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| **OCTOBER** |             |             |             |
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| **1968 JANUARY** |             |             |             |
| S     | M           | T           | W           | T           | F           | S           |
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| **1968 MAY** |             |             |             |
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| **1968 FEBRUARY** |             |             |             |
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| **1968 JUNE** |             |             |             |
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| **1968 JULY** |             |             |             |
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| **1968 AUGUST** |             |             |             |
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To obtain the 1968–69 issue of this Graduate Bulletin, send your order and 25¢ in coin or money order to: University Bookstore, 1750 Donaghho Rd., University of Hawaii, Honolulu, Hawaii 96822. Available after June 1968.

UNIVERSITY OF HAWAII BULLETIN

VOLUME XLVI

February 1967

Number 2

The University of Hawaii Bulletin is published in December, February, March, and May at the University of Hawaii, Honolulu, Hawaii, U.S.A. Entered as second-class matter at the Post Office at Honolulu, Hawaii, November 14, 1921, under Act of Congress of August 24, 1912.
1967-68 CALENDAR

First Semester

September 11-16, Monday through Saturday..........................Academic advising, registration, orientation
September 18, Monday....................................................Instruction begins
September 22, Friday................................................................Last day of registration for credit
October 6, Friday..................................................................Last day of withdrawal from courses without grade penalty

November 9, Thursday............................................................Deficiency reports due
November 10, Friday.............................................................Holiday (Friday before a holiday falling on Saturday)
November 11, Saturday..........................................................Veterans’ Day (holiday)
November 22, Wednesday........................................................Last day for removal of “Incompletes”
November 23-25, Thursday through Saturday..........................Thanksgiving recess
December 1, Friday..............................................................Last day for withdrawal from courses
December 4-15, Monday through Friday.................................Early registration for second semester
December 16, Saturday...........................................................Last day before Christmas recess
January 2, Tuesday..................................................................Instruction resumes
January 13, Saturday.............................................................Last day of instruction, first semester
January 15, Monday..............................................................Final examinations begin
January 20, Saturday.............................................................First semester ends

Second Semester

February 1 & 3, Thursday and Saturday....................................Academic advising, registration
February 5, Monday.............................................................Instruction begins
February 9, Friday..................................................................Last day of registration for credit
February 22, Thursday............................................................Presidents’ Day (holiday)
February 23, Friday................................................................Last day of withdrawal from courses without grade penalty
March 26, Tuesday.................................................................Prince Kuhio Day (holiday)
March 29, Friday....................................................................Deficiency reports due
April 11, Thursday.................................................................Last day for removal of “Incompletes”
April 12, Friday.....................................................................Good Friday (holiday)
April 13-20, Saturday through Saturday......................................Easter recess
April 26, Friday......................................................................Last day for withdrawal from courses
May 23, Thursday....................................................................Last day of instruction
May 24, Friday......................................................................Final examinations begin
May 30, Thursday..................................................................Memorial Day (holiday)
May 31, Friday......................................................................Second semester ends
June 9, Sunday......................................................................Commencement

Summer Session

June 17, Monday.................................................................Registration for 1st term
July 26, Friday.....................................................................1st term ends
July 29, Monday.................................................................Registration for 2nd term
September 6, Friday...........................................................2nd term ends

1968-69

September 9-14, Monday through Saturday..............................Academic advising, registration, orientation
GRADUATE DIVISION STAFF

Wytze Gorter, Ph.D., Dean
Howard P. McKaughan, Ph.D., Associate Dean, Programs and Personnel
Morton M. Rosenberg, Ph.D., Associate Dean, Research and Fellowships
Sumie F. McCabe, M.A., Assistant Dean, Student Services

ADMINISTRATIVE OFFICERS

General Administration

Thomas H. Hamilton, B.A., M.A., Ph.D., L.H.D., LL.D., President
Robert W. Hiatt, B.A., Ph.D., Vice-President for Academic Affairs
Richard S. Takasaki, B.S., M.A., M.P.A., Vice-President for Business Affairs
Richard H. Kosaki, B.A., M.A., Ph.D., Vice-President for Community Colleges
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## ACADEMIC INFORMATION

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The University of Hawaii is the principal institution of higher learning in the state of Hawaii. Its aim is to provide high-caliber instruction, research, and service to Hawaii, the nation, and the world community, especially the Pacific Basin.

In carrying out this aim, the University conducts a wide variety of activities. Many of these are similar to those offered by other state universities and land-grant colleges in the U.S. Others are unique, taking special advantage of Hawaii’s subtropical mid-Pacific location and its multiracial composition. This is especially true of programs in tropical agriculture, marine biology, biomedicine, geophysics, sociology, linguistics, and cultural and technical interchange among students, scholars, and technicians from Asia, the Pacific, and the Americas.

The main campus is located in the Manoa Valley section of Honolulu, the capital of the state. The University maintains a second campus in Hilo, on the island of Hawaii, where its Peace Corps training facility is also based. Space observatories and associated research facilities of the University are on the islands of Maui and Hawaii. Branches of the Hawaii Agricultural Experiment Station are located on four of the major islands of the state.

The University is a federal land-grant institution, founded in 1907 by the Hawaii Territorial Legislature under the provisions of the Morrill Act of 1862 and subsequent legislation. Originally called the College of Agriculture and Mechanic Arts, the University was given its present name in 1920.

On the main campus also are the buildings of the East-West Center (formally, the Center for Cultural and Technical Interchange between East and West), a project of the federal government operated in association with the University of Hawaii.

Inquiries. Prospective students should address inquiries to the Graduate Division, 2540 Maile Way, Honolulu, Hawaii 96822. Summer session information may be obtained by writing to the Dean of the Summer Session, Crawford Hall, Room 208, 2550 Campus Road, Honolulu.

RESEARCH AND SERVICE OPERATIONS

In addition to the instructional program, the University conducts organized research in several fields and offers other forms of public service. The most important of these operations are described below.

The Aquarium at Waikiki, which is open to the public, is operated by the University as a place of education and entertainment. It also houses some of the research facilities of the Hawaii Institute of Marine Biology.

The Communications Center offers services to all University staff members interested in using existing audio-visual instructional materials or in creating new materials. Services include creation of maps, projectuals, electronic sten-
cils, photographs, slides, charts, models, mock-ups, filmstrips, motion picture film clips, and television materials; locating and scheduling for classroom use 16 mm films, tape recordings, filmstrips, kinescopes, slide sets, chart sets and equipment, and operators as necessary. Inquiries should be directed to the Communications Center.

The Economic Research Center is designed to promote an understanding of the economy of the state of Hawaii. It evaluates economic effects of legislation and performs basic economic research, particularly statistical research relating to Hawaii. In cooperation with the economics department and the College of Business Administration, the Center offers research training to advanced students.

The Education Research and Development Center adopts an interdisciplinary approach to the conduct of basic and applied research concerned with instructional and administrative problems, curriculum development and evaluation, educational program evaluation, extension of understanding of human learning and development, the analysis and design of educational systems, and advance planning. Cross-cultural research and development to facilitate educational planning and practice in areas of the Pacific Basin and the Far East is a major concern.

The Gregg M. Sinclair Library is the main library of the University. The library's services and its collections are available to faculty, students, adult off-campus borrowers, and visiting scholars.

The main collection is organized in an open-stack arrangement for maximum ease of access. Two special subject collections are also housed in the Sinclair Library: the extensive Hawaiian and Pacific collection, and the Japan, China, and Korea collections (administered by the East-West Center). Government documents (including United Nations, U.S. Government Printing Office, and some foreign government publications) form a fourth separate collection.

The Sinclair Library's total collections (exclusive of East-West Center holdings) now number 470,000 bound volumes and about 800,000 unbound parts. Over 6,800 serial titles are received, and there are some 16,700 reels of microfilm, 218,000 microcards and microprints, and 39,000 maps.

Other libraries which University students may use include the East-West Center Library (which maintains a rapidly growing collection on Asia), the Library of Hawaii, the State Archives, and the libraries of the Hawaiian Historical Society, the Hawaiian Mission Children's Society, and of several cooperating institutions.

The Harold L. Lyon Arboretum occupies 123 acres in upper Manoa Valley, about 4 miles from the Manoa campus. It was developed by the Hawaiian Sugar Planters' Association and presented to the University in 1957. Several hundred species of exotic trees and shrubs are established, inventoried, and well maintained, providing the University and the scientific community with an unrivaled facility for research on living tropical and subtropical woody plants.

The Hawaii Institute of Geophysics is organized to take advantage of the unique position of Hawaii as a national laboratory for geophysical research covering the broad field of the earth sciences. A new building now houses the
Institute and also provides space for the Statistical and Computing Center. In cooperation with academic departments devoted to the physical sciences, the Institute operates research programs and provides advanced training in meteorology; coastal geology and oceanography including tsunamis; rock, soil, and volcanic gas chemistry and physics; atmospheric, cosmic, and solar physics; geophysics of the earth's crust and mantle, including seismology; and related fields. The Institute also maintains a high-altitude observatory on the summit of Mount Haleakala on Maui, a cloud physics observatory at Hilo, Hawaii, and a seismographic observatory in upper Manoa Valley; plans for an observatory at high elevation on the island of Hawaii are being developed.

The Hawaii Institute of Marine Biology has branches on Coconut Island in Kaneohe Bay and at the Aquarium in Waikiki. It encourages research in the marine biological sciences, including fisheries, by providing facilities and technical services for the faculty, graduate students, and visiting scientists. Its research programs include studies of the life histories, behavior, and identification of marine animals; poisonous and toxic marine animals and plants; fish poisoning; and fundamental research on life processes using marine animals for experimentation.

The Human Relations Area Files is a research organization which collects, organizes, and distributes to 20 participating universities data on selected countries and tribal societies of the world. This material, housed in Sinclair Library, facilitates basic research and comparative studies in human behavior, social life, and culture.

The Industrial Relations Center promotes understanding of personnel and industrial relations. Its library contains information on the basic services in the field, as well as current publications. The Center provides reference service, and assists in conducting conferences, lectures, and group discussions, and in training of advanced students. The Center publishes research studies in basic industrial relations problems, as well as a monthly Newsletter, a bimonthly Selected Acquisitions List, reprints, reading materials, and bibliographies.

The Land Study Bureau develops, assembles, coordinates, and interprets data on the characteristics and utilization of land throughout the state of Hawaii, to the end that the highest and best use of those lands may be ascertained. The primary program involves land classification of the entire state based on soil types, rainfall and climate, economics, and agricultural technology. Secondarily, the Bureau provides the governor, the legislature, and other state and county agencies with data and impartial advice on land use.

The Legislative Reference Bureau, created by the legislature in 1943 to aid in legislative and governmental problems, is situated on the campus, where it maintains a reference library. It provides the legislature, governor, departments, institutions, and agencies of the state with bill-drafting services, information, and reports. During sessions of the legislature the Bureau maintains an office on grounds adjacent to Iolani Palace.

The Office for International Programs coordinates international programs undertaken by the University in overseas areas. These involve programs in Pakistan, Thailand, the Trust Territories, and the Ryukyuan Islands. The office coordinates specialized training programs designed for American person-
The Office of University Relations and Development is responsible for the production of all official University publications, for publicity and public relations activities, and for the coordination of efforts to raise funds for the University from private sources.

The Pacific Biomedical Research Center encourages investigations in the areas of subcellular biology, microbiology, cell structure and function, regulatory biology, genetics, behavioral sciences, and epidemiology. Its building provides space; research equipment, such as electron microscopes; and research facilities, such as an animal colony, to faculty members, graduate students, and visiting scientists. The Center contains research laboratories for human genetics, microbiology, physiology, biochemistry, biophysics, pharmacology, and psychology, in which it fosters and facilitates research projects of biomedical interest.

The Pacific and Asian Linguistics Institute plans and conducts research in general theory and specific problems of lexicology, structural semantics, and grammatical description. Through its Pacific Lexicography Center the Research Institute collects and studies data on the languages of the Pacific and adjacent areas, developing and utilizing computer techniques for storage and retrieval.

The Social Science Research Institute facilitates the initiation of faculty research and develops and conducts programs, primarily interdisciplinary, in the social sciences. It buttresses instruction in appropriate departments by rendering support to research scholars engaged in directing the work of advanced graduate students. A long-term study of social movements in Asia and the Pacific, conducted by the Institute, provides an opportunity for faculty members to participate in field studies and related research in this area.

The Speech Communication Center provides instruction for those students who are discovered at entrance to need special attention to intelligibility and acceptability of utterance. Students appearing to need special instruction may also be referred by their instructors at any time. Within the space available, the Speech Communication Center accepts (on a fee basis) persons not enrolled in the University. The Center also engages in basic and applied research and training of researchers in speech communication.

The Speech and Hearing Clinic is operated by the speech pathology and audiology division of the School of Medicine. Diagnostic and therapeutic services in speech and hearing are provided for children, University students, and other adults by staff members and supervised student clinicians. A fee of $5.00 per semester or part thereof is charged for non-University registrants.

The Statistical and Computing Center operates an IBM 7040-1401 system and an IBM 360/50 system, along with a supporting line of peripheral punched card equipment. It provides services with respect to statistical consultation, system design, data processing, computing, and educational and reference advice to all the divisions and departments of the University.
The University of Hawaii Press publishes scholarly books, particularly those dealing with Hawaii and the Pacific, and two quarterly journals, *Pacific Science* and *Philosophy East and West*.

The Press is a member of the American Association of University Presses; it was established in 1947 as a division of the University operating under the guidance of an advisory committee of seven faculty members appointed by the president. Book manuscripts should be sent to the director, journal papers to the respective editors-in-chief.

The Water Resources Research Center, organized in 1964, plans and conducts research of either a basic or practical nature in relation to Hawaii's water resources, and provides for the training of engineers and scientists through such research. Research is interdisciplinary, involving hydrology and hydraulic engineering, geology, geochemistry, microbiology, public health, climatology, and other related fields. The Center promotes interdisciplinary programs in water resources research among various units of the University.

**COOPERATING INSTITUTIONS**

Through cooperative agreements with institutions listed below, the University has increased its research facilities and expanded its services to the state. The Bishop Museum, the Pacific and Asian Affairs Council, and the Academy of Arts offer student membership rates.

The Bernice P. Bishop Museum, a world-famous storehouse of information, contains an outstanding reference library as well as important biological and anthropological collections relating to Hawaii and other Pacific islands. In addition, this institution holds the combined herbaria of the University and the museum, the most complete collection of Hawaiian plants in existence. The museum's research facilities are available to University students on a reciprocal basis.

The Fruit Fly Laboratory is maintained on the campus by the U.S. Department of Agriculture, Entomology Research Division, for the study of fruit fly pests. This division also cooperates with the University in the use of a multi-purpose radiation facility, installed on campus in 1965 to study the disinfestation of agricultural produce.

The Hawaiian Sugar Planters' Association provided the funds for a building on the campus to house the Agricultural Engineering Institute, with shop facilities for instruction and research.

The Honolulu Academy of Arts, built and endowed by Mrs. Charles M. Cooke, contains valuable collections of both Eastern and Western art. These are available for use by students and instructors.

The Pacific and Asian Affairs Council sponsors lectures, seminars, and meetings on international affairs, particularly on Asia and the Pacific. Its library offers research materials on world affairs.

The Pineapple Research Institute of Hawaii, supported by the pineapple industry, is affiliated with the University. Offices and laboratories are in Institute buildings in the campus area. Field studies are carried on at a 150-acre experimental farm in Wahiawa, Oahu.
The Honolulu Biological Laboratory of the U.S. Fish and Wildlife Service has permanent headquarters on the campus. Senior staff members of the Laboratory cooperate with the departments of zoology, genetics, botany, geosciences, and oceanography in offering advanced courses and in directing research in marine biology and oceanography. Several fellowships are available to citizen students. Requests for information or application forms should be addressed to the Director, U.S. Fish and Wildlife Service, Honolulu Biological Laboratory, Box 3830, Honolulu, Hawaii. Also cooperating in the study of marine life is the Hawaii State Division of Fish and Game.

The universities of Michigan and Hawaii jointly use astronomical observatory facilities on the summit of Haleakala, island of Maui.

The U.S. Geological Survey Volcano Observatory, located at Kilauea Crater on the island of Hawaii, conducts research relating to the Hawaiian volcanoes. Research facilities are made available on occasion to faculty and students of the University.

University students use Sinclair Library for concentrated study. In recent years, research collections in specialized fields have been expanding rapidly.
TUITION AND FEES
(Tuition and fees subject to change)

Tuition and fees for graduate students are the same as for undergraduates. Out-of-state students pay the same tuition as resident students; however, out-of-state applicants pay a $10.00 credential evaluation fee.*

Tuition

Full-time students. Students registered for 12 or more credit hours in any semester pay $85.00.

Part-time students. Part-time regular session students pay $9.00 per credit hour.

College of General Studies and Summer Session. College of General Studies and summer session students pay $16.00 per credit hour.

Fees

To be official, tuition and the general fee must be paid within 24 hours after the close of the final day of registration. Exceptions may be made by the business office only upon written permission of the Graduate Division Dean.

General. Full-time students pay a general fee of $18.00 per semester.

Late registration. There is a late registration fee of $5.00.

Diploma fee. All recipients of advanced degrees are required to pay a diploma fee of $5.00 during their last term.

Thesis Binding fee. The fee is $4.00 to cover the cost of binding two copies of the thesis, payable during the student’s last term.

Payment for the diploma and thesis binding fees should be made at the business office.

Course changes. Each course change after initial registration costs $2.00, unless the change is required by conditions beyond the control of the student. This charge is not made for withdrawal from the University.

Refunds

Tuition and fees may be refunded to students who withdraw from courses, the percentage refunded to be in accordance with the following schedule:

- 80% during the first two weeks of instruction.
- 40% during the third and fourth weeks.
- 0% after the fourth week.

SCHOLARSHIPS AND FELLOWSHIPS

Teaching Assistantships. The University offers a number of teaching assistantships to graduates of accredited institutions of higher learning who have satisfactory scholastic records, an adequate undergraduate background in the

*This fee must accompany the application form. No action will be taken on an application until the fee is received by the Graduate Division. Checks or money orders must be made payable to the University of Hawaii. Do not send cash. For those who are applying from countries other than the U.S., payment must be made in international money order. This fee applies to applicants for admission toward a graduate degree program, and not to those who register for summer session only. The fee is not refundable, but will be applied toward tuition, provided that the applicant registers in the semester for which he has made application.
major field, and evidence of a high level of English proficiency. All applicants
for graduate assistantships must be admitted as potential degree candidates to
qualify for appointments. Graduate assistants serve as readers or part-time
Teaching assistants and carry a limited program of study. The initial remunera-
tion is $2,664 payable in twelve monthly installments, and waiver of tuition
and the general fee. The period of service is September 1 to June 15. Applica-
tions should be addressed to the chairman of the appropriate department and
should be filed before March 1. Each application must be accompanied by a
transcript of academic record and three letters of recommendation from profes-
sors of his major courses.

Research Assistantships. A number of one-half time research assistantships
is available for graduate students in agriculture. Inquiries and applications for
these should be addressed to the Dean of the College of Tropical Agriculture.

One-half time research assistantships are available in various other fields in
connection with research contracts or grants which are supervised by members
of the faculty. Inquiries concerning these should be addressed to the chairman
of the appropriate field of study.

East-West Center Scholarships. See pp. 18–20 for details.

Fellowships. The Graduate Division has available general information for
other fellowships competitions open to graduate students which are admin-
istered by outside foundations or agencies. Since opening and closing dates of
national competitions vary, as do application procedures and general require-
ments, it is suggested that the student obtain details from the persons indicated
below:

CASTLE AND COOKE GRANT

Mr. H. Roy McArdle
University Placement Officer

DANFORTH GRADUATE FELLOWSHIPS

Prof. William Huntsberry
Department of English

DANFORTH TEACHER GRANTS

Dr. Pressley C. McCoy, Assoc. Dir.
Danforth Foundation
607 North Grand Boulevard
St. Louis 3, Missouri

NASA PREDOCTORAL RESEARCH TRAINING PROGRAM

Associate Dean, Research & Fellowships,
Graduate Division
University of Hawaii

NDEA, TITLE IV, GRADUATE FELLOWSHIP PROGRAM

Department Chairman
University of Hawaii

NDEA, TITLE V, EXPERIENCED & PROSPECTIVE TEACHER FELLOWSHIP PROGRAM

Dean, College of Education
University of Hawaii

NDFL, TITLE VI, MODERN FOREIGN LANGUAGE FELLOWSHIPS

Dean, College of Arts & Sciences
University of Hawaii

NDEA INSTITUTES IN ADVANCED STUDY, TITLE XI

Dean, Summer Sessions
University of Hawaii

NATIONAL TEACHER CORPS PROGRAM

Dean, College of Education
University of Hawaii

NIMH FELLOWSHIPS

National Institutes of Health
Bethesda, Maryland 20014

NATIONAL SCIENCE FOUNDATION

Academic Year Institutes

Dr. Michael Frodyma
Department of Chemistry
FINANCIAL AIDS

Loan Funds. The University of Hawaii participates in the National Defense Student Loan, College Work Study, Educational Opportunity Grant and Guaranteed Loan Programs. All of these are Federal-sponsored programs, and are administered in accordance with Federal laws and regulations.

All new out-of-state students should submit a parents’ confidential statement through the College Scholarship Service. Application blanks may be obtained through high school guidance counselors or by writing to College Scholarship Service, Box 176, Princeton, New Jersey 08540; Box 881, Evanston, Illinois 60201, or Box 1025, Berkeley, California 94701. No action will be taken on applications for financial assistance until the student has been admitted to the University of Hawaii.

In applying for a guaranteed loan, contact the agency in the state where you maintain legal residence. Applications for all other financial assistance should be mailed to the Director of Financial Aids by March 1. Applications received from students who have been accepted for admission and which were completed prior to March 1 will be reviewed by this office and the applicants
notified of its decision on or before May 15. Late applicants will be notified before August 1.

For further information, write to the Director of Financial Aids, University of Hawaii, 2444 Dole Street, Honolulu, Hawaii 96822.

Veteran’s Affairs. The Financial Aids and Veteran’s Adviser’s Office assists with problems of veterans and their dependents, and handles students enrolled under the various Federal Veteran’s Bills, including the “Cold War G.I. Bill.” Students covered by any of these programs should present a proper “Certificate for Education and Training” or “Certificate of Eligibility and Entitlement” to the Veteran’s Adviser at the time of registration in order to receive benefits. Inquiries regarding all veteran’s affairs should be directed to the Director of Veteran’s Affairs, University of Hawaii, 2444 Dole Street, Honolulu, Hawaii 96822.

LIVING ACCOMMODATIONS AND EXPENSES

Admission to the University is made without reference to the availability of housing. Requests for residence hall accommodations should be made directly to the Student Housing office. The halls are operated on the American plan. The contract is for the entire academic year or remainder thereof and is for room and board (10 meals per week—breakfast and dinner, Monday through Friday). Dining facilities for Hale Kahawai are located in Jefferson Hall; for all other residence hall residents, in Gateway House.

There are no facilities on campus for temporary housing or for married students.

Gateway House has double-room accommodations for 104 women and 104 men in two separate towers. Both men and women students share common lounge, dining, and recreational facilities on the first floor.

Application contracts must be accompanied by a $25 deposit before consideration for space reservation can be made. Room and board fee is $370 per semester. Contract periods do not include official vacation periods during the academic year. Room costs for these periods are approximately $85.00 plus meals.

Off-Campus Housing. The Student Housing Office maintains information files on rooming houses, rooms in private homes, a few apartments, and room and board jobs. The housing office gives all possible assistance in locating suitable accommodations after the student arrives; because of the rapid turnover the names of landlords cannot be sent through the mail. Negotiations with off-campus landlords must be handled directly by the student. Students arriving in Honolulu without housing reservations are invited to come to the housing office for general information and current listings of available accommodations.

For information on campus or off-campus housing write to: Director of Student Housing, Johnson Hall A, 2555 Dole St., University of Hawaii, Honolulu, Hawaii 96822.

Food Services. In addition to those in Gateway House mentioned above, dining facilities on the campus include:

Hemenway Hall Cafeteria. Meals a la carte are served.
East-West Center Cafeteria. A complete food service in Jefferson Hall, including a cafeteria, a snack bar, and private dining rooms.

A snack bar in the northeast section of the campus.

Expenses. Minimum expenses are estimated at from $1,400 to $1,900 a year for board, room, tuition, registration, course fees, and books. Off-campus housing may be higher. These estimates do not include the cost of clothing, laundry, transportation, and other personal items. Students from outside the state should add the cost of transportation to and from Hawaii.

STUDENT EMPLOYMENT

The Office of Student Employment maintains information about jobs in the community and on the campus to assist students who seek part-time employment to defray expenses. Application for employment must be filed in person. The University of Hawaii participates in the College Work-Study Program of the Economic Opportunity Act. Students meeting eligibility requirements may be employed under this program.

Requests for information concerning part-time employment should be directed to the Office of Student Employment, Bachman Hall 124.

INTERNATIONAL STUDENT OFFICE

The International Student Office helps students from outside the United States with their immigration requirements, financial problems, living arrangements, and other non-academic matters. Special orientation programs for new students are held each semester prior to the beginning of classes. Foreign students who have been admitted to the University are notified of these programs by mail and are urged to arrive in time to attend them.

The office also assists persons and groups interested in building international understanding through contact with foreign students. Further information may be obtained from the Foreign Student Adviser, Webster Hall 101.

Foreign students who are graduates of accredited institutions and who are applying for admission should write to the Dean of the Graduate Division. Other specific inquiries or requests for more detailed information may be addressed to the Foreign Student Adviser, University of Hawaii, 2528 The Mall, Honolulu, Hawaii 96822.

ENGLISH LANGUAGE INSTITUTE

The University of Hawaii established the English Language Institute (ELI) as its agency for assuring that the English proficiency of its foreign students is adequate for University course work. ELI responsibilities include testing and evaluating the English competency of all new foreign students, and providing suitable instruction for those students whose English fails to meet standards determined by the University to be sufficient for the pursuit of full-time studies.

Testing and Evaluation. Upon arrival at the University, all foreign students are referred to ELI for evaluation of their English proficiency, regardless of whether they have previously taken an English examination as part of their application for admission to the University. Registration for University course work is not permitted until the ELI completes its evaluation.
Exemption from ELI. After ELI has evaluated their English proficiency, the following classes of students are exempted from ELI training: (1) those whose native language is English; (2) those who hold a degree from an American college or university; (3) those whose English meets the University's standards for full-time study.

Assignment to ELI Courses. All foreign students not exempted from ELI training are assigned to a program of ELI instruction designed to serve individual needs. Courses are offered at intermediate and advanced levels in oral English, structure, reading, and writing. ELI courses take precedence over all other course work. Enrolling in them may not be postponed until a subsequent semester, nor may they be dropped or taken in auditor status. Students who fail to comply with ELI assignments may be denied further registration at the University.

Relationship of ELI Assignments to Other Course Work. Students assigned to ELI training take a reduced academic load, in order to devote sufficient attention to gaining satisfactory competence in English. Students required to take relatively large amounts of ELI work during their first and second semesters must anticipate slower progress toward their academic goals. This is an especially important consideration, and should be recognized by all foreign students required to take courses in the ELI.

Eligibility for Registration in ELI. Registration for ELI courses is limited to students who have been officially admitted to the University. Students who apply to the Graduate Division of the University for the sole purpose of entering ELI in order to improve their English will not be accepted.

UNIVERSITY PLACEMENT OFFICE

The University Placement Office actively assists graduate students and alumni who are seeking career employment. The office cultivates the interest of prospective local, mainland, and overseas employers and provides them with facilities to contact candidates who are available for employment. Campus interviews are scheduled for representatives of academic, business, industrial, and government organizations. Credential files are established for students who are interested in an academic career. Early registration is encouraged during the final year of study.

COUNSELING AND TESTING CENTER

The Counseling and Testing Center staff consists of professional trained counselors, psychologists, psychiatrists, a social worker, a psychometrist, and interns who, as a team, function in the areas of student service, counselor training, and research. The Center provides the following services without charge to University students: individual counseling, group counseling, educational-vocational information, reading improvement, and testing.

Counseling, whether individually or in groups, may deal with educational, vocational, or personal concerns.

Counseling services are available to full-time and part-time students of the University of Hawaii, to high school seniors who are prospective University of Hawaii students, to University of Hawaii graduates, to applicants for admission to the University, and to faculty and staff members.
The Center is open Monday through Friday from 8:30 a.m. until noon and from 1:00 p.m. until 4:00 p.m. Appointments may be made by telephone or in person.

**STUDENT HEALTH SERVICE**

The Student Health Service is interested in assisting students in maintaining their total health while on campus. Every daytime registered student is eligible for the health services, but is first required to have a medical examination performed by his personal private physician. Students must make their own arrangements for this examination and are also responsible for paying him. The University provides the health form for reporting the examination to the Service.

The Service offers a medical care program similar to that of the general office practice of medicine. A dispensary provides out-patient physician and nursing care 7:45 a.m. to 4:30 p.m. Monday through Friday and from 9:00 a.m. to 11:00 a.m. on Saturdays. The infirmary can provide beds for medical care for minor illnesses and injury on a 24-hour basis 7 days a week during regular sessions of the University. A nurse is on continuous duty for the dispensary and infirmary services and a physician is on call. Students may be referred to a private physician for medical problems beyond the scope of the Student Health Service, for which they must bear the financial responsibility. It is therefore advised that students join a medical insurance program for this purpose of gaining supplemental medical and hospital care. The medical insurance plan sponsored by the ASUH is tailored to the students' special needs and is highly recommended.

Once enrolled, an annual tuberculin test or chest X-ray examination is required of each student. In view of the much higher incidence of tuberculosis in foreign students, semi-annual chest X-ray examinations are required of them. Failure to comply with these requirements may preclude registration for the following semester.

**PARKING AND TRAFFIC**

Students are expected to familiarize themselves with the University's parking and traffic rules and regulations established by the board of regents. These regulations, together with special instructions, may be obtained at several locations on campus including the student mail room, the business office in Bachman Hall, and the Auxiliary Services building. Ignorance of these rules and special instructions will not excuse a student from the payment of fines for violations.

**EAST-WEST CENTER**

The East-West Center—the Center for Cultural and Technical Interchange between East and West—was established by the U.S. Congress in 1960. The goal of the Center is to further mutual understanding among the peoples of Asia, the Pacific area, and the United States. This goal is the guideline for the operation of the Center's four main divisions: the Institute for Student Interchange, the Institute for Technical Interchange, the Institute of Advanced Projects, and the Division of Central Programs.
Institute for Student Interchange

Scholarships. Young men and women possessing a high degree of leadership potential and scholastic ability and giving evidence of real interest in the goals of the Center may qualify for scholarships which provide transportation to and from Honolulu, tuition and books, housing and meals, accident and health insurance, and a monthly incidental allowance. The scholarships may include a field study grant to the mainland United States or Asia. Scholarships are for 9 or 12 months with provisions for extensions for those who qualify.

