courses and junior standing or equivalent background.)
- PE 327 2 Credits** **Spring**
Movement Activities for Children (2+0)
 A practical background of sports, games, and fundamental movement activities appropriate for the child in the environment of the home, playground, or elementary school classroom or gymnasium. For parents, teachers, or others who work with children up to age 12. Course includes progressions in activities and participation in selected activities. (Prerequisites: Psy. 101, sophomore standing.)
- PE 400 2 Credits** **Every third Fall**
Judging and Coaching Gymnastics (1+3)
 Techniques for teaching, coaching, judging, and administering men's and women's gymnastics, including apparatus, tumbling, and floor exercise. (Prerequisite: Junior standing or previous gymnastic experience. Next offered: 1988-89.)
- PE 401 2 Credits** **Every third Fall**
Theory of Basketball (2+0)
 Techniques of playing and coaching men's and women's basketball, including theories of offense and defense, contest strategies and psychology of individual and team play. (Prerequisites: P.E. 302 and junior standing. Next offered: 1990-91.)
- PE 405 2 Credits** **Alternate Fall**
Concepts and Design of Physical Fitness Programs (1½+1½)
 Development of knowledge of the problems, methods of achievement, and maintenance of physical fitness in the modern world. Assessment of personal fitness status, participation in selected fitness activities, and acquisition of skills in basic physical fitness activity. (Prerequisites: Biol. 111 and 112. Next offered 1989-90)
- PE 406 3 Credits** **Alternate Fall**
Methods of Teaching Physical Education (2+3)
 Philosophy, curriculum development, methods for facilitating learning and controlling behavior, measurement and evaluation, observations, and teaching laboratories in elementary and secondary school physical education. (Prerequisite: Ed. 330. Next offered: 1989-90.)
- PE 408 2 Credits** **Every third Spring**
Aquatics Program Management (2+0)
 Aquatic program planning and implementation, competitive swim team coaching and administration, and management of swimming pools. (Prerequisite: P.E. 219 or 309. Next offered: 1989-90.)
- PE 411 3 Credits** **Alternate Spring**
History and Philosophy of Sport and Physical Activity (3+0)
 Examines the role of sport and physical activity from the perspective of the major philosophies. The contributions of physical activity to survival, artistic development, and classic and popular culture particularly as they have influenced the role of physical activity in the United States. (Prerequisite: Jr. Standing. Next offered 1989-90.)
- PE 412 3 Credits** **Alternate Fall**
Principles and Problems in Athletic Coaching (3+0)
 Philosophy and objectives of athletic competition at various age levels. The roles and responsibilities of the athletic coach. Problems of athletic coaching and management of athletes and their training. Content appropriate for those who plan to take leadership or coaching roles in any athletic programs, in schools, or in community recreation. (Prerequisite: Junior standing. Next offered: 1988-89.)
- PE 421 4 Credits** **Alternate Fall**
Physiology of Exercise (3+3) n
 Study of the responses and adaptations of the human body to physical work, exercise and systematically applied stressors, including the effects of environmental stressors, especially those specific to northern regions. (Prerequisite: Biol. 111-112. Next offered: 1988-89.)
- PE 425 3 Credits** **Alternate Fall**
Administration in Physical Education and Athletics (3+0)
 Principles and problems of planning, organizing, directing, and evaluating school programs in physical education, intramural sports, and interschool athletics. (Prerequisite: Junior standing. Next offered: 1989-90.)
- PE 432 4 Credits** **Alternate Fall**
Biomechanics of Human Performance (3+3) n
 Mechanical analysis of human movement, focusing both internally on musculo-skeletal interactions and externally on the body with the environment, for the purpose of understanding how humans moves. (Prerequisites: Biol. 111-112, Math. 107. Next offered: 1989-90.)

PE 437 3 Credits **Alternate Spring**
Adapted Programs of Physical Activity (3+0)
 Theory and practical guidelines for developing adapted movement activities and programs for persons who are impaired, disabled, or handicapped; "mainstreaming" such individuals in to regular programs in physical education and recreation. (Prerequisite: Psy. 101 or permission of instructor. Next offered: 1988-89.)

PE 440 3 Credits **Every third Spring**
Care and Prevention of Athletic Injuries (3+0)
 Scientific bases for the care and prevention of injuries, related to participation in sports and physical activity, rationale and strategies for taping and wrapping for injury prevention and rehabilitation, techniques in pre-activity conditioning and post-injury reconditioning, and equipment safety. (Prerequisites: Biol. 111 and 112, P.E. 205 or permission of instructor. Next offered: 1990-91.)

PE 442 3 Credits **Alternate Spring**
Measurements and Evaluation in Physical Education (3+0)
 Theory and application of the evaluation process in Physical Education including basic statistics, formation of measurable behavioral objectives, written test construction, survey of fitness and skill tests, their selection, administration and interpretation of results, and the use of basic computer programs to calculate various statistical values. (Prerequisites: Completion of 8 credits from 211-222. Next offered: 1988-89.)

Physics

PHYS 101 3 Credits **Spring**
Introduction to Space Science (3+0) n
 An exploration in non-mathematical terms of the discoveries of the space age for the general student. Topics include solar-terrestrial relations, the earth's upper atmosphere and magnetosphere (including the aurora), stratosphere, troposphere, and space communications, with emphasis on fundamental physical processes.

PHYS 103 4 Credits **Fall**

PHYS 104 4 Credits **Spring**
College Physics (3+3) n
 Unified classical and modern physics. Laboratory Fee: \$5.00 (Prerequisite: High school algebra and geometry, Phys. 103 for Phys. 104 or permission of instructor.)

PHYS 113 1 Credit **Fall**
Concepts of Physics (1+0)
 A general review of experimental and theoretical studies of fundamental interactions of nature which have been recognized as major advances in human knowledge will be given. Application of these discoveries to modern technologies, such as solid state electronics, lasers, holography, nuclear fusion, medical diagnostics, remote sensing, etc., will be presented.

PHYS 211 4 Credits **Fall and Spring**
PHYS 212 4 Credits **Fall and Spring**
General Physics (3+3) n
 Classical physics using calculus for majors in mathematics, physical sciences, and engineering. Laboratory Fee: \$5.00. (Prerequisites: At least concurrent registration in Math. 201, Phys. 211 for Phys. 212, or permission of instructor.)

PHYS 213 4 Credits **Spring**
Elementary Modern Physics (3+3) n
 Geometrical and physical optics; elementary-level modern physics including special relativity, atomic physics, nuclear physics, solid-state physics, elementary particles, simple transport theory, kinetic theory, and concepts of wave mechanics. (Prerequisites: Phys. 211 and 212 or permission of instructor.)

PHYS 275 3 Credits **Fall**
PHYS 276 3 Credits **Spring**
Astronomy (3+0) n
 Science elective for the general student. Fall semester: The solar system, laws of motion, nature of radiation, astronomical instruments, the earth, the moon, planets, comets and meteors, and cosmogony. Spring semester: Stellar astronomy, physical properties and distribution of stars, interstellar matter, evolution of stars, galactic structure, and cosmology. Evening demonstrations both semesters. (Prerequisites: Sophomore standing, high school algebra and trigonometry, Physics 275 for Physics 276 or permission of instructor.)

PHYS 311 4 Credits **Fall**
PHYS 312 4 Credits **Spring**

Mechanics (4+0) n
 Newtonian mechanics, motion of systems of particles, rigid body statics and dynamics, moving and accelerated coordinate systems, Lagrangian and Hamiltonian mechanics, continuum mechanics, theory of small vibrations, tensor analysis, rigid body rotations, special theory of relativity. (prerequisites Phys. 211 and at least concurrent enrollment in Math. 302; Phys. 311 for Phys. 312, or permission of instructor.)

PHYS 313 4 Credits **Fall**
Thermodynamics and Statistical Physics (4+0) n
 Thermodynamic systems, equations of state, the laws of thermodynamics, changes of phase, thermodynamics of reactions, kinetic theory, and introduction to statistical mechanics. (Prerequisite: Phys. 212 or permission of instructor.)

PHYS 331 3 Credits **Fall**
PHYS 332 3 Credits **Spring**

Electricity and Magnetism (3+0) n
 Electrostatics, dielectrics, magnetostatics, magnetic materials, and electromagnetism. Maxwell's equations, electromagnetic waves, radiation, physical optics, and selected topics from electronics. (Prerequisites: Phys. 212 and Math. 202 or permission of instructor.)

PHYS 381 2 Credits **Fall**
PHYS 382 2 Credits **Spring**

Physics Laboratory (0+6) n
 Laboratory experiments in classical and modern physics. (Prerequisite: Phys. 213, Phys. 381 for Phys. 382, or permission of instructor.)

PHYS 411 4 Credits **Fall**
PHYS 412 4 Credits **Spring**

Modern Physics (4+0) n
 Relativity, elementary particles, quantum theory, atomic and molecular physics, x-rays, and nuclear physics. (Prerequisites: Phys. 213, Math. 302 and Math. 314, Phys. 411 for Phys. 412, or permission of instructor.)

PHYS 445 3 Credits **Spring**
Solid State Physics and Physical Electronics (3+0) n

Theory of matter in the solid state and the interaction of matter with particles and waves. (Prerequisites: Math. 302, Math 314 and Phys 411 or permission of the instructor.)

PHYS 462 4 Credits **Fall**
Geometrical and Physical Optics (3+3) n

Geometrical optics, interference and diffraction theory, non-linear optics, Fourier optics, and coherent wave theory. (Prerequisites: Math. 302, Math 314 and Phys 331 or permission of instructor.)

PHYS 611 3 Credits **Alternate Fall**
PHYS 612 3 Credits **Alternate Spring**

Mathematical Physics (3+0)
(Same as Math. 611-612)
 Advanced consideration of such topics as transform methods, asymptotic methods, Green's function, Sturm-Liouville Theory, conformal mapping, and calculus of variations with applications to problems arising in physics. (Prerequisites: Math. 422 and permission of the instructor. Phys. 611 or equivalent, for Phys. 612. Next offered: 1989-90.)

PHYS 621 3 Credits **Alternate Fall**
Classical Mechanics (3+0)

Lagrange's equations, two-body problem, rigid body motion, special relativity, canonical equations, transformation theory, and Hamilton-Jacobi method. (Admission by arrangement. Next offered: 1989-90.)

PHYS 622 3 Credits **Alternate Spring**
Statistical Mechanics (3+0)

Classical and quantum statistics of independent particles, ensemble theory, and applications. (Admission by arrangement. Next offered: 1989-90.)

PHYS 626 3 Credits **Alternate Fall**
Fundamentals of Plasma Physics (3+0)

Single charge particle motion in the electromagnetic fields, plasma kinetic theory, Vlasov equations for collisionless plasmas, magnetohydrodynamic equations, linear plasma waves and instabilities, non-linear plasma waves and instabilities. (Prerequisite: Graduate standing. Next offered: 1989-90)

PHYS 627 3 Credits **Alternate Spring**
Advanced Plasma Physics (3+0)

Vlasov description of small amplitude waves in magnetized plasmas, advanced particle orbit theory, fluctuation and incoherent scattering theory, plasma discontinuities and collisionless shocks, weak turbulent theory, statistical theory of turbulence. (Prerequisite: Graduate standing. Next offered: 1989-90.)

PHYS 628 3 Credits Alternate Fall
Digital Time Series Analysis (3+0)
 The use of methods of time series analysis, including correlation, convolution, filtering, and multivariate techniques. Material is of general application to disciplines that obtain multiparameter data suites as part of their research, such as seismology, oceanography, meteorology, geomagnetism, and space physics. Lectures will develop basic techniques and guide the student in designing working algorithms. The student will apply algorithms to various data suites from geophysics, using the Geophysical Institute's VAX 11/780 computer. (Prerequisites: Math 401 and 402, familiarity with FORTRAN or consent of instructor. Next offered: 1989-90.)

PHYS 629 3 Credits Alternate Fall
Methods of Numerical Simulation in Fluids and Plasma (3+0)
 (Same as MSI 629)
 The fundamentals of computer simulation including time and spatial differencing and stability theory applied to partial differential equations describing convective and diffusive transport in fluids. The second part of the course will be separated into two tracks: one specializing in ocean and atmospheric dynamics and the other in the plasma state of matter. (Prerequisites: Math. 310, 421, 422 or equivalent; baccalaureate degree in physics, engineering or mathematics or equivalent; for plasma physics track: baccalaureate degree in physics including Phys. 311, 312, 331, 332 or equivalent; experience with FORTRAN. Next offered: 1989-90.)

PHYS 631 3 Credits Alternate Fall
PHYS 632 3 Credits Alternate Spring
Electromagnetic Theory (3+0)
 Electrostatics, magnetostatics, Maxwell's equations, and potentials. Lorentz equations, field energy, gauge conditions, retarded potentials, waves, radiation, tensor formulations, and non-Maxwellian electrodynamics. (Permission of instructor and Phys. 631, or equivalent, for Phys. 632. Next offered: 1989-90.)

PHYS 640 3 Credits Alternate Spring
Auroral Physics (3+0)
 The physical and chemical processes that underlie the formation of the aurora. The interaction of energetic particles with the atmosphere in producing various aurorally associated phenomena, optical emissions, ionization, x-rays, and chemical-ionic changes. Effects of aurora on the thermosphere, mesosphere, and stratosphere. Effects of electric fields. The auroral energy budget. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)

PHYS 645 3 Credits Alternate Fall
Fundamentals of Geophysical Fluid Dynamics (3+0)
 An introduction to the mechanics of fluid systems, the fundamental processes and Navier-Stokes' equations in rotating and stratified fluids, boundary layer phenomena, turbulent flows and mixing, wave motions and applications. (Prerequisite: Graduate standing. Next offered: 1989-90.)

