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To obtain the Graduate Bulletin, send your order and 25¢ in coin or money order to: University Book Store, 1760 Donaghho Rd., University of Hawaii, Honolulu, Hawaii 96822.

UNIVERSITY OF HAWAII BULLETIN

VOLUME XLVII       June 1968       Number 4

The University of Hawaii Bulletin is published in December, March, May and June 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.
### 1968-1969 UNIVERSITY CALENDAR

<table>
<thead>
<tr>
<th>Event</th>
<th>First Semester</th>
<th>Second Semester</th>
<th>Summer Session I</th>
<th>Summer Session II</th>
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<tbody>
<tr>
<td>Last day to file applications and renewals of application for admission</td>
<td>May 1</td>
<td>Nov. 1</td>
<td>Apr. 1</td>
<td>Apr. 1</td>
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<tr>
<td>Last day to file applications for readmission for students returning after an absence</td>
<td>Aug. 1</td>
<td>Dec. 1</td>
<td>May 1</td>
<td>May 1</td>
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<tr>
<td>Registration</td>
<td>Sept. 9</td>
<td>Jan. 30</td>
<td>Jun. 16</td>
<td>Jul. 28</td>
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<tr>
<td>Instruction begins</td>
<td>Sept. 16</td>
<td>Feb. 3</td>
<td>Jun. 17</td>
<td>Jul. 29</td>
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<tr>
<td>Last day of registration for credit</td>
<td>Sept. 24</td>
<td>Feb. 11</td>
<td>Jun. 21</td>
<td>Aug. 2</td>
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<tr>
<td>Last day of withdrawal from courses without grade penalty</td>
<td>Oct. 4</td>
<td>Feb. 20</td>
<td>Jun. 24</td>
<td>Aug. 3</td>
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<tr>
<td>Last day to file diploma applications</td>
<td>Oct. 7</td>
<td>Feb. 24</td>
<td>Jun. 27</td>
<td>Aug. 8</td>
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<tr>
<td>Deficiency reports due</td>
<td>Nov. 8</td>
<td>Mar. 28</td>
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<tr>
<td>Last day of removal of incompletes</td>
<td>Nov. 27</td>
<td>Apr. 3</td>
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<tr>
<td>Early registration for following term</td>
<td>Dec. 9-20</td>
<td>May 15-18</td>
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<tr>
<td>Last day of withdrawal from courses</td>
<td>Dec. 6</td>
<td>Apr. 25</td>
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<tr>
<td>Last day for final examinations, Plan A</td>
<td>Dec. 23</td>
<td>May 2</td>
<td>Jul. 7</td>
<td>Aug. 18</td>
</tr>
<tr>
<td>Theses and dissertations due in Graduate Division</td>
<td>Jan. 2</td>
<td>May 9</td>
<td>Jul. 7</td>
<td>Aug. 18</td>
</tr>
<tr>
<td>Last day for submission of Plan B final exam results</td>
<td>Jan. 6</td>
<td>May 16</td>
<td>Jul. 14</td>
<td>Aug. 25</td>
</tr>
<tr>
<td>Last day for titles of theses to be filed with Graduate Division</td>
<td>Jan. 15</td>
<td>May 15</td>
<td>Feb. 3</td>
<td>Feb. 5</td>
</tr>
<tr>
<td>Last day of instruction</td>
<td>Jan. 11</td>
<td>May 22</td>
<td>Jul. 25</td>
<td>Sept. 5</td>
</tr>
<tr>
<td>Final examinations begin</td>
<td>Jan. 13</td>
<td>May 23</td>
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<tr>
<td>Term ends</td>
<td>Jan. 18</td>
<td>May 29</td>
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<tr>
<td>Commencement</td>
<td>(none)</td>
<td>Jun. 8</td>
<td>Aug. 3</td>
<td>(none)</td>
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### HOLIDAYS

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>November 5</td>
<td>General Election Day</td>
</tr>
<tr>
<td>November 28-30</td>
<td>Thanksgiving Recess</td>
</tr>
<tr>
<td>November 11</td>
<td>Veterans' Day</td>
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<tr>
<td>December 22-</td>
<td>Christmas Recess</td>
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<td>January 5</td>
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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