Scholarships for American and Asia/Pacific students are primarily for graduate study at the University of Hawaii. There are some undergraduate scholarships for those students who come from countries where there is only a limited number of higher educational institutions. There is also a specialized Asian language program for American undergraduate students.

Field Study Grants. The field study grant provides opportunity to study in Asia or the Pacific Islands for those American students in good standing who demonstrate their seriousness, maturity, and ability. Generally, students seeking advanced degrees request up to one semester for research purposes or course work in a university. Certain students whose primary goal is language study may be permitted to spend a longer period overseas in recognized full-time Asian language programs.

The U.S. mainland field study grant, for the student in good standing from Asia or the Pacific, provides an opportunity for special study on the mainland United States. This study is usually planned to take place during the summer or fall semester, after two semesters have been spent at the University of Hawaii.

Students on scholarship are expected to participate in intercultural activities as their academic requirements may allow.

Language Requirements. Because the medium of instruction at the University of Hawaii is English, Asian and Pacific student grantees are tested for English proficiency by the University's English Language Institute. Those requiring extra help are assigned to full-time or part-time training in English until they are ready for a full academic program.

American students are required to complete at least two years of Asian language before the end of their grants.

Asia-America Program. Seminars conducted for East-West Center students by the faculty of the University are designed as a bridge that will enable Asians and Americans to develop the intercultural understanding recognized as one of the basic functions of the Center. Both groups of students play a vital role in the seminars by providing sources of information and guidance and by their critical and constructive comparisons of the various Asian societies with the variations in culture found in American society. Attendance at the seminars is required as a partial fulfillment of the Center scholarship grant.

The Asia-America Program also offers a film series, a lecture and visual arts program, and other non-academic activities for grantees. A browsing room and library of paperback books are also available.
Institute for Technical Interchange

The Institute for Technical Interchange brings to the East-West Center participants with needs for training in specific skills and techniques. Some of the projects currently handled by the Institute are medical technology, nursing, public health, museum and stage techniques, food production, public administration, hotel management and tourism, education, university administration, and teaching techniques in English. In addition, participants are sent to various parts of the Pacific or to Asia for training in the field. As participants learn specific techniques, they also gain a deeper understanding of the varying cultures of their fellow participants.

Institute of Advanced Projects

The Institute of Advanced Projects promotes mutual understanding between East and West through exchange of persons and scholarly publications programs. Senior specialists in Asian-Pacific affairs are invited to pursue their individual research and writing projects in functional groups and with the aid of the East-West Center Library; international development fellows are assisted in their doctoral studies; Research Translations translates Asian scholarly materials into English. A community of scholars, the Institute of Advanced Projects thus serves both the scholars in residence and the world of scholarship at large.

Central Programs

This division includes the administrative offices of the Chancellor, Deputy Chancellor, and its Fiscal and Administrative Management units, and Central Programs.

Central Programs' activities reach beyond the Center to the community and to Asia, the Pacific, and the United States through conferences and materials prepared and distributed by the Public Affairs staff. The Community Relations office coordinates activities of the Center and its students with Hawaii's residents on all islands, working with the Friends of the East-West Center, an organization of volunteers.

General Information

East-West Center Buildings. Facilities include Thomas Jefferson Hall, the administration building which houses offices, a food center, and conference rooms; Hale Manoa, men's residence; Hale Kuahine, women's residence; John F. Kennedy Hall, theatre-auditorium; and Abraham Lincoln Hall, which houses the Institute of Advanced Projects.

For Further Information

Asian-Pacific Scholarships. Write to Director of Student Selection, East-West Center, 1777 East-West Road, Honolulu, Hawaii 96822.
American Scholarships. Write or call the Director of Student Selection, East-West Center, 1777 East-West Road, Honolulu, Hawaii 96822.
Programs, Grants of the Institute of Advanced Projects. Write to the Director, Institute of Advanced Projects, Lincoln Hall, East-West Center, 1777 East-West Road, Honolulu, Hawaii 96822.
Academic Information

ADMISSION

Deadlines. To insure completion of action on applications for admission to the Graduate Division, applications must be received by April 30 for the fall semester, October 30 for the spring semester, and March 30 for the summer session.

Application.* Students with baccalaureate degrees from accredited American institutions of higher learning or, in the case of foreign students, baccalaureate degrees fully equivalent to the bachelor's degree granted by an American university, may be admitted to the Graduate Division, subject to the following qualifications: (1) that the standards of the degree in question are equivalent in both the distribution of academic subject matter and in scholarship achievement requirements to those maintained at the University of Hawai'i; and (2) that the student can be accommodated in the field in which he wishes to study.

The Dean of the Graduate Division will deny admission if the applicant's record of scholarship is not sufficiently distinguished, or if his undergraduate program is inadequate for advanced academic or professional study. These provisions affect all applicants whether from colleges or schools in the United States or elsewhere.

Notification of acceptance or rejection is sent to each applicant as soon as possible after the receipt of his application. Applicants are warned not to make definite arrangements for attending the University until they have received a formal notice of acceptance from the Graduate Division.

Students applying for admission must submit the following:

Graduates of American Universities:

Classified students:
1. Application form.
2. Transcripts (two complete sets) from each institution attended.
3. Records of examinations (GRE, MAT, etc.) as required by departments. (See special requirements under field listings.)

Unclassified students for summer session only:
1. Certification of degree or transcript. (Write to: Director of Admissions and Records)

Graduates of Foreign Universities (non-Americans):
1. Application form.
2. Transcripts (two complete sets) from each institution attended.

*Applicants to the Graduate School of Library Studies, School of Social Work, School of Public Health, and School of Medicine should apply directly to the Dean of the school concerned.
3. Records of examinations (GRE, MAT, ATGSB, etc.) as required by departments. (See special requirements under field listings.)
4. Statement of financial support.
5. Results of Test of English as a Second Language.

Test of English as a Foreign Language.* All applicants from foreign countries where English is not the usual means of communication are required to take the Test of English as a Foreign Language (TOEFL). Applications for admission will not be processed until the Graduate Division has received the TOEFL results, which are necessary in order to enable the admissions officer to evaluate the student's English proficiency in terms of his probable ability to carry effective graduate-level studies. TOEFL is administered only three times each year—in January, May, and October. Applicants should plan to take TOEFL at the following times:

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Completed registration forms to take TOEFL must be in the office of the Educational Testing Service (ETS) at least one month prior to the date of the examination. Information regarding the exact dates, locations, fees, etc., is available from: TOEFL, Educational Testing Service, Princeton, New Jersey 08540. Please do not write to the University of Hawaii for information on TOEFL.

SUMMER SESSION

Students applying for admission to the summer session only should apply to: Director of Admissions and Records, 2444 Dole St., Honolulu, Hawaii 96822. However, students wishing to apply for admission to a degree program beginning with the summer session should apply to the Graduate Division, Student Services, for regular admission.

ENTRANCE EXAMINATIONS

Application forms for the GRE, ATGSB, and MCAT are usually available at the Counseling and Testing Center, 1615 East-West Road.

Graduate Record Examinations. Students must apply to the Educational Testing Service to take the test. Applicants may write directly to: Graduate Record Examinations, Educational Testing Service, 1947 Center Street, Berkeley, California 94704. The test dates, test fees, and registration deadlines are posted on Graduate Division bulletin boards on all campuses. The tests are generally administered three times a year (usually January, April, and July), and the cost of each test is as follows: Aptitude test, $7.00; one advanced test, $8.00; Aptitude and advanced test taken on the same day, $12.00.

Admission Test for Graduate Study in Business. Students must apply to ETS by writing directly to: Admission Test for Graduate Study in Business, Educational Testing Service, Box 966, Princeton, New Jersey 08540. The

*See pp. 16-17 for information relating to the University's English Language Institute, and its role in testing and evaluating the English proficiency of foreign students.
ATGSB is usually administered in February, April, and July of each year at a cost of $10.00.

**Medical College Admission Test.** Students must apply to the Psychological Corporation by writing: Medical College Admission Test, The Psychological Corporation, P. O. Box 3540, Grand Central Station, New York, New York 10017. Information on test dates and deadlines is available at the Counseling and Testing Center. There is a fee of $15.00 for taking the test.

**Miller Analogies Test.** In-state students who are required to take the MAT should report to the Counseling and Testing Center Testing Room at the Pineapple Research Institute, 2500 Dole Street, Mondays between the hours of 9:00-10:30 a.m. or 1:00-2:30 p.m. The test takes one hour. A fee of $3.00 is charged to University of Hawaii students, and $5.00 to non-students.

All inquiries regarding test dates, registration deadlines, and test fees should be directed to the Counseling and Testing Center, 1615 East-West Road, Honolulu, Hawaii 96822.

**CLASSIFICATION OF STUDENTS**

Graduate students (graduates of this University or of other institutions of approved standing) who have been admitted to the University of Hawaii Graduate Division are designated as *classified* (regular, probational, special) students.

**Regular** students are those who have been accepted by the Graduate Division and in their respective fields of study as potential candidates to pursue programs of study leading to advanced degrees.

**Probational** students are those who have been admitted probationally by the Graduate Division and in their respective fields of study as potential candidates to pursue programs leading to advanced degrees.

**Special** students are those who have been admitted to special non-degree training or certificate programs.

**UNCLASSIFIED STUDENTS**

American graduate students not planning to pursue work toward advanced degrees should apply to the Director of Admissions and Records, Bachman Hall, 2444 Dole Street, Honolulu 96822, for admission as unclassified graduate students. Applicants who have been denied admission as classified students will not be considered for unclassified status. Foreign graduate students are not accepted as unclassified graduates.

**REGISTRATION AND CREDITS**

**Social Security Numbers.** Students are required to present social security cards at registration, since the University uses these numbers in its records.

**Transcript.** Certification of the bachelor’s degree by transcript must be submitted to the Graduate Division office upon registration for degrees awarded in June and by November 30 for those awarded in August.

**Course Loads.** Sixteen credit hours in a semester and seven in a six-week summer session are considered a maximum course load and may be exceeded only with the approval of the Dean. The minimum full-time load for graduate students is as follows:
8 credits, including 2 or more graduate courses
9 credits, including 1 graduate course
12 credits, undergraduate courses exclusively

A doctoral candidate, however, carrying fewer than 8 credits in Thesis 800 may be certified by his adviser as carrying a full load. For graduate teaching and research assistants, the minimum full-time load is 6 credits. Because their duties ordinarily require 20 hours per week, they are restricted to 9 hours of course work for credit (including thesis research 800).

Late Registration. Registration after the officially designated period is rarely permitted. The procedure is as follows: (1) during the first seven days following the last official day of registration, written approval must be obtained from the Dean of the Graduate Division, (2) after the seventh day, written approval must be obtained from the Dean and the instructor concerned, and students may enroll only for individual reading or research courses, the thesis course (800), or as auditors.

Change in Registration. An official blank may be obtained from the Graduate Division. The endorsed form should be submitted to the business office.

Withdrawal from the University is applied for on a form issued by the admissions and records office, and this blank, properly endorsed, must be submitted to the business office.

Withdrawal from Courses. During the first three weeks of a semester, an approved withdrawal is marked W on the student's record. Withdrawal at a later date, but before the last four weeks of class instruction in a semester, is marked W if the student's performance in the course warranted a passing grade. Otherwise, it is recorded WF. A student may not withdraw from a course during the last four weeks of instruction in a semester. However, the Dean may permit him to withdraw from the University. If a student withdraws from a course without approval, he will receive an F for the course.

Denial of Registration. The Dean of the Graduate Division will deny further registration to any student whose work is below the required level.

Graduate Credit for Seniors. Seniors at the University of Hawaii may earn credit toward an advanced degree for some courses completed during their last semester as undergraduates provided (1) that the courses taken are in excess of the requirement for the bachelor's degree and (2) that such courses may be used to fulfill requirements in the major field. To obtain such credit requires written approval of the dean of the appropriate undergraduate college and the Graduate Division when registering for the course.

Credit by Examination. Graduate students may obtain credit by examination in courses numbered 400–599 with the approval of the qualifying, thesis, or program committees, the instructor concerned, and the Dean of the Graduate Division, subject to the general University regulations and procedures, except that there shall be no limit on the number of such examinations which a graduate student may take during any one semester. Credit may not be obtained by examination in courses numbered 600 or above.

College of General Studies Credits. To obtain credit in the Graduate Division for courses taken in the College of General Studies requires approval of the student's adviser and the Dean of the Graduate Division at the time of
registration in the Graduate Division. Cards for approval are available from the Graduate Division office or the College of General Studies.

**Correspondence Course Credits.** No graduate credit is allowed for correspondence courses.

**Undergraduate Deficiencies.** Under no circumstances are courses in directed research to be used to make up undergraduate deficiencies.

**COURSE NUMBERS**

Courses numbered 600–799 are intended primarily for graduate students. Courses numbered 400–599 are upper-division undergraduate courses which may be used to fulfill advanced degree requirements.

**GRADES, GRADE POINTS, GRADE-POINT RATIOS**

Graduate students as well as undergraduate students are graded A, B, C, D, F, I, S, and W.

Grade points are given for all courses in which grades are reported. They are computed as follows: for each credit received in a course, 4 grade points are granted if the grade is A, 3 if B, 2 if C, 1 if D, and 0 if F.

The thesis is graded S (satisfactory). Failure to make satisfactory progress on a thesis does not entitle a student to refund of tuition fees.

An I is recorded if a student has failed to complete a small but important part of a semester's work before the semester grades are determined, if the instructor believes that failure was caused by conditions beyond the student's control and not by carelessness or procrastination. Instructors will send a report of Incomplete to each student receiving an I, indicating the steps to be taken to receive a passing grade. To receive credit for a course in which an I has been reported, the student must make up the incomplete work before the Thanksgiving or Easter recess of the next semester in which the student is in residence. If the work is not completed then, the I will be changed to F at the end of the semester. If the work is completed, the instructor will report a semester grade, taking the completed work into consideration. Credit in a course for which an F is given may be obtained only by passing the course, or its equivalent, either at the University of Hawaii or at some other accredited institution of higher education.

*Grade-point ratios* are computed by dividing the total number of grade points by the total number of credits for which a student has been registered. Grades of W or I are not included in the computation of ratios. Grades of F or WF are included until credit is subsequently obtained in the courses in which failures have been reported.

**"PASS-FAIL" OPTION**

The major purpose of the Pass-Fail Option is to encourage students to broaden their education by venturing into subject areas outside their fields of specialization without hazarding a relatively low grade. Under the option, students receive grades of P, passing, or F, failing. The grade of P is not computed in the student's grade-point ratio; the grade of F is.

The Pass-Fail Option may be exercised during the periods in which with-
drawal from courses without grade penalty is permitted (first three weeks of the semester, first five days of summer session) and only within the following conditions:

1. The student is a classified student and has already attended the University for at least a semester;
2. The student is in good standing (not on academic probation);
3. The student takes only one “pass-fail” course in any one term;
4. The course will not be used to fulfill the requirements for a master’s degree;
5. The exercise of the option must be mutually agreeable to the student and the course instructor.

**REQUIREMENTS FOR CONTINUED REGISTRATION**

To remain eligible for further graduate work and to be awarded a graduate degree, candidates and intended candidates must have a B average (3.0 grade-point ratio) for all courses they have completed. In addition, they must also have a B average for all graduate courses (i.e., courses numbered 600 and above) they have completed.

Credit-hour requirements for graduate degrees can only be fulfilled by grades of A, B, and C. Grades below C will not be counted toward the completion of requirements for advanced degrees but will be counted in computing the grade-point ratio. In computing the GPR of a student who has been required to retake an undergraduate course in which he received a grade of C or D, all grades in that course will be included, as will the appropriate number of units for each time the course was repeated. However, for purposes of fulfilling requirements for a graduate degree, only the credits earned the first time the course was taken will be allowed (i.e., counted).

Intended candidates and candidates whose cumulative grade-point ratios fail to meet the minimum requirements after completing two or more semesters and at least 12 credit hours will be placed on academic probation for the following semester. Those on probation who fail to attain the minimum standards at the end of the probationary period will be denied further registration in the Graduate Division.

**DIPLOMAS**

An application for a diploma must be filed with the Graduate Division at the beginning of the semester in which the student expects to complete his degree requirements.

**CONFERRING OF DEGREES**

Degrees are conferred and diplomas awarded thrice annually, in January, June, and September. Commencement exercises are held in June only. Students completing their degree requirements at any time during the year may, upon request, receive certification from the Dean of the Graduate Division that the degree will be conferred at the end of the appropriate semester.

Diplomas may be obtained from the admissions and records office. Inquiries regarding diplomas should be addressed to: Admissions and Records, 2444 Dole St., not to the Graduate Division.
TRANSCRIPTS

Transcripts may be obtained from the admissions and records office.

RESPONSIBILITY

Students admitted to the Graduate Division are assumed to be mature adults and are expected to behave accordingly. The advisory services provided for in the operation of the various graduate programs assist the students. However, the student alone is responsible for following the procedures and completing the steps required in his program. Failure of an adviser to remind a student of a requirement or deadline date is not acceptable as a basis for waiver of the requirement. Requirements of the Graduate Division, both procedural and substantive, may be waived only by written request of the student and/or committee concerned and must have the written approval of the Dean. Petition forms are available in department offices and the Graduate Division office.

DEGREES, REQUIREMENTS, AND PROCEDURES

MASTER'S DEGREES


The Master of Arts is offered in:
- American Studies
- Anthropology
- Art
- Asian Studies
- Chinese Drama and Theatre
- Economics
- English
- French
- Geography
- German
- History
- Japanese
- Linguistics
- Mathematics
- Music
- Pacific Islands Studies
- Philosophy
- Political Science
- Psychology
- Sociology
- Spanish
- Speech
- Teaching of English as a Second Language

The Master of Science is offered in:
- Agricultural Economics
- Agricultural Engineering
- Agronomy
- Animal Sciences
- Astronomy
- Biochemistry
- Botany
- Chemistry
- Civil Engineering
- Electrical Engineering
- Entomology
- Food Science
- Genetics
- Geosciences
- Horticulture
- Mechanical Engineering
- Microbiology
- Nursing
- Nutrition
- Ocean Engineering
- Oceanography
- Pharmacology
- Physics
- Physiology
- Plant Pathology
- Public Health
- Soil Science
- Speech Pathology & Audiology
- Zoology

The Master of Education is offered in:
- Educational Administration
- Elementary Education
- Educational Communications
- Educational Psychology
- Educational Foundations
- Secondary Education

The Master of Fine Arts is offered for creative production rather than research in:
- Art
- Drama and Theatre
- Music

The Master of Library Science is offered by the Graduate School of Library Studies. For requirements, etc., see the bulletin of the Graduate School of Library Studies.
The Master of Social Work is offered by the School of Social Work. For requirements, etc., see the bulletin of the School of Social Work.

The Master of Public Health is offered by the School of Public Health. For requirements, etc., see the bulletin of the School of Public Health.

**Residence**

The minimum residence requirement is two semesters of full-time work or four six-week summer sessions. For the Master of Social Work, four semesters of full-time work are required.

**Time Allowed**

Candidates for the master's degree who fail to complete all requirements within five years after admission to candidacy must be readmitted to candidacy by the Dean of the Graduate Division before they can proceed. All work must be completed within seven years preceding the date upon which the degree is conferred.

**Transfer of Credits**

Upon recommendation of the graduate faculty and no later than admission to candidacy, no more than 8 semester hours of graduate credit may be transferred from accredited institutions upon recommendation of the graduate faculty. No credit from another institution may be transferred unless the grade is \( B \) or better.

For an East-West Center student whose program includes a semester or two at mainland or Asian universities, the total number of credits approved for transfer before the student leaves for his field study will be automatically transferred, provided that the Graduate Division receives official transcripts of records from the institutions attended. The student is responsible for delivering the transcripts to the Graduate Division.

**Rules and Requirements**

The rules and requirements listed below are those of the Graduate Division and must be observed by all graduate students. Please note, however, that for some programs of study there are special requirements. For each field of study there is a statement of special requirements, if any, for the master's and doctoral degrees.

**PLAN A (THESIS)**

Unless otherwise stated, Plan A is available in all fields of study.

**Credit-Hour Requirements.** A minimum of 24 credit hours of course work and 6 credit hours of thesis research is required. In unusual cases, upon recommendation by the thesis committee no later than the registration period of the session during which the degree is conferred, either fewer credits or a maximum of 12 credits may be granted for thesis research. A minimum of 12 credits, exclusive of research methods courses, must be earned in courses numbered 600–799, including at least one graduate seminar related to the major field. A maximum of 4 credits may be allowed in directed research courses (699 and 799).

Candidates must be registered in the appropriate thesis research course (800) during the entire term in which the work for the degree is completed, except
that candidates who complete all requirements for the degree during the six-week summer terms need not be registered during the subsequent fall semester.

**Thesis Requirement.** When a thesis problem has been approved by the graduate faculty of the student's field of study, the chairman sends to the Graduate Division the candidate's name, the thesis title, and a recommendation for membership of the thesis committee. The committee will include one member from outside the major field of study. The student may then enroll in the thesis research course (800).

The thesis title must be submitted to the Graduate Division by January 15 or May 15 of the session preceding the one in which the candidate expects to complete the requirements for the degree. Candidates who expect to finish their program during the summer session must submit the thesis topic to the Graduate Division by the preceding February 1.

Upon request by the thesis committee relevant work done by the student in directed research (course 699) may be utilized as part of the thesis research. In such instances, the total credit for such directed research (course 699) and thesis research (800) to be applied toward the minimum requirement for the degree shall not exceed the maximum specified for thesis credit (6).

The chairman of the thesis committee is primarily responsible for directing and guiding the candidate's research and writing activities. It is the responsibility of the student to keep all members of the committee informed of the scope, plan, and progress of both the research and the thesis. Instructions for thesis preparation can be obtained at the Graduate Division office.

Copies of the completed thesis must be submitted to committee members at least two weeks prior to the date of the final examination. The original and first carbon copies must be deposited with the secretary of the Graduate Division by the deadline specified in instructions issued to all candidates at the beginning of the session in which the degree is conferred. Additional bound copies may be required by individual departments.

**Examinations**

**General Examination.** Before admission to candidacy the student must pass a general examination in his major field of study. This examination is given during the first semester. It is designed to reveal the quality of the student's preparation for advanced work in his field and his ability to pursue graduate work at the master's level.

A student who fails the general examination may repeat it after three months if a petition, recommended for approval by the graduate faculty of the major field of study, is approved by the Dean of the Graduate Division. The student will not be considered for candidacy again should he fail the general examination twice.

**Final Oral Examination.** This examination, covering the thesis and related areas, may be given at the option of the individual graduate field of study. If given, it should be held at least three weeks before the end of the term during which the degree is conferred. It is conducted by the thesis committee and is open to all faculty members. As an alternative, the committee chairman may have the candidate present the results of the thesis at a departmental graduate seminar, but all members of the thesis committee must be present. Should the
student fail the final examination he may repeat it upon recommendation of the graduate faculty concerned and approval of the Dean of the Graduate Division.

**Summary of Procedure**

1. Application for admission to the Graduate Division
2. Preliminary conference
3. Appointment of interim adviser
4. General examination
5. Admission to candidacy
6. Appointment of thesis committee
7. Approval of thesis title by thesis committee
8. Application for diploma
9. Completed thesis submitted to committee
10. Final oral examination (optional)
11. Final copies of thesis submitted to Graduate Division
12. Payment of diploma and thesis binding fees
13. Granting of the degree

**PLAN B (NON-THESIS)**

Plan B is available only in the following fields of study:

- Agricultural Economics
- Agricultural Engineering
- American Studies
- Anthropology
- Art (Eastern Art History)
- Asian Studies
- Astronomy
- Biochemistry
- Business Administration
- Chinese
- Civil Engineering
- Drama and Theatre
- Economics
- Educational Administration
- Educational Communications
- Educational Foundations
- Educational Psychology
- Electrical Engineering
- Elementary Education
- English
- Entomology
- Food Science
- Geography
- Geosciences
- German
- History
- Horticulture
- Japanese
- Library Studies
- Linguistics
- Mathematics
- Mechanical Engineering
- Microbiology
- Music Education
- Music Performance
- Nursing
- Pharmacology
- Philosophy
- Physics
- Physiology
- Plant Pathology
- Political Science
- Public Health
- Secondary Education
- Social Work
- Sociology
- Spanish
- Speech
- Teaching of English as a Second Language
- Zoology

**Credit-Hour Requirements.** A minimum of 30 graduate credit hours is required. A minimum of 18 credits must be earned in courses numbered 600–799, including at least one graduate seminar related to the major field.

When the student is advanced to candidacy, the chairman of the field of study appoints a program committee of three members of the graduate faculty, one of whom shall be from a field of study other than the major. The program committee advises the candidate and approves a coherent program of courses for the candidate.

**Examinations**

**General Examination.** Before admission to candidacy the student must pass a general examination in his major field of study. This examination is given during the first semester. It is designed to reveal the quality of the student's
preparation for advanced work in his field and his ability to pursue graduate work at the master's level.

A student who fails the general examination may repeat it after three months upon recommendation of the graduate faculty of the major field of study and approval of the Dean of the Graduate Division. The student will not be considered for candidacy again should he fail the general examination twice.

**Seminar Appearance and Examination.** Candidates shall make a seminar appearance near the conclusion of their program at least three weeks before the end of the term during which the degree is conferred, to which all members of the graduate faculty shall be invited, at which time they shall be examined by the program committee. Should the student fail the final examination or seminar appearance he may be permitted to repeat the examination only if this is recommended by the graduate faculty concerned and is approved by the Dean. At least three months must elapse before such re-examination.

**Summary of Procedure**

1. Application for admission to the Graduate Division
2. Preliminary conference
3. Appointment of interim adviser
4. General examination
5. Admission to candidacy and appointment of program committee
6. Establishment of program of courses
7. Diploma application
8. Seminar appearance and examination
9. Payment of diploma fee
10. Completion of course work
11. Granting of the degree

Research activities at the University of Hawaii have increased greatly in the past few years. Left, scientists at the Hawaii Institute of Marine Biology test out new equipment in Kaneohe Bay. Right, a graduate student in chemistry conducts an experiment in a modern, well-equipped laboratory.
DOCTOR OF PHILOSOPHY

The degree of Doctor of Philosophy is awarded only for the most distinguished scholarly achievement. The quality of a candidate’s work is judged by a variety of means culminating in a set of comprehensive and final examinations and a dissertation. The dissertation must be a significant original contribution to knowledge in the candidate’s chosen field. The additional, special requirements in any given field of study, as stated below, are designed to prepare the candidate for the examinations and successful completion of his dissertation.

Candidates are accepted only in fields of study in which the teaching staff, library, laboratory equipment, and cooperative relationships with other research institutions make it possible to offer training. These are:

- Agricultural Economics
- Anthropology
- Astronomy
- Biochemistry
- Botany
- Chemistry
- Drama and Theatre
- Educational Psychology
- Electrical Engineering
- Entomology
- Genetics
- Geography
- Geosciences
- History
- Horticulture
- Linguistics
- Microbiology
- Pharmacology
- Philosophy
- Physics
- Physiology
- Political Science
- Psychology
- Soil Science
- Zoology

Residence

The minimum residence requirement is three semesters of full-time work at the University of Hawaii.

Credits

There are no course credit requirements for the Ph.D. degree; nonetheless, candidates may be advised or required to enroll in courses if, in the opinion of their advisers or the faculty in charge of the program of study, these courses are essential to preparation for the examinations required of all candidates. For information regarding required or recommended courses, see the section of this bulletin appropriate to the field of study.

Language Requirements

The student must demonstrate comprehension of one foreign language. To test for comprehension, the student will be given a written examination. To pass the examination he must be able to read at reasonable speed research materials in his field of interest. English is not considered a foreign language in this context. The examination will be administered by the faculty of the appropriate language department, or by the Counseling and Testing Center (for the ETS foreign language examinations). If the language examination is to be administered by one of the language departments, the several graduate faculties will provide suitable materials on which to base the examination.

Examinations are given three times each year as announced by the Graduate Division.

The student must pass the language examination before he can be admitted to candidacy. In fields of study in which two foreign languages are required, the Graduate Division office must be notified that the candidate has passed the examination in both languages before he will be permitted to take the comprehensive examination.
Dissertation Committee

Upon admission to candidacy, the chairman of the graduate faculty of the field of study recommends to the Dean of the Graduate Division appointment of a dissertation committee consisting of at least five members, including representatives of the minor field or fields. This committee, appointed by the Dean of the Graduate Division, prescribes for the candidate a course of study in preparation for the comprehensive examination. The committee conducts the comprehensive and oral examinations described below. It also approves the dissertation research problem and dissertation itself (see below).

Examinations

Doctoral candidates must pass the following examinations:

1. Comprehensive examination. This examination, which may be either oral or oral and written, covers the major field and one or more of the minor fields, the latter to be given by a member or members of the dissertation committee. Candidates who fail the comprehensive examination may repeat it at the discretion of the graduate faculty concerned, no sooner than three months after the first examination. A candidate who fails the second examination is irrevocably dropped from candidacy.

2. A final oral examination in defense of the dissertation. This examination cannot be taken until after the comprehensive examination has been passed. If the student fails the final examination he may be allowed to repeat it upon petition approved by the graduate faculty concerned and the Dean of the Graduate Division.

Arrangements for the final examination must be made at least one month in advance, and it must occur at least three weeks before the end of the session in which the degree is granted.

Dissertation

The doctoral dissertation is expected to be a scholarly presentation of an original contribution to knowledge resulting from independent research and should be suitable for publication.

When the dissertation topic has been approved by the dissertation committee, it will notify the Graduate Division. At this time the candidate may register for the dissertation research course (800).

A graduate student may undertake a research problem when the subject is primarily in one field but has close relationship to other fields; in such an event, at the time the student submits his dissertation proposal, it must be ensured that: (1) the student possesses sufficient knowledge of the related field or fields to be able to deal competently with the research and dissertation, and (2) a representative of the related field is placed on the student's dissertation committee.

The candidate should look to the chairman of his dissertation committee for primary direction regarding research methods and the preparation of results. It is the joint responsibility of the chairman and the student to see that all members of the committee are kept informed of the scope, plan, and progress of both the research and the dissertation. A brochure on instruction for preparation of the dissertation can be obtained at the Graduate Division office.
Copies of the completed dissertation must be submitted to committee members at least four weeks prior to the date of the final oral examination. The original and first carbon copies must be deposited with the secretary of the Graduate Division by the deadline specified in instructions issued to all candidates at the beginning of the session in which the degree is conferred. Additional bound copies may be required by individual departments.