PHYS 650 3 Credits Alternate Fall
Aeronomy (3+0)
 The physical and chemical processes that govern the response of planetary atmospheres to solar radiation, surface phenomena. Composition of the neutral and ionized gases. Chemical and ionic reactions in the thermosphere, mesosphere, and stratosphere. Dynamical processes and upper air winds. The airglow. Electrodynamical processes and ionospheric currents. (Prerequisite: Graduate standing or permission of instructor. Next offered: 1989-90.)

PHYS 651 3 Credits Alternate Fall
PHYS 652 3 Credits Alternate Spring
Quantum Mechanics (3+0)
 Schrodinger's equations, operator formalism, correspondence principle, central force problems, perturbation theory, quantumstatistical mechanics and applications of quantum mechanics to collision problems, radiation, and spectroscopy. (Prerequisites: Permission of instructor and Phys. 651, or equivalent, for Phys. 652. Next offered: 1989-90.)

PHYS 672 3 Credits Alternate Fall
Magnetospheric Physics (3+0)
 Mass, momentum and energy transfer in the solar wind-magnetosphere-ionosphere interaction, electrodynamics of the magnetosphere-ionosphere coupling, auroral acceleration process, auroral kilometric radiation, geomagnetic pulsations, magnetospheric substorm phenomena and theories, generation mechanism of field-aligned currents, structures and instabilities at the magnetopause. (Prerequisite: Graduate standing. Next offered: 1989-90.)

PHYS 673 3 Credits Alternate Spring
Space Physics (3+0)
 Sun spot formation, solar flare theories, solar wind, planetary bow-shocks and interplanetary shocks, cosmic rays, pulsars, magnetic field reconnection concepts and theories, dynamo theories. (Prerequisite: Graduate standing. Next offered: 1989-90.)

Political Science

PS 101 3 Credits Fall and Spring
Introduction to American Government and Politics (3+0) s
 Principles, institutions, and practices of American national government; the Constitution, federalism, interest groups, parties, public opinion, and elections.

PS 102 3 Credits Fall and Spring
Introduction to American Government and Politics (3+0) s
 A survey of outstanding problems in policy areas of defense, energy, economic policy, civil rights, technology, social welfare, business regulation, pollution, and education.

PS 110 1 Credit Fall and Spring
Parliamentary Procedures (1+0)
 (Same as ANS. 110)
 Introduction to the rules and principles of parliamentary procedures and their application to group decision-making processes.

PS 201 3 Credits Fall
Comparative Politics: Methods of Political Analysis (3+0) s
 Modern methods of analyzing political behavior and processes on a cross-national basis. Specific topics to be covered in different semesters. (This course may be repeated for a maximum of 6 credits.)

PS 202 3 Credits Spring
Comparative Politics: Contemporary Doctrines and Structures (3+0) s
 Analysis of conflicting approaches to the solution of social and political problems with emphasis on nations employing various forms of ideological systems. (This course may be repeated for a maximum of 6 credits.)

PS 210 3 Credits Spring
Alaska Government and Politics (3+0) s
 A comprehensive introduction to the state's government and politics, including political history (as a territory and state), Constitution, political parties, interest groups, elections, public opinion, Governor, Legislature, Judiciary, administration; local government and public policy issues.

PS 211 3 Credits Alternate Fall
State and Local Government (3+0) s
 Forms, functions, and policies of state and local governments in the United States. Intergovernmental relations and comparative analysis of the politics of the 50 states. (Next offered: 1989-90.)

PS 212 3 Credits Alternate Spring
Introduction to Public Administration (3+0) s
 (Same as JUST 259)
 Theories and practice of public administration, especially as applied to federal agencies. Study of organization, planning, and decision making in implementing public policy. (Next offered: 1988-89.)

PS 250 3 Credits Fall
History of the Law (3+0) s
 (Same as JUST 250)
 An introduction to the history of law in Western civilization with an emphasis on the development of Anglo-American law in America.

PS 263 3 Credits Fall and Spring
Alaska Native Politics (3+0) s
 An introduction to the political development, organization, interests and activities of Alaska Natives; treatment of ethnic leadership issues, history of federal Indian policy, evolution of Native leadership, village and regional government, land claims, and community politics from the Alaska Native brotherhood to ANCSA to the Alaska Native Coalition.

PS 301 3 Credits Alternate Fall
American Presidency (3+0) s
 A study of the institution of the presidency in the American political system. (Prerequisite: P.S. 101 or consent of instructor. Next offered: 1988-89.)

PS 302 3 Credits Alternate Spring
Congress and Public Policy (3+0) s
 A study of the American Congress in the political system. (Prerequisite: P.S. 101. Next offered: 1989-90.)

- PS 303 3 Credits Fall**
Introduction to Legal Processes (3+0)
 (Same as JUST 303)
 The purpose and function of law in society, with a focus on legal reasoning and decisionmaking in civil cases. (Prerequisites: P.S. 101, Just. 110.)
- PS 310 3 Credits Alternate Fall**
The Politics of Post-Industrial States (3+0) s
 Political systems of societies which have completed their industrial revolutions. The problem of the welfare state, the no-growth society, the end of ideology, the loss of the work ethic, identity in homogeneous societies. Countries: the U.S., Great Britain, Soviet Union, Germany, Japan. (Prerequisite: P.S. 101 or 102 or consent of instructor. P.S. 201 strongly recommended. Next offered: 1989-90.)
- PS 311 3 Credits Alternate Spring**
Government and Politics of the Soviet Union (3+0) s
 A survey of Soviet institutions and political processes. (Prerequisites: P.S. 201 or permission of instructor. Next offered: 1989-90.)
- PS 312 3 Credits Alternate Fall**
Government and Politics of China (3+0) s
 Modern Chinese politics and society, including government institutions, political processes, foreign relations, and U.S.-China relations (Prerequisites: P.S. 201 or consent of instructor. Next offered: 1988-89.)
- PS 315 3 Credits Alternate Spring**
American Political Thought (3+0) s
 Political ideas in the United States from colonial times to the present: Puritanism, revolutionary ideas, Constitutionalism, nature of the Union, Progressive movement, pragmatism. (Prerequisite: P.S. 101 or consent of instructor. Hist. 131 and 132 strongly recommended. Next offered: 1988-89.)
- PS 321 3 Credits Fall**
International Politics (3+0) s
 Introduction to the international political system; evolution, process, concepts, dynamics, problems, and techniques for resolving conflicts. A survey of international political theory, including classical, geopolitical and behavioral approaches. (Prerequisites: P.S. 101 and 102 or permission of instructor.)
- PS 322 3 Credits Alternate Spring**
International Law and Organizations (3+0) s
 International law, regional and international organizations, and non-state actors in the world system, arms control and disarmament, international political integration. (Prerequisites: P.S. 101 and 102 or permission of instructor. Next offered: 1988-89.)
- PS 325 3 Credits Spring**
Native Self Government (3+0) s
 (Same as ANS 325)
 Comparative study of indigenous political systems, customary law and justice in Alaska emphasizing the organization of Native governance federal Indian Law and Alaska state chartered local government with comparisons between Alaska Native political development and those of tribes in the contiguous 48 states and northern hemisphere tribal people. (Prerequisites: Hist. 100, P.S. 263.)
- PS 330 3 Credits Spring**
Law and Society (3+0) s
 (Same as JUST 330)
 Study of moral issues related to the proper reach, extent, and enforcement of the law. (Prerequisites: P.S. 101 or Just. 110.)
- PS 400 3 Credits Fall**
Political Science Research Methods (3+0) s
 Methods, techniques, applications of political science and policy research including research design and planning; sampling, survey research methods, content analysis, observation, field research, aggregate data analysis, and description of data. (Prerequisites: P.S. 101, 102 or permission of instructor.)
- PS 401 3 Credits Alternate Spring**
Political Behavior: Organizations (3+0) s
 How organizations and groups in the U.S. behave. Focus on political parties, labor unions, business, and ethnic associations. Class research project on impact of organizations in modern political life. (Prerequisites: P.S. 101, 102 and 400 or permission of instructor. Next offered: 1988-89.)
- PS 402 3 Credits Alternate Spring**
Political Behavior: Individuals (3+0) s
 How individuals behave in the U.S. polity. Focus on political parties, labor unions, business, and ethnic associations. Class research project on impact of political opinions, attitudes, beliefs, and values in modern political life. (Prerequisites: P.S. 101 and 102 or permission of instructor; P.S. 400 strongly recommended. Next offered: 1988-89.)
- PS 403 3 Credits Alternate Spring**
Public Policy (3+0) s
 Discussion of the way in which the policy process works and how policy analysis is carried out. Examples of policy issues from recent cases, especially in Alaska. (Prerequisites: P.S. 101 and junior standing. Next offered: 1989-90.)
- PS 404 3 Credits Spring**
Introduction to Legal Research and Writing (3+0)
 (Same as JUST 404)
 The methods of legal research and preparation of legal materials. Introduction to the resources of law libraries and the techniques of presenting issues in legal form. (Prerequisites: P.S. 101, Just. 110, Just./P.S. 303.)
- PS 411 3 Credits Alternate Fall**
Classical Political Theory (3+0) h
 Political ideas from ancient Greece, Rome, and the Judaeo-Christian tradition. Theories of Plato, Aristotle, Cicero, Augustine, and Aquinas. (Prerequisites: P.S. 101 and 102 or consent of instructor. Next offered: 1989-90.)
- PS 412 3 Credits Alternate Spring**
Modern Political Theory (3+0) s
 Political ideas from the Renaissance to the modern world. Theories of Machiavelli, Hobbes, Locke, Rousseau, Burke, Marx, and Lenin. (Prerequisites: P.S. 101 and 102 or consent of instructor; P.S. 411 strongly recommended. Next offered: 1989-90.)
- PS 415 3 Credits Alternate Fall**
Contemporary Political Theory (3+0) s
 Theories of types of democratic regimes, including individualist and socialist. Analysis of underlying values and structural differences, drawing upon contemporary national state cases. (Prerequisites: P.S. 101 and 102 or permission of instructor; P.S. 412 strongly recommended. Next offered: 1988-89.)
- PS 435 3 Credits Alternate Fall**
The Supreme Court and the American Legal System (3+0) s
 The role of the Supreme Court in the development of American law with emphasis on the influence of social, political, and economic factors on the behavior of courts. (Prerequisites: P.S. 101 and 102 or permission of instructor. Next offered: 1988-89.)
- PS 436 3 Credits Alternate Spring**
The Courts and Civil Liberties (3+0) s
 Origin and development of civil and political liberties; responsibility of the branches of government and the people for their maintenance. (Prerequisite: P.S. 101. Next offered: 1988-89.)
- PS 437 3 Credits Alternate Spring**
Foreign Policy (3+0) s
 U.S. foreign policy in the post-war world, including development of policy (domestic and foreign influences), administration of political and military policies, policy coordination and evaluation of policy effectiveness in the nuclear age. (Prerequisites: P.S. 101 and 102 or permission of instructor. Next offered: 1989-90.)
- PS 475 3 Credits Fall and Spring**
Internship in Public Affairs (3+0)
 Study of public agencies or organizations through actual experience. (Admission by permission of the instructor.)
- PS 480 1-3 Credits Fall and Spring**
Model United Nations (1-3+0) s
 The history, organization, functions, and procedures of the United Nations. Can be taken for any combination of parts A, B, C for a total of 6 credits.
- PS 480A Model U.N.: Member Nations Fall**
 Introduction to United Nations organization and procedures. 1 credit (may be repeated for a maximum of 2 credits).
- PS 480B Model U.N.: Simulation Spring**
 Introduction to the use of simulation in international policymaking and administration, focusing on a United Nations member nation. 1 credit (may be repeated for a maximum of 2 credits).
- PS 480C Model U.N.: Conference Participation Spring**
 Participation in the Annual Session of the Model United Nations. 1 credit (may be repeated for a maximum of 2 credits). (Prerequisite: P.S. 321 or permission of instructor.)
- PS 481 3 Credits As Demand Warrants**
Geopolitics and the International Environment (3+0) s
 Relationship of the international environment (topography, demography, natural resources, technological change, and divergent patterns of economic development) and world politics. (Prerequisites: P.S. 101 and 102 or permission of instructor; P.S. 321 strongly recommended.)

Psychology

PSY 101 3 Credits Fall and Spring Introduction to Psychology (3+0)s

Fundamentals and basic principles of general psychology emphasizing both the natural science orientation and the social science orientation including the cultural, environment, heredity, and psychological basis for integrated behavior; visual perception and its sensory basis; audition and the other senses; motivation and emotion; basic processes in learning, problem solving, and thinking; personality; psychological disorders; and the prevention, treatment, and therapeutic strategies. (Also available via television as a self-paced, computer-aided course; special telecourse fee: \$20.00.)

PSY 116 2 Credits As Demand Warrants Loosening the Grip: A Survey of Alcohol Information (2+0)

An alcohol education course covering such topics as factors affecting alcohol use; the effects of alcohol; the symptoms and causes of alcoholism and alcoholic behavior; intervention and treatment; and special treatment considerations (the family of the alcoholic, special populations and prevention).

PSY 161 3 Credits As Demand Warrants Counseling Skills I (3+0)

The study and acquisition of counseling techniques centered on the development of a helping relationship. Emphasis on communication skills including forms of questioning, responses and leads, non-verbal communication. Other topics include delineation of the counselor role, ethics and confidentiality and making referrals. Extensive use of role playing and videotaping as learning approaches.