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General Administration

ROBERT W. HIATT, B.A., PH.D., Acting President of the University
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
RICHARD L. BALCH, A.B., Vice-President for Division of Continuing Education and Community Service
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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 primary function of the Economic Research Center is to promote an understanding of the economy of the State of Hawaii. The Center evaluates economic effects of legislation and performs basic and applied economic research relating to Hawaii. In cooperation with the resident academic departments of the University, 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, evaluation, and development concerned with instructional and administrative problems. Activities are directed at obtaining factual evidence that may assist educators in reaching decisions about educational practices. Major programs focus upon understanding of achievement motivation, of conditions influencing educational attainment of different ethnic and socio-economic groups, and of means of optimizing the cognitive learning of school children. Research and development to facilitate educational planning and practice in Hawaii and the Pacific Basin is a primary concern. All doctoral candidates in Educational Psychology serve as research fellows or trainees for a minimum of one semester.

The Graduate Research Library, located on the Mall, houses the main book and periodical collections of the University of Hawaii Library. Completed in early 1968, its four stories provide space for approximately 800,000 volumes and 1,050 readers in a total floor space of 106,848 square feet. It houses all research collections except the Government Documents Collection and the Hawaiian and Pacific Collection, which will remain in Sinclair Library until Phase II of the Graduate Research Library is completed. Collections are arranged in open-stack fashion for maximum ease of access.

Gregg M. Sinclair Library, located at University Avenue and Campus Road, houses the Undergraduate Collection (50,000 volumes) in addition to its two research collections noted above and the East-West Center Library's Oriental Collection. Sinclair Library is now in process of being converted to an undergraduate library. This includes expansion of the seating capacity, development of book collections geared to the undergraduate curriculum, and creation of browsing and listening areas.

The Communications Service Center, a division of Library Activities, provides audio-visual aids for classroom instruction and research projects. Consultation services include selecting, locating and producing graphic and audio-visual materials designed to meet specific needs. Audio-Visual Services lends AV equipment, films and does tape duplication. Graphic Services provides drafting, illustrating, design, layout, lettering, photography and projectual production. Instructional Systems operates a closed-circuit television system, a large multi-media auditorium in Kuykendall Hall and media instruction laboratory.

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 cloud physics observatory at Hilo, Hawaii, and a seismographic observatory in upper Manoa Valley.

The Hawaii Institute of Marine Biology, established in 1950, is located on Coconut Island in Kaneohe Bay. It encourages research in the marine biological sciences, including fisheries, by providing facilities and services for faculty members, graduate students, and visiting scientists. Its research programs include studies in the ecology, physiology, behavior, and systematics of marine animals and plants, pollution studies, biology, chemistry and pharmacology of toxic marine organisms, fundamental research in the interrelationship of organisms and their environment, and a summer graduate research program in marine biology initiated in 1967.

The Hawaii Cooperative Fishery Unit promotes graduate training and research in fishery biology by providing students with support, counseling, and facilities. The Unit is headquartered in Edmondson Hall and functions academically as part of the Department of Zoology. Research program centers on the fishery biology and ecology of inshore marine and inland waters. The Unit operates under joint sponsorship of the University, the Hawaii Department of Land and Natural Resources—Division of Fish and Game, and the U.S. Bureau of Sport Fisheries and Wildlife—Division of Fishery Services.

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,
Left: Nationally known exobiologist Dr. Sanford Siegel conducts experiments in the new field of space biology. Right: Research by the horticulture department has produced new strains of corn for Hawaii.

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 the state capitol.

The Office of International Programs provides general administrative and program direction and guidance to the University's training centers; coordinates all business, administrative and training aspects of the University's contracts with the Peace Corps and the Agency for International Development; assists in devising and developing plans for new training programs; promotes and encourages the most effective use of the University's resources on international activities; provides on-campus assistance to foreign visitors as needed, particularly those engaged in related international programs.

The training centers of the University of Hawaii include two Peace Corps training centers, one located on the Island of Hawaii and the other on the island of Molokai. The Asia Training Center, located on the island of Oahu, trains A.I.D. personnel for assignments in Vietnam, Laos and other countries of Southeast Asia.

Late in 1967 the Office of International Programs established a Tropical Rice Production Center on the island of Kauai. This Center, administered jointly by the College of Tropical Agriculture and the Office of International Programs, is used to train both Americans and Asians in the latest methods of rice production.

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 of an interdisciplinary nature, in the social sciences and related fields. Particular emphasis is given to the study of modernization, socio-economic development, and cultural change. The Institute is developing new programs in survey research, contemporary Korea, and Hawaii's people. A long-term study of culture and mental health in Asia and the Pacific will provide an opportunity for Asian and American scholars to participate in cooperative research.