A majority of the members of the dissertation committee must approve both the dissertation and the examination on the dissertation. A minority member has the right of appeal to the Graduate Division Council for a final decision. The chairman must ensure that the final form of the dissertation, including revisions and amendments agreed upon, is acceptable to a majority of the committee. The committee members express their approval on the title page of the dissertation.

Chairmen of graduate fields of study have the privilege of being ex officio members of all dissertation committees in the field.

**Summary of Procedure**

1. Application for admission to the Graduate Division
2. Preliminary conference
3. Appointment of interim adviser
4. Certification of proficiency in a foreign language
5. Admission to candidacy and appointment of dissertation committee
6. Approval of dissertation proposal
7. Certification of proficiency in second foreign language (where required)
8. Diploma application
9. Comprehensive examination
10. Final examination
11. Copies of dissertation filed in Graduate Division
12. Payment of diploma and dissertation binding fee
13. Granting of the degree

The above order is that usually followed, but at the pleasure of the graduate faculty of any field of study, admission to candidacy and beginning of dissertation research may be delayed until after successful performance on the comprehensive examination.

**PROFESSIONAL TEACHING CERTIFICATE**

The Department of Education of the state of Hawaii issues the professional teaching certificate to teachers in the employ of the Department who, after receiving the Bachelor of Education degree or its equivalent, earn a total of 30 semester hours, 6 of which must be in graduate courses (600–799) in education. For purposes of such certification, the Bachelor of Education equivalent is defined as a bachelor's degree with 18 semester hours in education courses and practice teaching under the supervision of an accredited teacher training institution.
Graduate Fields of Study

FACULTIES, REQUIREMENTS, AND COURSES

Courses listed here numbered 400-599 are undergraduate courses available for graduate programs in the major field. Courses numbered 600 and above are graduate courses.

Only the number, title, and credit of courses are given. Course descriptions will be found in the University's General Catalog. Students should consult the time schedules issued prior to the opening of sessions for information on courses offered, credit, instructors, etc.

In addition to the minimum requirements stated in the forepart of this Bulletin, specific requirements are indicated here by fields of study.

Agricultural Economics

GRADUATE FACULTY

F. S. Scott, Jr., Ph.D. (Chairman) — marketing
H. L. Baker, Ph.D. — forest economics
E. R. Barmettler, Ph.D. — marketing
J. R. Davidson, Ph.D. — production economics
J. T. Ishida, Ph.D. — marketing
J. T. Keeler, M.S. — farm management
A. B. Larson, Ph.D. — price analysis
C. W. Peters, M.S. — marketing
P. F. Philipp, Ph.D. — production economics
H. Spielman, Ph.D. — marketing
C. P. Wilson, Ph.D. — marketing and agricultural policy

AFFILIATE FACULTY

K. Gertel, Ph.D. — resource economics
P. P. Wallrabenstein, Ph.D. — statistics

Candidates for the M.S. degree must present a minimum of 18 hours of undergraduate credit in agricultural economics, general economics, or business, including a minimum of 12 hours in agricultural economics or general economics.

A thesis (Plan A) will be required for the M.S. program in most instances. A non-thesis program (Plan B) is permissible in special cases. For Plan A, a minimum of 12 hours, exclusive of thesis must be selected from the agricultural economics courses listed below. For Plan B, a minimum of 18 hours must be selected from courses listed below. The remaining course requirements may be elected from related fields with the approval of the program committee. Twelve hours, exclusive of thesis, must be in courses numbered 600 or above, at least 9 of which must be in agricultural economics.

Candidates for the Ph.D. in agricultural economics must meet requirements specified for admittance to candidacy for the M.S. in agricultural economics.
AGRICULTURAL ECONOMICS

423 Agricultural Cooperatives (3)
424 Marketing of Tropical and Subtropical Agricultural Products (3)
425 Marketing of Livestock, Poultry and Dairy Products (3)
426 Agricultural Economics Extension (3)
428 Production Economics (3)
429 Agricultural Policy and Planning (3)
430 Agricultural Finance (3)
431 Forest Economics (3)
433 Advanced Farm Management and Plantation Economics (3)
434 Statistical Methods
435 Consumer Economics and Food Distribution (3)
624 Marketing Research (3)
625 Economics of Agriculture: Tropical Countries and Asia (3)
626 Collection of Economic Data in Agriculture (3)
629 Production Economics (3)
630 Market Development for Agricultural Products (3)
632 Economics of Agricultural Processing Industries (3)
634 Advanced Agricultural Prices and Statistical Analysis (3)
635 Seminar: Agricultural Price Analysis and Statistics (3)
636 Seminar: Agricultural Policy (3)
637 Economics of Agricultural Resource Development (3)
638 Seminar: Land Use in Developing Countries (3)
639 Financing Agriculture in Developing Countries (3)
699 Directed Research (arr.)
800 Thesis Research (arr.)

Agricultural Engineering

GRADUATE FACULTY
J. K. Wang, Ph.D. (Chairman) — farm processing, power and machinery
H. M. Gitlin, M.S. — cooling and handling of farm products
D. M. Kinch, Ph.D. — power and machinery, farm processing
I-pai Wu, Ph.D.— irrigation engineering

AFFILIATE FACULTY
W. N. Reynold, M.S.— irrigation

Intended candidates for the M.S. must present a bachelor's degree in an accredited agricultural, civil, or mechanical engineering program or the equivalent.

Courses available for the graduate program are listed below. Courses from the related fields of civil engineering, mechanical engineering, mathematics, physics, food science, agronomy and soil science may be approved in a degree program. The only required course from related fields is Mathematics 402. Candidates may specialize in farm processing, power and machinery, or soil and water conservation. Required courses are marked with an asterisk.

AGRICULTURAL ENGINEERING

411 Methods of Post Harvest Handling of Agricultural Products (3)
431 Agricultural Power and Equipment
435 Irrigation Principles and Practices
631 Analysis of Implement Design (3)
635 Farm Irrigation System Design (3)
647 Methods of Agricultural Engineering (3)
648 Post Harvest Process Engineering (3)
699 Directed Research (arr.)
700 Seminar (1)
*800 Thesis Research (arr.)

Agronomy

GRADUATE FACULTY
L. D. Swindale, Ph.D. (Chairman) — soil management
R. L. Fox, Ph.D.— soil and crop management
D. L. Plucknett, Ph.D.—crop management, weed control
P. P. Rotar, Ph.D.—plant breeding
G. D. Sherman, Ph.D.—soil and crop management
W. G. Sanford, Ph.D.—agronomy
M. Takahashi, M.S.—tropical range management, turf research

Intended candidates for the M.S. must present a minimum of 18 undergraduate credits in agronomy which shall include 9 credits in agronomy and 9 credits in general soil science, plant physiology, and genetics or plant breeding. The undergraduate program must also include basic courses in botany, microbiology, chemistry, and statistics.

Courses in the major field are to be selected from those listed below. All candidates must register for the seminars in agronomy and soil science (soil fertility). Courses may be taken in related fields: botany, climatology, genetics, horticulture, agricultural engineering, and microbiology. Candidates may specialize in crop production or tropical range management.

**AGRONOMY**

501 Tropical Crop Production (3)
502 Principles of Agronomy (3)
503 Range Management (3)
510 Sugar Cane Agronomy (3)
699 Directed Research (arr.)
800 Thesis Research (arr.)

**SOIL SCIENCE**

687 Soil Science Seminar (1)
689 Advanced Soil Fertility (4)
690 Advanced Soil Chemistry (arr.)

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**American Studies**

**GRADUATE FACULTY**

S. Lutzky, Ph.D. (Chairman)—history and social backgrounds
S. Brown, Ph.D.—politics and history of ideas
R. Denney, B.A.—literature and sociology
J. Gurian, Ph.D.—literature and social problems
G. Hamaker, Ph.D.—history and political science
F. Matson, Ph.D.—politics and social science
J. McCutcheon, Ph.D.—social and cultural history

The American studies department offers a program designed as an interdisciplinary and intercultural approach to the study of the United States. Taking advantage of the University's location, library resources, and faculty interest, the department places a special emphasis on the problems of American relationships with Asian nations and cultures.

Recognizing the unique nature of the program and the difficulties of adequate undergraduate preparation, especially for Asian students, departmental requirements for intended candidates are flexible. Candidates should present a record indicating a wide range of study in the humanities and the social sciences or be willing to undertake additional work in those fields before their acceptance as degree candidates. The department offers a degree program under either Plan A (with thesis) or Plan B (non-thesis) programs. Under either plan candidates are required to take a minimum of 12 semester credits in American studies courses. In addition, candidates must submit a program which includes courses in the following fields of study:
1. Literature and the Arts
2. History, Philosophy and Education
3. Other Social Sciences

Plan A should include a minimum of 6 hours each in two of the above three fields of study. Plan B should include a minimum of 9 hours in one of the three with 9 more chosen from the other two fields.

American candidates having a special interest in Asia can obtain the certificate offered by the Overseas Career Program in conjunction with the M.A. in American studies.

**AMERICAN STUDIES**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>485-486</td>
<td>Contemporary American Civilization</td>
<td>3-3</td>
</tr>
<tr>
<td>490</td>
<td>Leaders and Movements in American Thought</td>
<td>3</td>
</tr>
<tr>
<td>495</td>
<td>The Businessman in America</td>
<td>3</td>
</tr>
<tr>
<td>600</td>
<td>Seminar: Asia-America</td>
<td>2</td>
</tr>
<tr>
<td>630</td>
<td>Criticism in the Mass Media Age</td>
<td>3</td>
</tr>
<tr>
<td>640</td>
<td>Asian Influences in American Civilization</td>
<td>3</td>
</tr>
<tr>
<td>650</td>
<td>American Civilization and the Overseas American</td>
<td>3</td>
</tr>
<tr>
<td>660</td>
<td>Seminar: Presidential Leadership and American Civilizat</td>
<td>3</td>
</tr>
<tr>
<td>670</td>
<td>Seminar: Analysis of Sociability in the United States</td>
<td>3</td>
</tr>
<tr>
<td>685-686</td>
<td>Seminar: The Nature of American Society</td>
<td>3-3</td>
</tr>
<tr>
<td>690</td>
<td>Introduction to Contemporary America</td>
<td>3</td>
</tr>
<tr>
<td>699</td>
<td>Directed Research (arr.)</td>
<td></td>
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<tr>
<td>700</td>
<td>Methods in American Studies</td>
<td></td>
</tr>
<tr>
<td>750</td>
<td>Seminar: The Interaction of Asia and America</td>
<td>3</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
<td></td>
</tr>
</tbody>
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**Animal Sciences**

**GRADUATE FACULTY**

- E. H. Cobb, Ph.D. (Chairman)—animal breeding and quantitative genetics
- J. E. Alicata, Ph.D.—parasitology
- C. C. Brooks, Ph.D.—swine nutrition
- R. B. Herrick, Ph.D.—poultry physiology
- J. H. Koshi, Ph.D.—dairy science
- A. L. Palafox, M.S.—poultry nutrition
- E. Ross, Ph.D.—poultry nutrition
- R. W. Stanley, Ph.D.—dairy nutrition
- O. Wayman, Ph.D.—general physiology and physiology of reproduction

The M.S. in animal sciences is offered in the fields of genetics, nutrition, and physiology. Strong training in chemistry, physics, and mathematics is desirable with emphasis depending upon the field of specialization. Candidates wishing to specialize in nutrition or physiology should be strong in chemistry and physics with a good background in mathematics. Candidates wishing to specialize in animal breeding or quantitative genetics should be particularly strong in mathematics with a good biological background.

**ANIMAL SCIENCES**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>442-443</td>
<td>Physiology of Domestic Animals</td>
<td>4-4</td>
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<tr>
<td>444</td>
<td>Animal Nutrition</td>
<td>4</td>
</tr>
<tr>
<td>445</td>
<td>Animal Breeding</td>
<td>3</td>
</tr>
<tr>
<td>446</td>
<td>Animal Diseases and Their Control</td>
<td>3</td>
</tr>
<tr>
<td>641</td>
<td>Seminar in Animal Sciences</td>
<td>1</td>
</tr>
<tr>
<td>642</td>
<td>Ruminant Nutrition</td>
<td>2</td>
</tr>
<tr>
<td>643</td>
<td>Physiology of Reproduction</td>
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<tr>
<td>645</td>
<td>Quantitative Genetics</td>
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<td>699</td>
<td>Directed Research (arr.)</td>
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<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
<td></td>
</tr>
</tbody>
</table>
Anthropology

GRADUATE FACULTY

S. B. Boggs, Ph.D.—culture and personality, applied anthropology (medicine and mental health), complex societies (occupations, values)

E. A. Cook, Ph.D.—Oceania, Southwest American Indians, values and social change, social structure and kinship, language and culture

A. G. Dewey, Ph.D.—(Coordinator of Graduate Studies)—Indonesia, Polynesia, Melanesia, social anthropology, culture change

J. D. Jennings—New World, archeology (visiting 1967–1968)

W. P. Lebra, Ph.D.—East Asia, social anthropology, religion

K. Luomala, Ph.D.—Polynesia, ethnology and folklore studies

T. W. Maretzki, Ph.D.—(Department Chairman)—East Asia, psychological and applied anthropology, culture change

L. E. Mason, Ph.D.—Micronesia, ethnology, applied anthropology, culture change (on leave 1967/68)

R. J. Pearson, Ph.D.—Archeology, Southeast Asia, Pacific, East Asia

W. G. Solheim, II, Ph.D.—Southeast Asia, archeology (on leave 1967/68)

AFFILIATE FACULTY

T. T. Barrow, Ph.D.—Asian and Pacific traditional cultures, social anthropology, ecology, material culture, art and museum techniques

G. Bateson, M.A.—Melanesia, Indonesia, culture and personality, values

K. E. Emory, Ph.D.—Polynesia, archeology, ethnology

R. W. Force, Ph.D.—Oceania, culture change

S. A. Howard, Ph.D.—Polynesia, social and psychological anthropology, ethnoscience

Y. Sinoto, D. Sc.—Polynesia and Japan, archeology

D. Yen—Oceania, Southeast Asia, Ethnobotany

PART-TIME FACULTY

R. Green, Ph.D.—Oceania, archeology, ethnology

Intended candidates for the M.A. or Ph.D. need not have an undergraduate background in anthropology. Students with the B.A. in related fields are particularly welcome. All students are expected to acquire a common knowledge of the four basic areas in the field, biological anthropology, linguistics, archeology, social and psychological anthropology, during the first year of graduate work. Anthropology 650–651 is designed to review these subjects. While this course is not required, passing the final examination which is given at the end of each semester is mandatory for all candidates. A familiarity with the historical development of anthropology as a formal discipline and anthropological methods is also expected of all students.

The graduate program is designed to allow specialization within two broad fields of anthropology, social and psychological anthropology, and archeology. Specialized interests in biological anthropology may be pursued by working closely with the department of human genetics. Anthropologists who wish to concentrate on linguistic studies may work in a program jointly with the department of linguistics. A broad base in related courses in the social sciences, humanities, and natural sciences is strongly recommended for all students and specializations are expected to cross disciplinary lines in all cases.

M.A.

The M.A. candidate has a choice of a thesis (Plan A) or a non-thesis (Plan B) program. Plan A consists of 24 semester hours of course work and a thesis worth an additional 6 hours. Plan B consists of 30 semester hours. Both require a minimum of 18 credits in graduate courses in anthropology and normally a minimum of 6 in related fields.

After a common core of anthropological knowledge has been established
for the first year, students are free to develop their specialized interests. All students are required to take Anthropology 510, 700, and two offerings of 750. Also required is a course in statistics (Anthropology 500) or passing the final examination for this course. All students must demonstrate reading knowledge of one foreign language useful in the candidate's research. Candidates will be tested for their area of specialization in anthropology in a written comprehensive examination. Plan B candidates must also take an oral examination.

Ph.D.

In addition to the broad preparation in anthropology described as prerequisite for the M.A. degree, the doctoral candidate must demonstrate competence in anthropological theory construction, research design, and the collection and evaluation of data. He will be encouraged to undertake faculty supervised research prior to submitting his thesis proposal and conducting thesis research. He will also be expected to develop and demonstrate his abilities in teaching. While not all candidates will be teaching assistants, they are encouraged to give lectures or other presentations to undergraduate or graduate students and faculty. Required courses are Anthropology 510, 700, either 710 or equivalent or 520-521 and 4 semester offerings of 750. Reading knowledge in two foreign languages is required for all doctoral candidates. Upon recommendation of the supervisory committee, oral competence alone may be accepted for one of the two required languages. An intensive oral examination is given to all Ph.D. candidates prior to the beginning of field research. This examination covers the specialized subjects on which the individual student focuses his studies in graduate work. The doctoral dissertation must be based upon fieldwork in another culture; such fieldwork may take up one year and should not be less than eight months.

Courses for the graduate program may be selected from those listed below and from offerings in related fields of study as directed by the candidate's supervisory committee. A bimonthly seminar is scheduled for the presentation of theoretical issues and original research by faculty, graduate students, and visiting anthropologists. Graduate students are expected to attend. The department requests a copy of both M.A. and Ph.D. theses for the departmental files.

Applications for admission to the graduate program in anthropology should include the following information: (1) two transcripts; (2) Graduate Record Examination scores; (3) background information, including a detailed statement on the student's interest in anthropology, his plans for study and a career in the field (application forms are available from the department and the Graduate Division); (4) three letters of reference from faculty members who can evaluate the applicant's potential for graduate studies.

ANTHROPOLOGY

450 Regional Cultures of Oceania (3)
(1) Hawaii
(2) Micronesia
(3) Polynesia
(4) Melanesia

460 Regional Archeology (3)
(1) Asia and the Pacific
(2) Europe, Africa, and the Near East
(3) North and South America
FIELDS OF STUDY

Arts in Cultural Perspective
470 Folklore (3)
   (Art 474, Primitive Art, and Music 471, Music of Non-literate Peoples)
500 Anthropological Statistics (3)
510 Foundations of Anthropological Method (3)
520-521 Archeological Techniques (3-3)
550 Anthropological Applications (3)
   (1) Dependency Administration
   (2) Health
   (3) Education (Ed HP 570)
   (4) Overseas Operations
650-651 Proseminar: General Anthropology (6-6)
660 Social Organization (3)
665 Psychological Anthropology (3)
670 Archeology (3)
675 Anthropology of Religion (3)
690 Ecological Anthropology (3)
699 Directed Reading or Research (arr.)
700 History of Anthropology (3)
710 Anthropological Techniques (3)
750 Research Seminar (3)
   (1) Archeology
   (2) Linguistics
   (3) Ethnography
   (4) Social Anthropology
   (5) Applied Anthropology
   (6) Psychological Anthropology
   (7) Biological Anthropology
800 Thesis Research (arr.)

Anthropology Seminar (no credit)

Art

GRADUATE FACULTY
A. B. Etherington, B. Arch. (Chairman) — architecture
C. W. Anderson, M.A. — painting, design
J. H. Cox, M.A. — painting, Oceanic art
M. T. Everson, M.F.A. — weaving, textile design
C. F. Horan, M.A. — ceramics
K. G. Kingrey, M.A. — design
S. Kimura, M.A. — illustration
H. O. McVay, M.A. — ceramics
P. Neogy, M.A. — Asian art
B. Norris, B.A. — painting
H. A. Robinson, M.A. — textiles
E. Stasack, M.F.A. — painting, printmaking
T. D. Terazaki, equiv. to M.E. — architecture
M. Turnbull, M.A. — painting
J. C. Wirgin, Ph.D. — Asian art

The M.A. is given only in the field of Far Eastern art history. Intended candidates must present the equivalent of an undergraduate major in the history of art including 24 credits in art history and related courses, and, in addition to English, a reading knowledge of one language in which a considerable body of relevant literature is published. The faculty will determine the suitability of Plan A or Plan B at the preliminary conference.

The M.F.A. (Plan A only) is awarded for creative studio work in one or more of the following media: (1) drawing and printmaking, (2) painting, (3) weaving and textiles, (4) ceramics, (5) visual design. The thesis includes an exhibition of original work in the chosen medium. Intended candidates must present the equivalent of an undergraduate major in art including 18 credits
in art history and theory. Evidence of ability to do creative work of superior quality must be presented by means of a portfolio or slides.

In view of the intensive character of the program of professional studies in art, students who are admitted to the Graduate Division with a B.A. or B.S. degree are required to complete work which is comparable to that of a Bachelor of Fine Arts degree or its equivalent before admission to candidacy for the Master of Fine Arts degree. Ordinarily this will not exceed two semesters of study.

An otherwise deficient or incompatible undergraduate program will require, at the discretion of the graduate faculty, additional course work for either degree. It is unlikely that the M.F.A. can be earned with less than two years of study.

Courses available for the graduate program are listed below. A maximum of 10 hours may be earned in certain advanced courses in anthropology, classics, English, history, music, and philosophy, or other pertinent fields.

Art 689 and 800 are required courses for the M.A.
Art 690 and 800 are required courses for the M.F.A.

ARD
476 Italian Renaissance Painting and Sculpture (3)
477 Northern Renaissance Painting and Sculpture (3)
478 19th Century Painting and Sculpture (3)
479 20th Century Painting and Sculpture (3)
481 Art of Islam (3)
487 Arts of the Pacific
565 Visual Communication (2)
585 Chinese Painting (3)
615-616 Printmaking (2-2)
621-622 Painting (2-2)
623 Watercolor Painting (2)
625 Materials and Techniques of Painting (2)
636-637 Design and Research in Weaving (2-2)
641-642 Ceramics (2-2)
643-644 Ceramic Glazes and Clay Bodies (2-2)
661-662 Visual Design (2-2)
681 The Art of Central Asia (3)
683 Applied Arts of China (3)
684 Chinese Painting from Ming to Early Ching (3)
685 Chinese Painting from Ching to the Present (3)
687 Problems in Pacific Art (3)
688 Arts of Hawaii (3)
689 Seminar in Asian Art (2)
690 General Seminar (3)
699 Directed Work (arr.)
700 Studio (arr.)
782 Buddhist and Hindu Art (3)
784 Early Chinese Art (3)
786 Japanese Painting and Sculpture (3)
789 Museum Studies in Asian Art (3)
800 Thesis Research (arr.)

Asian Studies

GRADUATE FACULTY
R. S. Anderson, Ph.D. (Chairman) — education
G. Akita, Ph.D. — history
J. T. Araki, Ph.D. (East Asia Program Committee) — literature
G. Artola, Ph.D. — Asian and Pacific languages
A. G. Dewey, Ph.D. — anthropology
P. H. Lee, Ph.D.—Korean
D. H. Kornhauser, Ph.D.—geography
W. Maurer, Ph.D.—Asian and Pacific languages
G. R. Nunn, Ph.D.—history
H. T. Oshima, Ph.D.—economics
F. R. Pitts, Ph.D.—geography
R. K. Sakai, Ph.D.—history
Yao Shen, Ed.D.—Chinese
B. B. Smith, Ph.D.—music
R. B. Stauffer, Ph.D.—political science
R. Van Niel, Ph.D. (Southeast Asia Program Committee) —history
W. Vella, Ph.D.—history
H. J. Wiens, Ph.D.—geography

The graduate program in Asian studies is designed primarily for students who have taken their B.A. in a discipline and who wish to focus their work at the M.A. level on a particular geographical and cultural region of Asia. The program is open also to Asian nationals provided they focus their study upon an area not native to them. The master's degree is the terminal degree in Asian studies; this degree is offered only under Plan B, which is a non-thesis program.

Graduate work in Asian studies is supervised and coordinated through three area program committees. These committees represent the areas of East Asia, Southeast Asia, and South Asia. The student is expected to focus his work upon one of the regions of Asia as represented by the area committees.

Students desiring to enter the graduate program in Asian studies should present a minimum of twelve hours of work in courses related to Asia in addition to introductory Asian language courses. Students not having this background may be required to take, without credit toward the degree, certain preparatory courses designated by their respective area committee. Attention is drawn to the language requirement listed below.

Requirements for the M.A. in Asian studies include: (1) a concentration of 15 hours of courses approved by the departmental adviser in one discipline; (2) a minimum of 6 hours of Asian courses in a minor field or fields; (3) a multidisciplinary graduate Asian Studies seminar offered by the area program committees; (4) a minimum of 6 hours of credit in an Asian language at the fourth-year level or higher.

ASIAN STUDIES
798 Seminar in Asian Studies (3)
(1) Multidiscipline Seminar in East Asian Studies.
(2) Multidiscipline Seminar in Southeast Asian Studies.
(3) Multidiscipline Seminar in South Asian Studies.

Astronomy

GRADUATE FACULTY
J. R. Holmes, Ph.D. (Chairman) —optics, spectroscopy
W. K. Bonsack, Ph.D.—stellar spectroscopy
J. T. Jefferies, D.Sc.—solar physics, radiation transfer
F. Q. Orrall, Ph.D.—solar physics
W. M. Sinton, Ph.D.—planetary and infra-red astronomy
J. B. Zirker, Ph.D.—solar physics

Undergraduate preparation for admission to the graduate program in astronomy includes a minimum of 35 semester hours of undergraduate credits in physics or astronomy, some of which must be in atomic and nuclear physics,
electromagnetism, mechanics, optics, and thermodynamics. An undergraduate course in Introductory Astronomy is recommended. A year's course in chemistry, and mathematics through differential equations, are also required. Candidates for admission must also submit results of the Physics and Aptitude sections of the Graduate Record Examination.

Courses in astronomy available for the graduate program are listed below. Courses required for the M.S. degree in astronomy are marked with an asterisk. In addition Physics 600 and 610 are required.

**ASTRONOMY**

- 621 Stellar Atmospheres I (3)
- 622 Stellar Atmospheres II (3)
- 623 Stellar Interiors and Evolution (3)
- 624 Solar Physics (3)
- 627 Galactic Structure I (3)
- 628 Galactic Structure II (3)
- 629 Astrophysical Techniques (3)
- 632 Astrophysical Spectra (3)
- 633 Special Topics in Astronomy (3)

**Biochemistry**

**GRADUATE FACULTY**

- T. Winnick, Ph.D. (Chairman) — metabolism and biosynthesis of proteins and peptides
- G. A. Barber, Ph.D. — carbohydrate metabolism
- J. B. Hall, Ph.D. — nucleic acids and viruses
- M. Mandel, Ph.D. — physiology of temperate bacteriophage; nuclear magnetic resonance
- R. H. McKay, Ph.D. — physical biochemistry, biological oxidations
- H. F. Mower, Ph.D. — biological nitrogen fixation; energy transfer mechanisms
- L. H. Piette, Ph.D. — mechanisms of organic and biological reactions, electron paramagnetic resonance
- R. A. Scott, Ph.D. — physical chemistry of proteins and nucleic acids
- K. T. Yasunobu, Ph.D. — relationship of enzyme structure to function

**AFFILIATE FACULTY**

- R. M. Heinicke, Ph.D. — enzymology, nutrition, plant biochemistry
- L. G. Nickell, Ph.D. — physiology and biochemistry of sugar cane

Intended candidates for either the M.S. or Ph.D. must have or acquire adequate preparation in organic, physical, and analytical chemistry. They should consult with the department faculty in planning their curricula and in choosing appropriate courses offered by other departments such as microbiology, physiology-pharmacology, genetics, zoology, chemistry, and mathematics. Available courses are listed below.

**BIOCHEMISTRY**

- 441 Basic Biochemistry (3)
- 442 Basic Biochemistry Laboratory (1)
- 561–562 General Biochemistry (3–3)
- 571–572 General Biochemistry Laboratory (2–2)
- 585 Biochemistry Literature (1)
- 610 Special Topics in Enzymology (2)
- 615 Advanced Carbohydrate Metabolism (2)
- 620 Bioenergetics (2)
- 630 Nucleic Acids and Viruses (2)
- 635 Metabolic Regulation (1)
- 640 Biosynthesis of Proteins and Peptides (1)
- 655 Enzymology Laboratory (arr.)
- 671–672 Seminar (1)
- 699 Directed Research (arr.)
- 701 Marine Biochemistry (1)
- 800 Thesis Research (arr.)
FIELDS OF STUDY

BIOPHYSICS

591-592 Survey of Biophysics (2-2)
751-752 Topics in Biophysics (1-1)
760 Biophysics Laboratory (3)

Botany

GRADUATE FACULTY

N. P. Kefford, Ph.D. (Chairman) — physiology
G. E. Baker, Ph.D. — mycology
A. J. Bernatowicz, Ph.D. — phycology
M. L. Bristol, Ph.D. — ethnobotany
B. J. Cool, Ph.D. — physiology
M. S. Doty, Ph.D. — phycology
G. W. Gillett, Ph.D. — systematics
C. H. Lamoureux, Ph.D. — anatomy
D. Mueller-Dombois, Ph.D. — ecology
E. W. Putman, Ph.D. — physiology
A. C. Smith, Ph.D. — systematics

AFFILIATE FACULTY

B. Krauss, M.S. — anatomy
L. G. Nickell, Ph.D. — physiology

Intended candidates for either the M.S. or Ph.D. degrees must present a minimum of 18 hours of undergraduate credit in botany or related subjects such as microbiology, developmental biology, genetics or biochemistry. Additional work required to remedy deficiencies and for degree programs will be decided through a diagnostic examination at the time of enrollment in the department and by continuing faculty counseling. Thesis work may be undertaken in biochemistry, ecology, ethnobotany, morphology, mycology, phycology, physiology and systematics. Courses available for the graduate program are listed below.