PSY 202 3 Credits As Demand Warrants Psychology of Adjustment (3+0)

Application of psychological principles to the student's everyday life. Learn to analyze his/her behavior. Emphasis will be on the variety of ways people cope with stress, and what are the most adaptive ways of coping with that life brings.

PSY 210 3 Credits Spring Cross-Cultural Psychology (3+0)s

A survey of the concepts, premises, and methods of cross-cultural psychology emphasizing its use in testing, extending, and refining psychological theories developed in Western settings. Topics include perceptions, cognition, social behavior, psychopathology, and social change as they relate to cultural variation. (Prerequisite: Psy. 101.)

PSY 230 3 Credits Alternate Fall Psychology of Adjustment (3+0)s

Study of the psychology of adjustment, growth, and creativity, including advances in personal psychology, understanding personality patterning, and an exploration of burgeoning techniques and methods for furthering creative potential. (Prerequisite: Psy. 101. Next offered: 1989-90.)

PSY 240 3 Credits Fall and Spring Developmental Psychology in Cross-Cultural Perspective (3+0)s

The development of persons is examined from both a psychological and cross-cultural perspective. Key topics will be the development of cognition, personality, and social behavior with attention to relevant research on those cultures found in Alaska. (Prerequisite: Psy. 101.)

PSY 245 3 Credits As Demand Warrants Child Development (3+0)

A study of the physical, emotional, cognitive, and social aspects of a child's development from the prenatal period through early adolescence. (Prerequisite: PSY 101 or permission of the instructor.)

PSY 250 3 Credits Fall and Spring Introductory Statistics for Behavioral Sciences (3+0) (Same as Soc. 250)

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. (Prerequisite: Psy. 101.)

PSY 255 3 Credits Fall Foundations of Counseling I (3+0) (Same as HMSV 255)

This course is a survey of counseling philosophy and the various types of counseling systems that are used in most settings. An examination of the appropriate approach and system match will be undertaken so that the student will be able to make intelligent decisions concerning which approach to use. Some of the approaches examined will be psychoanalysis, behavior therapy, and humanistic approaches. Offshoots of these approaches will be surveyed if they are in fairly wide use. Counseling ethics will be studied and ethical problems illustrated and discussed. (Prerequisites: Psy 101 and Psy 240 or permission of instructor.)

PSY 261 3 Credits As Demand Warrants Counseling Skills II (3+0)

A continuation of Psy 161 to further develop counseling skills and increase sophistication in the application of skills. Topics include specific counseling strategies and techniques, goal-setting, termination issues and methods of self-critique for paraprofessional counselors. Extensive use in class of case study, role play and audio and video taping. (Prerequisite: Psy 161 or permission of instructor.)

PSY 262 2 Credits As Demand Warrants Family Counseling Skills (2+0)

Concentration on practical counseling skills set against the backdrop of family therapy. Teaching of family therapists will be applied to the solution of problems of everyday living and those presented to local human service agencies. Students are encouraged to integrate theoretical learning with their own style. (Prerequisites: Psy 101, 161, or permission of instructor.)

PSY 267 3 Credits As Demand Warrants Stress and the Family (3+0)

A study of family in the context of both producing and reacting to stress. Focus is on sources of stress from inside and outside the family system. Concentration is on the normal, gradual and cumulative life stressors experienced during the life cycle of the family as well as the extraordinary stressors which occur suddenly and which frequently overwhelm the family's ability to cope. (Prerequisite: Psy 101 or permission of instructor.)

PSY 304 3 Credits Fall Personality (3+0)s

Psychological and social/cultural determinants of personality formation including appropriate theories in both areas. (Prerequisite: Psy. 101.)

PSY 330 3 Credits Spring Social Psychology (3+0)s (Same as Soc. 330)

An analysis of inter-group relationships in terms of process and value orientation, their influences on the personality, and the various aspects of collective behavior on group and person. Of special concern are those aspects of social interaction that have cultural and intercultural variation. (Prerequisite: Psy. 101 or Soc. 101 or junior standing.)

PSY 345 3 Credits Fall Abnormal Psychology (3+0)

A study of abnormal behavior, its causes, treatment, and social impact. The major classifications of disorders are presented. (Prerequisite: Psy. 101.)

PSY 350 3 Credits Alternate Spring Comparative Psychology (3+0)s

An integrated multidisciplinary behavioral approach to the study of comparative psychology emphasizing the basic premises, causal factors, functional consequences and interrelationships, and synthesis of animal behavior and ethology in the development and maintenance of behavioral patterns extant within both individual organisms and social groups. (Prerequisites: Biol. 105-106, Psy. 101, or permission of instructor. Next offered: 1988-89.)

PSY 356 3 Credits Spring Foundations of Counseling II (3+0) (Same as HMSV 351)

This course is a continuation of HMSV 350-Foundations of Counseling I. Specific counseling strategies will be studied in-depth such as crisis intervention, individual techniques such as the rational therapies and specific behavioral approaches. The role of the counselor in community education and consultation will be explored as will methods of promoting community change. Issues in cross-cultural counseling will be studied to include those likely to be encountered in Alaska. (Prerequisites: HMSV 350 or Psy. 355.)

PSY 370 3 Credits Alternate Fall Drugs and Drug Dependence (3+0)s (Same as Soc. 370.)

A multidisciplinary approach to the study of drugs and drug abuse emphasizing acute and chronic alcoholism, commonly abused drugs, law enforcement and legal aspects of drug abuse, medical uses of drugs, physiological aspects of drug abuse, psychological and sociological causes and manifestations of drug abuse, recommended drug education alternatives and plans, and the treatment and rehabilitation of acute and chronic drug users. (Prerequisite: Psy. 101 or Soc. 101 or permission of instructor. Next offered: 1989-90.)

PSY 380 3 Credits Alternate Fall Human Behavior in the Arctic (3+0)s

A study of human behavior as it relates to cold climates. Emphasis will be placed on living systems in Alaska and behavioral characteristics that have to do with stress and isolation. Material will include structural design as related to behavioral research. (Prerequisite: Psy. 101. Next offered: 1988-89.)

- PSY 440 3 Credits** Alternate Spring
Learning (3+0) s
 Survey of theory and research on the fundamentals of learning. Topics to be covered include: animal learning, classical conditioning, instrumental learning, discrimination learning, biological constraints on learning, and cross-cultural differences in learning styles. (Prerequisite: Psy. 101. Next offered: 1989-90.)
- PSY 445 3 Credits** Fall
Community Psychology (3+0) s
 (Same as HMSV 445)
 Community psychology foundations to include community assessment and consultation with regard to areas for study, surveys, evaluation of services, and use of results for programming. During the community consultation portion, education, prevention, and service issues are covered with particular attention given to rural and small community assessment and change, especially as it applied to Alaska. (Prerequisites: Psy. 101, Soc. 101, HMSV 201.)
- PSY 450 4 Credits** Spring
Experimental Psychology (2+6) s
 An integrated approach to the study of experimental psychology. Emphasis will be placed on the research methodologies and techniques extant in the diverse areas of experimental psychology. Students will engage in the design, execution, and analysis of individual projects involving both animal and human subjects, which relate to fields of current research interest in psychology. (Prerequisites: Psy. 101, Psy. 250 or A.S. 301, and C.S. course(s) strongly recommended and/or permission of instructor.)
- PSY 460 4 Credits** Alternate Fall
Physiological Psychology (3+3) s
 An integrated multidisciplinary approach to the study of physiological psychology — neuroanatomy and neurophysiology — emphasizing the basic principles, cortical and subcortical organization, functional mechanisms, and the physical-chemical foundations extant in the physiological bases of behavior with special reference to such disciplines as neuroanatomy, neurochemistry, and electrophysiological measures employed in the study of behavior and brain activity; research methods and techniques, and extensive exploration into areas of current research interest, including brain dynamics, the neural bases of learning, the neural substrates of emotion and motivation, states of consciousness, and stress and psychosomatic relationships. (Prerequisite: Psy. 101, Biol 105-106 or Biol 111-112 strongly recommended, or permission of instructor. Next offered: 1989-90.)
- PSY 470 3 Credits** Alternate Fall
Sensation and Perception (3+0) s
 An integrated psychophysiological inquiry into the study of sensation and perception emphasizing the essential principles, functions and organization, fundamental mechanisms, and the structural complexity extant in the sensory physiology of the special sensory processes — audition, gustation, kinesthesia, olfaction, proprioception, somesthesia, and vision — as well as an examination of the theoretical models and systems of perception with special reference to the biological, cultural, developmental, hereditary, physiological, psychological, and social effects on the interpretation of perceptual and sensory phenomena. (Prerequisite: Psy. 101, Psy. 460, and Biol. 105-106 or Biol. 111-112 strongly recommended; and/or permission of instructor. Next offered: 1988-89.)
- PSY 473 3 Credits** Fall
Social Science Research Methods (3+0) s
 (Same as Soc. 473)
 Techniques of social research: sampling, questionnaire construction, interviewing and data analysis in surveys; field and laboratory experiments, and attitude scaling. (Prerequisite: Psy. 250 or Soc. 250).
- PSY 610 3 Credits** Fall
Alcohol: Pharmacology and Behavior (3+0)
 A multidisciplinary approach to the study of alcohol abuse and alcoholism which incorporated the biomedical, epidemiological, genetic, pharmacological, psychological, social, and cultural bases. (Prerequisite: Permission of instructor)
- PSY 615 3 Credits** Fall
Drug Action: Physiology and Behavior (3+0)
 A multidisciplinary approach to the study of drugs and drug abuse which emphasizes the biomedical, epidemiological, genetic, pharmacological, psychological, and sociological factors extant in drug use and misuse. (Prerequisite: Permission of instructor)
- PSY 618 3 Credits** Spring
Community Treatment Alternatives (3+0)
 An examination of the role of community in the treatment of mental health problems among indigenous or ethnic groups. It will focus on bringing to bear the resources of the community on the healing process. (Prerequisite: Permission of instructor)
- PSY 620 3 Credits** Spring
Treatment of Drug and Alcohol Dependency (3+0)
 An examination of the treatments available for drug and alcohol abuse. Both medical and psychological treatments will be studied. Medical treatments will include abrupt, gradual, and substituting techniques. Psychological techniques will include traditional Western therapies as well as other less traditional approaches. (Prerequisite: Psy. 610 or 615)
- PSY 625 3 Credits** Spring
Prevention of Alcohol and Drug Dependency (3+0)
 A study of the various ways to prevent alcohol dependency, especially among indigenous peoples or in ethnic groups. There will be an emphasis on cross-cultural approaches to the prevention of dependency. (Prerequisite: Permission of instructor)
- PSY 630 3 Credits** Fall
Community Psychology (3+0)
 The current status of community psychology with an analysis of what synergistic community is, its diverse forms across cultures, and delineates the most common approaches to the theory, research, and practice of community psychology. The course finishes with an analysis of prevention, theory and interventions in communities. (Prerequisite: Permission of instructor)
- PSY 631 3 Credits** Spring
Community Psychology: Cross-cultural Applications and the Ethics of Change (3+0)
 Application of principles of community psychology to cross-cultural settings, especially in Alaska. Indigenous and alternative approaches to change. Value-context of community psychology is examined - the ethics of intervention, the dynamics of individual and community empowerment and liberation, the spiritual dimension of socio-economic development. A community-based practicum is central to the course as is participation of Native elders and community providers. (Prerequisites: Graduate standing in community psychology master's program and Psy 630 or permission of instructor.)
- PSY 635 3 Credits** Spring
Field-Based Research Methods (3+0)
 A presentation of methods used in doing cross-cultural social research in community settings. The emphasis is on the formal description of the interaction between persons and their environments. The course will present a wide variety of designs, analyses, and conceptual approaches appropriate to improving our general understanding of behavior in communities. Both quantitative and qualitative methods will be presented in the context of carrying out individual research projects. (Prerequisite: Permission of instructor)
- PSY 638 3 Credits** Spring
Social Policy and Social Change (3+0)
 (Same as Soc. 638)
 Analysis of social policy issues related to community health, empowerment, and change will lead to an understanding of how spontaneous and planned social change takes place. Particular attention will focus on issues in the development of new settings in cross-cultural and rural contexts. (Prerequisite: Permission of instructor)
- PSY 645 3 Credits** Spring
Prevention Theories and Strategies (3+0)
 (Same as Soc. 645)
 Environmental and psychosocial approaches in the prevention of mental and emotional disturbances. Theories that focus on situational stress are examined, as well as methods and coping situations that can be used to reduce this stress. The unique environmental problems of rural areas and problems in cases of cultural conflict are particularly noted. (Prerequisite: Permission of instructor)
- PSY 646 3 Credits** Fall
Consultation (3+3)
 (Same as Soc. 646)
 Experiences and training in consultation skills as a professional who can be looked to for expert help in specific areas related to their preparation in community psychology and related disciplines. Consultation as problem solving, as indirect service and as a colleague relationship in behavior dynamics, personal and interpersonal relationships, communication skills and community network support services is emphasized. (Prerequisite: Permission of instructor)
- PSY 650 3 Credits** Fall
Cross-Cultural Psychopathology (3+0)
 The etiology and treatment of different forms of major and minor mental illnesses across a specific group of cultures: Western, Native, American, Oriental, and African. Students will learn to conceptualize madness and its diagnosis using a variety of cultural formats. (Prerequisite: Psy./Soc. 340 and/or permission of instructor)

- PSY 655 3 Credits Spring**
Healing: Implications for Clinical/Community Practice (3+0)
 A presentation of healing across a variety of cultures: Native American, Western, African, Polynesian, and Oriental. The course will emphasize the preparation and education of healers, their roles and work, and integration within a community. Analyses and implications for the practice of preparation for community psychology roles will be stressed. (Prerequisite: Permission of instructor)
- PSY 660 4 Credits Fall**
Principles and Techniques of Individual Counseling (3+3)
 (Same as Coun. 623)
 A survey of the major theoretical systems of counseling and a limited practice in basic techniques. Major systems include cognitive, behavioral, psychodynamic, perceptual/phenomenological, and existential approaches. Actual practice in techniques of listening, helping, session management, problem identification, and goal setting. (Prerequisites: Coun. 615 and/or permission of instructor.)
- PSY 661 3 Credits Spring**
Cross-Cultural Counseling (3+0)
 An examination of the ethnic and cultural issues that affect the counseling setting, interaction, and outcome. There will be a review of the literature dealing with intercultural counseling, discussions of workable methods that have been used in such counseling, and examinations of target populations with whom the counselor may be involved, especially in Alaska. (Prerequisite: Permission of instructor)
- PSY 662 3 Credits Alternate Fall**
Transformational Development and Psychotherapy (3+0)
 Depth psychological perspectives, including both modern psychodynamic approaches and mythological traditions from various cultures, of the development of consciousness and the self. The relationship of suffering and psychopathology to stages of development. Self-study and clinical methods which draw upon expressions of the unconscious, focusing therapeutic work with dreams. (Prerequisite: Graduate standing in community psychology or permission of the instructor. Next offered: 1989-90.)
- PSY 663 3 Credits Fall**
Clinical Methods and Assessment (3+0)
 Fundamentals of therapeutic interviewing. Assessment of personality style and classification of psychopathology. Introductory survey of, and experience with, psychological tests. (Prerequisites: Graduate standing in community psychology or permission of instructor.)
- PSY 664 3 Credits Spring**
Behavior Therapy (3+0)
 A comprehensive examination of behavior therapy and its associated techniques. The philosophical and scientific basis for behavior therapy will be studied as well as specified procedures such as systematic desensitization, assertive training, behavior modification, and others. Students will practice such techniques so as to gain facility with the skills involved. (Prerequisite: Permission of instructor)
- PSY 665 3 Credits Alternate Fall**
Psychoanalytic Theory and Clinical Method (3+0)
 Psychoanalytic theory and the study of lives are presented to acquaint the student with the analysis of life histories or psychoanalytic perspective. Students study the therapeutic procedures of Freud, Jung, Searles, Sullivan, Lacan, and object relations theorists. (Prerequisite: Permission of instructor. Next offered: 1988-89.)
- PSY 666 3 Credits Spring**
Family and Network Therapy (3+0)
 Survey of concepts and theories of function and dysfunction in the area of couples and families as social networks. In addition, it provides an introduction to the skills necessary for one who would intervene in these systems. (Prerequisite: Permission of instructor)
- PSY 667 3 Credits Alternate Spring**
Existential Psychotherapy (3+0)
 Focus on ultimate concerns rooted in the individual's existence. Theoretical and therapeutic approaches to existential issues such as death, freedom, isolation/relationship, meaning/meaninglessness, and suffering. Euro-American, Native American and Eastern concepts and practices will be examined. (Prerequisite: Permission of instructor. Next offered: 1988-89.)
- PSY 668 3 Credits Spring**
Crisis Intervention (3+0)
 An overview of the development of crisis theory that examines major assumptions, characteristics, and stages of a crisis situation. Counselor training issues and descriptive intervention techniques with respect to assessing individuals in crisis will be discussed. Examining specific types of crises encountered within the community and strategies for handling those crises situations will be focused upon in depth. Class activities will include utilizing skills in brief treatment through role-playing of crises situations. (Prerequisite: Permission of instructor)
- PSY 670 3 Credits Spring**
Advanced Cross-Cultural Psychology (3+0)
 Culture's impact on the basic psychological processes and human behavior in general. Topics covered include perception, cognition, personality, abnormal behavior, and social psychology. This course emphasizes that no culture exists in isolation and considers that fact when looking at traditional topics in psychology. As such the course draws heavily on data from sociology and anthropology. Also, as much evidence as is available from those ethnic groups and subcultures in Alaska will be the basic material for the course. (Prerequisite: Permission of instructor)
- PSY 674 3 Credits Spring**
Group Counseling (3+0)
 (Same as Coun. 624)
 Kinds and types of groups with emphasis on methods, problems and needed skills in working with groups in a counseling situation. (Prerequisite: Permission of instructor)
- PSY 677 3 Credits Alternate Spring**
Psychological Assessment - Intelligence (3+0)
 A focus on methods of psychological assessment concerning intelligence. Initially the concept of intelligence will be surveyed as well as its many multicultural implications. The latter part of the course will enable students to gain familiarity with some of the more widely-used intelligence assessment procedures and be particularly concerned with minority issues and the concept of intelligence. (Prerequisite: Permission of instructor. Next offered 1988-89.)
- PSY 678 3 Credits Alternate Spring**
Psychological Assessment - Personality (3+0)
 An examination of current practices, issues, and problems in the rapidly developing field of personality assessment. Particular emphases will be paid to problems of multicultural personality concepts and evaluations. Hands-on experience will be required. (Prerequisite: Permission of instructor. Next offered 1988-89.)
- PSY 683 3 Credits Spring**
Biological Bases of Behavior and Behavioral Change (3+0)
 A review and extension of neuroanatomy and neurophysiology which emphasizes the basic function and structure of both the central and peripheral nervous systems. Systematic examination includes advanced topics in clinical neuropsychology, clinical neurology, psychopharmacology, psychoneuroendocrinology, and the biochemical processes underlying dysfunction, as well as treatment approaches to the various neuropsychological and psychological disorders. (Prerequisite: Permission of instructor)
- PSY 688 3 Credits Spring**
Practicum in Community Psychology (2+7)
 Practicums provide for supervised experiences and weekly seminars with course instructor. The supervised experience is at an agency that will provide direct and/or participant observation and interactions for the beginning counselor along with immediate feedback concerning the experience. The weekly seminars will cover actual and role-playing situations and skills appropriate to the specific practicum, i.e. alcohol or drug abuse, community, or clinical. (Prerequisite: Permission of instructor)
- PSY 690 3-12 credits Semester**
Internship in Community Psychology (0+40)
 Usually one semester. The internship would not occur until after the first year. However, it can be two summers or one-half time over a year or so or full-time for one semester in order to get 600 hours. The internship must be adequately supervised and may involve more than one site. Graded Pass/Fail. (Prerequisite: Completion of required coursework)

Religion

RELG 205 3 Credits As Demand Warrants
Introduction to the Bible (3+0)

A study of the Bible as literature of ancient Israel and the early Christian Church.

RELG 221 3 Credits AS Demand Warrants
Religions of the World (3+0)

A survey of the development of major religions of the Eastern and Western world including contemporary world religions.

Rural Development

RD 200 3 Credits Fall
Community Development in the North (3+0)

Examines rural community development efforts in Circumpolar countries and the impact of these efforts on Northern communities and indigenous peoples.

RD 255 3 Credits As Demand Warrants
Rural Alaska Land Issues (3+0)

The history and significance of ANCSA, ANILA and other land issues in rural areas of Alaska.

RD 265 3 Credits Fall
Perspectives on Subsistence in Alaska (3+0)

Examines the socio-economic, cultural, legal and political dimensions of subsistence lifestyles in Alaska.

RD 300 3 Credits As Demand Warrants
Rural Development in a Global Perspective (3+0) s

A comparative and theoretical approach to the process of change and development in cross-cultural contexts, particularly in relation to their effects on rural communities. (Prerequisite: junior standing or permission of instructor.)

RD 325 3 Credits As Demand Warrants
Community Organization and Development Strategies (3+0) s

Examines community development/organizational strategies appropriate for a variety of institutional and community situations.

RD 338 3 Credits As Demand Warrants
Education and Economic Development (3+0)
(same as ED 338)

An examination of both theory and evidence linking varied forms of education to economic growth and development. A comparative approach is utilized to explore similarities and differences between rural Alaskan regional development and systematic nation-building efforts in developing countries. (Prerequisite: Permission of instructor.)

RD 350 3 Credits As Demand Warrants
Community Research and Planning Techniques (3+0)

Basic techniques and concepts associated with long range community level research, planning and evaluation, activities related to the needs of Native corporations, rural communities and the rural school districts, including practical experience in grant writing.

RD 375 3 Credits As Demand Warrants
Women and Development (3+0)

The effect of modernization and development processes on the role of women in a variety of Third World and tribal world contexts as well as the increasingly important 'new' role women play in these complex processes.

RD 400 3 Credits As Demand Warrants
Rural Development Internship

Structured experience in an appropriate educational, agency or corporate setting. An approved project required. Enrollment only by prior arrangement with the instructor.

RD 425 3 Credits As Demand Warrants
Cultural Impact Analysis (3+0)

An examination of the potential impacts of development projects on cultural systems, and then how we can use this information to shape the actual project in positive directions. Particular attention will be paid to data gathering and analysis techniques related to impact predictions. Students will be required to carry out an impact analysis as part of the course. (Prerequisite: RD 350 or permission of instructor.)

RD 450 3 Credits As Demand Warrants
Managing Community Development Projects and Programs (3+0)

Examines appropriate management and accountability approaches for small-scale, community-based programs and projects, particularly those found in rural and/or cross-cultural contexts. (Prerequisite: RD 325 or permission of instructor.)

RD 475 3 Credits As Demand Warrants
Rural Development Senior Project

Under faculty supervision, the student will be required to complete a major theoretical, research and/or applied project which relates the student's applied emphasis area to rural development considerations. (Prerequisite: Senior standing or permission of instructor.)

Russian

RUSS 075 3 Credits As Demand Warrants
RUSS 076 3 Credits As Demand Warrants

Conversational Russian I and II (3+0)

An introductory course for students who wish to acquire the ability to speak Russian. Students first learn to understand simple spoken language, then to speak simple Russian developing a beginning level of communicative competence in the language. (Prerequisite: Span 075 for 076.)

RUSS 101 5 Credits Fall
RUSS 102 5 Credits Spring

Elementary Russian I and II (5+0) h

Introduction to the language and culture: development of competence and performance in the language through understanding, recognition and use of linguistic structures, increasing emphasis on listening comprehension and speaking, basic vocabulary of approximately 750 words, exploration of the cultural dimension, implicitly through language, and explicitly through texts and audio-visual materials; use of Foreign Language Learning Center.

RUSS 201 4 Credits Fall
RUSS 202 4 Credits Spring

Intermediate Russian I and II (4+0) h

Continuation of Russ. 102. Increasing emphasis on reading ability and cultural materials. Conducted in Russian. (Prerequisite: Russ. 102 or two years of high school Russian.)

RUSS 288 2 Credits Alternate Spring
Individual Study: Reading Russian h

Emphasis on expanding passive vocabulary and recognizing basic grammatical structures; modern Soviet texts. (Prerequisites: Russ. 201, equivalent training or permission of instructor. Recommended to be taken concurrently with Russ. 202. Next offered: 1989-90.)

RUSS 301 3 Credits Alternate Fall
RUSS 303 3 Credits Alternate Fall

Advanced Russian (3+0) h

Discussions and essays on more difficult subjects or texts: translations, stylistic exercises, and special grammatical problems. Conducted in Russian. (Prerequisite: Russ. 202 or instructor's permission. Next offered: Russ. 301, 1989-90; Russ. 303, 1988-89.)

RUSS 387 2 Credits Alternate Fall
Individual Study: Semantics h

Systematic expansion of passive and active vocabulary through analysis of word fields, series of synonyms and antonyms, principles of word formation, derivation, composition, etc. (Prerequisite: Two years of Russian or permission of instructor. Next offered: 1989-90.)

RUSS 432 3 Credits Spring
Studies in Russian Literature and Civilization (3+0) h

Intensive study of authors, literary movements, periods, and/or genres. Analysis of cultural material other than texts. Conducted in Russian. Student may repeat course for credit when topics vary. (Prerequisites: Russ. 301 or 303 or equivalent, and at least sophomore standing, or permission of instructor.)

RUSS 487 2 Credits Alternate Fall
Individual Study: Translation (2+0) h

Expansion of vocabulary and grammatical knowledge, emphasis on understanding precise shades of meaning, stylistic, artistic expression and cultural values in language; literary and non-literary texts. Conducted in Russian. Student may repeat course for credit if materials vary. (Prerequisites: Russ. 301 or 303 or equivalent and at least sophomore standing, or permission of instructor. Next offered: 1988-89.)

Science Application

SCIA 100 1 Credits As Demand Warrants
Introducing Astronomy (1+0)

Course on the history of astronomy, the structure of the universe and its parts and the techniques used for studying the universe. Students will use various optical instruments to observe celestial bodies.

SCIA 107 1 Credit As Demand Warrants
Rock Identification (1+0)

A study of the physical properties of igneous, sedimentary and metamorphic rocks. These properties will be applied toward sight identification of rocks with emphasis on rocks found on the Seward Peninsula.

SCIA 109 1 Credit As Demand Warrants
Mineral Identification (1+0)

A study of the physical and field identifiable chemical properties of rocks and minerals. Emphasis will be on minerals found on the Seward Peninsula.