BOTANY

410 Plant Anatomy (3)
412 Microtechnique (3)
418 Cytology (3)
430 Mycology (3)
436 Medical Mycology (3)
450 Natural History of the Hawaiian Islands (2)
454 Ecology II (4)
461 Taxonomy of Vascular Plants II (3)
470 Principles of Plant Physiology (4)
480 Physiology (3)
610 Botanical Seminar (1)
612 Advanced Botanical Problems (arr.)
615 Morphology Seminar (2)
620 Primitive Angiosperms and Phytogeographic Theory (4)
631 Marine Phytoplankton (3)
   (same as Ocean 631)
650 Environmental Phytogeography (2)
651 Dynamics of Marine Productivity (3)
   (same as Ocean 651)
662 Advanced Taxonomy (3)
665 Nomenclature Seminar (2)
670-671 Advanced Physiology (3-3)
672 Techniques in Physiology (2)
673 Techniques in Physiology—Biochemistry (2)
675 Physiology Seminar (1)
681 Phycology—Chlorophyta (2)
682 Phycology—Phytoplankton (2)
683 Phycology—Myxophyta and Phaeophyta (2)
Business Administration

GRADUATE FACULTY

F. McIntyre, Ph.D. (Chairman) — business economics
J. Adler, Ph.D. — accounting, finance
L. W. Ascher, Ph.D. — finance
J. K. Bailey, Ph.D. — management
E. M. Barnet, Ph.D. — management, marketing, travel industry management
D. W. Bell, B.S. — real estate, land economics
R. B. Buchele, Ph.D. — management
P. N. H. Chung, Ph.D. — business economics, statistics
C. F. Congdon, M.B.A. — statistics
D. A. Corbin, Ph.D. — accounting, finance
F. B. Evans, Ph.D. — marketing
J. B. Ferguson, Ph.D. — personnel management, industrial relations
L. P. Freitas, Ph.D. — finance
T. Q. Gilson, Ph.D. — management, industrial relations
H. W. Grayson, Ph.D. — business economics
S. Hoslett, Ph.D. — management
T. Ige, Ph.D. — business economics
L. W. Jacobs, Ph.D. — management, marketing, industrial relations
S. Kim, Ph.D. — business economics
A. L. Kirkpatrick, M.A. — business economics, money and banking
S. S. O. Lee, Ph.D. — accounting
Y. S. Leong, Ph.D. — public finance, statistics
H. D. Lowe, D.B.A. — accounting, finance
J. V. Miccio, Ed.D. — management
E. C. Pendleton, Ph.D. — labor economics, industrial relations
K. W. Pierson, M.A. — insurance
E. Richman, D.Eng.Sc. — management
H. S. Roberts, Ph.D. — labor economics, industrial relations
K. Sasaki, Ph.D. — statistics
K. K. Seo, Ph.D. — business economics, money and banking
H. B. Stellmacher, M.B.A. — marketing
A. M. Whitehill, Ph.D. — international management

Intended candidates for the M.B.A.* must submit the results of the Educational Testing Service Examination "Admission Test for Graduate Study in Business."

There are no undergraduate pre-requisites to the program; students are admitted on the basis of undergraduate grade averages and the results of the ATGBS examination.

The M.B.A. is a 36-credit hour non-thesis program offered under Plan B of the Graduate Division.

PROGRAM REQUIREMENTS

<table>
<thead>
<tr>
<th>Group</th>
<th>Requirement</th>
<th>Hours</th>
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<tr>
<td>Group I, Foundation Courses</td>
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<tr>
<td>Group II, Core Courses</td>
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<tr>
<td>Group III, Business Electives</td>
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<td>9</td>
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<tr>
<td>Group IV, Integration Course</td>
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36 hours

All courses in Groups I, II, and IV are required. Elective courses may be in the same field or different fields as the student chooses. However, a student

*For further information, see "Graduate Program Leading to the Master of Business Administration" issued by the College of Business Administration, University of Hawaii.
must have completed any relevant Foundation or Core course before taking an elective course in the same subject.

Group I

Bus 605 Behavioral Science for Business (3)
Bus 610 Economic Analysis for Business (3)
Bus 615 Quantitative Methods for Business (3)

Group II

Bus 620 Accounting (3)
Bus 625 Administration (3)
Bus 630 Finance (3)
Bus 635 Marketing (3)
Bus 640 Personnel and Industrial Relations (3)

Group III

Accounting
Acc 600 Intermediate and Advanced Accounting (3)
Acc 661 Cost and Managerial Accounting (3)
Acc 682 Auditing and Tax Planning (3)
Acc 685 Accounting History and Theory (3)
Acc 670 Contemporary Accounting Theory
Acc 675 Seminar in Advanced Accounting (3)

Business Analysis and Statistics
BAS 680 Statistical Decision Theory (3)
BAS 681 Operations Research (3)
BAS 682 Quantitative Methods of Business and Economic Forecasting (3)

Business Economics
BEC 691 Managerial Economics (3)
BEC 692 Current Economic Problems (3)
BEC 693 Capital Markets and International Finance (3)

Finance
Fin 700 Problems in Business Finance (3)
Fin 701 Investment Analysis and Management (3)
Fin 702 The Financial System (3)

Insurance
Ins 710 Theory and Practice of Insurance (3)
Ins 711 Risk Management (3)

Law
Law 770 Legal Environment of Business (3)

Management
Mgt 720 Organization Theory and Practice (3)
Mgt 721 Comparative Management (3)
Mgt 722 Production and Operations Management (3)

Marketing
Mkt 730 Mass Marketing Management (3)
Mkt 731 Marketing Communication and Promotional Strategy (3)
Mkt 732 Marketing Research Methodology (3)

Personnel and Industrial Relations
PIR 740 Management Staffing and Development (3)
PIR 741 Problems in Organizational Health (3)
PIR 742 Problems and Practices of Labor Dispute Settlement (3)

Real Estate
RE 750 Real Estate (3)
RE 751 Advanced Real Estate: Land Development (3)

Travel Industry Management
TIM 760 Advanced Travel Industry Management (3)

Group IV

Bus 645 Business Policy (3)
Chemistry

GRADUATE FACULTY
R. G. Inskeep, Ph.D. (Chairman) — infrared spectroscopy, hydrogen bonding, complex ions
G. Andermann, Ph.D. — analytical chemistry, emission spectroscopy, X-ray spectroscopy, infrared reflectance studies
I. L. Barnes, Ph.D. — analytical chemistry and geochemistry, age determination of minerals, chemistry of the solid state
R. A. Duce, Ph.D. — nuclear and atmospheric chemistry, trace element analysis by neutron activation analysis
M. M. Frodyma, Ph.D. — analytical chemistry, polarography, gas analysis
J. W. Gilje, Ph.D. — inorganic chemistry, boron hydride chemistry, phosphorus and nitrogen chemistry
J. L. Ihrig, Ph.D. — reaction mechanisms, free radicals, kinetics, magnetochemistry
E. F. Kiefer, Ph.D. — reaction mechanisms, small ring compounds, olefin transition metal complexes
H. O. Larson, Ph.D. — natural products, new synthetic methods, rearrangements
J. A. Mann, Ph.D. — physical chemistry, theoretical chemistry, physics and chemistry of surfaces
R. L. McDonald, Ph.D. — physical chemistry, solvent extraction of inorganic complexes, kinetics of isotopic exchange reactions
R. E. Moore, Ph.D. — organic chemistry, structure determination and biosynthesis of natural products from marine organisms
J. J. Naughton, Ph.D. — analytical, physical, solid state and geochemistry
L. L. Schaleger, Ph.D. — physical organic chemistry, kinetics and mechanism of acid catalyzed organic reactions, hydrolysis and hydration phenomena
F. J. Scheuer, Ph.D. — organic chemistry, structure determination of natural products
J. L. T. Waugh, Ph.D. — boron chemistry, intermetallic and heteropoly compounds, X-ray studies
J. W. Wrathall, Ph.D. — inorganic chemistry, coordination compounds, reactions of coordinated ligands
H. Zeitlin, Ph.D. — organic and oceanographic chemistry, reflectance spectrophotometry

AFFILIATE FACULTY
G. E. Felton, Ph.D. — food technology, carbohydrate chemistry
H. W. Hilton, Ph.D. — agricultural chemicals and carbohydrates
J. H. Payne, Ph.D. — carbohydrate chemistry, sugar technology

Intended candidates for the M.S. or Ph.D. must present the following minimum undergraduate preparation chemistry: year courses in general, organic, analytical, and physical chemistry.

Courses may be selected from those listed below or from graduate offerings in mathematics and the natural sciences. Required courses are marked with an asterisk. Additional details of programs may be found in a departmental brochure.

CHEMISTRY
445  Modern Synthetic Methods (4)
524  Preparative Inorganic Chemistry (3)
621  Introductory Quantum Chemistry (3)
622  Advanced Inorganic Chemistry I (3)
623  Advanced Inorganic Chemistry II (3)
631  Instrumental Methods of Analysis (4)
632  Electroanalytical Chemistry (3)
633  Analytical Applications of Spectroscopy (3)
634  Advanced Analytical Laboratory (2)
641  Advanced Organic Chemistry: Structure and Stereochemistry (3)
642  Advanced Organic Chemistry: Mechanisms (3)
651–652 Intermediate Physical Chemistry (3–3)
655  Radiochemistry and Nuclear Reactions (3)
656  Radiochemical Techniques (3)
*691–692 Seminar (1–1)
699  Directed Research (arr.)
721–722 Special Topics in Inorganic Chemistry (arr.)
Fields of Study

751-732 Special Topics in Analytical Chemistry (arr.)
741-742 Special Topics in Organic Chemistry (arr.)
744 Organic Applications of Spectroscopy (3)
751-752 Special Topics in Physical Chemistry (arr.)
753 Modern Theories of Atomic and Molecular Structure (3)
756 Statistical Mechanics (3)
*800 Thesis Research (arr.)

Chinese

Graduate Faculty

L. P. H. Winters, M.A. (Chairman)—traditional and modern literature; philosophy in literature; literature and culture
R. Cheng—Chinese linguistics
J. De Francis, Ph.D.—Chinese linguistics
C. T. Lo—traditional literature
J. Young, Ph.D.—applied linguistics and civilization

Both Plan A (thesis) and Plan B (non-thesis) M.A. programs in one of the following three major fields are available: (1) literature, (2) language, and (3) teaching of Chinese as a second language (CHISL). Intended candidates must have a B.A. in Chinese or have had equivalent preparation in the discipline.

Under Plan A, a minimum of 18 semester hours of course work in the major field, 6 semester hours of course work in the related field and 6 semester hours of thesis research is required. Required courses are marked with asterisks.

Under Plan B, a minimum of 24 semester hours of course work in the major field and 6 semester hours of course work in the related field is required.

Proficiency in another language approved by the graduate faculty is required.

Chinese

401-402 Chinese Literature in English (3-3)
407-408 Structure of Chinese (3-3)
409-410 Fourth-Level Chinese—Modern (3-3)
417-418 Fourth-Level Chinese—Classical (3-3)
428 Accelerated Fourth-Level Chinese—Modern (6)
499 Reference Materials for Chinese Studies (3)
611-612 Contemporary Chinese Literature (3-3)
613-614 Chinese Poetry (3-3)
*616 History of Chinese Literary Criticism (3)
617 Traditional Chinese Fiction (3)
618 Traditional Chinese Drama (3)
631 Historical Phonology (3)
632 Major Dialects (3)
641 Contrastive Analysis of Mandarin and English: Phonology (3)
642 Contrastive Analysis of Mandarin and English: Morphology and Syntax (3)
*693-694 Methods in Chinese Studies (3-3)
*750 Research Seminar in Chinese (3)
800 Thesis Research (arr.)
AP 690 Directed Reading (arr.)
AP 699 Directed Research in Chinese (3)
AP 751-752 Seminar in East Asian Comparative Literature (3-3)

Civil Engineering

Graduate Faculty

T. Mitsuda, Ph.D. (Chairman)—applied mechanics
D. B. Alves, Ph.D.—applied mechanics
Intended candidates for the M.S. in civil engineering must present a B.S. in civil engineering or the equivalent. Both Plan A and Plan B are available. Choice of plan must be made before 14 credits of graduate work applicable to the degree have been completed.

Under Plan A the program may include a maximum of 6 credits of approved courses in fields other than civil engineering. At least two graduate seminars are required.

The program under Plan B requires 30 credits of graduate study. It normally includes 24 credits in graduate civil engineering courses and 6 credits in approved courses in other departments. At least two graduate seminars are required.

CIVIL ENGINEERING

571 Advanced Dynamics (3)
581 Prestressed Concrete (3)
621 Advanced Fluid Mechanics I (3)
622 Advanced Fluid Mechanics II (3)
623 Ground Water Hydrology (3)
624 Flow in Porous Media (3)
625 Ocean Engineering (3)
626 Coastal and Harbor Engineering (3)
650 Soil Mechanics (3)
651 Applied Soil Mechanics I (3)
652 Applied Soil Mechanics II (3)
671 Theory of Elasticity (3)
672 Theory of Elasticity II (3)
673 Theory of Plasticity (3)
674 Theory of Elastic Stability (3)
675 Theory of Vibrations (3)
676 Structural Dynamics (3)
678 Theory of Plates (3)
679 Theory of Thin Shells (3)
680 Energy Methods in Applied Mechanics (3)
681 Advanced Indeterminate Structures (3)
682 Numerical Methods of Stress Analysis (3)
683 Advanced Reinforced Concrete Design I (3)
684 Advanced Reinforced Concrete Design II (3)
685 Advanced Design of Metal Structures (3)
696 Selected Topics in Civil Engineering (3)
697 Seminar in Civil Engineering (1)
698 Seminar in Civil Engineering (1)
699 Directed Research (arr.)
800 Thesis Research (arr.)

Please refer to the General Catalog for a complete list of courses.
SPECIAL PROGRAM IN ENVIRONMENTAL AND SANITARY ENGINEERING

In addition to the regular graduate faculty in engineering the following are utilized in this program.

GRADUATE FACULTY

N. C. Burbank, Sc.D. (Program Adviser) — environmental engineering theory and science (microbiology and chemistry)

R. K. C. Lee, M. D., Dr. P. H. — public health administration

R. M. Worth, M.D., M.P.H., Ph.D. — epidemiology

AFFILIATE GRADUATE FACULTY

A. Q. Y. Tom, Sc.D. — environmental engineering theory and design

Administered with the close cooperation of the department of public health, the program is intended for candidates with a B.S. in engineering who meet the Graduate Division admission qualifications. Plan A (thesis program) is highly recommended for this program of study although in exceptional cases Plan B (non-thesis) may be permitted. Suggested electives are Public Health 601-602, 610, 625, 636-637, 651, 710; Chemistry 441, 580, 655, 656; Zoology 401, 425, 620, 621, 629, 645; Microbiology 415, 620, 625, 631, 632, 655; Civil Engineering 621, 622, 624, 651, 652.

Ordinarily, at least one full calendar year will be needed to complete the program. Courses marked with an asterisk are required of all candidates.

CIVIL ENGINEERING

623 Ground Water Hydrology (3)
631 *ESE Theory I (3)
632 ESE Theory II (3)
633 ESE Design I (3)
634 ESE Design II (3)
635 ESE Chemistry (4)
636 ESE Microbiology (4)
637 ESE Laboratory (3)
638 ESE Public Health (3)
697 Seminar in Civil Engineering (1)
698 Seminar in Civil Engineering (1)
699 Directed Research (arr.)
800 Thesis Research (arr.)

*Drama and Theatre

GRADUATE FACULTY

E. Ernst, Ph.D. (Chairman) — Oriental theatre, aesthetics
L. Bentley, M.A. — puppetry, creative dramatics
E. Langhans, Ph.D. — playwriting, direction
E. MacQueen, Ph.D. — acting, theatre management
R. Mason, M.F.A. — design
B. Ortolani, Ph.D. — Oriental theatre, theory
J. Trapido, Ph.D. — stagecraft and lighting, theatre planning
C. Wolz, M.A. — dance

M.A. and M.F.A.

Two master’s degrees are offered: The Master of Arts (both Plan A and Plan B) and the Master of Fine Arts. For the M.A. thesis the candidate does research in theatre history, criticism, or theory. The M.F.A. thesis is a record of creative work in play production, playwriting, design, or dance.

Intended candidates must present an adequate undergraduate background in the humanities, submit official scores from the general portion of the Grad-
uate Record Examination, and pass a foreign language examination before admission to candidacy. East-West Center grantees from the United States must attain proficiency in an Oriental language.

All candidates are required to take 550–551, 660, 710, and 6 credits from 620, 630, 635, or 640. Those with sufficient undergraduate preparation may take approved related graduate courses in other departments. Besides work in course, candidates are required to participate in the production of at least three plays.

**Ph.D.**

The Doctor of Philosophy degree, given for scholarship in theatre history, criticism, or theory, not creative or artistic work, is offered in three areas: (1) Western Theatre. Required courses are 710 and two other seminars. A minor of at least 12 graduate credit hours is required in anthropology, art, English, history, music, or philosophy. (2) Oriental Theatre. Required courses are 710, 750, and one other seminar. A minor of at least 12 graduate credit hours is required in Far Eastern history, art history, or philosophy; or in Oriental drama and literature. (3) Comparative Oriental-Western Theatre. The curriculum is determined by the graduate faculty.

Applicants for admission to the Ph.D. program must submit a statement of their proposed area of research, three letters from those acquainted with their academic work, a sample of their research (such as a seminar paper or master's thesis), and official scores from the general portion of the Graduate Record Examination.

Admission to candidacy requires a broad background in the humanities, a master's degree in theatre or its equivalent, and competence in dramatic production. Two foreign languages appropriate to the proposed area of research are required; for candidates in Oriental theatre and Comparative Oriental-Western theatre at least one language must be Asian.

Candidates must demonstrate their teaching ability by giving several lectures in an undergraduate course.

**Drama and Theatre**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>405</td>
<td>Puppetry</td>
<td>(3)</td>
</tr>
<tr>
<td>410</td>
<td>Creative Dramatics</td>
<td>(3)</td>
</tr>
<tr>
<td>415</td>
<td>Playwriting</td>
<td>(3)</td>
</tr>
<tr>
<td>416</td>
<td>Advanced Playwriting</td>
<td>(3)</td>
</tr>
<tr>
<td>420-421</td>
<td>Acting</td>
<td>(3-3)</td>
</tr>
<tr>
<td>424-425</td>
<td>Dance Techniques</td>
<td>(3-3)</td>
</tr>
<tr>
<td>426</td>
<td>Dance Workshop</td>
<td>(1)</td>
</tr>
<tr>
<td>428</td>
<td>Dance Composition</td>
<td>(3)</td>
</tr>
<tr>
<td>430</td>
<td>Direction</td>
<td>(3)</td>
</tr>
<tr>
<td>435</td>
<td>Design in the Theatre</td>
<td>(3)</td>
</tr>
<tr>
<td>440</td>
<td>Modern Stagecraft and Stage Lighting</td>
<td>(3)</td>
</tr>
<tr>
<td>445</td>
<td>Costume for the Stage</td>
<td>(3)</td>
</tr>
<tr>
<td>450</td>
<td>Theatre Management</td>
<td>(3)</td>
</tr>
<tr>
<td>540</td>
<td>Oriental Drama and Theatre</td>
<td>(3)</td>
</tr>
<tr>
<td>550-551</td>
<td>History of the Theatre</td>
<td>(3-3)</td>
</tr>
<tr>
<td>560</td>
<td>Dance History</td>
<td>(3)</td>
</tr>
<tr>
<td>620</td>
<td>Advanced Acting Techniques</td>
<td>(3)</td>
</tr>
<tr>
<td>630</td>
<td>Problems in Direction</td>
<td>(3)</td>
</tr>
<tr>
<td>635</td>
<td>Advanced Design</td>
<td>(3)</td>
</tr>
<tr>
<td>640</td>
<td>Problems in Stagecraft and Stage Lighting</td>
<td>(3)</td>
</tr>
<tr>
<td>660</td>
<td>Theories of the Theatre</td>
<td>(3)</td>
</tr>
<tr>
<td>700</td>
<td>Advanced Theatre Practice</td>
<td>(3)</td>
</tr>
</tbody>
</table>
FIELDS OF STUDY

710 Seminar in Theatre Research (3)
720 Seminar in Drama and Theatre (3)
750 Seminar in Oriental Theatre (3)
770 Seminar in Aesthetics of the Theatre (3)
799 Directed Work (arr.)
800 Thesis Research (arr.)

Economics

GRADUATE FACULTY
R. Sato, Ph.D. (Chairman)—economic theory, mathematical economics, econometrics
W. Gorter, Ph.D.—international trade
R. Hoffman, Ph.D.—public finance
F. C. Hung, Ph.D.—economic theory, economic development of China
R. M. Kamins, Ph.D.—public finance
H. T. Oshima, Ph.D.—national income accounting, economic development
J. Wise, Ph.D.—economic theory, mathematical economics, econometrics, international economics
Y. H. Yeh, Ph.D.—international trade

Applicants should have 24 credits in undergraduate economics, including principles (6); money and banking (3); intermediate economic theory, micro (3) and macro (3); and statistics (3). Knowledge of calculus is strongly recommended.

Economics 600 and 602 are required. Candidates must pass a written and oral comprehensive examination covering three fields of economics-economic theory, and two selected from: economic development, quantitative analysis, monetary economics, public finance, and international economics, or an approved outside field. A maximum of 6 semester credits in outside fields is allowed in Plan A and 9 in Plan B.

ECONOMICS

410 Asian Economic Development (3)
416 Economic Development of Europe (3)
417 Economic Development of U.S. (3)
420-421 Quantitative Methods in Economic Analysis (3-3)
430 Comparative Economic Systems (3)
440 Monetary Economics (3)
450 Public Finance (3)
452 Subnational Finance (3)
460 International Trade and Finance (3)
462 International Economic Policy (3)
470 Government and Business (3)
499 Economic Development (3)
502 American Economic Policy (3)
600 Theory of Price and Distribution (3)
601 Seminar in Price and Distribution Theory (3)
602 Theory of Income and Growth (3)
603 Seminar in Economic Growth and Fluctuations (3)
604 History of Economic Thought (3)
609 Asian Economic History (3)
619 Regional Economics (3)
620 Mathematical Economics (3)
624 Econometrics (3)
626 National Income Accounting (3)
627 Economic Programming (3)
640 Seminar in Money and Banking (3)
650 Seminar in Fiscal Problems (3)
650 Seminar in International Trade (3)
652 Seminar in Economic Foreign Policy (3)
670 Economic Development (3)
671 Economic Development of Japan (3)
672 Economic Development of China (3)
673 Economic Development of India (3)
690 Seminar in Current Labor Problems (3)
699 Directed Research (arr.)
710 Seminar in Economic Development (3)
800 Thesis Research (arr.)

Educational Administration

GRADUATE FACULTY
J. B. Crossley, Ed.D. (Chairman)—administration of intermediate, secondary, community college, and administrative leadership
H. V. Everly, Ph.D.—general school administration
L. D. Jackson, Ed.D.—school law, school finance, general administration
R. W. Johnson, Ed.D.—general school administration, legal and business administration, theory of administration

Intended candidates for the M.Ed. must present a minimum of 10 semester hours in professional education courses, and in addition, have had two years of successful teaching experience. Applicants shall provide written evidence of such experience when applying.

Admission to candidacy is based upon (1) the quality of the student's undergraduate and graduate record; (2) his performance on the Graduate Record Examination and the Miller Analogies Test; and (3) successful completion of EA 685.

Plan A requirements include 3 semester hours in educational foundations, 3 semester hours in educational psychology, 3 semester hours in research methods, and at least 2 seminars in educational administration or supervision. Included in the requirements under Plan B are 9 to 15 semester hours in fields other than educational administration and supervision, 3 semester hours in educational foundations, 3 semester hours in educational psychology, one seminar in educational administration or supervision, one additional seminar in administration or supervision, terminal in nature, and directed by the candidate's program committee.

Selection of specific courses in the above fields will be by the program committee of the candidate.

EDUCATIONAL ADMINISTRATION
600 Theory of Administration (3)
670 Supervision of Instruction (3)
671 School Public Relations (3)
680 Public School Organization (3)
685 Principles of Educational Administration (3)
689 The School Plan (3)
699 Directed Research (arr.)
768 Research Seminar in Educational Administration (3)
770 Seminar in Supervision of Instruction (3)
780 Seminar in Educational Administration (3)
782 Legal Aspects of School Administration (3)
784 Financial Aspects of School Administration (3)
785 Seminar and Internship in Administrative Leadership (2-4)
800 Thesis Research (arr.)

Educational Communications

GRADUATE FACULTY
W. A. Wittich, Ph.D. (Chairman)—Educational Communications and Public Administration
R. M. Reed, M.A.—Educational Television
R. A. Sanderson, Ph.D.—Educational Communications
R. E. Wileman, Ed.D.—Curriculum and Teaching
The master's degree program in educational communications is designed to educate candidates in the nature and use of new educational media as they can be applied to the improvement of teaching and learning. Participating candidates will be involved in three general areas of activity: (1) the evaluation of educational media research and the relationship of these research findings to demonstrations and innovations through which the selection and use of educational media may improve teaching and learning; (2) the evaluation and creation of plans for using existing available audio-visual materials in the improvement of instruction; and (3) the production and use of needed graphics and films which are not now currently available.

Intended candidates for the Master of Education must present a minimum of 18 semester hours in professional education courses, the teaching certificate, or what in the opinion of the staff constitutes a reasonable substitute experience.

Admission to candidacy is based on: (1) the quality of the student's undergraduate record; (2) his scores on the Miller Analogies and the Graduate Record examinations; (3) his performance on a departmental general examination; (4) his teaching or comparable experience.

Thesis and non-thesis programs are based on 30 credits beyond the B.A., 18 of which must be in the field of educational communications as such. Thesis Plan A requires 24 credits plus 6 thesis credits. Non-thesis Plan B requires 30 credits and in addition, the completion of a seminar report.

**Educational Communications**

- 514 Audiovisual Media (3)
- 620 Introduction to Instructional Materials Production (3)
- 623 Survey and Production of Asian Study Materials (3)
- 625 Production of Educational Film and Multimedia Presentations (3)
- 630 Television in Education (3)
- 635 Advanced Educational Television (3)
- 700 Seminar in Educational Media Research (3)
- 710 Seminar in Organization and Administration of Media Programs (3)

**Educational Foundations**

- A. M. Keppel, Ph.D. (Chairman) - history, philosophy
- S. Amioka, Ph.D. - philosophy, Japanese education
- R. S. Anderson, Ph.D. - comparative education
- G. Austin, Ph.D. - history, philosophy, social foundations
- W. H. Boyer, Ed.D. - philosophy, social foundations
- V. Kobayashi, Ph.D. - comparative education, philosophy
- R. E. Potter, Ed.D. - history, social foundations

The purpose of the master's degree program in educational foundations is to develop educational leaders capable of critical analysis of alternatives in educational policy and practice through the study of the interconnections between educational theory and the academic fields of philosophy, history, and the social sciences.

Intended candidates for the M. Ed. must present a minimum of 18 semester hours in professional education courses and, in addition, credit for supervised student teaching or teaching experience.

Admission to candidacy is based upon (1) the quality of the student's under-
graduate record, (2) his scores on certain standardized examinations, and (3) his performance on the general examination.

Both Plan A (thesis) and Plan B (non-thesis) are available. Plan A: The program may include a maximum of 10 semester credits in approved courses other than educational foundations, which are related to the candidate's announced goals. Plan B: The program normally includes 18 semester hours of education, of which at least 12 are in the department of educational foundations and 12 semester hours in a planned and approved sequence of courses which carry graduate credit in other fields.

In both Plan A and Plan B, requirements include 3 semester credits in educational psychology, 3 semester credits in research, at least two of the listed Ed EF courses which are marked with asterisks (of which one must be 650, 651, or 660), and at least one seminar in the department of educational foundations. Plan B requirements normally include an additional terminal seminar in the department of educational foundations.

In both Plan A and Plan B, courses in fields of study other than educational foundations will normally be concentrated in one or two of the following: philosophy, history, economics, political science, sociology, anthropology, Asian studies, American studies, or another graduate field in education. Graduate courses in educational foundations not listed below, but which are offered in summer sessions or during the year by visiting professors, may be included in degree programs with the approval of the chairman.

EDUCATIONAL FOUNDATIONS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>570</td>
<td>Anthropology and Education</td>
<td>3</td>
</tr>
<tr>
<td>*650</td>
<td>Historical Foundations of Western Education</td>
<td>3</td>
</tr>
<tr>
<td>*651</td>
<td>History of American Education</td>
<td>3</td>
</tr>
<tr>
<td>*660</td>
<td>Philosophy of Education</td>
<td>3</td>
</tr>
<tr>
<td>670</td>
<td>Comparative Education: Europe and America</td>
<td>3</td>
</tr>
<tr>
<td>*671</td>
<td>Comparative Education: Asia</td>
<td>3</td>
</tr>
<tr>
<td>679</td>
<td>Education and the World Community</td>
<td>3</td>
</tr>
<tr>
<td>681</td>
<td>The Church and the School</td>
<td>2</td>
</tr>
<tr>
<td>*683</td>
<td>Social Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>684</td>
<td>Interpersonal Relationships in Education</td>
<td>3</td>
</tr>
<tr>
<td>685</td>
<td>Education in America</td>
<td>3</td>
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<tr>
<td>699</td>
<td>Directed Research (arr.)</td>
<td></td>
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<tr>
<td>751</td>
<td>Recent History of American Education</td>
<td>3</td>
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<tr>
<td>757</td>
<td>Educational Classics</td>
<td>2</td>
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<tr>
<td>763</td>
<td>Seminar in Educational Theory</td>
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<tr>
<td>(1)</td>
<td>Educational Issues</td>
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<tr>
<td>(2)</td>
<td>John Dewey</td>
<td></td>
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<tr>
<td>(3)</td>
<td>Contemporary Educational Philosophers</td>
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<td>(4)</td>
<td>Japanese Educational Philosophy</td>
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<td>(5)</td>
<td>History of Education</td>
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<tr>
<td>765</td>
<td>Comparative Ideologies and Education</td>
<td>3</td>
</tr>
<tr>
<td>768</td>
<td>Seminar in Problems in Education</td>
<td>2</td>
</tr>
<tr>
<td>770</td>
<td>Seminar in Comparative Education</td>
<td>2</td>
</tr>
</tbody>
</table>

Educational Psychology

GRADUATE FACULTY

D. R. Collins, Ed.D. (Chairman)—counseling and guidance
D. C. Adkins, Ph.D.—measurement, research
R. S. Alm, Ph.D.—diagnosis and remedial instruction
W. F. Char, M.D.—child psychiatry, special education
F. E. Clark, Ed. D.—counseling and guidance
FIELDS OF STUDY

P. Dunn-Rankin, Ed.D.—learning, research
G. A. Fargo, Ph.D.—special education
G. Y. Fujita, Ph.D.—statistics, research
D. W. Fullmer, Ph.D.—counseling and guidance
D. A. Leton, Ph.D.—school psychology
T. A. McIntosh, Ed.D.—special education, guidance
A. M. Niyekawa, Ph.D.—social psychology, psycholinguistics
I. E. Reid, Ph.D.—learning, research
D. G. Ryans, Ph.D.—measurement, research
A. W. Staats, Ph.D.—learning, research

Intended candidates for the M.Ed. and the Ph.D. in educational psychology must present a minimum of 18 semester hours in professional education courses. Twelve of these hours must be composed of work in psychology or educational psychology including courses in developmental psychology, educational psychology, and tests and measurements. Students should plan on meeting a proficiency in statistics prerequisite for Educational Research Methods (EP 708).

M.Ed.*

Admission to candidacy is based upon (1) the quality of the student's undergraduate record and (2) his performance on the general examination. The results of the Aptitude Test of the Graduate Record Examination and the Miller Analogies Test must be submitted to the chairman at the time the student plans on entering the M.Ed. program. The graduate faculty may waive the requirement for the MAT provided that both the Aptitude and Area Tests of the Graduate Record examination are submitted.