SCIA 130 1 Credit As Demand Warrants
Moose Ecology (1+0)

Using the natural history of moose, the ecological concepts of energy flow, nutrient cycling, food webs and population dynamics are presented. Special attention is given to the Seward Peninsula moose population and the factors that are considered in making wildlife management decisions.

SCIA 150 1 Credit As Demand Warrants
Subarctic Horticulture (0+3)

General study of horticultural techniques in a subarctic environment. Emphasis on development and care of greenhouses and gardens in the Nome area. Topics covered will be soils, plant propagation, disease and insect control, variety selection, fertilization, greenhouse construction and care and gardening techniques.

SCIA 161 1 Credit As Demand Warrants
Birds of Alaska (1+0)

The biology and identification of birds including behavior, anatomy, physiology, ecology, systematics and field identification. Birds of the Seward Peninsula will be emphasized.

SCIA 230 2 Credits As Demand Warrants
Biology and Management of King Crab in Norton Sound (1+3)

Study of the biology and management of King Crab in Norton Sound. Anatomy, physiology and ecology of the King Crab will be covered. Selected topics in scientific methodology, field biologist's duties and problems of fishery management will be presented. Students will work with Alaska Department of Fish and Game Biologists who are conducting an ongoing study of Norton Sound King Crab. Six student limit in lab; may register for lecture portion only.

SCIA 251 3 Credits As Demand Warrants
Horticultural Science in a Subarctic Environment (2+3)

Topics studied are plant anatomy, physiology, genetics, ecology, propagation, insect and disease control, soils, greenhouse construction and care and gardening techniques. Students will develop and carry out a horticultural research project in the Nome area.

Social Work

SWK 103 3 Credits Fall and Spring
Social Work in the Human Services (3+0)

Introduction to the profession of social work and the human services delivery system. Examines the historical development of social work focusing on the knowledge, values, and skills that characterize the social worker. Provides an orientation to the context for social work, including the diversity of human needs, human services, social policy and legislation which constitute society's response to social problems. Services, programs, and career opportunities within rural and urban Alaska, as well as nationally, are discussed.

SWK 225 2 Credits As Demand Warrants
Case Management (2+0)
 (same as HMSV 225)

Introduction to basic knowledge and skills needed to develop service plans in human service work and to maintain appropriate case records. Legal and ethical issues in case management are considered and discussed. (Prerequisite: Psy 101, Soc 101 or permission of instructor.)

SWK 306 3 Credits Spring
Social Welfare: Policies and Issues (3+0)

Social policies and how they effect the delivery of social services. Factors that have influenced the development of the current social service system and its place in the total social structure. Analysis of the dilemmas which develop in a welfare system attempting to deal with rapid social change. Exploration of alternative approaches to the solution of social problems and possible future developments in the social service system. (Prerequisite: HMSV 201.)

SWK 320 3 Credits Spring
Rural Social Work (3+0)

Preparation for practice in rural areas where there is a need for more than one delivery system, an understanding of rural customs, and a scarcity of resources. Emphasis will be on preparation for practice nationally with unique features of Alaska incorporated at key points. (Prerequisites: SWK. 103, Soc. 101 or Psy. 101.)

SWK 360 3 Credits Alternate Spring or As Demand Warrants
The Helping Role in Child Abuse and Neglect (3+0)

This course is designed to enable participants to identify and understand the dynamics, implications and treatments of child abuse and neglect for individuals and families in rural and urban Alaska. (Prerequisites: SWK 103 or permission of instructor.)

SWK 442 3 Credits Fall
Human Behavior in the Social Environment (3+0)

This course presents theoretical frameworks considered useful for organizing knowledge about the understanding of personality development and social behavior of individuals. The course will encompass the study of the life cycle, including the processes that shape the individual differences. (Prerequisites: SWK. 103, Soc. 101, Psy. 240 and senior standing.)

SWK 460 3 Credits Fall
Social Work Practice I (3+0)

Development of beginning skills in interviewing and helping processes with individuals, families and groups. Application of intervention strategies and techniques made to case materials, primarily in family and child welfare services. Contracting, case management and social brokerage are discussed. (Prerequisites: SWK. 306, social work major, senior standing; must be taken concurrently with SWK. 461.)

SWK 461 6 Credits Fall
Practicum in Social Work I

Application of knowledge and skills to practice in agency setting as practitioners in problem-solving process, including problem assessment, planning and negotiating contracts, implementation and goal attainment and termination and evaluation. Beginning generic skills are practiced in work with individuals, groups and families. Students complete 200 hours of direct practice in an approved agency under the supervision of a field instructor. (Prerequisites: SWK. 306, senior standing, social work major; must be taken concurrently with SWK. 460.)

SWK 463 3 Credits Spring
Social Work Practice II

Further development of student's knowledge of direct practice with clients and development of beginning skills in community work including social planning. Heavy emphasis placed on aspects of rural practice such as utilization of community associations and the informal helping network. (Prerequisites: SWK. 460, SWK 461, senior standing, social work major; must be taken concurrently with SWK. 464.)

SWK 464 6 Credits Spring
Practicum in Social Work II

Continuation of SWK. 461; further experience of direct practice with client groups, development and use of beginning skills in community work including social planning, indirect or macro-social work methods focus. Emphasis placed on social work methods adapted to rural and cross-cultural settings. Students complete 200 hours of practice in an approved agency under the supervision of a field instructor. (Prerequisites: SWK. 460, SWK. 461, senior standing, social work major; must be taken concurrently with SWK. 463.)

SWK 484 3 Credits As Demand Warrants
Seminar in Social Work Practice Areas (3+0)

The course covers problem areas in which social work is involved. Allows students to learn application of basic social work skills in special settings. Problem areas are covered separately in different semesters. Content will be announced in class schedule prior to each semester offered. Course may be repeated for credit when topic varies. (Prerequisites: SWK. 103, HMSV 201, junior or senior standing, or permission of instructor.)

Sociology

- SOC 101 3 Credits** Fall and Spring
Introduction to Sociology (3+0) s
 An introduction to the science of the individual as a social being, emphasizing the interactional, structural, and normative aspects of social behavior. An attempt is made to construct a cross-cultural framework in understanding and predicting human behavior. (Also available via television as a self-paced, computer-aided course; special telecourse fee: \$20.00.)
- SOC 102 3 Credits** Spring
Social Institutions (3+0) s
 A continuation of Soc. 101: application of the concepts learned by developing and carrying out short surveys of sociological phenomena. Institutions of society, such as family, political and economic order, are examined, including their operation in the Alaska rural and cross-cultural milieu. (Also available via television as a self-paced, computer-aided course; special telecourse fee: \$20.00. Prerequisite: Soc. 101.)
- SOC 160 3 Credits** As Demand Warrants
Current Woman (3+0)
 Explores both past history and current influences on Feminist Movement. Changing personal, sexual, family, economic and political roles of women. Emphasizes psychological impact of these changes on women's lives today.
- SOC 201 3 Credits** Fall
Social Problems (3+0) s
 A study of the major problems facing contemporary society, including analysis of factors giving rise these problems. Emphasis is given to cross-cultural differences in Alaska and other parts of the world. (Also available via television as a self-paced, computer-aided course; special telecourse fee: \$20.00.)
- SOC 207 3 Credits** As Demand Warrants
Population and Ecology (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.
- SOC 242 3 Credits** Spring
The Family: A Cross-Cultural Perspective (3+0) s
 The study of contemporary patterns of marriage and family relationships. Various approaches such as the developmental, systems, and social psychological are used to analyze these relationships. The family is followed through the stages of the family life cycle, such as mate selection, marriage, early marital interaction, parenthood, the middle and later years, and possible dissolution. Attention is given to cross-cultural differences in Alaska as well as in other parts of the world. (Prerequisites: Soc 101 or permission of instructor.)
- SOC 250 3 Credits** Fall and Spring
Introductory Statistics for Behavioral Sciences (3+0)
 (Same as Psy. 250.)
 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. (Prerequisite: Soc. 101.)
- SOC 301 3 Credits** Spring
Rural Sociology (3+0) s
 Application of the principles of sociology to the study of rural social systems in the U. S. and abroad. Topics covered include: societal processes, changing values, economic development, demographic change, agrarian reforms, planned change, and rural community networks. Part of the focus will be on the rural communities of Alaska. (Prerequisites: Soc. 101, Soc. 103 or permission of instructor.)
- SOC 307 3 Credits** Spring
Demography (3+0) s
 The study of formal demographic variables such as Fertility, Mortality, and Migration and their interaction with social demographic variables like social class, religion, race, residence, attitudes, and values. The course also focuses on the Alaskan population dynamics.
- SOC 309 3 Credits** Alternate Fall
Urban Sociology (3+0) s
 Origin and development of urban society as an industrial-ecological phenomenon; the trends of migration and metropolitanism with futuristic implications; and the rural-urban dichotomy in the Alaskan content. (Next offered: 1988-89.)
- SOC 310 3 Credits** Alternate Spring
Sociology of Later Life (3+0) s
 An analysis of the social status and role of the aging in America, with comparisons with elderly in Alaska as well as those in other societies. (Prerequisite: Soc. 101. Next offered: 1988-89.)
- SOC 330 3 Credits** Spring
Social Psychology (3+0) s
 (Same as Psy. 330)
 An analysis of inter-group relationships in terms of process and value orientation, their influences on the personality, and the various aspects of collective behavior on group and person. Of special concern are those aspects of social interaction that have cultural and intercultural variation. (Prerequisites: Soc. 101, Psy. 101.)
- SOC 335 3 Credits** Fall
Sociology of Deviant Behavior (3+0)
 A study of the causes of deviant behavior, both criminal and non-criminal, with emphasis on the nature of social interaction and an examination of the social control groups and institutions. (Prerequisite: Soc. 101.)
- SOC 345 3 Credits** Fall
Sociology of Education (3+0)
 (Same as Ed. 345)
 Examination of the ways in which social, political, and economic forces influence what happens in schools with focus on how the organization of schools affects what teachers can do in the classroom, how peer groups affect student learning, and how national political and economic concerns determine what becomes an educational issue. (Prerequisites: Soc. 101 and junior standing.)
- SOC 363 3 Credits** Fall
Social Stratification (3+0) s
 The study of the differential distribution of social power, privilege, and life chances in class and caste as the basis for social organization. Emphasis on occupational, educational, and other correlates which determine social structure. Also includes a comparative study of class and caste in India and the United States. (Prerequisites: Soc. 101, 102.)
- SOC 370 3 Credits** Alternate Fall
Drugs and Drug Dependence (3+0) s
 (Same as Psy. 370)
 A multidisciplinary approach to the study of drugs and drug abuse emphasizing acute and chronic alcoholism, commonly abused drugs, law enforcement and legal aspects of drug abuse, medical uses of drugs, physiological aspects of drug abuse, psychological and sociological causes and manifestations of drug abuse, recommended drug education alternatives and plans, and the treatment and rehabilitation of acute and chronic drug users. (Prerequisite: Psy. 101 or Soc. 101 or permission of instructor. Next offered: 1989-90.)
- SOC 402 3 Credits** Spring
Theories of Sociology (3+0) s
 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. (Prerequisite: Permission of instructor.)
- SOC 405 3 Credits** Alternate Spring
Social Change (3+0) s
 Philosophy of change and its affiliation to socio-cultural change in terms of history, technology, axiology, and social movement. (Prerequisites: Soc. 101, 102 or permission of instructor. Next offered: 1988-89.)
- SOC 406 3 Credits** Alternate Spring
Environmental Sociology (3+0) s
 The study of the interaction between society and physical environment including the ecological complex — population, organization, environment, and technology — which is used as the analytical framework to study the societal-environmental interaction. (Prerequisite: Soc. 101. Next offered: 1989-90.)
- SOC 407 3 Credits** Alternate Spring
Formal Organization (3+0) s
 Theoretical and analytical approaches to the study of contemporary complex formal organizations, including their coordination, status and role interrelationships, and their diverse publics. Formal organizations unique to Alaska's multicultural population will be considered. (Prerequisite: Soc. 101. Next offered: 1989-90.)
- SOC 408 3 Credits** Alternate Spring
American Minority Groups (3+0) s
 An examination of the status of minority groups and intergroup relations in America, including changes in sociological, economic and political status. Theories and concepts of minority role behavior and intergroup relations are applied to American and Alaskan racial and ethnic groups. (Prerequisite: Soc. 101. Next offered: 1989-90.)

SOC 473 3 Credits **Fall**
Social Science Research Methods (3+0) s
 (Same as Psy. 473.)

Techniques of social research: sampling, questionnaire construction, interviewing and data analysis in surveys; field and laboratory experiments, and attitude scaling. (Prerequisite: Psy. 250 or Soc. 250.)

SOC 638 3 Credits **Spring**
Social Policy and Social Change (3+0)
 (Same as Psy. 638.)

Analysis of social policy issues related to community health, empowerment, and change will lead to an understanding of how spontaneous and planned social change takes place. Particular attention will focus on issues in the development of new settings in cross-cultural and rural contexts. (Prerequisite: Permission of instructor)

SOC 645 3 Credits **Spring**
Prevention Theories and Strategies (3+0)
 (Same as Psy. 645.)

Environmental and psychosocial approaches in the prevention of mental and emotional disturbances. Theories that focus on situational stress are examined, as well as methods and coping situations that can be used to reduce this stress. The unique environmental problems of rural areas and problems in cases of cultural conflict are particularly noted. (Prerequisite: Permission of instructor)

SOC 646 3 Credits **Fall**
Consultation (3+3)
 (Same as Psy. 646)

Experiences and training in consultation skills as a professional who can be looked to for expert help in specific areas related to their preparation in Community Psychology and related disciplines. Consultation as problem solving, as indirect service and as a colleague relationship in behavior dynamics, personal and interpersonal relationships, communication skills and community network support services is emphasized. (Prerequisite: Permission of instructor)

Spanish

(For studying in Mexico, see International Programs.)