Areas of study offered: counseling and guidance, remedial and diagnostic techniques, special education, learning, measurement, and research methods. The programs in counseling and guidance and special education meet the certification requirements of the Hawaii State Department of Education; the program in remedial and diagnostic techniques meets the recommendations of the International Reading Association.

In Plan A, the program may include a maximum of 10 semester hours in approved courses other than educational psychology which are related to the candidate's announced goals. At least one graduate seminar in educational psychology is required. A minimum of 3 units in philosophy of education or history of education is required. This requirement may be met by the undergraduate course Ed EF 320, Foundations of American Education, or its equivalent.

In Plan B, the program must include a minimum of 30 hours in a planned and approved sequence of courses, 18 of which will normally be in educational psychology. A maximum of 6 hours of graduate work may be taken in fields of study other than educational psychology. Ordinarily, the related field of study shall be in the behavioral sciences. At least one graduate seminar in educational psychology is required. A minimum of 3 units in philosophy of education or history of education is required. This requirement may be met by the undergraduate course Ed EF 320, Foundations of American Education, or its equivalent.

*The departmental requirements are in addition to those of the Graduate Division which are described in the "Academic Information" section of this catalog.
Ph.D.*

The Ph.D. program in educational psychology requires a minimum of three years (six semesters) of graduate study. The master's degree is not ordinarily required as a prerequisite for the Ph.D.; however, the graduate faculty may, at its discretion, request potential candidates to complete the master's degree before entering the doctoral program. At the discretion of the graduate faculty, the master's degree earned at the University of Hawaii in educational psychology or its equivalent may be granted two semesters of residence credit.

The current Ph.D. program in educational psychology offers three emphases: (1) counseling and guidance, (2) learning, and (3) measurement, statistics, and research design. Admission to the program is determined by (1) the academic record of the candidate, (2) the Miller Analogies Test, (3) Graduate Record Aptitude, Advanced Education, Advanced Psychology Examinations, and (4) three letters of recommendation indicating capability of accomplishing doctoral work. Admission to candidacy for the Ph.D. degree may be granted after (1) one semester's work in the program, (2) the demonstration of competency in measurement, statistics, research design, and learning theory at the Master's level, and (3) passing the examination in the required foreign language. The advanced work in the major field will principally be comprised of seminars and directed research. The candidate must select one or more minor fields of study; suggested fields include anthropology, linguistics, mathematics, philosophy, and psychology. All doctoral students will be expected to serve as research fellows or trainees in the Education Research and Development Center for a minimum of one semester.

The foreign language requirement is ordinarily French or German; however, the graduate faculty will accept an alternate language (other than English) if the student can provide appropriate justification.

**EDUCATIONAL PSYCHOLOGY**

404 Education of Exceptional Children (3)
405 The Mentally Retarded (3)
406 Curriculum Development for Mentally Retarded Children (3)
407 Education of the Mentally Retarded (3)
408 The Emotionally Disturbed Child (3)
409 Culturally and Economically Disadvantaged Pupil (3)
415 Clinical Assessment of Exceptional Children (3)
416 Tests and Measurements (3)
429 Introductory Statistics (3)
450 Practicum Experience with the Mentally Retarded (9)
451 Practicum for Teachers of Emotionally Disturbed Children (9)
500 Student Personnel Services in the Community College (3)
507 Remedial Reading (3)
601 Guidance in the School (3)
602 Elementary School Guidance (3)
604 Occupational Information in Guidance (3)
605 Problems of School Adjustment (3)
607 Clinical Procedures in Reading (3)
609 Tests and Inventories in Guidance (3)
614 Education of Gifted Children (3)
616 Seminar in Education of Mentally Retarded (3)
629 Educational Statistics (3)
672 Advanced Educational Psychology: Learning (3)
673 Advanced Educational Psychology: Psycho-Social Development (3)
Directed Research (arr.)
Seminar in Guidance (3)
  (1) General, (2) Testing, (3) Counseling, (4) Vocational,
  (5) Elementary School, (6) Administration, (7) Group Procedures
Group Guidance (3)
Guidance Practicum (3)
Educational Research Methods (3)
Advanced Problems of Educational Measurement and Evaluation (3)
Scaling Qualitative Data (3)
Seminar in Educational Psychology (3)
  (1) General, (2) Learning, (3) Measurement, (4) Research and
  Statistics, (5) Psycho-Social Development
Thesis Research (arr.)

Electrical Engineering

W. W. Peterson, Ph.D. (Chairman) — error-correcting codes; information theory; computers
N. Abramson, Ph.D. — information theory and coding; pattern recognition satellite
communications
E. Gott, D.Eng. — circuit theory; signal processing systems
B.S.M. Granborg, Ph.D. — automatic control
H.H.H. Hwang, Ph.D. — power system analysis; energy conversion
B. K. Kinariwala, Ph.D. — system theory; signal theory
F. F. Kuo, Ph.D. — system theory; computer applications
C. Lenz, Ph.D. — automatic control
S. Lin, Ph.D. — information theory; error-correcting codes
K. Najita, M.S. — electromagnetic theory
T. H. Roelofs, Ph.D. — radio wave propagation; ionospheric physics
P. F. Weaver, Ph.D. — radio science; ionospheric physics
P. C. Yuen, Ph.D. — radio science, satellite communications

M.S.

Intended candidates for the M.S. in electrical engineering must present the B.S. in electrical engineering or the equivalent. A general exam is required of all students and is to be taken before 9 hours of course work are completed. Attendance at graduate seminars is required, and each graduate student must enroll in a seminar course EE 697 or EE 698 once and make one presentation before completion of his program.

Both Plan A and Plan B are available. Plan A must include at least 6 credits of approved courses in departments other than electrical engineering and at least 18 credits in electrical engineering as well as at least 6 credits in EE 800, Thesis Research. Plan B requires 30 credits of graduate study in approved technical courses. It must include at least 6 credits in approved courses in departments other than electrical engineering and at least 21 credits in electrical engineering courses. In both plans, at least 18 credits must be in courses numbered above 600.

Ph.D.

Intended candidates for the Ph.D. in electrical engineering must present the B.S. degree in electrical engineering or its equivalent.

The Ph.D. student in electrical engineering is required to achieve a good, broad understanding of electrical engineering fundamentals and a thorough knowledge, up to its present state, in a chosen special field. The student must perform research in his special field under the guidance of a faculty adviser and present a dissertation which must be an original contribution to electrical
engineering. The dissertation must be a scholarly presentation suitable for publication.

A knowledge of one foreign language sufficient for reading electrical engineering literature is required. A language which will be useful to the student in his research must be chosen and the choice must meet the approval of the graduate faculty of the department of electrical engineering.

The intended candidate for the Ph.D. in electrical engineering must take a general examination covering the electrical engineering fundamentals usually covered in undergraduate programs and must demonstrate a superior understanding of these fundamentals. This examination will be offered every semester and must be taken by all intended Ph.D. candidates who have not passed it. A student who does not pass it by the time he has spent two semesters at the University of Hawaii or has spent one semester as an intended Ph.D. candidate if he received his M.S. degree in electrical engineering at the University of Hawaii, may be dropped from the Ph.D. program.

After passing the general examination, the student should arrange to have a thesis committee appointed, consisting of at least five members, one of whom must be in a department other than electrical engineering. As soon as possible then, the student should work out a tentative program of courses which meets the approval of his committee.

When the student has completed most of his course work but before he undertakes his research, he must pass a comprehensive examination. This consists of an oral examination of at least two hours given by his entire committee, and may be preceded at the discretion of individual committee members by some additional oral or written examination. If the student fails, he may repeat the examination only once, no sooner than three months after the first examination. The language examination must have been passed before the comprehensive examination is taken.

When the student passes the comprehensive examination, he is admitted to candidacy for the Ph.D. degree and proceeds with his dissertation research.

At the conclusion of his research, the student writes a dissertation. The dissertation is reviewed by the thesis committee and must be approved by a majority of the committee. Finally, the student must pass a final oral examination primarily covering the dissertation and research work.

**ELECTRICAL ENGINEERING**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>421</td>
<td>Microwave Theory and Techniques (3)</td>
<td></td>
</tr>
<tr>
<td>431</td>
<td>Electronic Instrumentation (3)</td>
<td></td>
</tr>
<tr>
<td>433</td>
<td>Instrumentation Laboratory (1)</td>
<td></td>
</tr>
<tr>
<td>441</td>
<td>Principles of Communication (3)</td>
<td></td>
</tr>
<tr>
<td>451</td>
<td>Feedback Control Systems (3)</td>
<td></td>
</tr>
<tr>
<td>452</td>
<td>Feedback Control Systems Laboratory (1)</td>
<td></td>
</tr>
<tr>
<td>461</td>
<td>Digital Techniques (3)</td>
<td></td>
</tr>
<tr>
<td>463</td>
<td>Analog Computers (3)</td>
<td></td>
</tr>
<tr>
<td>465</td>
<td>Information Theory and Coding (3)</td>
<td></td>
</tr>
<tr>
<td>471</td>
<td>Synchronous Machines and Power Systems (3)</td>
<td></td>
</tr>
<tr>
<td>493-494</td>
<td>Special Topics in Electrical Engineering (3-3)</td>
<td></td>
</tr>
<tr>
<td>495-496</td>
<td>Special Topics Laboratory (1-1)</td>
<td></td>
</tr>
<tr>
<td>601-602</td>
<td>Electromagnetic Theory and Applications (3-3)</td>
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<tr>
<td>604</td>
<td>Magneto-Ionic Theory (3)</td>
<td></td>
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<tr>
<td>605-606</td>
<td>Network Synthesis (3-3)</td>
<td></td>
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<tr>
<td>608</td>
<td>Analysis of Nonlinear Systems (3)</td>
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<tr>
<td>621-622</td>
<td>Advanced Microwave Theory (3-3)</td>
<td></td>
</tr>
</tbody>
</table>
FIELDS OF STUDY

631 Advanced Electronic Instrumentation (3)
641 Statistical Communications Theory (3)
651 Advanced Feedback Control Systems (3)
652 Optimization Techniques in Control Systems (3)
653 Adaptive Control (3)
655 Sampled-Data Control Systems (3)
657 Hybrid Automatic Control Systems (3)
661 Theory and Design of Digital Machines (3)
663 Information Theory (3)
665 Signals and Random Noise (3)
667 Applied Statistical Decision Theory (3)
668 Error-Correcting Codes (3)
693 Special Topics in Electrical Engineering (3)
697–698 Seminar in Electrical Engineering (1–1)
699 Directed Reading or Research (arr.)
800 Thesis Research (arr.)

Elementary Education

GRADUATE FACULTY
E. C. Jenkins, Ph.D. (Chairman)—elementary curriculum, supervision, language arts
A. B. Carr, Ed.D.—science education, elementary
E. D. Hayes, Ph.D.—creative expression, language arts
B. J. Hurley, M.A.—language arts, reading, children’s literature
A. D. Miller, Ph.D.—mathematics education
A. L. Pickens, Ed.D.—art education
M. R. Porter, Ph.D.—curriculum, supervision (on leave)

Intended candidates for the M.Ed. in elementary education must present a minimum of 18 semester hours in professional education courses and, in addition, credit for supervised student teaching or teaching experience. Before completion of the M. Ed. degree, evidence of one year of successful teaching experience beyond student teaching must be presented.

Admission to candidacy is based upon (1) the quality of the student’s undergraduate record, (2) his performance on the Graduate Record Examination, and (3) personal interview.

Plan A: minimum of 30 semester hours, 21–27 in foundation courses, research, and elementary education (of which 6 semester hours may be allowed for thesis) and 3–9 semester hours of electives other than elementary education which are related to the candidate’s goals. At least one graduate seminar is required.

Plan B: minimum of 30 semester hours, 6–9 in foundations of education, 12–15 in elementary education, and 6–12 in electives. Additional hours may be required depending upon student’s background in interpreting research, in issues and problems related to the elementary school curriculum, and in academic areas related to the major field of concentration.

Six to nine credits in history and philosophy of education are required of all candidates.

Required courses in elementary education are marked with an asterisk below.

CURRICULUM AND INSTRUCTION
620 Teaching Reading in the Elementary School (2)
621 Modern Language Arts Program, Elementary (2)
*622 Elementary School Curriculum (3)
623 The Elementary Science Curriculum (3)
624 The Elementary Mathematics Curriculum (3)
The Elementary Social Studies Curriculum (3)
Art in Elementary Education (3)
Curriculum Development in Creative Expression (3)
Curriculum Trends in Early Childhood Education (3)
Directed Research (arr.)
Seminar in Elementary Curriculum Foundations (3)
Thesis Research (arr.)

English

GRADUATE FACULTY
G. L. Anderson, Ph.D. (Chairman) - 18th-century literature, Oriental literature
J. M. Backus, Ph.D. - American literature
C. S. Bouslog, Ph.D. - English romanticism, 20th-century British and American literature
D. S. Brown, Ph.D. - American literature
J. Cline, Ph.D. - Renaissance literature
R. Crymes, Ph.D. - modern English grammar
A. G. Day, Ph.D. - American literature, writing, Pacific literature; comparative literature
J. W. Frierson, Ph.D. - Victorian literature
T. H. Fujimura, Ph.D. - Restoration literature, drama
W. T. Furniss, Ph.D. - Renaissance literature
D. George, Ph.D. - 18th-century literature
J. Gray, Ph.D. - literary criticism and theory
W. E. Huntsberry, M.A. - writing
H. M. Hurwitz, Ph.D. - American literature, comparative literature
B. F. Kirtley, Ph.D. - comparative literature, folklore, Pacific literature
R. L. Larson, Ph.D. - rhetoric and composition, Restoration literature
A. P. Leib, Ph.D. - American literature, medieval literature
M. Lester, Ph.D. - English language and grammar
A. J. Levy, Ph.D. - American literature
J. K. Lowers, Ph.D. - Elizabethan literature
S. Lutzky, Ph.D. - American literature and social backgrounds
J. Maltby, Ph.D. - modern drama, 18th-century literature
E. McCutcheon, Ph.D. - Renaissance and 17th-century literature
Y. Shen, Ed.D. - English language
D. Stempel, Ph.D. - 19th-century literature, linguistics, criticism
B. M. Stillians, Ph.D. - English romanticism, American literature
T. L. Summersgill, Ph.D. - Elizabethan literature, Chaucer
T. F. Teevan, Ph.D. - modern English and Irish literature
L. Wellein, Ph.D. - comparative literature, Old and Middle English
W. Wilson, Ph.D. - drama, playwriting
L. E. Winters, Ph.D. - comparative literature, Chinese and American literature

Intended candidates for the M.A. are expected to present, in addition to the customary freshman and sophomore composition and literature survey courses, 24 semester hours of undergraduate credit in English or closely related subjects, including Shakespeare, English literature, and American literature. In addition, courses in English and American history and in classical and European literature are desirable. A reading knowledge of an ancient or modern European language is required. Courses for the graduate program are to be selected from the list below; however, a number of advanced courses in other disciplines may be approved as part of a program. Required courses are marked with an asterisk; English 780 or 785 is required, not both.

Both Plan A and Plan B are available.

Applicants for admission to graduate study in English must submit official scores from the general and advanced literature portions of the Graduate Record Examination.
FIELDS OF STUDY

ENGLISH

420 History of Rhetoric (3)
425 Modern English Grammar (3)
*426 History of the English Language (3)
440 English Drama to 1642 (3)
443, 444 Modern Dramatic Literature (3, 3)
447 The English Novel to 1832 (3)
448 The English Novel, 1832–1900 (3)
451 Medieval English Literature (3)
452 Chaucer (3)
455 Sixteenth-Century English Literature (3)
457, 458 Shakespeare (3, 3)
460 Early Seventeenth-Century English Literature (3)
465 Restoration Literature (3)
466 Milton
470 Early Eighteenth-Century English Literature (3)
471 Late Eighteenth-Century English Literature (3)
480 The Romantic Movement in England (3)
485, 486 Victorian Literature (3, 3)
490 Twentieth-Century British Novel (3)
540 Narratives of Oral Tradition (3)
571, 572 American Literature (3, 3)
573 Studies in American Literature (3)
585 Literature of the Pacific (3)
590 Twentieth-Century American Novel (3)
592 Twentieth-Century British and American Poetry (3)
620 Seminar in Teaching Composition (3)
621 Teaching College Composition (3)
*630 Seminar in Research Methods (3)
635 Seminar in Comparative Literature (3)
636 History of Literary Criticism (3)
640 Old English (3)
645 Seminar in English Language (3)
657 Seminar in Shakespeare (3)
660 Major Authors (3)
675 Literary Genres and Problems (3)
*685 Seminar in English Literature (3)
699 Directed Research (arr.)
*780 Seminar in American Literature: Authors (3)
*785 Seminar in American Literature: Problems, Periods (3)
*800 Thesis Research (arr.)

Entomology

GRADUATE FACULTY

D. E. Hardy, Ph.D. (Chairman) – taxonomy, medical entomology
J. W. Beardsley, Jr., Ph.D. – biological control, systematics
H. A. Bess, Ph.D. – biological control and ecology
F. H. Haramoto, Ph.D. – acarology
A. A. LaPlante, Ph.D. – extension entomology
W. C. Mitchell, Ph.D. – economic entomology
R. Namba, Ph.D. – insect transmission of plant viruses
T. Nishida, Ph.D. – ecology
M. Sherman, Ph.D. – toxicology
M. Tamashiro, Ph.D. – insect pathology
L. D. Tuthill, Ph.D. – taxonomy

AFFILIATE FACULTY

J. L. Gressitt, Ph.D. – taxonomy
C. R. Joyce, Ph.D. – medical entomology
I. Keiser, B.S. – fruit flies
K. Sakimura, B.S. – pineapple insects
L. F. Steiner, M.S. – fruit flies
N. Wilson, Ph.D. – acarology
C. Yoshimoto, Ph.D. – hymenoptera
Intended candidates for the M.S. or Ph.D. in entomology must present a minimum of 18 hours of undergraduate credit in entomology and zoology, including general zoology, general entomology, economic entomology, insect morphology, and systematic entomology. In addition, they should have credit for two years of chemistry (including inorganic and organic), and courses in algebra, botany, and genetics. Deficiencies in undergraduate preparation must be made up.

Courses available for graduate credit are listed below. Courses in the fields of zoology, botany, microbiology, and genetics may be allowed in the degree program. Required courses are marked with an asterisk.

**ENTOMOLOGY**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>661</td>
<td>Medical and Veterinary Entomology (3)</td>
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<tr>
<td>662</td>
<td>Advanced Systematic Entomology (3)</td>
</tr>
<tr>
<td>663</td>
<td>Scale Insects (3)</td>
</tr>
<tr>
<td>664</td>
<td>Immature Insects (3)</td>
</tr>
<tr>
<td>671</td>
<td>Insect Ecology (3)</td>
</tr>
<tr>
<td>672</td>
<td>Acarology (3)</td>
</tr>
<tr>
<td>673</td>
<td>Insect Pathology (3)</td>
</tr>
<tr>
<td>675</td>
<td>Biological Control of Pests (3)</td>
</tr>
<tr>
<td>680</td>
<td>Insect Toxicology (4)</td>
</tr>
<tr>
<td>686</td>
<td>Insect Transmitted Diseases of Plants (3)</td>
</tr>
<tr>
<td>697</td>
<td>Entomology Seminar (1)</td>
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<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
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</tbody>
</table>

**ZOOLOGY**

<table>
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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>*601</td>
<td>Zoological Literature (1)</td>
</tr>
<tr>
<td>*602</td>
<td>Preparation of Scientific Manuscripts (1)</td>
</tr>
</tbody>
</table>

**Food Science**

**GRADUATE FACULTY**

E. Ross, Ph.D. (Chairman) — food science and technology  
H. A. Frank, Ph.D. — food science, food microbiology  
H. Y. Yamamoto, Ph.D. — food and plant biochemistry

**AFFILIATE FACULTY**

J. E. Brekke, M.S. — fruit chemistry and processing technology  
G. E. Felton, Ph.D. — food technology, carbohydrate chemistry  
J. H. Payne, Ph.D. — sugar technology

Intended candidates for the M.S. must present a minimum undergraduate preparation of two and a half years of chemistry, including at least a semester each of analytical and organic chemistry, one year of general physics, credits in agricultural and biological sciences, including general microbiology, and college algebra and trigonometry.

Courses for the graduate program are to be selected from those offered in the major field of food science, and the related fields of agricultural engineering, chemistry, biochemistry and biophysics, microbiology, and nutrition. A maximum of 6 credits may be earned in other fields. Required courses are marked with an asterisk.

**FOOD SCIENCE**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>510</td>
<td>Principles of Tropical Food Processing and Preservation (3)</td>
</tr>
<tr>
<td>511</td>
<td>Chemistry and Technology of Tropical Food Products (3)</td>
</tr>
<tr>
<td>601</td>
<td>Principles in Food Science and Technology (3)</td>
</tr>
<tr>
<td>603</td>
<td>Microbiology of Foods (3)</td>
</tr>
<tr>
<td>604</td>
<td>Laboratory Methods for Food Microbiology (2)</td>
</tr>
<tr>
<td>*620</td>
<td>Seminar (1)</td>
</tr>
</tbody>
</table>
Plan A (thesis) and Plan B (non-thesis), outlined below, are designed to meet the needs of two different types of students. Plan A is primarily intended for those who plan to work for a doctorate; for them it is desirable to have the experience of writing a thesis. Plan B is primarily intended for those for whom additional course work in linguistics and the methodology of language teaching may be more valuable than thesis research. Normally all candidates in both plans are required to take 10-12 credits in French literary courses. Reading proficiency in a second foreign language is to be demonstrated by passing the examination stipulated by the Graduate Division. Some Latin is desirable. It is to be recognized that all specified requirements are minimal. A program for each individual will be worked out on the basis of the results of the preliminary conference and general examination.

Requirements for admission, in addition to those of the Graduate Division, are: (1) 3.0 average in French although applicants with somewhat lower averages may be accepted provisionally; (2) 24 credits of French beyond the intermediate level; (3) acceptable accent and fluency as demonstrated in a personal interview or by a tape recording as specified by the department.

Under Plan A, 24 hours of course work and 6 hours of thesis research are required. Of these, a minimum of 12 credits, exclusive of research methods course, must be in French courses numbered 600–799, including at least one graduate seminar. Four to six credits of European history, if not taken as undergraduate work, are required as well as EL 630 and French 660. Eight credits may be obtained in related fields.

Under Plan B, 30 hours of course work are required of which a minimum of 18 credits, exclusive of research methods course, must be earned in French courses numbered 600–799 including at least one graduate seminar. Four to six credits of European history, if not taken as undergraduate work, are required as well as EL 630 and 610 and French 660. Ten credits may be obtained in related fields.

Both Plan A and Plan B also require satisfactory scores on the M. L. A. Teacher Proficiency examinations as well as written and oral comprehensive exams. Candidates under Plan B present a paper in a special seminar appearance.

**French**

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>406</td>
<td>Structure of French (3) II</td>
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</tr>
<tr>
<td>411</td>
<td>Masterpieces of 17th-Century Literature (3) I</td>
<td></td>
</tr>
<tr>
<td>413</td>
<td>Masterpieces of 18th-Century Literature (3) II</td>
<td></td>
</tr>
<tr>
<td>415-416</td>
<td>Masterpieces of 19th-Century Literature (2-2)</td>
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</tr>
<tr>
<td>417-418</td>
<td>Masterpieces of 20th-Century Literature (2-2)</td>
<td></td>
</tr>
</tbody>
</table>
601 Seminar in Contemporary French Literature (3) II
602 Seminar in French Poetry (3) I
609 Seminar in French Renaissance (3) II
660 Stylistics (2) I
665 History of French Literary Criticism (2) II
671 History of the Language (2) I
672 Medieval Literature (2) II
680 The Novel in France (3) I
685 Seminar in French Literature (3) I or II
690 The Theatre in France (3) I
699 Directed Research (arr.) I, II
800 Thesis Research (6)

EUROPEAN LANGUAGES
610 Contrastive Analysis of Spanish and French with English (3) I
630 Seminar in Research Methods (2) I

CURRICULUM AND INSTRUCTION
640 Seminar in Special Methods (3) I

Genetics

GRADUATE FACULTY
G. C. Ashton, Ph.D. (Chairman) — genetic polymorphisms
L. Beckman, Ph.D. — biochemical genetics
Y. Hiraizumi, D.Sc. — Drosophila genetics
J. A. Hunt, Ph.D. — biochemical genetics
M. P. Mi, Ph.D. — statistical genetics
N. E. Morton, Ph.D. — human population genetics

AFFILIATE FACULTY
K. Fujino, Ph.D. — immunogenetics
S. L. Halperin, Ph.D. — genetical psychology
J. B. Smith, Ph.D. — cytogenetics
L. M. Sprague, Ph.D. — immunogenetics
S. H. Waxman, M.D. — cytogenetics

The M.S. and Ph.D. in genetics are offered in human genetics, biochemical genetics, population genetics, plant genetics (see Horticulture) and quantitative genetics (see Animal Sciences). Intended candidates must have or acquire adequate preparation in biology, biometrics, chemistry through organic chemistry, calculus, genetics, and physics. For human genetics an additional undergraduate requirement is anthropology. For quantitative animal genetics, the preparation should include vertebrate zoology and physiology. For plant genetics the undergraduate requirements include cytology, plant anatomy, taxonomy, and physiology. The Graduate Record Examination and two letters of recommendation are required of all applicants.

All candidates for the graduate degree in genetics must take Genetics 518, 618, 650, 4 semesters of 654, Biochemistry 561-562, and any additional courses specified by the thesis committee. Related fields in which credit will normally be allowed toward the degrees in genetics include animal science, anthropology, botany, biochemistry, chemistry, horticulture, mathematics, medicine, microbiology, public health, and zoology.

GENETICS
518 Biochemical Genetics
618 Cytogenetics
625 Advanced Topics in Genetics
650 Population Genetics
654 Seminar
660 Statistical Methodology in Genetics
699 Directed Research
800 Thesis Research
### Geography

**Graduate Faculty**

- R. J. Fuchs, Ph.D. (Chairman) — urban and economic geography, Soviet Union
- N. M. Bowers, Ph.D. — South Asia, Micronesia
- J. H. Chang, Ph.D. — climatology, agricultural geography, China
- S. D. Chang, Ph.D. — China, cartography
- D. W. Fryer, Ph.D. — economic geography, economic development, Southeast Asia
- C. A. Manchester, Jr., Ph.D. — Japan, history of geography, historical geography
- P. N. D. Pirie, Ph.D. — population geography, Pacific
- F. R. Pitts, Ph.D. — cultural geography, East Asia, computer applications
- J. M. Street, Ph.D. — agricultural and physical geography, tropical biogeography
- H. J. Wiens, Ph.D. — cultural and historical geography of China, regional geography of Asia and the Pacific Islands

Undergraduate background should include the courses required for a geography major. However, students with majors in related disciplines are welcomed with the understanding that they may be obliged to take some essential courses on a non-credit basis. The student is expected to have adequate preparation in mathematics or statistics and to have a reading knowledge of a foreign language. Applicants for the graduate program should arrange to have results of the Aptitude Test of the Graduate Record Examination sent to the chairman.

Courses available for the graduate program are listed below. Regulations on course and degree requirements are available from the department. Programs are individually arranged by the department to guarantee inclusion of basic content and methods courses and the beginnings of specialization in a systematic field and a regional field. Ordinarily, the bulk of a student's program will be made up of systematic and methods courses within the department, and an integrated group of courses selected from other disciplines in physical and social sciences.

### Systematic and Methods

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>410</td>
<td>Physical Geography (3)</td>
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<tr>
<td>420</td>
<td>Introduction to Climatology (3)</td>
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<tr>
<td>421</td>
<td>Advanced Climatology (3)</td>
</tr>
<tr>
<td>430</td>
<td>Cartography (3)</td>
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<tr>
<td>440</td>
<td>Quantitative Methods in Geography (3)</td>
</tr>
<tr>
<td>450</td>
<td>Urban Geography (3)</td>
</tr>
<tr>
<td>455</td>
<td>Economic Geography and Location Theory (3)</td>
</tr>
<tr>
<td>470</td>
<td>Population Geography (3)</td>
</tr>
<tr>
<td>507</td>
<td>Conservation and Utilization of Natural Resources (3)</td>
</tr>
<tr>
<td>580</td>
<td>Geography of the Tropics (3)</td>
</tr>
<tr>
<td>601</td>
<td>History of Geography, (3)</td>
</tr>
<tr>
<td>605</td>
<td>Historical Geography (3)</td>
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<tr>
<td>610</td>
<td>Pro Seminar in Geography (6)</td>
</tr>
<tr>
<td>615</td>
<td>Field Camp (1)</td>
</tr>
<tr>
<td>630</td>
<td>Seminar in Climatology (3)</td>
</tr>
<tr>
<td>635</td>
<td>Computer Applications in Geography (3)</td>
</tr>
<tr>
<td>640</td>
<td>Advanced Quantitative Methods in Geography (3)</td>
</tr>
<tr>
<td>680</td>
<td>Seminar in Geography (3)</td>
</tr>
<tr>
<td>750</td>
<td>Research Seminar (3)</td>
</tr>
</tbody>
</table>

(1) biogeography
(2) economic geography
(3) geographic aspects of economic development
(4) urban geography
(5) resource management
(6) cultural geography
(7) population geography
Regional

GEOGRAPHY

501  Geography of United States and Canada (3)
526  Geography of the Soviet Union (3)
541  Geography of Asia (3)
552  Geography of Japan (3)
553  Geography of China (3)
555  Geography of South Asia (3)
556  Geography of Southeast Asia (3)
561  Geography of Australia and New Zealand (2)
571  Geography of the Pacific Islands (3)
578  Geography of Hawaii (3)
660  Seminar in Geography of Asia (3)

(1) Asia
(2) China
(3) Japan
(4) Southeast Asia
(5) South Asia
665  Seminar in Geography of the Pacific (3)

Individual Research

699  Directed Research (arr.)
800  Thesis Research (arr.)

Geosciences

GRADUATE FACULTY

C. S. Ramage, Sc.D. (Department chairman and sub-chairman for meteorology)—tropical meteorology
W. M. Adams, Ph.D. (sub-chairman for solid earth geophysics)—seismology, applied geophysics
D. C. Cox, Ph.D. (sub-chairman for hydrology)—hydrology, ground-water and engineering geology
G. A. Macdonald, Ph.D. (sub-chairman for geology)—volcanology, igneous petrology
A. T. Abbott, Ph.D.—ore deposits, geomorphology
I. L. Barnes, Ph.D.—geochemistry
T. K. Chamberlain, Ph.D.—geological oceanography
J-H. Chang, Ph.D.—climatology
W. C. Chiu, Ph.D.—atmospheric turbulence and oscillations
E. F. Danielsen, Ph.D.—synoptic meteorology, troposphere-stratosphere exchange
R. A. Duce, Ph.D.—atmospheric chemistry
P. C. Ekern, Ph.D.—agricultural meteorology, hydrology, erosion
P. F. Fan, Ph.D.—geochemistry and mineralogy of marine sediments, geology of Asia
A. S. Furumoto, Ph.D.—seismology, geophysics
G. W. Groves, Ph.D.—hydrodynamics
L. S. Lau, Ph.D.—ground and surface water hydrology
S. H. Laurila, Ph.D.—geodesy
A. Malahoff, Ph.D.—geomagnetism, gravity
M. Manghnani, Ph.D.—geochemistry, geophysics
R. M. Moberly, Jr., Ph.D.—sedimentology, marine geology
J. J. Naughton, Ph.D.—geochemistry
K. A. Pankiwskyj, Ph.D.—metamorphic geology, silicate phase petrology
J. M. Reag, D. rer. nat.—paleontology
J. C. Rose, Ph.D.—gravity, marine geophysics
W. R. Steiger, Ph.D.—atmospheric and solar physics
G. H. Sutton, Ph.D.—seismology, exploration geophysics
C. W. Thomas, M.A., M.S.—paleontology
A. H. Woodcock, D.Sc.—cloud physics
G. P. Woollard, Ph.D.—gravity, seismology, geomagnetism
R. J. Workman, Ph.D.—atmospheric electricity, cloud electrification
I-pai Wu, Ph.D.—surface water hydrology
K. Wyrtki, Ph.D.—air-sea interaction
FIELDS OF STUDY

AFFILIATE FACULTY

D. A. Davis M.S.—ground-water geology, geology of Pacific Islands
H. G. Loomis, Ph.D.—applied mathematics
H. A. Powers, Ph.D.—volcanology, petrology
S. Price, B.S.—physical meteorology

Degree Requirements (Plan A only)

A reading knowledge of one foreign language with useful scientific literature in the field of the candidate is required for the M.S. degree.