SPAN 075 3 Credits **As Demand Warrants**
SPAN 076 3 Credits **As Demand Warrants**

Conversational Spanish I and II (3+0)
 An introductory course for students who wish to acquire the ability to speak Spanish. Students first learn to understand simple spoken language, then to speak simple Spanish developing a beginning level of communicative competence in the language. (Prerequisite: Span 075 for 076.)

SPAN 101 5 Credits **Fall**
SPAN 102 5 Credits **Spring**
Elementary Spanish I and II (5+0) h

Introduction to the language and culture: development of competence and performance in the language through understanding, recognition and use of linguistic structures, increasing emphasis on listening comprehension and speaking, basic vocabulary of approximately 1000 words, exploration of the cultural dimension, implicitly through language and explicitly through texts and audio-visual materials; use of Foreign Language Learning Center.

SPAN 105 3 Credits **As Demand Warrants**
Beginning Spanish I (3+0)
 Basic conversational skills with appropriate grammar and vocabulary.

SPAN 106 3 Credits **As Demand Warrants**
Beginning Spanish II (3+0)
 Continuation of Spanish I with increased emphasis on listening comprehension and speaking. Development of vocabulary and linguistic structures. Cultural aspects are included.

SPAN 113 3 Credits **As Demand Warrants**
Spanish for Tourists (3+0)
 For students with no background in Spanish who wish to learn useful phrases and basic language. Cultural and travel information on Spain and Latin America.

SPAN 201 3 Credits **Fall**
SPAN 202 3 Credits **Spring**

Intermediate Spanish I and II (3+0) h
 Continuation of Span. 102. Increasing emphasis on reading ability and culture material. Conducted in Spanish. (Prerequisite: Span. 102 or equivalent.)

SPAN 288 2 Credits **Spring**
Individual Study: Reading Spanish h

Emphasis on rapid expansion of passive vocabulary and immediate recognition of frequent idiomatic expressions and grammatical structures, development of true reading skill, and modern literary and/or non-literary texts. (Prerequisites: Span. 201, equivalent training or permission of instructor. Recommended to be taken concurrently with Span. 202.)

SPAN 301 3 Credits **Alternate Fall**
SPAN 303 3 Credits **Alternate Fall**

Advanced Spanish (3+0) h
 Discussions and essays on more difficult subjects or texts, translations, stylistic exercises, and special grammatical problems. Conducted in Spanish. (Prerequisite: Span. 202 or equivalent. Span. 301 next offered: 1989-90; Span. 303: 1988-89.)

SPAN 387 2 Credits **Alternate Fall**
Individual Study: Semantics h

Systematic expansion of passive and active vocabulary through analysis of word fields, series of synonyms and antonyms, principles of word formation, derivation, composition, etc. Conducted in Spanish. (Prerequisite: Span. 202 or permission of instructor. Next offered: 1989-90.)

SPAN 432 3 Credits **Spring**
Studies in Hispanic Literature and Culture (3+0) h

Intensive study of authors, literary movements, periods, and/or genres. Analysis of cultural material other than texts. Conducted in Spanish. Student may repeat course for credit when topics vary. (Prerequisite: Span. 301 or 303 or equivalent and at least sophomore standing, or permission of instructor.)

SPAN 487 2 Credits **Alternate Fall**
Individual Study: Translation of Texts

Expansion of vocabulary and grammatical knowledge; emphasis on understanding precise shades of meaning, stylistics, artistic expression and cultural values in language, and literary and non-literary texts. Student may repeat course for credit if materials vary. Conducted in Spanish. (Prerequisite: Span. 301 or 303 or equivalent and at least sophomore standing, or permission of instructor. Next offered: 1988-89.)

SPAN 488 3 Credits **As Demand Warrants**
Individual Study: Senior Project h

Designed to permit the student to demonstrate ability to work with the language and the culture through the analysis and presentation, in the language, of a problem chosen by the student in consultation with the department. The student must apply for senior project and submit a project outline by the end of the 6th week of the semester preceding the semester of graduation. Offered normally in the semester preceding the student's graduation. Conducted in Spanish. (Prerequisite: At least 10 credits in upper division Spanish or permission of instructor.)

Speech Communication

Because of enrollment pressures, it is Department of Speech and Drama policy to drop from the class roll students who fail to attend the first two meetings of a basic course (Speech Communication 121, 131 and 141) even if they have preregistered.

SPC 111 3 Credits **As Demand Warrants**
Fundamentals of Oral Communication (3+0) o

An introduction to the concepts and processes of oral communication. Focuses on increased understanding of and effective performance in common interpersonal, group, and public communication situations.

SPC 121 3 Credits **Fall and Spring**
Fundamentals of Oral Communication: Interpersonal Emphasis (3+0) o

An introduction to the communication process. Focuses on the core concepts of listening, perception, verbal and non-verbal communication, and organizing materials. Emphasizes increased understanding of and effective performance in TWO-PERSON COMMUNICATION SITUATIONS.

SPC 131 3 Credits **Fall and Spring**
Fundamentals of Oral Communication: Small Group Emphasis (3+0) o

An introduction to the communication process. Focuses on the core concepts of listening, perception, verbal and non-verbal communication, and organizing material. Emphasizes increased understanding of and effective performance in SMALL GROUP COMMUNICATION SITUATIONS.

- SPC 141 3 Credits** **Fall and Spring**
Fundamentals of Oral Communication: Public Speaking
Emphasis (3+0) o
 An introduction to the communication process. Focuses on the core concepts of listening, perception, verbal and non-verbal communication, and organizing material. Emphasizes increased understanding of and effective performance in PUBLIC SPEAKING SITUATIONS.
- SPC 211 3 Credits** **As Demand Warrants**
Voice and Diction (2+2)
 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 recording. (Prerequisite: Any 100 level oral communication course or permission of instructor.)
- SPC 231 3 Credits** **Alternate Years**
Business and Professional Communication (3+0) s
 A pre-professional course designed to help business, professional, and communication students enhance their oral communication skills, focusing on superior/subordinate communication, interviewing, conference and meeting techniques, and presentational speaking. (Prerequisites: Any 100 level oral communication course or permission of instructor. Next offered: Spring 1990.)
- SPC 251 3 Credits** **Alternate Years**
Argumentation and Debate (3+0)
 Principles and practices in contemporary debate. Review and analysis of relevant argumentation principles as applied to a debate situation. Practice in preparation, defense, and refutation of cases developed in reference to a given debate resolution. (Prerequisite: Any 100 level oral communication course or permission of instructor. Next offered: Fall 1988.)
- SPC 261 3 Credits** **Alternate Years**
Oral Interpretation (3+0) h
 Interpretive reading of a variety of literary forms. Focuses on the development of (1) intellectual and emotional responsiveness to literature for increased understanding and appreciation, and (2) expressional skills of voice and body for effective oral interpretation of literature. (Prerequisites: Any 100 level oral communication course, Thr. 221, or permission of instructor. Next offered: Fall 1989.)
- SPC 282 3 Credits** **Alternate Years**
Communication Research Methods (3+0)
 Empirical and rhetorical-critical research methodologies employed in communication studies, including assumptions, key issues, and applications. (Prerequisites: Any 100 level oral communication course or permission of instructor. Next offered: Spring 1989.)
- SPC 320 3 Credits** **Alternate Years**
Communication and Language (3+0)
 The role of language and meaning in human communication. (Prerequisite: Any lower division speech communication course or permission of instructor. Next offered: Spring 1990.)
- SPC 321 3 Credits** **Alternate Years**
Nonverbal Communication (3+0) s
 The role of non-verbal behavior in human communication. Includes consideration of the roles of space, physical environment, physical appearance and dress, kinesics, facial expression, and non-verbal vocal behavior. (Prerequisite: Any lower division Speech Communication course or permission of instructor. Next offered: Fall 1989.)
- SPC 322 3 Credits** **Alternate Years**
Interpersonal Communication (3+0) s
 Study of humanistic approaches to interpersonal communication. Emphasis is on dialogic/transactive communication within two person situations. In-depth exploration of theoretical materials related to many types of relational interchanges. (Prerequisite: Any 100 level oral communication course or permission of instructor. Next offered: Fall 1987.)
- SPC 330 3 Credits** **Alternate Years**
Intercultural Communication (3+0) s
 The nature and the sources of problems in communication that may arise when persons with different cultural backgrounds interact. Special emphasis on problems in intercultural communication in Alaska. (Prerequisite: Any lower division Speech Communication course or permission of instructor. Next offered: Fall 1990.)
- SPC 331 3 Credits** **Alternate Years**
Group Communication (3+0) s
 Current research and theory in intergroup and intragroup relations. Topics will include the study of leadership, power, group structure, participation, and conflict. (Prerequisites: Any 100 level Speech Communication course or permission of instructor. Next offered: Fall 1988.)
- SPC 335 3 Credits** **Alternate Years**
Organizational Communication (3+0) s
 The scope and nature of communication networks within and between organization, concentrating on message flow, interaction patterns, and environmental-structural interactions in organizational settings. (Prerequisite: Completion of one lower division Speech Communication course or permission of the instructor. Next offered: Spring 1990.)
- SPC 342 3 Credits** **Alternate Years**
Advanced Public Speaking (3+0) s
 Advanced opportunities to study and critique methods of speech preparation and delivery. Performance and criticism of original speeches to develop understanding of sophisticated techniques of public discourse. (Prerequisite: Any lower division Speech Communication course or permission of the instructor. Next offered: Spring 1989.)
- SPC 425 3 Credits** **Alternate Years**
Communication Theory (3+0) s
 Study of theories of human communication, as well as of the nature of inquiry into human communication phenomena. Issues covered include the nature of communication as a discipline, critical and scientific inquiry, and major paradigms or perspectives within which communication theories are created. (Prerequisite: Any 300 level Speech Communication course or permission of the instructor. Next offered: Fall 1989.)
- SPC 441 3 Credits** **Alternate Years**
Persuasion (3+0) s
 Examination of communication situations which involve attempts to modify the beliefs, attitudes, values, intentions, or behaviors of another individual or group of individuals. Explores the process, methods, and ethics of attempts to affect change via persuasive communication. (Prerequisite: Any 300 level Speech Communication course or permission of the instructor. Next offered: Spring 1989.)
- SPC 443 3 Credits** **Alternate Years**
Rhetorical Theory (3+0) s
 Critical analysis of Plato, Aristotle and Sophists on rhetoric, tracing the development of rhetorical theory from inception in 500 B.C. to current practices. Significant contributions by important scholars of rhetoric will be studied. (Prerequisite: Any 300 level oral communication course or permission of the instructor. Next offered: Spring 1990.)
- SPC 475 3 Credits** **Alternate Years**
Speech Communication in Education and Training (3+0)
 Issues pertaining to the research and development of instructional units in speech communication for educational and professional courses. Issues covered include student needs analysis, syllabi development, behavioral objectives, unit packages, competency, models, and program integration. (Prerequisites: Any 300 level Speech Communication course or permission of instructor. Next offered: Fall 1988.)
- SPC 482 3 Credits** **Alternate Years**
Seminar in Speech Communication (3+0)
 Current trends and theory in key-areas of the discipline of Speech Communication are examined. Students will concentrate their research in their speciality area while examining selected topics in all the areas. (Prerequisite: Any 300 level Speech Communication course or permission of instructor. Next offered: Fall 1989.)

Statistics

- STAT 301 3 Credits** **Fall and Spring**
Elementary Probability and Statistics (3+0)
 Descriptive statistics, frequency distributions, sampling distributions, elementary probability, estimation of population parameters, hypothesis testing (one and two sample problems), correlation, simple linear regression, and one-way analysis of variance. Parametric and nonparametric methods. (Prerequisites: Math 107 and junior standing or consent of instructor)
- STAT 351 2 Credits** **Spring**
Statistical Computing Packages (1+3)
 A study of the use of BMDP, SPSS, MINITAB, IMSL, and other miscellaneous statistical computing packages. Comparison of output for similar analyses. (Prerequisite: AS 301.)
- STAT 400 3 Credits** **Fall**
Statistics (3+0)
 A calculus-based course emphasizing applications. Topics include: probability, point and interval estimation including maximum likelihood, one and two sample hypothesis tests including likelihood ratio tests, simple linear regression, and one-way analysis of variance. A student may not use Stat. 301 and Stat. 400 to meet the requirement of a year's sequence course in statistics. (Prerequisites: Math 200, 272, or 162.)



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STAT 401 4 Credits Fall
Experimental Design and Regression (3+3)
 A thorough study of multiple regression including multiple and partial correlation, the extra sum of square principle, indicator variables, and model selection techniques. Analysis of variance and covariance for multifactor studies in completely random, randomized complete block, and nested designs; multiple comparisons and orthogonal contrasts. (Prerequisite: Stat. 301)

STAT 402 3 Credits Fall and Spring
Scientific Sampling (2+3)
 Sampling methods, including simple random, stratified and systematic; estimation procedures, including ratio and regression methods; special area and point sampling procedures; optimum allocation. (Prerequisite: STAT 301)

STAT 431 3 Credits Alternate Fall
Applied Nonparametric Statistics (3+0)
 The use and properties of nonparametric and distribution-free statistical methods. Procedures for one, two, and multiple sample problems, multiple comparisons, goodness-of-fit problems, contingency table analyses, and linear regression. General use of ranks in constructing tests of hypotheses. (Prerequisites: Stat. 301. Next offered: 1988-89.)