A reading mastery of one foreign language with useful scientific literature in the field of the candidate is required for the Ph.D. degree.

Geology

Intended candidates will be accepted from undergraduate majors in the natural sciences, mathematics, and engineering. Students not having year-length courses in elementary geology, physics, chemistry, college mathematics, and geological field methods, and at least one semester of mineralogy, petrology, and structural geology or their equivalent will be obliged to take those courses. The M.S. General Examination and the Ph.D. Comprehensive Examination may include questions from all of the basic fields of geology, such as mineralogy, petrology, structural geology, stratigraphy, geomorphology, and paleontology.

Hydrology

Training in hydrology involves not only several fields of the geosciences but several other disciplines. Intended candidates will usually be accepted from undergraduate majors in the natural sciences or engineering. Students not having adequate backgrounds in geosciences, mathematics, physics, chemistry, or hydraulics may be required to take certain undergraduate courses.

Degree programs may be arranged which emphasize various aspects of hydrology. Such programs will involve not only courses from the geosciences but courses in geography, oceanography, engineering, soils, agriculture, or other fields, depending on the aspects to be emphasized. The Hawaiian environment offers special opportunities for research in tropical hydrometeorology, tropical agro-hydrology, and the geohydrology of oceanic islands and basalt terrains.

Meteorology

Intended candidates must present a thorough preparation in general physics, chemistry, and mathematics through calculus, as well as a minimum of 14 hours of undergraduate credit in meteorology including courses in climatology, instruments and observations, descriptive meteorology, and synoptic meteorology. Deficiencies in undergraduate preparation must be made up. Besides geosciences courses, courses may be allowed in the fields of oceanography, physics, and mathematics.

Solid Earth Geophysics

It is desirable that intended candidates possess undergraduate training equivalent to 20 credit hours in each of mathematics, physics, and geology.
Besides geosciences courses, courses may be allowed in engineering, physics, mathematics, and chemistry. Experience with an exploration or research organization will prove beneficial.

**GEOSCIENCES**
- 699 Directed Research (arr.)
- 800 Thesis Research (arr.)

**GEOLOGY AND HYDROLOGY**
- 401 Mineralogy (3)
- 402 Petrology (3)
- 405 Structural Geology (3)
- 406 Work of Water (4)
- 410 Historical Geology (3)
- 411 Paleontology (3)
- 412 Micropaleontology (3)
- 416 Geomorphology (3)
- 420 Marine Geology (3)
- 424 Optical Mineralogy (3)
- 425 Geochemistry (3)
- 426 Igneous and Metamorphic Petrography (3)
- 427 Sedimentary Petrography (3)
- 430 Geology of Asia (2)
- 455 Hydrogeology (3)
- 601 Petrology (2)
- 602 Seminar in Petrology (2)
- 603 Phase Petrology (3)
- 605 Seminar in Engineering and Ground-water Geology (3)
- 607 Seminar in Ore Deposits (2)
- 609 Seminar in Geomorphology (2)
- 614 Advanced Field Study (arr.)
- 617-618 Seminar in Geotectonics (3)
- 619 Sedimentology and Stratigraphy (3)
- 624 Topics in Geochemistry (3)
- 625 Seminar in Current Research Topics (arr.)

**METEOROLOGY**
- 560 Satellite Meteorology (3)
- 565 Advanced Tropical Meteorology (5)
- 742 Atmospheric Turbulence (3)
- 743 Cloud Physics (3)
- 744 Physical Meteorology (3)
- 745 Numerical Analysis and Prediction (5)
- 746 Statistical Meteorology (3)
- 750 Advanced Theoretical Meteorology I (3)
- 751 Advanced Theoretical Meteorology II (3)
- 752 Special Topics in Meteorology (3)
- 753 Advanced Topics in Synoptic Meteorology (3)
- 765 Seminar in Meteorology (1)
- 775 Historical Development of Meteorological Ideas (1)

**SOLID EARTH GEOPHYSICS**
- 451 Seismology (3)
- 457 Introduction to Geodetic Science (3)
- 460 Principles of Geophysics (3)
- 463 Physical Properties of Earth Matter (3)
- 465-466 Geophysical Exploration (3-3)
- 655 Seismology (3)
- 656 Seismic Propagation Phenomena (3)
- 658 Seismometry and Seismological Model Study (3)
- 660 Seminar in Solid Earth Geophysics (arr.)
- 661 Marine Geophysics (3)
- 665 Numerical Methods in Geophysical Data Analysis (2)
- 681-682 Physical Geodesy (3-3)
- 683 Satellite Geodesy (4)
- 684 Advanced Geodesy (3)
- 685 Adjustment Computation (3)
FIELD OF STUDY

German

GRADUATE FACULTY

D. Dauer, Ph.D.—Buddhist influence on German literature and thought
B. Mueller, Ph.D.—Goethe, nineteenth-century literature
J. Michalski, M.A.—medieval period, twentieth-century literature
A. Moore, M.A.—Franco-German literary relations
E. Schorrig, Ph.D.—East-West synthesis; Goethe through Hesse
F. Sydow, Ph.D.—German romanticism; modern German literature

Intended candidates must present a full undergraduate major in German or the equivalent. They must also demonstrate, by means of a personal interview or a tape recording, such fluency and accuracy in German as will insure successful participation in class discussion and research. They must also pass a proficiency test in a second European language.

The minimum requirement is 36 graduate credit hours. A maximum of 8 of the 36 hours may be elected from courses in related fields. Required courses are marked with an asterisk. Candidates are advised to consult the chairman of the graduate faculty for further details about the program.

GERMAN

405 Structure of the German Language (2)
419 Enlightenment through Post Classicism (3)
420 Romanticism through Realism (3)
421 Naturalism through Neo-Romanticism (3)
422 Literary Currents since World War I (3)
*601 History of German Language (2)
*602 Stylistics (2)
651 Seminar. Narrative Literature Goethe through Mann (3)
652 Seminar. Drama Gryphius through Brecht (3)
653 Seminar. Lyric Poetry (3)
654 Seminar. Middle Ages through Baroque (3)
655 Faust I (3)
656 Faust II (3)
699 Directed Research (arr.)
800 Thesis Research (6)

History

GRADUATE FACULTY

H. F. Margulies, Ph.D. (Chairman) —United States political, the Progressive Era
G. Akita, Ph.D.—Far East, modern Japan
C. B. Cowing, Ph.D.—United States social and economic
A. G. Daws, Ph.D.—Hawaii, the Pacific
W. A. Ernest, Ph.D.—Medieval Europe
C. Hunter, Ph.D.—Hawaii, United States cultural
D. Johnson, Ph.D.—United States diplomatic, Latin America, United States in the Pacific
W. Johnson, Ph.D.—recent United States
D. W. Y. Kwok, Ph.D.—modern China, Chinese thought
H. J. Lamley, Ph.D.—modern China
W. H. Maurer, Ph.D.—ancient Near East, Greece and Rome
J. M. McCutcheon, Ph.D.—United States cultural and social
T. D. Murphy, Ph.D.—British Commonwealth, the Pacific
I. A. Newby, Ph.D.—United States, the South
G. R. Nunn, Ph.D.—Asia, research methods and resources
R. L. Rapson, Ph.D.—United States intellectual and cultural
R. K. Sakai, Ph.D.—modern Japan
S. Sakamaki, Ph.D.—Japan, the Ryukyus
A. W. Saville, Ph.D.—modern Europe, Germany
J. Sharma, Ph.D.—South Asia
M. Shinoda, Ph.D.—Far East, pre-modern Japan
J. Stalker, Ph.D.—recent United States social and economic
Intended candidates must present a minimum undergraduate preparation of 18 upper-division credits in history. Students who lack this preparation or who wish to undertake study in a new area of history must make up deficiencies either before or during graduate study.

Intended candidates for the M.A. degree may select either the Plan A (thesis) or the Plan B (non-thesis) program. Plan A requires a minimum of 24 semester hours of graduate course work (at least 15 must be in courses numbered 600 to 799, including History 711 and 712), and 6 semester hours of thesis research. Plan B requires a minimum of 30 hours of graduate course work (at least 18 in courses numbered 600 to 799, including History 711 and 712) and comprehensive examinations in two fields of history. Under both plans an intended candidate is required to give evidence of his competence in a foreign language appropriate to the area of his major interest. In some fields language competence is demonstrated by passing an examination in the language; in other fields, by completing or having completed 12 hours of college-level language study.

Intended candidates for the Ph.D. degree are expected to possess the M.A. degree in history or its equivalent. The Ph.D. candidate must demonstrate that he is capable of pursuing a successful career as a professional historian by showing initiative in historical research and by giving evidence of ability to present his findings both orally and in writing. He must prove his competence by acquiring a broad background in general history, passing four comprehensive examinations that show special academic knowledge in two broad geographic areas of history, and completing an original dissertation. He must also demonstrate a knowledge of at least two foreign languages related to the dissertation topic; for candidates in United States or Pacific history an alternative requirement may, at the discretion of the doctoral committee, be substituted for one of the languages.

The department of history offers the Ph.D. in the Asian, American, Pacific, and European fields. A student who plans to base his dissertation primarily on locally available resources should bear in mind that, although American and European resource materials for some topics are available, the University's particular resource strengths are in the areas of the Pacific and Asia.

An applicant for admission to the M.A. program is requested to supplement his application and transcript with at least two letters of recommendation from professors with whom he has worked.

An applicant for admission to the Ph.D. program is requested to supplement his application and transcript with (1) at least three letters of recommendation from professors with whom he has worked and (2) a sample of his research work, such as a seminar paper or master's thesis.

Additional details on the graduate programs in history are given in a departmental brochure, which is available upon request.

Courses for the graduate programs are to be selected from those listed be-
FIELDS OF STUDY

low and from graduate offerings in related disciplines as directed by the candidate's supervisory committee.

The consent of the instructor is required for admission to all courses numbered 600 through 800, except History 711 and 712.

**Asia**

527 Russian Siberia and the Pacific
529-530 History of Southeast Asia
531-532 History of China
541-542 History of Japan
545-546 History of Korea
551-552 History of South Asia
553 Russian Central Asia and the Caucasus
564 Seminar in Mainland Southeast Asian History
565 Seminar in Island Southeast Asian History
569-660 Chinese Intellectual History
661 Seminar in Chinese History
663 Seminar in Indian History
   (1) Ancient India
   (2) South India
   (3) Muslim India
   (4) Modern South Asia
665 Seminar in Japanese History
666 Seminar in Political History of Modern Japan
667-668 Japanese Intellectual History
669-670 Seminar on Pre-Modern Japan
713 Research Materials and Methods in Asian History
714-715 Chinese Historical Literature
741-742 China from Classical Antiquity to 750

**The Pacific**

439 Australia and New Zealand
571 History of Oceania
575 The United States in the Pacific
577 History of the Hawaiian Islands
675 Seminar in Pacific History

**Americas**

461-462 History of the United States to 1877
463-464 History of the United States since 1877
471-472 Diplomatic History of the United States
475 Constitutional History of the United States
481 American Thought and Culture
491 The West in American History
492 The South in American History
498 The City in American History
511-512 History of Latin America
635 The Colonial Period in American History
636 Seminar in Nineteenth-Century American History
637 The Progressive Period in American History
638 Seminar in Recent American History
640 Seminar in American Social and Intellectual History
641 Seminar in American Diplomatic History
731 Advanced Problems and Reading in American History

**Europe**

401-402 Greek and Roman Civilizations
405-406 Medieval Europe, 300–1300
409 Renaissance and Reformation, 1300–1600
410 Early Modern Europe, 1600–1800
425 Europe in the Nineteenth Century
426 Europe since Versailles
431-432 History of England
435 Constitutional History of England
Intended candidates for the M.S. or Ph.D. in horticulture must present a minimum of 24 hours of undergraduate credit in plant sciences (including botany, horticulture, agronomy, plant pathology) and related fields. Basic courses in chemistry and botany are required. Deficiencies must be made up without credit.

Courses available for the graduate program are listed below. Related fields in which credit will normally be allowed toward the degrees in horticulture include agronomy, biochemistry, biophysics, botany, entomology, food science, genetics, microbiology, plant pathology, soil science, and zoology. Required courses are marked with an asterisk.

**Horticulture**

453  Principles of Plant Breeding (3)
462  Tropical Fruit Crops (3)
463  Floriculture (3)
464  Orchidology (3)
471  Post-Harvest Handling (3)
481  Weed Science (3)
494  Systematic Vegetable Crops (3)
603  Experimental Design (3)
611  Advanced Plant Breeding (3)
618  Plant Cytogenetics (3)
622  Advanced Tropical Fruit Science (3)
FIELDS OF STUDY

666 Radiation Biology (3)
667 Horticulture Seminar (1)
668 Growth Regulators in Horticulture (3)
691 Crop Ecology (3)
699 Directed Research (arr.)
711 Special Topics in Experimental Horticulture (arr.)
800 Thesis Research (arr.)

Japanese

Both Plan A (thesis) and Plan B (non-thesis) M.A. programs in one of the following three major fields are available: (1) literature, (2) language, and (3) teaching of Japanese as a second language (JASL). Intended candidates must have a B.A. in Japanese or have had equivalent preparation in the discipline.

Under Plan A, 18 semester hours of course work in the major field and 6 semester hours of course work in the related field and 6 semester hours of thesis research are the minimum requirements.

Under Plan B, a minimum of 24 semester hours of course work in the major field and 6 semester hours of course work in the related field is required.

In addition, proficiency in another language approved by the graduate faculty is required.

Library Studies

GRADUATE FACULTY
R. R. Shaw, Ph.D. (Dean)—administration, documentation
R. D. Stevens, Ph.D. (Associate Dean)—administration
M. M. Andrews, M.S. in L.S.—management, reader services
M. W. Ayrault, M.S. in L.S.—cataloging and classification
The program leading to the degree of master of library studies consists of a core curriculum to provide the basic professional equipment for all types of library work and enough electives to enable each student to explore one area of specialization.

**College, Public, and Special Librarians:** The normal basic curriculum for public, college, and special librarians includes the following courses. Field experience, on a non-credit basis, will be available to persons interested in first-hand contact with children, young adult, and adult services.

**LIBRARY STUDIES**

- **601** Bibliography and Reference Sources (3)
- **602** Advanced Reference Sources (3)
- **605** Basic Cataloging and Classification (3)
- **610** Social Functions of Libraries (3)
- **615** Building Library Collections (3)
- **647** Management of Library Operations (3)
- **650** Administration of Libraries (3)
- **678** Reader Services (3)

**ELECTIVES**

- **606** Advanced Cataloging and Classification (3)
- **618** Government Documents (3)
- **642** Audio-Visual Services in Libraries (3)
- **660** Science and Technology Literature (3)
- **662** Business and Economic Literature (3)
- **664** Abstracting and Indexing for Information Services (3)
- **670** Literature Searching and Documentation (3)
- **677** Evaluation and Use of Popular Literature (3)
- **681** Reading Materials for Children (3)
- **682** Reading Materials for Youth (3)
- **683** Service for Children and Young People (3)
- **685** Traditional Literature and Oral Narration (3)
- **698** Field Seminar (during last term in the School) (3)

**School Librarians:** The basic program for school library work is identical with the above; in addition, the following courses are also required:

**LIBRARY STUDIES**

- **681** Reading Materials for Children (3)
- **682** Reading Materials for Youth (3)
- **683** Service for Children and Young People (3)

For those who have not had practice teaching the following course may be required:

- **698** Field Seminar (during last term in the School of Library Studies) (3)

School librarians who wish to qualify for work in other states will require 36 hours of library school study, and an additional 12 credit hours is frequently designated in fields of education in certain states. Supervised practice work in a school library, arranged by a faculty member of the School of Library Studies, is also required for certification in some states; and students who want to make sure that their degree will qualify them for certification in other states should make enquiries in advance through the Dean's office.
FIELDS OF STUDY

GRADUATE FACULTY

G. W. Grace, Ph.D. (Chairman)—theoretical, comparative, and historical linguistics, ethnolinguistics, Malayo-Polynesian languages

B. W. Bender, Ph.D. (assistant Chairman)—descriptive and applied linguistics, Marshallese and other Micronesian languages, comparative Micronesian

S. H. Elbert, Ph.D.—comparative and historical linguistics, Hawaiian and other Polynesian and Micronesian languages

H. P. McKaughan, Ph.D.—descriptive and theoretical linguistics, Philippine and Papuan languages

G. J. Parker, Ph.D.—descriptive and comparative linguistics, Quechua, Andean languages

A. J. Schutz, Ph.D.—descriptive linguistics, field methods, Melanesian and Polynesian languages

D. M. Topping, Ph.D.—descriptive and applied linguistics, Philippine and Micronesian languages

S. M. Tsuzaki, Ph.D.—descriptive and applied linguistics, languages in contact, Romance linguistics

Intended candidates for the M.A. or Ph.D. in linguistics must present a minimum background of 27 credits in language study or be prepared to make up such work during the first year of graduate study. Included in this background should be the following, or the equivalent: 3 hours of introductory linguistics, 3 hours of introductory work in historical-comparative linguistics, and at least 6 hours of the structure of English. Those not fulfilling these specified requirements may be admitted to candidacy only under conditions stipulated by the graduate faculty.

M.A.

The department offers both Plan A and Plan B programs. Besides the general requirements of the Graduate Division, Plan A requires a reading knowledge of French, German, or Russian to be demonstrated at least one full semester before the candidate takes his final examination. The substitution of another language may be made if there is sufficient linguistic literature in such language, and if approved by the graduate faculty in linguistics. Plan A requires 24 units and a thesis (6 units).

Plan B requires either a reading knowledge of one of the languages mentioned above, or conversational control of a second language other than that native to the candidate. The latter must be approved by the department and may be demonstrated by examination. In addition, in either case, the student must have a knowledge of the structure of the language in question. Plan B requires a minimum of 30 units approved by the candidate's program committee. Six of these must be earned in courses outside of the department of linguistics, chosen in consultation with the candidate's advisors. This plan also requires a written comprehensive examination near the end of the course work in addition to the Graduate Division requirement of a final seminar appearance.

Ph.D.

Ph.D. candidates must pass a comprehensive examination and a final oral examination in defense of the dissertation. A reading knowledge of two languages other than that native to the candidate is required. French, German, and Russian are acceptable; others must be approved by the graduate faculty in linguistics. The doctoral candidate is expected also to have one or more
minor fields of study selected in consultation with his advisors. Suggested fields include anthropology, Asian and Pacific languages, English, European languages, philosophy, and psychology.

Courses are listed below to guide the candidate, M.A. or Ph.D., in his preparation for the various examinations. The major portion of the work done beyond the M.A. level will be in seminars and directed research, though the candidate must expect to do individual study in areas not covered by course offerings.

**LINGUISTICS**

- 610 Articulatory Phonetics (3)
- 620 Introduction to Linguistic Analysis (3)
- 621 Phonemics (3)
- 622 Morphology and Syntax (3)
- 630 Field Methods (3)
- 645 Comparative Method (3)
- 650-651 Advanced Linguistic Analysis (3-3)
- 699 Directed Research (arr.)
- 710 Areal Linguistics (3)
- 720 Seminar in Applied Linguistics (3)
- 750 Seminar (3)
- 760 Problems in Comparison and Pre-History (3)
- 780 Ethno-Linguistics (3)
- 800 Thesis or Dissertation Research (arr.)

**Mathematics**

**GRADUATE FACULTY**

- E. Mookini, Ph.D. (Chairman) - analysis
- C. Gregory, Ph.D. - applied mathematics
- W. Leahey, Ph.D. - algebraic number theory
- A. Mader, Ph.D. - group theory
- K. Rogers, Ph.D. - algebra, number theory
- F. B. Strauss, Ph.D. - algebra
- Z. Z. Yeh, Ph.D. - analysis

Intended candidates must present a minimum preparation of differential and integral calculus, differential equations, linear algebra, advanced calculus, and modern algebra. In addition to the examinations prescribed by the Graduate Division, candidates for the M.A. must pass a written comprehensive examination in their last semester.

Courses available for the graduate program are listed below. Courses may also be allowed in appropriate related fields.

**MATHEMATICS**

- 402 Differential Equations (3)
- 403-404 Methods in Higher Analysis (3-3)
- 420 Introduction to the Theory of Numbers (3)
- 441 Numerical Analysis (3)
- 442 Vector Analysis (3)
- 444 Functions of a Complex Variable (3)
- 471 Probability (3)
- 472 Statistical Inference (3)
- 599 Topics in Mathematics (3)
- 611-612 Modern Algebra (3-3)
- 621-622 Topology (3-3)
- 631-632 Functions of a Real Variable (3-3)
- 644-645 Analytic Function Theory (3-3)
- 650 Seminar (1)
- 699 Directed Research (arr.)
- 800 Thesis Research (arr.)
Mechanical Engineering

The department offers programs leading to the M.S. in mechanical engineering with areas of specialization in the thermosciences (e.g., heat transfer, mass transfer, thermodynamics, fluid mechanics, gas dynamics, energy conversion) and in mechanics and materials (e.g., continuum mechanics, space mechanics, rheology, properties of materials, corrosion). A third broad area of specialization, systems and design, is currently being developed.

Acceptance for initial registration in the department of mechanical engineering requires admission to the Graduate Division and recommendation by the graduate faculty of the department. Applicants are strongly urged to have the results of the Aptitude and Engineering Tests of the Graduate Record Examination sent to the department chairman prior to July 15 or December 15 for admission the succeeding semester.

Admission to candidacy for the M.S. degree requires both adequate academic performance and a background of knowledge equivalent to that represented by a B.S. degree in mechanical engineering at the University of Hawaii. Adequate academic performance consists in qualification for continued registration. Adequate background in mechanical engineering is determined by means of a General Examination (written, oral or both) administered by the department.

The department offers both Plan A (thesis) and Plan B (general study). The thesis program provides valuable experience in organizing, carrying out and reporting on a project. The department therefore generally recommends Plan A. Laboratory facilities and instrumentation are available to support experimental thesis work. Choice of plan is required prior to admission to candidacy.

Attendance at graduate seminars is required, and each candidate must make one seminar presentation before completion of his program.

MECHANICAL ENGINEERING

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ME 475</td>
<td>Heat Transfer (3)</td>
</tr>
<tr>
<td>ME 477</td>
<td>Fundamentals of Space Dynamics (3)</td>
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<tr>
<td>ME 601</td>
<td>Advanced Engineering Thermodynamics (3)</td>
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<tr>
<td>ME 605-606</td>
<td>Heat Transfer I, II (3-3)</td>
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<tr>
<td>ME 610</td>
<td>Gas Dynamics (3)</td>
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<tr>
<td>ME 619-620</td>
<td>Thermoscience Laboratory (arr.)</td>
</tr>
<tr>
<td>ME 631</td>
<td>Mechanical Properties of Materials (3)</td>
</tr>
<tr>
<td>ME 635</td>
<td>Corrosion (3)</td>
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<td>ME 640</td>
<td>Mechanics of Continua (3)</td>
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<tr>
<td>ME 649-650</td>
<td>Materials Laboratory (arr.)</td>
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<tr>
<td>ME 697-698</td>
<td>Mechanical Engineering Seminar (1-1)</td>
</tr>
<tr>
<td>ME 699</td>
<td>Directed Research (arr.)</td>
</tr>
<tr>
<td>ME 800</td>
<td>Thesis Research (arr.)</td>
</tr>
</tbody>
</table>

Microbiology

GRADUATE FACULTY

A. A. Benedict, Ph.D. (Chairman)—immunochemistry
L. R. Berger, Ph.D.—general microbiology and microbial physiology
A. O. Bushnell, Ph.D.—medical and economic bacteriology
G. W. Chu, Sc.D.—medical bacteriology and parasitology
D. E. Contois, Ph.D.—general microbiology and microbial physiology
C. E. Folsome, Ph.D.—general microbiology and microbial genetics
H. A. Frank, Ph.D.—food microbiology
K. R. Gundersen, Ph.D.—marine microbiology
M. Herzberg, Ph.D.—medical bacteriology
H. R. Hohl, Ph.D.—ultrastructure and morphogenesis
P. C. Loh, Ph.D.—virology
B. Z. Siegel, Ph.D.—cell biology

AFFILIATE FACULTY
M. Levine, Ph.D.—public health and medical bacteriology
J. Stephenson, M.D.—medical bacteriology
M. Yokoyama, M.D.—immunology

Intended candidates must present a minimum of 15 hours of undergraduate work in microbiology, a basic course in biology, botany, or zoology, and courses in general and organic chemistry, quantitative analysis and college physics. Deficiencies in undergraduate preparation must be made up.

Courses for the graduate program are to be selected from those listed below and from others offered in the related fields of biochemistry and biophysics, chemistry, genetics, mathematics, plant pathology, public health, soil science, and zoology. Required courses are marked with an asterisk.

MICROBIOLOGY

415 Advanced General Bacteriology (3)
531 Microbial Physiology (3)
625 Immunochemistry (4)
632 Advanced Microbial Physiology (3)
642 Marine Microbiology (4)
655 Virology (2)
657 Virology Laboratory (3)
661 Ultrastructure of Microorganisms (3)
665 Electron Microscopy (2)
671 Microbial Genetics (4)
681 Host-Parasite Relationships (3)
*690 Seminar (1)
*695 Special Topics in Microbiology (arr.)
*699 Directed Research (arr.)
800 Thesis Research (arr.)

Music

A. Russell, A.M.D. (Chairman)—music composition
M. Kerr, M.M.—music performance, piano
R. N. McKay, Ph.D.—music composition
O. F. Paul, Ed.D.—music education
N. D. Rian, Ed.D.—music education
B. B. Smith, M.M.—ethnomusicology
R. Vaught, Ph.D.—musicology
R. W. Vine, M.M.—music performance, voice

Intended candidates for the master's degree in music must present an undergraduate degree with a major in music or an undergraduate degree in another field with evidence of an equivalent musical background. Applications should include two copies of transcripts.

Applicants should take the Aptitude and Advanced Music Test of the Graduate Record Examination and have reports sent to the music department.
The M.A. in music is offered with a concentration in ethnomusicology, in musicology, and in music education. The M.F.A. in music is offered with a concentration in composition and in performance. It is important that the student declare the specific concentration for which he will be an intended candidate at the time of his application. This declaration is important in determining possible deficiencies. For concentration in music education a record of teaching experience should be presented. For concentration in performance the student must appear in an audition or if the applicant is not in Hawaii an unedited tape recording may be submitted which includes works representative of his abilities in various styles. For concentration in composition three original compositions should be submitted which are representative of previous work in various forms and media.

Before being admitted to candidacy the student will be required to successfully complete the general examination. This is divided into three parts which test the following areas: (1) a basic theory background as included in the first two years of the undergraduate major, (2) a broad knowledge of music literature from the Middle Ages to the present and (3) achievement in the area of the concentration. Students concentrating in composition will be examined in the area of form and analysis, counterpoint and orchestration.

Concentration in composition, ethnomusicology, and musicology follow the thesis program only (Plan A). The concentration in performance follows the non-thesis program only (Plan B). For concentration in musicology a reading knowledge of French or German is required; for concentration in other areas a foreign language appropriate to the field of thesis research may be required as determined by the supervising committee. Candidates concentrating in music education may choose between the thesis program and the non-thesis program. Requirements for the Hawaii State Department of Education Professional Certificate may be met in the M.A. program in music education.

Courses for the graduate major must be selected from those listed below. Normally a minimum of 6 credit hours may be selected from advanced courses in anthropology, drama, education, English literature, Asian, Pacific or European languages, philosophy, psychology, sociology, or other disciplines closely related to the field of thesis research as determined by the supervising committee. A seminar in the field of concentration is required of all candidates.