STAT 461 3 Credits Alternate Spring
Applied Multivariate Statistics (3+0)
 A study of multivariate statistical methods of estimation and hypothesis testing, multivariate normality and its assessment, multivariate one and two sample tests, confidence regions, multivariate analysis of variance, discrimination and classification, principal components, factor analysis clustering techniques, and graphical presentation. Statistical computing packages utilized in assignments. (Prerequisites: Stat. 401 or consent of instructor. Next offered: 1989-90.)

STAT 602 3 Credits As Demand Warrants
Experimental Design (3+0)
 Constructing and analyzing designs for experimental investigations; completely randomized, randomized block and Latin-square designs, split-plot design, incomplete block design, confounded factorial designs, lattice and cubic lattice designs, treatment of missing data, comparison of designs. (Prerequisites: Stat. 401 or consent of instructor.)

STAT 680 4 Credits Alternate Fall
Data Analysis in Biology (3+3)
 (Same as Biol. 680)
 Biological applications of nonparametric statistics, including tests based on binomial and Poisson distributions, analysis of two-way and multiway contingency tables, and tests based on ranks; multivariate statistics, including principal component analysis, ordination techniques, cluster analysis, and discriminant analysis; and time-series analyses. Introduction to the use of the computer, computer programming, use of statistical packages, and plotting routines. Each student will analyze a data set appropriate to his or her research interests. (Prerequisites: Stat. 301, 401 and either graduate standing in a biologically oriented field or permission of instructor. Next offered: 1989-90.)

Note: The following courses are statistical in orientation. A course description and listing of prerequisites may be found in the appropriate departmental course listings.

Anth. 421 — Analytical Techniques
 B.A. 360 — Operations Management
 B.A. 606 — Quantitative Analysis
 B.A. 684 — Quantitative Methods for Management
 Geos. 430 — Statistical and Data Analysis in Geology
 Econ. 226 — Introduction to Statistics for Economics and Business
 Econ. 227 — Statistical Methods
 Econ. 626 — Econometrics
 E.S.M. 621 — Operations Research
 Math. 371 — Probability
 Math. 408 — Mathematical Statistics
 Psy. 250 — Introduction to Statistics for Behavioral Sciences
 Fish. 630 — Quantitative Fisheries Science

Theater

THR 101, 201
THR 301, 401 1-3 Credits Fall and Spring
Theater Practicum (0+Var.) h
 Participation in Drama Workshop or lab production as performer or technical staff member. Graded pass/fail only. (Credit in this course may not be applied to a major program in theater.)

THR 120 3 Credits Fall
Beginning Acting (3+0) h
 Basic stage acting techniques for persons without prior acting experience. Develops intensity in emotional connection leading to strong interaction. Also effective for auditions and cold readings. Scene development is included.

THR 161 3 Credits Fall
Introduction to Tuma Theatre (3+0) h
 (Same as ANS 161)
 Introduction to the development and performance of original and traditional theatrical works derived from various Alaska Native cultural heritages and experiences. This course is a prerequisite for ANS/Thr 361, Advanced Tuma Theatre and for membership in the Tuma Theatre touring company.

THR 211 3 Credits Fall and Spring
Introduction to the Theater (3+0) h
 Understanding and appreciation of both the distinctive and collaborative contributions of playwright, actor, director and designer to the total work of dramatic art. Study of plays and theater forms from the major periods of theater.

THR 221 3 Credits Fall
Acting I (1+4) h
 Principles of acting developed through pantomime, improvisation, and sense-memory.

THR 225 3 Credits Alternate Spring
Movement for the Actor (1+4) h
 Principles of stage movement, body awareness, and control as explored through analysis, exercise, study of historical dance and scene work. (Next offered: 1989-90.)

THR 241 3 Credits Fall
Basic Stagecraft (2+2) h
 Materials of scene construction and painting and their use.

THR 321 3 Credits Spring
Acting II (1+4) h
 Building a character; role study and performance of small scenes. (Prerequisite: Thr. 221, or admission by arrangement.)

THR 325 3 Credits Alternate Fall
Theater Speech (2+2) h
 Vocal techniques for actors. Standard stage diction and foreign dialects. (Prerequisite: Thr. 221 or permission of instructor. Next offered: 1989-90.)

THR 331 3 Credits Alternate Fall
Directing (1+4) h
 Direction of short plays for drama lab productions. (Prerequisite: Thr. 221 or admission by arrangement. Next offered: 1988-89.)

THR 341 3 Credits Alternate Years
Intermediate Stagecraft (2+2) h
 An examination of the less common scenic materials with methods and techniques for their use. (Students will spend approximately \$40 for materials.) (Prerequisite: Thr. 241 or permission of instructor. Next offered: 1988-89.)

THR 343 3 Credits Alternate Fall
Scene Design (3+0) h
 Principles and techniques of theatrical scene design. The student will design projects directed at solving particular scenic problems or working in a specific scenic style with specific physical limitations. (Prerequisite: Thr. 241 or permission of the instructor. Students will spend approximately \$40 for materials. Next offered: 1988-89.)

THR 347 3 Credits Alternate Spring
Lighting Design (3+0) h
 Principles and techniques of theatrical lighting design. The student will conduct practical experiments and design projects applying the experience gained from the experiments. (Prerequisite: Thr. 343 or permission of the instructor. May be taken concurrently with Thr. 343. Students will spend approximately \$40 for materials. Next offered: 1988-89.)

THR 351 3 Credits Spring
Makeup for Theater (1+4) h
 Theatrical makeup for actors, teachers, directors, and other theater workers; makeup materials and use, straight and character makeup, illusory and plastic relief, national types, and influence of lighting. (Students will spend approximately \$85 for materials.) (Prerequisite: Any lower division theater course or permission of the instructor.)

- THR 354 3 Credits Fall**
Costume Construction and Design (3+0) h
 The processes of research, design, and construction of period and modern clothing for the stage. The student will research and design projects representative of specific periods of dress, as well as be given practical experience in the areas of pattern drafting, theatrical construction methods, and drawing and rendering techniques. (Prerequisite: Thr. 211 or permission of the instructor.)
- THR 355 3 Credits Alternate Spring**
History of Stage Costume (3+0) h
 Stage costume and contemporary dress of the major theatrical periods. Emphasis will be placed on the process of selection of costumes for representative plays of each period. (Prerequisite: Thr. 211 or permission of instructor. The student is expected to have basic knowledge of theater practice and the interpretation of dramatic literature. Next offered: 1988-89.)
- THR 361 3 Credits Fall**
Advanced Tuma Theatre (3+0) h
 (Same as ANS 361)
 Continuation of ANS/Thr. 161 with emphasis on performance of previously prepared materials. Rehearsals during the first half of the semester will be followed by local area performances. Upon successful completion of the course, students will be eligible for the Tuma Theatre Company's spring and summer tours (see Thr. 101-401). (Prerequisites: ANS/Thr. 161 and one of the following: Thr. 221, Thr. 241, Thr. 343, Thr. 347 or permission of instructor.)
- THR 411 3 Credits Alternate Years**
Theater History I (3+0) h
 Intensive examination of theatrical form and practice from its origins in storytelling and ritual through the French Neo-classic Theater. (Prerequisites: Junior standing and Thr. 211 or permission of instructor. Next offered: 1989-90.)
- THR 412 3 Credits Alternate Years**
Theater History II (3+0) h
 Intensive examination of theatrical form and practice from the English Restoration through the present. (Prerequisites: Junior standing and Thr. 211 or permission of instructor. Next offered: 1988-89.)
- THR 413 3 Credits Alternate Fall**
Playscript Analysis (3+0) h
 Intensive investigation of the structure of playscripts designed to develop skills in analysis and interpretation for performance. (Prerequisites: Junior Standing, Thr. 211 or permission of instructor. Next offered: 1989-90.)
- THR 421 3 Credits As Demand Warrants**
Period Styles of Acting (2+2) h
 The acting techniques required for the performance of period plays ranging from Greek Drama through Absurdist Theater. (Prerequisites: Acting I plus Acting II or permission of instructor.)
- THR 435 3 Credits As Demand Warrants**
Directing (3+0) h
 Directorial analysis of a major dramatic work for public presentation. (Prerequisite: Senior majors with 3.00 G.P.A. in Theater.)
- THR 456 3 Credits Alternate Spring**
Intermediate Costuming (3+0) h
 Examination of theatrical costuming materials and methods and the continuation of the study of period styles. Special projects concerning drafting, construction, composition and design. (Prerequisites: Thr. 211, Thr. 354 or permission of instructor. Next offered: 1988-89.)
- THR 471 3 Credits Alternate Years**
Methods in Secondary Theatre Education (3+0)
 Principles and methods of teaching theatre in junior and senior high school with emphasis on philosophies, management, objectives, and teaching techniques for classroom and extracurricular theatre activities. Includes development and implementation of specific unit packages and rehearsal methods. (Prerequisite: Thr. 211 or permission of instructor. Next offered: Fall 1988.)
- TTCH 106 3 Credits As Demand Warrants**
Residential Electrical Systems (3+0)
 Provides basic electrical theory and technical skills for installation and service of electrical equipment commonly found in the home.
- TTCH 113 3 Credits As Demand Warrants**
Basic Plumbing (3+0)
 Introduction to methods and materials used in household plumbing. Topics include pipe fittings and valves, pipe hangers and brackets, copper and plastic pipe fitting and plumbing fixtures.
- TTCH 117A 1 Credit As Demand Warrants**
Four-Cycle Engine Repair (1+0)
 Covers four-cycle engine theory and principles of operation. Classroom activities include step-by-step disassembly, inspection and assembly of a four-cycle engine.
- TTCH 117B 1 Credit As Demand Warrants**
Two-Cycle Engine Repair
 Covers two-cycle engine theory and principles of operation. Classroom activities include step-by-step disassembly, inspection and assembly as well as familiarization with tools used in small engine repair.
- TTCH 120 4 Credits As Demand Warrants**
Refrigeration and Air Conditioning (4+0)
 Introduces fundamentals of refrigeration and air conditioning theory for preparation of further study. Topics include compressors, condensers, evaporators, metering devices and related components. Assumes no previous knowledge on part of student.
- TTCH 130 3 Credits As Demand Warrants**
Blueprint and Schematic Reading (3+0)
 Basic blueprint and schematic reading skills used by building maintenance personnel. Introduction to machine drawings, building drawings, hydraulic and pneumatic drawings, electrical schematics and symbols, air conditioning and refrigeration drawings, welding and joining symbols.
- TTCH 131 3 Credits As Demand Warrants**
Maintenance Mathematics (3+0)
 Practical application of mathematics as applied to industry, including arithmetic review, ratios and proportion, powers and roots, algebra, geometry and trigonometry. Mathematical applications of basic physics with reference to units of measurement, use of precision measuring tools, measurement of forces, temperature, fluids and electricity.
- TTCH 132 3 Credits As Demand Warrants**
Building Maintenance Materials (3+0)
 Discusses the basic properties, processes and uses of metals and non-metals in tools, machines and building materials. Practical application of these materials to building maintenance situations will be emphasized.
- TTCH 133 3 Credits As Demand Warrants**
Basic Hand and Power Tools (3+)
 Includes proper nomenclature, uses, care and maintenance of hand and power tools. Familiarity and skill development with these tools through construction of shop projects.
- TTCH 134 1 Credit As Demand Warrants**
Maintenance Safety (1+0)
 Introduction to industrial safety including the following: recognizing safety hazards; working safely; handling materials safely; using machinery safely; personal protective equipment; electrical safety; fire protection and government safety regulations.
- TTCH 135 1 Credit As Demand Warrants**
Basic Maintenance Troubleshooting (1+0)
 Basic troubleshooting procedures used by building maintenance personnel in the repair of plant equipment and systems. Systematic approaches to troubleshooting, scheduled and unscheduled maintenance.
- TTCH 136 3 Credits As Demand Warrants**
Basic Shielded Metal-Arc Welding (3+0)
 Introduction to welding in preparation of further study. Topics included are welding safety, electrical welding equipment, electrode identification and selection. Welding practice on mild steel in various welder positions. Assumes no previous knowledge on part of student.
- TTCH 146 2 Credits As Demand Warrants**
Furnace Repair (2+0)
 Introduction to theory of operation, maintenance, repair of oil burning furnaces, both forced air and radiant. Course is designed to familiarize the homeowner with routine maintenance and upkeep of a furnace and trouble shooting procedures for emergency servicing.
- TTCH 147 1 Credit As Demand Warrants**
Burner Maintenance and Repair (1+2)
 Students will learn to troubleshoot 10 common problems, read manuals, change parts, set electrodes, change nozzles, understand controls and order replacement parts.

Trades and Technology

- TTCH 101 2 Credits As Demand Warrants**
Machine Woodworking I (2+0)
 Introduction to woodworking power machines (circular saw, jointer, radial arm saw), joints, fasteners, and different stains and finishes used on wood.
- TTCH 105 1 Credit As Demand Warrants**
Basic Electrical Wiring (1+0)
 Familiarizes the student with fundamental skills and career opportunities in electrical wiring.

TTCH 214 3 Credits As Demand Warrants
Heating Systems Design (3+0)
 Comprehensive instruction in installation and design of heating systems. Topics include installation procedures of current systems, heat loss calculation, heat distribution through hydronic and air systems, and boiler and furnace sizing. Major emphasis is placed upon systems approach to heating system design.