### MUSIC

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>University Concert Choir (1)</td>
</tr>
<tr>
<td>401</td>
<td>Ensemble Music (1)</td>
</tr>
<tr>
<td>405</td>
<td>University Orchestra (1)</td>
</tr>
<tr>
<td>409</td>
<td>University Concert Band (1)</td>
</tr>
<tr>
<td>435</td>
<td>Individual Instruction (arr.)</td>
</tr>
<tr>
<td>451</td>
<td>Advanced String Methods (2)</td>
</tr>
<tr>
<td>452</td>
<td>Advanced Woodwind Methods (2)</td>
</tr>
<tr>
<td>453</td>
<td>Advanced Brass Methods (2)</td>
</tr>
<tr>
<td>455</td>
<td>Advanced Percussion Methods (2)</td>
</tr>
<tr>
<td>461</td>
<td>Symphonic Music (2)</td>
</tr>
<tr>
<td>462</td>
<td>Choral Music (2)</td>
</tr>
<tr>
<td>463</td>
<td>Music of the Romantic Period (2)</td>
</tr>
<tr>
<td>464</td>
<td>Contemporary Music (2)</td>
</tr>
<tr>
<td>470</td>
<td>Art Music of Asia (2)</td>
</tr>
</tbody>
</table>

*Graduate credit not available to candidates for a degree in composition.*
471 Music of Non-Literate Peoples (3)
*481 Advanced Orchestration (2)
*483-484 Counterpoint (2-2)
*485-486 Form and Analysis (2-2)
*487-488 Composition (2-2)
*489-490 Advanced Composition (2-2)
580 Theoretical Aspects of Music Styles (3)
600 Seminar
(1) composition
(2) ethnomusicology
(3) musicology
(4) performance repertory
(5) music education
635 Advanced Individual Instruction (arr.) M.F.A. only
650 Problems in Music Education (2)
651 Foundations in Music Education (2)
654 Pacific and Asian Music in Education (2)
657-658 Advanced Conducting (2-2)
660 Studies in Music Literature (3)
661 Bibliography and Research Methods in Music (3)
670 Regional Musics (3)
(1) Asia
(2) Oceania
680 Advanced Problems in Music Theory (2)
(1) counterpoint
(2) form and analysis
(3) orchestration
(4) pedagogy
(5) transcription of performance practices
699 Directed Work (arr.)
800 Thesis Research (arr.)

*Graduate credit not available to candidates for a degree in musicology.

Nursing

GRADUATE FACULTY
M. Dunlap, Ed.D. (Chairman)—curriculum and teaching
L. Bermosk, M.Litt. (Director)—mental health-psychiatric nursing
W. Cody, M.D.—psychiatry
H. Olson, Ph.D.—medical-surgical nursing, nursing service administration

Intended candidates for the master of science degree in mental health-psychiatric nursing must present a baccalaureate degree with a major in nursing which includes theory and field experience in psychiatric and public health nursing, a course in elementary statistics, and have active registration for the practice of nursing.

The M.S. in mental health-psychiatric nursing focuses on the preparation of the clinical specialist and consists of three semesters or 36 hours of graduate credit under Plan B (non-thesis). Clinical experience is an integral part of the seminars and practicum conferences, wherein students study their interactions with selected psychiatric patients and demonstrate their capacity for self-directed and independent study in their investigation of the validity of formulated concepts.

NURSING
610 Curriculum Development (3)
630 Seminar (2): (1) Advanced Psychiatric Nursing Concepts (each semester)
640 Practicum (2): (1) Advanced Psychiatric Nursing: Adults; Children; Community Psychiatry (each semester)
FIELDS OF STUDY

655-656  Advanced Psychiatric Concepts (2–2)
699    Directed Research (arr.)

Cognates

Behavioral Science

Group Dynamics (3)
Research Methodology (3)
Electives (6–9 credits)

Nutrition

Graduate Faculty

J. R. Beaton, Ph.D. (Chairman) — energy metabolism, obesity, response to environment
M. L. Brown, Ph.D. — vitamins, reproduction and growth
D. M. Hilker, Ph.D. — carbohydrate metabolism, enzymology
I. J. Lichton, Ph.D. — fluid handling, endocrinology
B. R. Standal, Ph.D. — protein, lipid metabolism
F. Young, Ph.D. — lipids, atherosclerosis

Intended candidates for the M.S. in Nutrition must present an undergraduate major in foods and nutrition or equivalent preparation in a related area which includes qualitative and quantitative analysis, organic chemistry, vertebrate zoology, and general physics. Undergraduate deficiencies will be determined by the faculty. Courses for the graduate major are to be selected from those listed below. Majors are required to take 701 each semester of study. Additional graduate courses may be taken in animal science, chemistry, biochemistry, food science, physiology, or other related fields. A thesis is required.

Nutrition

601–602  Human Nutrition (3–3)
603–604  Human Nutrition Laboratory (1–1)
621    Topics in Nutrition (2)
622    Nutritional and Metabolic Diseases (2)
651    Nutrition Surveys (2)
699    Directed Readings and Research (arr.)
701    Seminar (1)
800    Thesis Research (arr.)

Ocean Engineering

Graduate Faculty

C. L. Bretschneider, Ph.D. (Chairman) — civil engineering, physical oceanography
N. Burbank, Sc.D. — environmental engineering
T. K. Chamberlain, Ph.D. — geological oceanography
R. Grace, Ph.D. — civil engineering
G. W. Groves, Ph.D. — oceanography
J. M. Jordaan, Jr., Ph.D. — ocean engineering
J. Larsen-Badse, Ph.D. — materials science
J. A. Williams, Ph.D. — civil & ocean engineering, hydromechanics

Affiliates

E. Link — Ocean Systems
G. Miller — ESSA
R. Q. Palmer — Tribar Incorporated

The master of science in ocean engineering is an interdepartmental graduate program contributed to by the departments of oceanography, civil engineering, electrical engineering, and mechanical engineering. Intended candidates for the Master of Science in Ocean Engineering must present a B.S. in Civil, Chemical, Electrical or Mechanical Engineering or the equivalent. Plan A (Thesis Program) is recommended but Plan B (Non-Thesis) may be permitted. Choice of plan must be made before 14 credits of graduate work
applicable to the degree have been completed. Foreign language is not required.

Plan A requires a minimum total of 30 credit hours, including 24 credit hours of course work and 6 credit hours of thesis research. 6 credit hours of course work may be taken outside the College of Engineering and the Department of Oceanography. At least 8 credits must be in Engineering courses. Two graduate seminars in Engineering or in Oceanography are required. A minimum of 18 credits must be in courses numbered 600–799.

Plan B requires 30 credits of course work. At least 6 credit hours shall be taken outside the College of Engineering and the Department of Oceanography. At least 8 credits must be in Engineering courses. Two graduate seminars in Engineering or Oceanography are required. A minimum of 18 credits must be in courses numbered 600–799.

The following courses are required of all students in Ocean Engineering:

OCEANOGRAPHY
Ocn 620 Physical Oceanography (3)  
CE 625 Ocean Engineering (3)

Six credits of approved courses may be selected from Physics, Mathematics, Chemistry, or Geosciences. Additional courses normally will be selected from the following list:

CIVIL ENGINEERING
621 Advanced Fluid Mechanics I (3)  
622 Advanced Fluid Mechanics II (3)  
626 Coastal and Harbor Engineering (3)  
635 Environmental and Sanitary Engineering Chemistry (4)  
636 Environmental and Sanitary Engineering Microbiology (4)  
651 Advanced Soil Mechanics (3)  
671 Theory of Elasticity (3)  
674 Theory of Elastic Stability (3)  
675 Theory of Vibrations (3)  
676 Structural Dynamics (3)  
678 Plates (3)  
679 Theory of Thin Shells (3)  
681 Advanced Indeterminate Structures (3)  
682 Numerical Methods of Stress Analysis (3)  
683 Advanced Reinforced Concrete Design (3)

ELECTRICAL ENGINEERING
601-602 Electromagnetic Theory and Applications (3–3)  
603 Active Network Analysis  
631 Advanced Electronic Instrumentation (3)  
651 Advanced Feedback Control Systems (3)  
652 Optimization Techniques in Control Systems (3)  
655 Sampled-Data Control Systems (3)  
661 Theory and Design of Digital Machines (3)  
663 Information Theory (3)  
665 Signals and Random Noise (3)

MECHANICAL ENGINEERING
601 Advanced Engineering Thermodynamics (3)  
605–606 Heat Transfer (3–3)  
631 Corrosion (3)

OCEANOGRAPHY
622 Geological Oceanography (3)  
623 Chemical Oceanography (2)  
632 Littoral Geological Processes (3)  
640 Advanced Physical Oceanography (3)  
642 Recent Marine Sediments (3)  
660 Ocean Wave Theory (3)  
661 Tides (3)
The University currently offers a master’s degree program in physical, chemical, geological, and biological oceanography, and anticipates expansion of this program to the doctorate by 1967.

Intended candidates should have a major in one of the sciences, mathematics, or engineering. Depending upon the specific areas of interest in oceanography, undergraduate deficiencies if any, will be determined by the faculty. A reading knowledge of a foreign language is required.

Students pursuing a degree program must take the following courses or their equivalents: Ocn 620; 621; 622; 623; 799 (2 units).

Courses listed below are available for credit in the degree program. Additional courses may be selected from the fields of botany, chemistry, engineering, geology, mathematics, meteorology, physics, and zoology.

It should be understood that many oceanography courses involve varying amounts of work at sea although specific activity levels per course are not shown since lengths, objectives, and times of occurrence vary.

**OCEANOGRAPHY**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tr>
<td>620</td>
<td>Physical Oceanography</td>
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<tr>
<td>621</td>
<td>Biological Oceanography</td>
<td>3</td>
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<tr>
<td>622</td>
<td>Geological Oceanography</td>
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<td>623</td>
<td>Chemical Oceanography</td>
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<tr>
<td>631</td>
<td>Marine Phytoplankton</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(Same as Bot. 631)</td>
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<tr>
<td>632</td>
<td>Littoral Geological Processes</td>
<td>3</td>
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<tr>
<td>633</td>
<td>Chemical Oceanography Laboratory Methods</td>
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<td>636</td>
<td>Phytoplankton Ecology</td>
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<td>640</td>
<td>Advanced Physical Oceanography</td>
<td>3</td>
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<tr>
<td>641</td>
<td>Marine Zooplankton</td>
<td>1</td>
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<tr>
<td>642</td>
<td>Recent Marine Sediments</td>
<td>3</td>
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<tr>
<td>643</td>
<td>Marine Geochemistry</td>
<td>3</td>
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<tr>
<td>646</td>
<td>Zooplankton Ecology</td>
<td>3</td>
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<tr>
<td>651</td>
<td>Dynamics of Marine Productivity</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(Same as Bot. 651)</td>
<td></td>
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<tr>
<td>660</td>
<td>Ocean Wave Theory</td>
<td>3</td>
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<td>661</td>
<td>Tides</td>
<td>3</td>
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<tr>
<td>672</td>
<td>Ocean Basins</td>
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<td>699</td>
<td>Directed Research</td>
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<tr>
<td>701</td>
<td>Necton Ecology</td>
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<td>735</td>
<td>Seminar in Oceanography</td>
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<tr>
<td>750</td>
<td>Topics in Biological Oceanography</td>
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<tr>
<td>799</td>
<td>Seminar</td>
<td>1</td>
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<tr>
<td>800</td>
<td>Thesis Research</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(arr.)</td>
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</tbody>
</table>
Overseas Career Program

GRADUATE FACULTY
J. M. Allison, LL.D. (Director) — foreign affairs
W. G. Hackler, M.A. (Associate Director) — foreign affairs

The Overseas Career Program is open only to graduate students who are intended candidates for a master's degree in one of the regular academic departments of the University and is a prescribed course of study designed to prepare Americans for service in Asia with governmental and international agencies, private institutions, and business. In conjunction with the objectives of the program and the student's academic background, experience and goals, a coordinated course of study will be individually arranged.

Upon successful completion of the requirements for the master's degree and the Overseas Career Program, an overseas career certificate will be awarded. To obtain the certificate as well as the master's degree in another department will, in most cases, take a longer period of time than would be required for the master's degree alone.

To qualify for the overseas career certificate, 15 semester hours of credit at the graduate level are required:

Six (6) hours—Overseas Career Training Seminar, a two-semester seminar required of all candidates for the certificate.

Three (3) hours—Internship in an Asian country; internships consist of active duty for at least six months (in many cases up to twelve months) with governmental or private agencies in Asia. Periodic and final reports are required.

Six (6) hours in area studies in one Asian country or region and related elective courses, for example:

- American Civilization for Overseas Americans
- Anthropology of Southeast Asia
- Comparative Management
- Economics of Agriculture: Tropical Countries and Asia
- Economic Development of Underdeveloped Areas
- Foreign Marketing
- Politics of National Development

One or more of these courses might well be part of the student’s course program for the master’s degree in another department.

The other requirement for the overseas career certificate, for which no credit is given, is proficiency in an Asian language. Students may satisfy this requirement by passing an examination given by the department of Asian and Pacific languages or by successfully completing intermediate language courses.

The requirements for an internship and area studies may be waived if the student presents satisfactory evidence of equivalent knowledge and experience.

Courses available for graduate credit are:

OVERSEAS CAREER PROGRAM
601 Internship in an Asian country (3)
631–632 Overseas Career Training Seminar (3–3)
Pacific Islands Studies

GRADUATE FACULTY
G. Daws, Ph.D. (Chairman) — history
H. Cox, M.A. — art
G. Grace, Ph.D. — linguistics
C. Hunter, Ph.D. — history
L. Mason, Ph.D. — anthropology
N. Meller, Ph.D. — political science
P. Pirie, Ph.D. — geography
J. Street, Ph.D. — geography

The required undergraduate background is 18 hours of credit (or the equivalent) dealing with the Pacific Islands area in such fields as the following: anthropology, art, geography, history, linguistics, literature, music, political science, and sociology. A basic course in either anthropology or geography of the Pacific Islands is required. Candidates are urged to acquire a reading knowledge of French, German, Hawaiian, Japanese, or Spanish and to utilize the chosen language in thesis research.

Courses are to be selected from those listed below in such manner as to provide an integrated program bearing upon a particular concentration of interest. At least three departments must be represented. In valid instances, courses relating to the Pacific Islands in certain fields such as agriculture, botany, chemistry, microbiology, nutrition, public health, and zoology, may be substituted. Required courses are marked with an asterisk.

ANTHROPOLOGY
450 Regional Cultures of Oceania (3)
  (1) Hawaii
  (2) Micronesia
  (3) Polynesia
  (4) Melanesia
460 Regional Archeology (3)
  (1) Asia and the Pacific
699 Directed Research (arr.)
750 Research Seminar (in Oceania) (3)

ENGLISH
585 Literature of the Pacific (3)
699 Directed Research (arr.)

GEOGRAPHY
561 Geography of Australia and New Zealand (2)
571 Geography of the Pacific Islands (3)
578 Geography of Hawaii (3)
665 Seminar in Geography of the Pacific (3)
699 Directed Research (arr.)

HISTORY
439 Australia and New Zealand (3)
571 History of Oceania (3)
575 The United States in the Pacific (3)
577 History of the Hawaiian Islands (3)
675 Seminar in Pacific History (3)
699 Directed Research (arr.)

MUSIC
401 (71) Ensemble (Asian and Pacific) (1)
435 (12) Hawaiian Chant (var.)
471 Music of Non-literate Peoples (3)
600 Seminar (in Ethnomusicology) (3)
654 Pacific and Asian Music in Education (2)
670 (2) Regional Musics (Oceanic) (3)
699 Directed Research (arr.)
PACIFIC ISLANDS
   699  Directed Research (arr.)
   •800  Thesis Research (arr.)

POLITICAL SCIENCE
   640  Comparative Government and Politics (3)
   651  Development Administration (3)
   699  Directed Reading and Research (arr.)
   740  Seminar: Comparative Government and Politics (3)

SOCIOLOGY
   451  Race Relations in the Pacific (3)
   699  Directed Research (arr.)

GRADUATE FACULTY
  W. E. Nagley, Ph.D. (Chairman)—history of Western religious philosophy, existential philosophy
  C. Y. Cheng, Ph.D.—Chinese philosophy, philosophy of language
  K. K. Inada, Ph.D.—history and theory of Buddhist philosophy, Asian thought
  H. E. McCarthy, Ph.D.—history and theory of metaphysics, philosophy of art
  M. D. Resnik, Ph.D.—symbolic logic, foundations of mathematics
  S. K. Saksena, Ph.D.—history and theory of Indian philosophy, comparative: Indian and Western

Intended candidates for the M.A. or the Ph.D. must present a minimum undergraduate background of 24 credits in philosophy, including courses in history of philosophy, ethics, logic, and contemporary philosophy. Related courses in anthropology, art, drama, Far Eastern studies, history, literature, mathematics, psychology, sociology, and the biological and physical sciences are recommended.

Degrees are offered in three specific areas of philosophy: (1) Western Philosophy. All graduate students in philosophy must acquire a first-rate knowledge of the history and problems of Western philosophy. The Western tradition is the lecture and research frame of reference for the department and serves as the base of operations for its unique work in the Asian and comparative fields. (2) Asian Philosophy. Resting on the mandatory mastery of the Western field, the department offers the Asian field of specialization. Three areas in the Asian field are available: Indian, Buddhist, or Chinese. (3) Comparative Philosophy. In this field the candidate elects a comparison of any one of the three Asian fields, Indian, Buddhist, or Chinese, with any one of the three Western fields, Greek, Modern Classical, or Contemporary.

A reading knowledge of two or more foreign languages is required. Details on this matter and all programs of this department are available in a special brochure.

Western

PHILOSOPHY
   410  American Philosophy (3)
   431  Symbolic Logic I (3)
   432  Symbolic Logic II (3)
   433  Philosophy of Mathematics (3)
   434  Philosophy of Language (3)
   435  British Empiricism (3)
   436  Continental Rationalism (3)
   437  Kant (3)
   438  Hegel (3)
   439  Phenomenology (3)
   440  Political Philosophy (3)
475 Plato (3)
476 Aristotle (3)
480 Medieval Philosophy (3)
500 Philosophy of Art (3)
505 Philosophy of Religion (3)
510 Philosophy in Literature (3)
515 Philosophy of History (3)
520 Existential Philosophy (3)
550 Theory of Science (3)
555 Foundations of Science (3)
601 Seminar in Greek Philosophy (3)
610 Seminar in Modern Philosophy (3)
620 Seminar in Contemporary Philosophy (3)

Eastern

445 Philosophical Foundations of Indian Culture (3)
450 Indian Philosophy (3)
451 Contemporary Indian Philosophy (3)
453 Indian Social Philosophy (3)
454 Indian Logic (3)
460 Buddhist Philosophy (3)
461 Theravada Buddhist Philosophy (3)
462 Mahayana Buddhist Philosophy (3)
464 Zen Buddhist Philosophy (3)
470 Chinese Philosophy (3)
471 Confucianism (3)
472 Neo-Confucianism (3)
473 Taoism (3)
650 Seminar in Indian Philosophy (3)
660 Seminar in Buddhist Philosophy (3)
670 Seminar in Chinese Philosophy (3)

Comparative

465 Philosophy, East and West (3)
690 Seminar in Comparative Philosophy (3)
699 Directed Research (Greek, Modern Classical, Contemporary Western, Indian, Buddhist, Chinese, and Comparative) (arr.)

*800 Thesis Research (arr.)

Physics

GRADUATE FACULTY
J. R. Holmes, Ph.D. (Chairman) — optics, spectroscopy
R. G. Cence, Ph.D.—elementary particles
P. N. Dobson, Ph.D.—theoretical physics
S. Y. H. Hee, Ph.D.—nuclear physics
B. L. Henke, Ph.D.—ultra-soft x-rays
H. C. McAllister, Ph.D.—optics, spectroscopy
M. W. Peters, Ph.D.—high energy physics
V. Z. Peterson, Ph.D.—elementary particles
W. Pong, Ph.D.—solid state
W. R. Steiger, Ph.D.—optics, atmospheric and solar physics
V. J. Stenger, Ph.D.—elementary particles
S. F. Tuan, Ph.D.—theoretical physics
K. Watanabe, Ph.D.—spectroscopy (on leave 1967-68)
M. S. Watanabe, Ph.D.—theoretical physics

Intended candidates for the M.S. or Ph.D. in physics must present a minimum of 35 semester hours of undergraduate credits in physics, including atomic and nuclear physics, electromagnetism, mechanics, optics, and thermodynamics. Year courses in general chemistry and differential equations are also
required. Official scores of the Aptitude and the Physics tests of the Graduate Record Examination must be submitted prior to admission.

Courses available for the graduate program are listed below. Required courses for the physics M.S. are marked with an asterisk. Additional courses may be selected, with approval, in mathematics, chemistry, meteorology, engineering, and philosophy. All graduate students are required to attend the weekly department seminar.

440 Physical Electronics (3)
540 Quantum Electronics (3)
*600-601 Methods of Theoretical Physics (3-3)
+605-606 Modern Physics Laboratory (1 or 2)
*610 Analytical Mechanics I (3)
611 Analytical Mechanics II (3)
620 Physics of the Upper Atmosphere
630 Statistical Mechanics (3)
*650 Electrodynamics I (3)
651 Electrodynamics II (3)
660 Advanced Optics (3)
*670 Quantum Mechanics I (3)
671 Quantum Mechanics II (3)
677 Nuclear Physics I (3)
678 Nuclear Physics II (3)
680 Atomic and Molecular Spectra (3)
685 Solid State Theory (3)
*690 Seminar (1)
695 Seminar on Atomic & Solid State Physics (1)
699 Directed Research (arr.)
700 Seminar on Elementary Particle Physics (1)
710 Quantum Theory of Fields (3)
800 Thesis Research (arr.)

†Required for M.S. Plan B but Physics 699 may be substituted if approved by chairman.

**Physiology and Pharmacology**

**GRADUATE FACULTY**

W. C. Cutting, M.D. (Chairman) — chemotherapy
M. H. Baslow, Ph.D.—marine pharmacology
M. L. Brown, Ph.D.—physiology in nutrition
L. V. Davis, Ph.D.—developmental physiology
E. Furusawa, M.D.—virus chemotherapy
F. I. Kamemoto, Ph.D.—endocrinology, osmoregulation (marine)
T. J. Haley, Ph.D.—toxicology
J. F. Lenney, Ph.D.—biochemical pharmacology
I. J. Lichton, Ph.D.—endocrinology, fluid balance
B. S. Muir, Ph.D.—energy metabolism, respiration (marine)
M. D. Rayner, Ph.D.—nerve-muscle physiology
T. A. Rogers, Ph.D.—environmental physiology
S. Shibata, M.D., Ph.D.—cardiovascular pharmacology
O. Wayman, Ph.D.—reproductive-physiology
P. B. van Weel, Ph.D.—physiological ecology (marine)

Intended candidates for the M.S. or Ph.D. in physiology or pharmacology must have or acquire adequate preparation in biology, chemistry, physics, and mathematics.

The course work required of candidates includes basic courses in related sciences, or demonstrated competency in these fields, plus other course work
adapted to the needs of the particular student as determined by the major professor and the thesis committee. Most students will be expected to take graduate courses in biochemistry, microbiology, and genetics. When it is possible to include them, minimum courses in pathology and clinical medicine will be recommended for some students.

**PHYSIOLOGY AND PHARMACOLOGY**

- 601 Human Physiology (3)
- 602 Physiology of Muscle and Nerve (3)
- 603 Seminar in Human Physiology (1)
- 611 Pharmacology: Actions and Uses of Drugs (3)
- 612 Pharmacology of Marine Toxins (1)
- 613 Seminar in Pharmacology (1)
- 699 Directed Research (arr.)
- 800 Thesis Research (arr.)

**Plant Pathology**

**GRADUATE FACULTY**

- R. B. Hine, Ph.D. (Chairman)—soil-borne fungal diseases, pineapple diseases
- M. Aragaki, Ph.D.—fungal physiology, physiology of disease resistance, disease control
- I. W. Buddenhagen, Ph.D.—bacterial diseases, post-harvest diseases
- O. V. Holtzmann, Ph.D.—parasitic nematodes, diseases of fruits and nuts
- M. Ishii, Ph.D.—virology, diseases of vegetable crops
- E. E. Trujillo, Ph.D.—soil-borne fungal diseases

**AFFILIATE FACULTY**

- W. J. Apt, Ph.D.—nematology, pineapple diseases
- C. A. Wismer, Ph.D.—diseases of sugar cane

Intended candidates for the M.S. in plant pathology must present a minimum of 18 hours of undergraduate credit in agricultural plant sciences, botany, or entomology. The undergraduate program should also include two years of chemistry, one year of physics, one year of mathematics, and basic courses in bacteriology, economics, English composition, scientific writing, genetics, soils, and zoology.

Both Plan A and Plan B are available. Plan B is designed for those students who do not intend to make plant pathological research their profession. In this program at least 9 credits of work in courses numbered 600–799 shall be earned in the major field. Six credits must be earned in directed research in the major field. Students may change from Plan A to Plan B only with the approval of the graduate faculty.

Courses available for the graduate program are listed below. In addition, selected courses from agronomy, biochemistry, botany, chemistry, entomology, genetics, horticulture, microbiology, soil science, zoology, and related disciplines may be approved to fit the needs of individual candidates. Courses marked with an asterisk are required of all thesis program candidates.

**PLANT PATHOLOGY**

- 610 Principles of Plant Disease Control (3)
- 615 Plant Nematology (3)
- 620 Plant Pathology Techniques (3)
- 625 Advanced Plant Pathology (2)
- 660 Plant Pathology Seminar (1)
- 699 Directed Research (arr.)
- 800 Thesis Research (arr.)
GRADUATE FACULTY

H. J. Friedman, Ph.D. (Chairman) — comparative administration, comparative politics
T. Becker, Ph.D. — judicial process, political theory
R. S. Cahill, Ph.D. — politics, political theory
M. N. Goldstein, Ph.D. — political theory, politics
M. Haas, Ph.D. — international relations, political development
H. S. Kariel, Ph.D. — political theory
Y. Kuroda, Ph.D. — comparative politics, political socialization
O. M. Lee, Ph.D. — international relations, comparative politics
W. Levi, Ph.D. — international relations, comparative politics
R. M. Miwa, Ph.D. — political theory, legislative process
C. Neff, Ph.D. — international relations, comparative politics
F. W. Riggs, Ph.D. — comparative administration, development administration
R. J. Rummel, Ph.D. — international relations, systems theory
M. J. Shapiro, Ph.D. — political theory, legislative behavior
R. B. Stauffer, Ph.D. — comparative politics, political development

Intended candidates for the M.A. or Ph.D. degrees must present a minimum of 15 hours of undergraduate credit in political science or the equivalent.

Intended candidates for the master's degree will select a thesis or non-thesis program in consultation with their advisers. A student will be advised that he can be admitted to candidacy only after successful completion of the oral hearing on the thesis proposal for Plan A, and only after successful completion of 9 credits in political science at the University of Hawaii for Plan B. Thesis students will focus their research efforts in one of the four program areas and will submit a program proposal to a committee which will conduct the oral hearing. All M.A. students are required to pass successfully Political Science 600. All other courses may be taken more than once for credit with permission of an adviser.

Intended candidates for the Ph.D. shall submit a proposed program to an adviser at the end of the first semester. The program must then be approved by the department's Graduate Programs Committee. A Ph.D. student will select his research topic from one of the four program areas and will submit his dissertation proposal to a committee which will conduct an oral hearing, to be held either before or after completion of a written comprehensive examination. The comprehensive examination will be given within the framework of the existing four programs. The number of such programs for which the student will be held responsible will be based upon his Ph.D. program statement, as approved by the Graduate Programs Committee. A student will be advised that he can be admitted to candidacy only after successful approval of his proposed program and upon completion of the comprehensive examination and the oral hearing on his dissertation proposal.

All Ph.D. students are required to pass successfully Political Science 600 and 601. All courses numbered above 700 may be repeated for credit with permission of an adviser. Every student must pass one course in each of the four programs.

**Systems of Political Thought**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>Scope and Methods of Political Science</td>
<td>3</td>
</tr>
<tr>
<td>601</td>
<td>Political Analysis, Theory Building and Techniques</td>
<td>3</td>
</tr>
<tr>
<td>602</td>
<td>Research Practicum</td>
<td>3</td>
</tr>
<tr>
<td>610</td>
<td>Political Thought</td>
<td>3</td>
</tr>
<tr>
<td>710</td>
<td>Seminar: Political Thought</td>
<td>3</td>
</tr>
</tbody>
</table>
FIELDS OF STUDY

Decision Making

620  American Government (3)
650  Public Administration Theory (3)
651  Functional Aspects of Public Administration (3)
660  Public Law and Judicial Systems (3)
670  Politics (3)
*720  Seminar: American Government (3)
*750  Seminar: Public Administration (3)
*760  Seminar: Judicial Systems (3)
*770  Seminar: Politics (3)

Political Development

640  Comparative Government and Politics (3)
650  Public Administration Theory (3)
660  Public Law and Judicial Systems (3)
670  Politics (3)
*740  Seminar: Comparative Government and Politics (3)
*750  Seminar: Public Administration (3)
*760  Seminar: Judicial Systems (3)
*770  Seminar: Politics (3)

International Relations

630  International Relations (3)
631  International Relations of Asia (3)
*730  Seminar: International Relations (3)

General

699  Directed Reading and Research (arr.)
800  Thesis Research (arr.)

Psychology

GRADUATE FACULTY

J. M. Digman, Ph.D. (Chairman) —measurement; child personality
A. Arkooff, Ph.D.—clinical
H. M. Bitner, Ph.D.—student counseling
R. J. Blanchard, Ph.D.—comparative, physiological
D. H. Crowell, Ph.D.—infant responsiveness; exceptional children
A. L. Diamond, Ph.D.—psychophysics
A. A. Dole, Ph.D.—individual differences; disability
L. M. Herman, Ph.D.—experimental
J. Michel, Ph.D.—counseling
W. F. Oakes, Ph.D.—learning, verbal behavior
R. M. Suinn, Ph.D.—clinical, counseling
H. B. Weaver, Ph.D.—applied; tourist industry

AFFILIATE FACULTY

E. N. Barker, Ph.D.—clinical
H. Gudeman, Ph.D.—clinical

Intended candidates for the M.A. or Ph.D. degree must present 18 hours of undergraduate credit in psychology, including general and experimental psychology and statistics. Related course requirements are mathematics, extending at least through intermediate algebra, and introductory zoology.

No more than 6 credits in courses numbered in the 400–500 series may be counted toward the advanced degree. A maximum of 6 hours may be elected from closely related courses in anthropology, philosophy, physics, sociology and zoology. Additional elective courses will be dependent upon the candidate's background.
The M.A. and Ph.D. degrees are offered in the following fields: general-experimental, social-personality, developmental, and counseling. Candidates for the M.A. in counseling are expected to meet the standards set by the American Psychological Association, including 48 semester credits. Special programs with traineeships are available in developmental and in vocational rehabilitation counseling.

The following courses are required: 620, 630, and either 614 or 615.

Intended candidates for the doctorate may, under special circumstances, offer 24 course credits in lieu of the M.A. degree, although all students without the M.A. degree in psychology from an American university must enter the program initially as intended candidates for the M.A. degree.

Official scores of the aptitude and advanced psychology tests of the Graduate Record Examination and of the Miller Analogies Test are required when applying for admission. Additional details of the departmental programs are presented in a brochure available from the department.