TTCH 099, 199, 299 1-3 Credits As Demand Warrants
Practicum
 Allows the student to work on and develop the skills learned in prior courses. Designed to meet the needs of individual students.

Welding and Materials Technology

WMT 101 3 Credits As Demand Warrants
Introduction to Welding (2+2)
 Introduction and orientation to the processes and procedures involved in the welding field. Course presented in a 'hands-on' fashion.

WMT 102 3 Credits As Demand Warrants
Intermediate Welding (2+2)
 Continuation of WMT 101 (Prerequisite: WMT 101.)

WMT 103 3 Credits As Demand Warrants
Welding I (3+0)
 Entry-level course in basic oxy-acetylene, arc welding, flame cutting, brazing, and braze welding principles and practices. Materials fee: \$200.00.

WMT 105 3 Credits As Demand Warrants
Welding II (3+0)
 Covers arc welding techniques and basic MIG and TIG welding. (Prerequisite: WMT 103 or permission of instructor.) Materials fee: \$200.00.

WMT 110 1-3 Credits As Demand Warrants
Oxy-Acetylene Welding (OAW)
 Up to three credits will be awarded toward the program for successful completion of any of the four sections; 110A-Certif OAW (1G); 110B-Certif OAW (2G); 110C-Certif OAW (3G); 110D-Certif OAW (4G). Courses are presented in competency based manner.

WMT 115 1 Credit As Demand Warrants
Bronze Gas Welding (OAW Bronze) (1+0)
 One credit will be granted for successful completion of the certification test. WMT 115A-Certif OAW (1G). Course presented in competency based manner.

WMT 130 1-3 Credits As Demand Warrants
Shielded Metal Arc Welding (SMAW)
 All positions will be emphasized for multiple pass fillet welds. Up to three credits will be awarded toward the program for successful completion of any of the four sections; 130A-Certif SMAW (1F); 130B-Certif SMAW (2F); 130C-Certif SMAW (3F); 130D-Certif SMAW (4F). Course presented in competency based manner.

WMT 150 1-3 Credits As Demand Warrants
Gas Tungsten Arc Welding (GTAW)
 Use of tungsten and argon gas to do aluminum and stainless steel gas welding. (Formerly call Heliarc.) Up to three credits will be awarded toward the program for successful completion of any of the four sections; 150A-Certif GMAW Alum (1F); 150B-Certif GMAW Alum (2F); 150C-Certif GMAW Alum (3F); 150D-Certif GMAW Alum (4F). Course presented in competency based manner.

WMT 160 1-3 Credits As Demand Warrants
Gas Metal Arc Weld Alum (GMAW)
 Course designed to prepare student to work on Microwire processes. Up to three credits will be awarded toward the program for successful completion of any of the four section; 160A-Certif GMAW M.Steel (1F); 160B-Certif GMAW M. Steel (2F); 160C-Certif GMAW M. Steel (3F); 160D-Certif GMAW M. Steel (4F). Course presented in competency based manner.

WMT 241 3 Credits As Demand Warrants
Gas, MIG and TIG Welding (3+0)
 Course covers gas shield welding with three common methods used in industry. Emphasis on metal specifications, cap joints, butt joints, tee joints and tube welding on steel, aluminum and stainless. Materials fee: \$240.00. (Prerequisite: WMT 103 and 105.)

WMT 261 3 Credits As Demand Warrants
Aviation Welding (2+2)
 Tungsten inert gas and oxyacetylene will be used to weld Moly steel aircraft structural parts. Basic aircraft joints and sheet metal joints will be welded. Recommended as a review for licensed Aircraft and Power mechanics as well as those contemplating an A & P license.

Wildlife

WLF 101 1 Credit Spring
Survey of Wildlife Science (1+0)
 Survey of the history and nature of wildlife work. Lectures, supplemented by guest presentations, will introduce major aspects of wildlife biology and management as well as the research of local wildlife biologists and the programs of management agencies. (Prerequisite: Completion of a course emphasizing the biology of non-human organisms.)

WLF 201 2 Credits Spring
Wildlife Management Principles (1+3)
 Application of ecological principles to the study and management of wildlife populations and habitats. Laboratory work in information retrieval from biological and resource management literature, examples in the use of computers and quantitative methods in wildlife work. Some field trips may be included. (Prerequisites: Biol. 271, familiarity with computer usage desirable.)

WLF 302 2 Credits Alternate Fall
Fish and Wildlife Ecology and Management (1+3)
 Introduction to ecology and management of wildlife and fish populations. Identification, life history and management of Alaskan birds, mammals and commercial and sport caught fish. Laboratory fee: \$10.00. (Prerequisites: A.L.R. 101 or Biol. 104, 105-106 or permission of instructor. Next offered: 1988-89.)

WLF 303 3 Credits Fall
Wildlife Management Techniques (2+3)
 Study of procedures used by wildlife biologists and managers to collect, analyze, and disseminate information. A brief discussion of the usefulness of a technique will precede its description or application. Topics covered include: using the wildlife literature and scientific writing; behavioral sampling; nomenclature, identification, and sexing and aging of wildlife; census methods; habitat evaluation and manipulation; biotelemetry; home range; food habits and modeling; and necropsy procedures, animal condition, and wildlife diseases. A term paper is required. Laboratory fee: \$10.00. (Prerequisites: WLF 201 or equivalent, Biol. 271.)

WLF 304 1-3 Credits Fall and Spring
Wildlife Internships
 Programs designed to provide undergraduate students with practical experience in wildlife management in public or private agencies. Projects are approved by faculty member and supervised by professional agency staff. Not substitutable for courses required for major. (Prerequisites: Permission of instructor.)

WLF 305 3 Credits Alternate Fall
Concepts of Animal/Wildlife Diseases (2+3)
 Basic concepts of parasitic, infectious, environmental, and nutritional diseases. Specific study of Alaskan wildlife diseases. Basic sterile technique, treatment and chemical immobilization. Laboratory fee: \$10.00. (Prerequisites: Biol. 105, 106 or equivalent and permission of instructor. Next offered: 1988-89.)

WLF 360 3 Credits Fall
Nutrition and Physiological Ecology of Wildlife (3+0)
 Concepts and techniques of nutrition and physiological ecology used by wildlife managers to understand relationships between wild animals and habitats they occupy. Includes techniques for constructing energy and nutrient budgets of wild animals and applications of these budgets to population level processes and habitat management. (Prerequisites: Biol 210, 271, WLF 201.)

WLF 410 3 Credits Spring
Wildlife Populations and Their Management (2+3)
 The characteristics and ecology of wildlife populations and the knowledge necessary for their wise management. Measures of abundance, dispersal, fecundity and mortality, population modeling, competition and predation, and the management of rare species and their habitats. Laboratory fee: \$10.00. (prerequisites: Biol 271, Stat. 301, WLF 303.)

WLF 417 2 Credits Alternate Spring
Wildlife Management: Forest and Tundra (2+0)
 Description of tundra and forest ecosystems including major groups of birds and mammals. Biological, economic, and political factors important in the conservation of major species. (Prerequisites: Biol. 425 and Biol. 426 or permission of the instructor. Next offered: 1989-90.)

WLF 419 3 Credits Alternate Fall

Waterfowl and Wetlands Ecology and Management (3+0)
Distribution and abundance of North American waterfowl. Ecology of waterfowl, shorebirds and furbearers and their associated wetland habitats. Management of populations including harvest and manipulation of habitats. Field trips to important wetlands in Alaska. (Prerequisite: Biol. 271, 426 or permission of the instructor. Next offered: 1989-90.)

WLF 420 3 Credits Spring

Wildlife Policy and Administration (3+0)
Study of laws and agencies shaping wildlife management in North America. History and current status of major policy issues. Organization of and funding sources for state and federal programs in wildlife conservation. (Prerequisite: A 3 credit course in wildlife management principles or permission of instructor.)

WLF 611 Credits Arr. As Demand Warrants**WLF 612 Credits Arr. Wildlife Field Trip**

Trips to wildlife areas to acquaint students with principal animals of the state and problems involved in their management. (Admission by arrangement.)

WLF 614 2 Credits Alternate Spring**Grazing Ecology (2+0)**
(Same as Biol. 614)

The dynamics of herbivory, emphasizing the grazing process, and including mechanisms of feeding, feeding behavior, habitat and plant selection, physiological influences on feeding, plant and community level responses, plant defenses against herbivory and management of grazing systems. (Prerequisite: graduate standing or approval of instructor. Next offered: 1988-89.)

WLF 615 2 Credits Alternate Fall

Advanced Topics in Wildlife Management (2+0)
Political, economic, administrative and ecologic aspects of wildlife management in northern regions. (Prerequisite: graduate standing in biology, fisheries or wildlife or permission of instructor. Next offered: 1989-90.)

WLF 621 3 Credits Alternate Spring**Vertebrate Population Dynamics (2+3)**

Assessing, describing, and interpreting the characteristics and dynamics of wild populations. Estimates of survival, mortality, and recruitment rates, and of population size, and assessment of population trends and welfare using data from sources such as hunter-kill samples, composition counts, marking and recapturing, predation, and various types of surveys. Students will proceed from simplified artificial data sets to complex real ones. Both analytic and simulation techniques will be used. Laboratory fee: \$10.00. (Prerequisites: Admission by arrangement: minimal preparation, equivalent to Biol. 271, Math. 200 and Stat. 301. Next offered: 1988-89.)

WLF 692 1 Credit Fall and Spring**Graduate Seminar (0+0+1)**

Topics in fish and wildlife management explored through readings, talks, group discussions and guest speakers with a high level of student participation. Joint seminars in fish and wildlife management will be scheduled one semester and separate seminars will be scheduled the other. (Prerequisite: graduate standing or permission of instructor.)

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Credits

All photos taken by University Relations photographer Samuel Winch except back cover aurora photo by Fred Sacco.

Cover Photos:

Front cover:

This view of the Alaska Range is why *Outside* magazine rated the view from the 8th floor of Moore Hall the "best view from a dorm room" of all American universities.

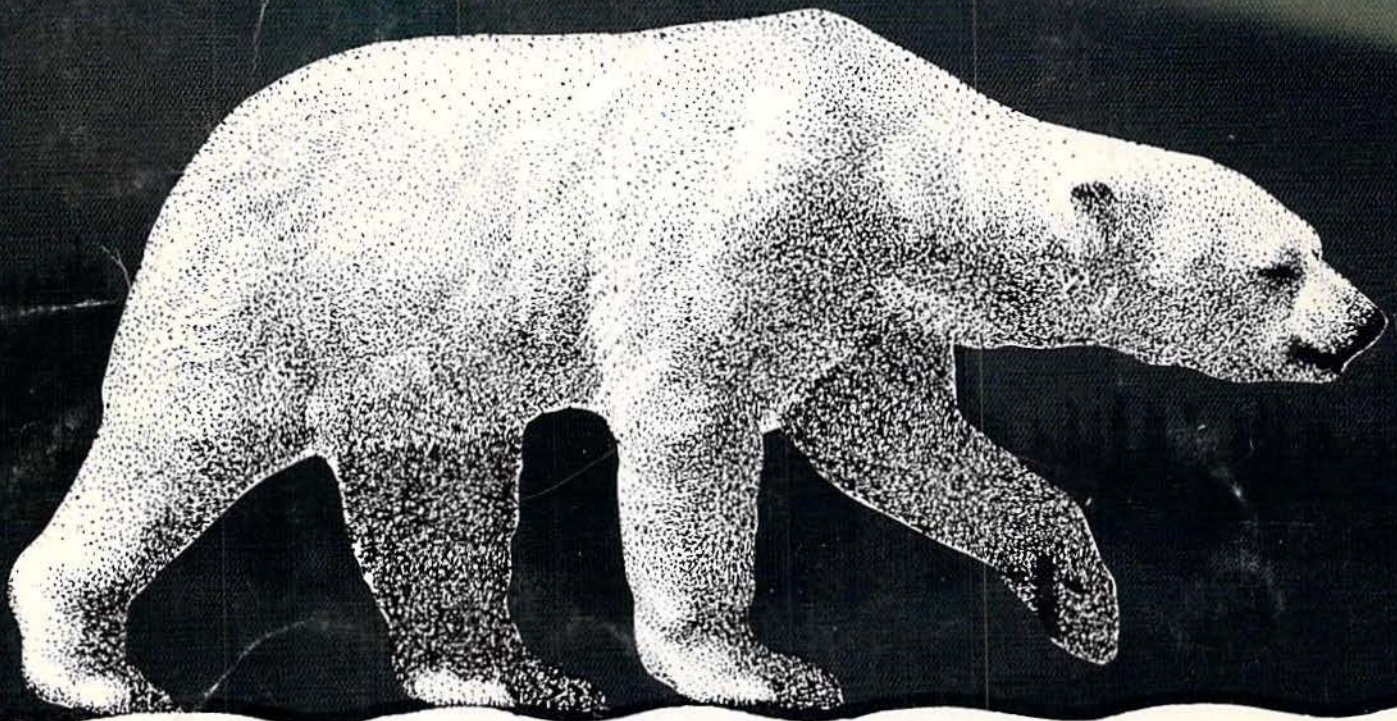
Inset:

Pauline Walter, a senior education major from Tununak, Alaska, studies on a ledge outside the Elmer E. Rasmuson Library.

Back cover:

The aurora borealis, a common sight during Fairbanks winters, is the subject of research by the Geophysical Institute, located on the West Ridge of campus.





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