**PSYCHOLOGY**

- 410 History of Psychology (3)
- 413 Senior Majors Seminar (3)
- 516 Industrial Psychology (3)
- 550 The Exceptional Child (3)
- 551 Social Development of Children (3)
- 582 Psychological Testing (3)
- 600 Seminar: Problems in Psychology (3)
- 614 Theory I (3)
- 615 Theory II (3)
- 620 Quantitative Methods I (3)
- 621 Quantitative Methods II (3)
- 626 Quantitative Methods III (3)
- 630 Experimental Psychology I (3)
- 631 Experimental Psychology II (3)
- 650 Developmental Psychology I (3)
- 652 Developmental Psychology II (3)
- 660 Personality (3)
- 662 Social Psychology (3)
- 670 Applied Social Psychology (3)
- 672 Advanced Educational Psychology (3)
- 678 Psychology of Occupations (3)
- 679 Psychology of Vocational Rehabilitation (3)
- 682 Psychological Appraisal A (3)
- 683 Psychological Appraisal B (3)
- 684 Psychological Appraisal C (3)
- 699 Directed Research (arr.)
- 700 Thesis Research (arr.)
- 720 Directed Research (Experimental) (arr.)
- 750 Directed Research (Developmental) (arr.)
- 760 Directed Research (Personality) (arr.)
- 762 Directed Research (Social) (arr.)
- 780 Directed Research (Counseling) (arr.)
- 782 Psychological Counseling A (3)
- 783 Psychological Counseling B (3)
- 784 Psychological Counseling C (3)
Public Health

GRADUATE FACULTY
R. K. C. Lee, M.D., Dr.P.H. (Dean)—public health administration
D. R. Bassett, M.D.—cardiovascular diseases
M. L. Brown, Ph.D.—public health nutrition
N. C. Burbank, Jr., Sc.D.—environmental health and sanitary engineering
D. F. Char, M.D.—maternal and child health
C. S. Chung, Ph.D.—biostatistics
A. Connor, M.D., M.P.H.—maternal and child health
V. V. Drenckhahn, M.S., M.P.H.—public health education
J. Grossman, M.P.H., Ph.D.—public health education
M. C. W. Kau, D.D.S., M.P.H.—dental health
H. W. Klemmer, Ph.D.—sanitary microbiology
R. E. Mytinger, Dr. P.H.—health services administration
C. B. Park, M.D., Dr. P.H.—biostatistics
R. Y. Suehiro, M.P.H.—public health administration
E. Voulgaropoulos, M.D., M.P.H.—international health, epidemiology
R. J. Wolff, Ph.D.—behavioral sciences
R. M. Worth, M.D., M.P.H., Ph.D.—epidemiology
R. H. F. Young, Sc.D.—environmental health and sanitary engineering

AFFILIATE FACULTY
L. Bernstein, M.D., M.P.H.—public health administration
K. McLaren, M.P.H.—public health nursing
J. Paty, M.P.H.—public health education
W. B. Quisenberry, M.D.—public health nursing
L. Rosen, M.D., Dr. P.H.—epidemiology

M.P.H.

The M.P.H. program (Plan B) is designed to prepare persons for a variety of careers in the broad field of public health at local, state, national, and international levels. The degree candidate must present at least a bachelor's degree in a discipline appropriate to his chosen area of public health in which he plans to be employed. Depending on the student's background and interest, an appropriate course of study is prescribed, incorporating the student's selected area of emphasis. Candidates must complete a minimum of 30 semester hours, including 14 semester hours of required courses (marked with an asterisk below), a comprehensive essay and suitable field training. Students are required to pass a general diagnostic examination on public health before formal admission to candidacy and must pass a final oral seminar near the completion of the program.

Traditionally, M.P.H. candidates have been physicians, dentists, veterinarians or other personnel in the health or related professions with at least three years of experience; for these, the program may be completed in one year. The M.P.H. program at the University of Hawaii is open not only to such experienced personnel but also to students with a bachelor's degree or to students with a graduate degree in a health-related science. For students with only baccalaureate degrees and no previous work experience in the health professions, the program usually requires up to two years to complete.

M.S.

The M.S. program is open to persons with at least a bachelor's degree in any of the several sciences basic to public health and who desire research training in some specific aspect of public health. Both Plan A and Plan B are available. Both plans (1) ordinarily require two years to complete, (2) require
the passing of a general examination on public health before formal admission to candidacy, (3) require the completion of 14 semester hours of required courses (identical courses required in the M.P.H. program), and (4) may require some form of appropriate short-term field work. In Plan A the minimum requirement is 24 semester hours plus 6 credits for thesis research, and a final oral examination on the thesis and related subjects; in Plan B the minimum requirement is 30 semester hours and a final seminar appearance.

Areas of Emphasis

Several areas of emphasis in the broad field of public health are offered in the M.P.H. and M.S. (Plans A and B) programs. Areas include biostatistics, environmental sanitation, epidemiology, health services administration, international health, maternal and child health, population studies, public health education, public health engineering, public health laboratory, and public health nutrition.

Courses are to be selected from those listed below, and, with approval, others in the related fields suitable for each individual student.

PUBLIC HEALTH

*601 Public Health Organization and Administration I (3)
*602 Public Health Organization and Administration II (2)
603 Organization of Medical Care Systems (3)
604 Institutional Health Care Facilities (3)
605 Non-Institutional Health Care Facilities (2)
606 Management of Health Services (3)
607 Planning and Control of Health Services (4)
609 Seminar in Health Services Administration (1)
612 Economics for Health Administrators (3)
613 Seminar in Medical Care Organization (2)
*625 Biostatistics I (3)
626 Biostatistics II (3)
630 Public Health Nutrition I (2)
631 Public Health Nutrition II (2)
632 Seminar in Public Health Nutrition (1)
633 Dental Public Health (2)
*636 Environmental Health I (3)
637 Environmental Control of Disease through Food Protection (3)
638 Vector Control in Environmental Health (2)
640 Public Health Education I (2)
641 Public Health Education II (3)
650 Infectious Diseases of Man in the Pacific Area (3)
*651 Principles of Epidemiology (3)
660 Community Mental Health (2)
665 Socio-cultural Aspects of Health and Illness (3)
670 Medical Aspects of Disability (3)
675 Evaluation and Measurement of Environmental Factors in Health Problems (3)
680 Maternal and Child Health I (2)
681 Maternal and Child Health II (2)
682 The Handicapped Child (2)
683 Principles of Comprehensive Maternity Care (1)
684 Health Services for the Mentally Retarded (2)
685 Demography and World Population Problems (3)
686 Staff Seminar in Population Dynamics (2)
687 Fertility and Reproduction (2)
692 Seminar in School Health Services (2)
693 International Health I (1)
696 International Health II (2)
699 Directed Research in (area of emphasis) (arr.)
710 Advanced Public Health Practice in (area of emphasis) (3)
800 Thesis Research (arr.)
Secondary Education

Graduate Faculty

A. W. S. In, Ph.D. (Chairman) —secondary education, administration, supervision, curriculum
R. S. Alm, Ph.D.—language arts and reading
E. F. Chui, Ph.D.—physical education
R. M. Martin, Ph.D.—secondary education, administration, supervision, curriculum
G. Meyer, Ph.D.—secondary education, curriculum
T. Nelson, Ed.D.—secondary education, administration, supervision, curriculum
D. S. Noda, Ph.D.—secondary education, administration, supervision, curriculum
A. L. Pickens, Ed.D.—art education
M. F. Poyzer, Ed.D.—industrial education
N. Whitman, Ph.D.—mathematics education

Intended candidates for the M.Ed. must present a minimum of 18 semester hours in professional education courses and, in addition, credit for supervised student teaching or teaching experience.

Admission to candidacy is based upon (1) the quality of the student’s undergraduate record; (2) his performance on the general examination.

Both Plan A (thesis) and Plan B (non-thesis) are available.

Plan A: The program requires a minimum of 24 semester credits of course work, with a minimum of 14 semester credits in education and a maximum of 10 semester credits in a related field and 6 hours in a thesis. At least one graduate seminar is required. Required courses are EdCI 635 or 636, 640*, EdEP 708, one of EdEF 650, 651, 660, or 683, and EdCI 800.

Plan B: The program requires a minimum of 30 semester credits in course work, with a minimum of 15 hours in education and a minimum of 12 hours in a related field. The program is primarily designed to enable teachers to strengthen their teaching field majors. At least one graduate seminar is required. Required courses are EdCI 635 or 636, 640*, 733 and one of EdEF 650, 651, 660, or 683.

Curriculum and Instruction

634 Extraclass Activities in Secondary Schools (2)
635 Junior High School Curriculum (3)
636 Secondary School Curriculum (3)
637 Art in Secondary Education (3)
640 Seminar in Special Methods (5)
672 Teaching Aids on Asia (2)
679 Supervision of Student Teaching (2)
699 Directed Research (arr.)
733 Seminar in Curriculum (3)
737 Foundations in Art Education (3)
800 Thesis Research (arr.)

*Required if “related field of study” in M.Ed. program is a commonly taught subject in public schools.

Social Work

Graduate Faculty

K. N. Handley, M.S.W. (Dean) —social services
R. Fisher, M.S.C.—group work
H. A. Jambor, D.S.W.—social services, community organization research
K. Kumabe, M.S.W.—casework, field work
F. C. Merritt, M.S.W.—group work
The School of Social Work offers an accredited two-year M.S.W. program. Inquiries for information and applications for admission should be sent to the office of the School of Social Work. The School publishes an annual bulletin.

The curriculum for the master of social work requires the student to complete a minimum of 48 credits of work including at least 10 credits (750 clock hours) of supervised field work and 6 credits covering research on a group project or individual thesis. The core curriculum, aside from the research sequence, covers three areas: social services, human growth and behavior, and social work methods. The courses in these areas are set up as sequences which continue throughout the two years. The student's program usually includes the following courses:

**Social Services**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>627</td>
<td>Social Services</td>
<td>(2)</td>
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<tr>
<td>628</td>
<td>Social Services</td>
<td>(2)</td>
</tr>
<tr>
<td>658</td>
<td>Legal Aspects of Social Work</td>
<td>(2)</td>
</tr>
<tr>
<td>656</td>
<td>Social Welfare Organization and Administration</td>
<td>(2)</td>
</tr>
<tr>
<td>780</td>
<td>Administrative Methods in Social Work</td>
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</tr>
<tr>
<td>781</td>
<td>Seminar in Social Welfare Policy</td>
<td>(2)</td>
</tr>
<tr>
<td>785</td>
<td>Methods of Supervision in Social Work</td>
<td>(2)</td>
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**Human Growth and Behavior**

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<th>Course</th>
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<tr>
<td>610–611</td>
<td>Human Growth and Behavior</td>
<td>(3–3)</td>
</tr>
<tr>
<td>775</td>
<td>Advanced Social Psychiatry</td>
<td>(2)</td>
</tr>
<tr>
<td>790</td>
<td>Cultural Factors in Social Work Practice</td>
<td>(2)</td>
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</tbody>
</table>

**Social Work Methods**

<table>
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<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>606</td>
<td>Social Casework</td>
<td>(2–2), or</td>
</tr>
<tr>
<td>609</td>
<td>Social Group Work</td>
<td>(2–2)</td>
</tr>
<tr>
<td>612</td>
<td>Group Work Program Activities</td>
<td>(1–1)</td>
</tr>
<tr>
<td>615</td>
<td>Community Organization</td>
<td>(2)</td>
</tr>
<tr>
<td>660-661</td>
<td>Supervised Field Work</td>
<td>(3–3)</td>
</tr>
<tr>
<td>760–761</td>
<td>Advanced Supervised Field Work</td>
<td>(4–4)</td>
</tr>
<tr>
<td>765–766</td>
<td>Advanced Social Casework</td>
<td>(2–2), or</td>
</tr>
<tr>
<td>770–771</td>
<td>Advanced Social Group Work</td>
<td>(2–2)</td>
</tr>
<tr>
<td>777</td>
<td>Community Development in Social Work</td>
<td>(2)</td>
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</table>

**Research**

<table>
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<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>652</td>
<td>Social Research and Statistics</td>
<td>(2)</td>
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<tr>
<td>798–799</td>
<td>Seminar in Research</td>
<td>(3–3)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research</td>
<td></td>
</tr>
</tbody>
</table>

**Sociology**

**GRADUATE FACULTY**

D. S. Yamamura, Ph.D. (Chairman) —methodology and statistics, demography and ecology
H. V. Ball, Ph.D. —sociology of law, penology
O. Bartos, Ph.D. —theory and small groups
M. Bloombaum, Ph.D. —social interaction, methodology
C. K. Cheng, Ph.D. —social institutions, criminology, penology
C. E. Glick, Ph.D. —race relations, collective behavior
B. L. Hormann, Ph.D. —modernization of peasant peoples, social disorganization
I. Krauss, Ph.D. —social stratification, urban sociology
A. W. Lind, Ph.D.—the community, emphasis on race relations
R. E. Sakamoto, Ph.D.—urban sociology, social deviance
T. Wittermans, Ph.D.—social change in developing areas
G. Won, Ph.D.—industrial and urban problems
G. K. Yamamoto, M.A.—occupations and professions
C. K. Yang, Ph.D.—social movements and social change

Intended candidates for the M.A. must present a minimum undergraduate preparation of 18 credits in sociology, including Introduction to the Study of Society (151) or Principles of Sociology (201) or the equivalent.

Plan A (thesis): A minimum of 24 graduate credit hours of course work and 6 credit hours of thesis research is required. A maximum of 6 credit hours may be earned in courses outside the field of sociology, with the approval of the supervising committee.

Plan B (non-thesis): A minimum of 36 graduate credit hours is required. Of these at least 6 shall be earned in courses outside the field of sociology with the approval of the supervising committee.

Courses available for the graduate program are listed below.

**Sociology**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>410</td>
<td>Population and Society (3)</td>
</tr>
<tr>
<td>435</td>
<td>The Agrarian Community (3)</td>
</tr>
<tr>
<td>436</td>
<td>The Urban Community (3)</td>
</tr>
<tr>
<td>444</td>
<td>People and Institutions of China (3)</td>
</tr>
<tr>
<td>446</td>
<td>People and Institutions of Japan (3)</td>
</tr>
<tr>
<td>451</td>
<td>Race Relations in the Pacific (3)</td>
</tr>
<tr>
<td>472</td>
<td>The Family (3)</td>
</tr>
<tr>
<td>480</td>
<td>Sociology of Religion (3)</td>
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<tr>
<td>486</td>
<td>Industrial Sociology (3)</td>
</tr>
<tr>
<td>490</td>
<td>Social Stratification (3)</td>
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<tr>
<td>504</td>
<td>Juvenile Delinquency (3)</td>
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<tr>
<td>530</td>
<td>Sociology of Small Groups (3)</td>
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<tr>
<td>545</td>
<td>Collective Behavior and Social Movements (3)</td>
</tr>
<tr>
<td>560</td>
<td>Methods of Social Research (3)</td>
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<tr>
<td>570</td>
<td>Social Statistics (3)</td>
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<td>572</td>
<td>Advanced Social Statistics (3)</td>
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<td>Sociological Theory (3)</td>
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<td>602</td>
<td>Graduate Seminar (3)</td>
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<td>628</td>
<td>Seminar in Race Relations (3)</td>
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<tr>
<td>650</td>
<td>Seminar in Chinese Society (3)</td>
</tr>
<tr>
<td>652</td>
<td>Seminar in Social Change in Developing Areas (3)</td>
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<tr>
<td>654</td>
<td>Seminar in Community Development (3)</td>
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<tr>
<td>656</td>
<td>Culture and Communication (3)</td>
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<tr>
<td>660</td>
<td>Seminar in Methods of Research (3)</td>
</tr>
<tr>
<td>682</td>
<td>Mathematical Models in Behavioral Science (3)</td>
</tr>
<tr>
<td>699</td>
<td>Directed Research (arr.)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
</tr>
</tbody>
</table>

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**Soil Science**

L. D. Swindale, Ph.D. (Chairman) —soil genesis and classification, physical chemistry
P. C. Ekern, Ph.D. —soil management, agricultural meteorology
Intended candidates for the M.S. or Ph.D. in soil science must have completed a minimum of 18 hours of undergraduate credit in soil science and related subject matter fields and two years of college chemistry. The related subject matter fields are microbiology, chemistry, geography, geology, mineralogy, physics, botany, plant physiology, agronomy, and agricultural engineering (irrigation).

Courses in the major field are to be selected from those listed below. Required courses are marked with an asterisk. Supplementary courses in related fields will be required, as determined by the area of specialization. Candidates may specialize in tropical soil genesis and classification, soil and clay mineralogy, soil management, soil fertility, and the fundamental physical and chemical properties of soils.

**SOIL SCIENCE**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>484</td>
<td>Soil Physics (3)</td>
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<tr>
<td>485</td>
<td>Soil Biotics (3)</td>
</tr>
<tr>
<td>*685</td>
<td>Soil Genesis and Formation (3)</td>
</tr>
<tr>
<td>686</td>
<td>Advanced Soil Classification (3)</td>
</tr>
<tr>
<td>*687</td>
<td>Soil Science Seminar (1)</td>
</tr>
<tr>
<td></td>
<td>(a) Soil Chemistry</td>
</tr>
<tr>
<td></td>
<td>(b) Soil Physics</td>
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<td></td>
<td>(c) Soil Genesis, Formation and Classification</td>
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<td></td>
<td>(d) Soil Fertility</td>
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<td>689</td>
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<td>799</td>
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<tr>
<td>800</td>
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**Spanish**

Intended candidates for the M.A. in Spanish must present 24 semester hours of undergraduate credit in Spanish, excluding introductory and intermediate courses, but including work in Spanish phonetics, Peninsular literature, and Spanish American literature, or equivalent preparation. They must also demonstrate, by means of a personal interview or by a tape recording, that they possess an acceptable accent and a reasonable degree of fluency in Spanish.

Both Plan A and Plan B are available. Under both plans a minimum of 6 and a maximum of 15 credits may be taken from courses in related fields. Some knowledge of Latin is desirable, and one year of a second modern language will be required of those whose basic command of Spanish was largely acquired in the home. Before admission to candidacy a student must present satisfactory
scores on the Proficiency Examinations for Teachers and Advanced Students prepared by M.L.A. and E.T.S. Required courses are marked with an asterisk; those numbered between 400 and 500 not taken as part of the undergraduate preparation must form part of the M.A. program.

**SPANISH**

- 400-401 Advanced Oral Practice (3-3)
- 431 Structure of Spanish (3)
- 440 History of the Spanish Language (3)
- 449 Spanish Dialectology (3)
- 460-461 Modern and Contemporary Spanish Literature (3-3)
- 480-481 Spanish American Novel (3-3)
- 490 Hispano-Philippine Literature (2)
- 628-629 Stylistics and Advanced Composition (3-3)
- 659 Seminar in Spanish Linguistics (3)
- 661 Cervantes (2)
- 665 Spanish Literature Prior to the Golden Age (3)
- 670 Spanish Literature of the Golden Age (3)
- 675 Modernismo (2)
- 698 Seminar in Hispanic Literature (3)
- 699 Directed Research (arr.)
- 800 Thesis Research (arr.)

**HISTORY**

- *511-512 History of Hispanic America (3-3)

**LINGUISTICS**

- 620 Introduction to Linguistic Analysis (3)
- 621 Phonemics (3)
- 622 Morphology and Syntax (3)

**EUROPEAN LANGUAGES**

- 610 Contrastive Analysis of Spanish and French with English (3)
- 630 Seminar in Research Methods (2)

**SECONDARY EDUCATION**

- 635 Foreign Languages, Secondary (3)
- 640 Seminar in Special Methods (3)

**ENGLISH**

- 635 Seminar in Comparative Literature (3)

**GEOGRAPHY**

- 521 Geography of Europe (3)

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**Speech**

**GRADUATE FACULTY**

- R. L. Rider, Ph.D. (Chairman) — radio and television, mass communication
- E. J. Bilsborrow, Ph.D. — public speaking, speech education, semantics
- L. N. Breneman, M.A. — interpretation, speech improvement, speech education
- E. B. Carr, Ph.D. — phonetics, phonemics, research methods, oral English for foreign students
- G. Dykstra, Ph.D. — theory of language structure, first and second language development in the individual, theory and practice in learning programs
- H. W. Ellingsworth, Ph.D. — speech education, rhetoric and public address, theory and processes of interpersonal communication
- M. J. Gordon, M.A. — speech improvement, speech education
- L. S. Harms, Ph.D. — speech science, experimental methods
- P. Heinberg, Ph.D. — speech science, voice science, experimental methods
- J. P. Hoshor, Ph.D. — leadership and discussion, semantics
- D. W. Klopf, Ph.D. — forensics, debate
- V. G. Larson, M.A. — speech education, speech improvement, choral speaking
- O. S. Lefforge, Ph.D. — rhetoric, public address
- H. H. Wong, Ph.D. — speech education, speech improvement, phonetics
Graduate study in speech at the University of Hawaii is designed to enable students to teach, to do research, and to administer or supervise positions in the areas of oral communication. Such subjects as phonetics, rhetoric, public address, interpretation, voice science, pedagogy, forensics, and radio-television may be explored historically, scientifically, and creatively. Graduate programs are structured to acquaint all students with the field of speech and to provide for a specialty in one area. Every program is planned with a view to employing the intellectual interests and meeting the needs of the student in his own career.

Anyone wishing to pursue studies leading to a master's degree in speech at the University of Hawaii should submit to the department a statement including a transcript of undergraduate studies completed and in progress, the names of his instructors in speech and related areas (e.g., history, philosophy, psychology, linguistics, drama), and a brief statement listing aspirations, areas of interest, and reasons for desiring to undertake graduate study at the University of Hawaii. Every student admitted will be assigned an advisor pro tem, who will assist the student in preparing a tentative study program, subject to revision by the student in consultation with his graduate committee.

Required courses are marked with an asterisk.

The following courses in speech pathology and audiology offered in the College of Health Sciences and Social Welfare are also available to qualified students in the department of speech: SPA 600, 601, 602, 603, 610, 611, 621, 630, 640, 641, 650, 699, and 800.

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<td>480</td>
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<td>616</td>
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<tr>
<td>650</td>
<td>Seminar in Rhetoric and Public Address (3)</td>
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<tr>
<td>651</td>
<td>History and Criticism of British Oratory (3)</td>
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<tr>
<td>652</td>
<td>History and Criticism of American Oratory (3)</td>
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<td>670</td>
<td>Seminar in Broadcast Program Criticism and Social Effects (3)</td>
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<td>*690</td>
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<tr>
<td>699</td>
<td>Directed Research (arr.)</td>
</tr>
<tr>
<td>*800</td>
<td>Thesis Research (arr.)</td>
</tr>
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**Speech Pathology and Audiology**

**GRADUATE FACULTY**

- M. Ansberry, Ph.D.—speech pathology, audiology
- S. Batkin, M.D.—speech science
- G. Pang-Ching, Ph.D.—audiology
- E. G. Ritter, Ph.D.—speech pathology, speech science
- J. R. Watson, M.D.—audiology, hearing science
Intended candidates for the M.S. degree in speech pathology and audiology must present a minimum of 27 undergraduate credits in the area including basic courses in speech correction, methodology, pathology of speech, audiology, testing of hearing, speech and hearing science, practicum in both speech pathology and audiology, and phonetics. In addition a minimum of 9 credits in psychology including courses in developmental psychology and psychology of adjustment is required. Deficiencies in undergraduate preparation will be determined by evaluation of transcripts and examination. Deficiencies must be removed by enrollment in basic courses which will not carry graduate credit.

Two programs are offered for graduate study: Plan A, thesis; and Plan B, non-thesis. Under Plan A, 36 credits in speech pathology and audiology and allied fields plus a thesis are required. If Plan B is chosen by the student and his advisory committee, 44 credits of course work must be completed as a graduate student. Either of these programs will enable the student to meet the basic requirements for the certificate of clinical competence in both speech pathology and audiology as established by the American Speech and Hearing Association. The full-time graduate student should plan to be in residence a minimum of three semesters and two summer sessions; normally two academic years are required.

Specialized courses offered at the graduate level are listed below.

**SPEECH PATHOLOGY AND AUDIOLOGY**

- Organic Disorders of Speech (3)
- Auditory Training and Speech Reading (3)
- Functional Disorders of Speech (3)
- Language Development for Children with Hearing Deficiencies (3)
- Advanced Practicum in Speech Pathology (3)
- Advanced Practicum in Audiology (3)
- Advanced Audiology (3)
- Introduction to Graduate Study (3)
- Seminar in Speech Pathology (3)
- Seminar in Audiology (3)
- General Seminar (3)
- Research (1-4)
- Thesis (6)

The master of arts in the teaching of English as a second language is an interdepartmental graduate program contributed to by the departments of English, linguistics, and speech. Available to both foreign and American graduate students, this is a 36-semester hour, non-thesis program with major em-
phasis on applied linguistics and linguistic methods of teaching English. Competence in speaking, understanding, reading, and writing English is prerequisite and in the case of foreign students must be certified by English language experts in the students' own country at the time of application for admission. Required program courses are listed below; additional information relating to courses in a minor area, to elective courses, and to other program requirements is available in a program brochure.

ENGLISH
425 Modern English Grammar (3)
622 Teaching English as a Second Language (3)
723 Textbook and Test Construction (3)

LINGUISTICS
620 Introduction to Linguistic Analysis (3)
720 Seminar in Applied Linguistics (3)

SPEECH
615 Phonetics and Phonemics of American English (3)

Zoology

GRADUATE FACULTY
A. J. Berger, Ph.D. (Chairman) — ornithology, anatomy
J. E. Alicata, Ph.D.— parasitology
A. H. Banner, Ph.D.— invertebrate zoology, systematics
V. E. Brock, M.A.— fishery biology, oceanography
T. C. Cheng, Ph.D.— physiological parasitology
G. W. Chu, Ph.D.— parasitology
L. V. Davis, Ph.D.— morphogenesis of invertebrates
W. A. Gosline, Ph.D.— ichthyology, zoogeography and evolution
P. Helfrich, Ph.D.— ichthyology, ecology
R. W. Hiatt, Ph.D.— ecology, marine biology
S. C. Hsiao, Ph.D.— experimental embryology, comparative anatomy
F. I. Kamemoto, Ph.D.— physiology, endocrinology
R. E. Kane, Ph.D.— cell biology
E. A. Kay, Ph.D.— malacology
J. A. Maciolek, Ph.D.— limnology, fishery biology
D. C. Matthews, Ph.D.— invertebrate zoology
B. S. Muir, Ph.D.— fishery biology, population dynamics
M. D. Rayner, Ph.D.— muscle-nerve physiology
E. S. Reese, Ph.D.— behavior, ecology, invertebrate zoology
T. A. Rogers, Ph.D.— vertebrate physiology
A. L. Tischer, Ph.D.— fishery biology, biometry
S. J. Townsley, Ph.D.— invertebrate zoology, ecology, radio-biology
L. D. Tuthill, Ph.D.— taxonomy
P. B. van Weel, Ph.D.— physiology, physiological ecology

AFFILIATE FACULTY
Y. Kondo, Ph.D.— malacology
J. S. Hendrickson, Ph.D.— vertebrate zoology
J. J. Magnuson, Ph.D.— population dynamics, fish behavior
J. C. Marr, M.A.— fishery biology, population dynamics
J. E. Randall, Ph.D.— ichthyology
B. S. Rothschild, Ph.D.— fishery biology
D. W. Strasburg, Ph.D.— ichthyology
M. Takata, M.S.— fishery biology

Intended candidates for the M.S. or Ph.D. in zoology must present a minimum of 18 hours of undergraduate preparation in zoology, including courses in vertebrate zoology (including comparative anatomy), embryology, and physiology. M.S. and Ph.D. candidates should have completed two years of chemistry (inorganic and organic), and courses in college algebra, botany, and
one year of physics. Deficiencies in undergraduate preparation must be made up. An official record of the student's performance on the Graduate Record Examination (Aptitude Test and the Advanced Test in Biology) must be submitted to the chairman of the zoology department before any action will be taken on applications for admission.

Courses are listed below. One seminar each year is required. 602 and 800 are required only for Ph.D. candidates. For the M.S. under Plan A a maximum of 6 hours, and under Plan B a minimum of 6 hours, may be elected from related courses in botany, chemistry, entomology, genetics, mathematics, meteorology, oceanography, and physics. For the Ph.D., additional work will be stipulated by the supervising committee. Ph.D. candidates must pass a reading examination in two foreign languages.

**ZOOLOGY**

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<th>Course</th>
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</tr>
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<td>410</td>
<td>Parasitology</td>
<td>3</td>
</tr>
<tr>
<td>416</td>
<td>Histology</td>
<td>3</td>
</tr>
<tr>
<td>425</td>
<td>Microtechnique</td>
<td>3</td>
</tr>
<tr>
<td>431</td>
<td>Biometry</td>
<td>3</td>
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<tr>
<td>432</td>
<td>Advanced Biometry</td>
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<tr>
<td>441</td>
<td>History of Zoology</td>
<td>2</td>
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<tr>
<td>450</td>
<td>Natural History of the Hawaiian Islands</td>
<td>2</td>
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<tr>
<td>460</td>
<td>Avian Biology</td>
<td>3</td>
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<tr>
<td>504</td>
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<td>2</td>
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<tr>
<td>505</td>
<td>Endocrinology</td>
<td>2</td>
</tr>
<tr>
<td>510</td>
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<td>4</td>
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<tr>
<td>525-526</td>
<td>General Ichthyology</td>
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</tr>
<tr>
<td>602</td>
<td>Preparation of Scientific Manuscripts</td>
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<tr>
<td>603</td>
<td>Zoogeography</td>
<td>2</td>
</tr>
<tr>
<td>605</td>
<td>Comparative Endocrinology</td>
<td>4</td>
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<tr>
<td>606</td>
<td>Animal Behavior</td>
<td>3</td>
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<tr>
<td>607</td>
<td>Physiological Bases of Animal Behavior</td>
<td>3</td>
</tr>
<tr>
<td>608</td>
<td>Growth and Form</td>
<td>4</td>
</tr>
<tr>
<td>611</td>
<td>Principles of Systematic Zoology</td>
<td>3</td>
</tr>
<tr>
<td>615-616</td>
<td>Advanced Invertebrate Zoology</td>
<td>3-3</td>
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<tr>
<td>620</td>
<td>Marine Ecology</td>
<td>3</td>
</tr>
<tr>
<td>621</td>
<td>Physiological Ecology</td>
<td>3</td>
</tr>
<tr>
<td>622</td>
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<td>3</td>
</tr>
<tr>
<td>629</td>
<td>Methods of Fishery Investigation</td>
<td>3</td>
</tr>
<tr>
<td>631</td>
<td>Population Dynamics</td>
<td>3</td>
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<td>645</td>
<td>Advanced General Physiology</td>
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<td>646</td>
<td>Comparative Invertebrate Physiology</td>
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<tr>
<td>691</td>
<td>Seminar in Zoology</td>
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<td>692</td>
<td>Seminar in Fisheries, Biology</td>
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<td>Directed Research</td>
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<td>732</td>
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