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, providing they have not previously been referred. 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, and a semi-annual journal, Oceanic Linguistics.

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, established in 1964, plans and conducts research of both basic and practical nature related to Hawaii's water resources, and provides for the training of engineers and scientists through such research. Research is interdisciplinary with a broad base of physical sciences, technology, and social sciences. It involves hydrology and hydraulic engineering, geology, geophysics and geochemistry, sanitary engineering and public health, climatology and soil physics, agricultural engineering and forestry, and socio-economic and legal aspects. 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 Pineapple Research Institute of Hawaii is supported by the pineapple industry. Offices and laboratories are located on a 150-acre experimental field station near 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 Haleakula, 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.

The Organization for Tropical Studies, Inc., is a consortium of universities (currently with 21 member institutions including the University of Hawaii) established to increase understanding of tropical environments and to provide a scientific basis for their intelligent use by mankind. It maintains a central administrative office (now at the University of Michigan), and its first center of operations has been established at the University of Costa Rica, a member university. Instructional institutes are held in Costa Rica during February-March and July-August. Admission is on a competitive basis and is open to graduate students from all universities in the Americas. Transfer of course credits can be arranged.

Study parks on the campus provide students with added space for relaxing, studying, and getting together with other students. This is part of the campus design utilizing Hawaii’s exceptional climate.
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.

*Graduation fee.* All recipients of advanced degrees are required to pay a graduation 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 special course fees may be refunded to students who withdraw from courses, the percentage refunded to be in accordance with the following schedule:

---

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

In no case is refund made for any part of the general fee, late registration fee, or fee for returned check.

**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 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 remuneration is $2,664 payable in twelve monthly installments, and waiver of tuition up to a maximum of nine credit hours (including audit) and the general fee. Graduate assistants registering for twelve or more semester hours (including audit) must pay the $18.00 general fee. They are not exempt from special course fees listed in the General Catalog. The period of service is September 1 to June 15. Applications 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 professors 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 p. 16 for details.

*Fellowships.* The Research and Fellowships office of the Graduate Division has available general information for other fellowships competitions open to graduate students which are administered by outside foundations or agencies. Since opening and closing dates of national competitions vary, as do application procedures and general requirements, 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**  
Dr. James Linn

**Danforth Teacher Grants**  
Dr. Pressley C. McCoy, Assoc. Dir.  
Danforth Foundation  
607 North Grand Boulevard  
St. Louis 3, Missouri
### GENERAL INFORMATION

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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.

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 in-
surance, 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.

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 and staff of the Center 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 from Asia, the Pacific, and the United States 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. The Institute also administers training and job observation in Hawaii for Agency for International Development participants and participants from other private or government agencies.

Institute of Advanced Projects

The Institute of Advanced Projects offers a unique program at the advanced professional level. Aimed at improving understanding and establishing better relations between East and West, the Institute serves the Center's purpose in two ways: through exchange of persons and exchange and dissemination of information and scholarly materials. The Senior Specialists program brings together distinguished persons from Asia, the Pacific area, and the United States for informal seminars, research, and writing. The Research Publications and Translations program not only translates scholarly materials from and into Asian languages, but also compiles teaching and research aids such as bilingual dictionaries and annotated bibliographies. Its publications include the Occasional Papers, IAP Reprints and IAP Monographs. The Institute also administers the Jefferson Fellowships program, a non-degree program of 17 weeks designed for mature journalists and others in the several communications media to pursue, not studies in journalism, but projects of their own choosing available to them from the wide resources of the University of Hawaii and the East-West Center. Panels of advisers and consultants on substantive matters have been established to aid the program directors in selection of candidates and subject-matter emphases.

Central Programs

This division of the East-West Center includes the administrative offices of the Chancellor, Deputy Chancellors, 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. The East-West Center Press publishes new books originating within the Center as well as from other institutions throughout the world. It exports American books to Asia and imports Asian books in English. The East-West Center Library is building an outstanding collection of Asian materials, including books, periodicals and microfilm, emphasizing national development and cross-cultural relations.

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.


LIVING ACCOMMODATIONS AND EXPENSES

Admission to the University is granted 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 $390 per semester.

Off-Campus Housing. The Student Housing Office offers a free, central listing service and maintains listings of rooms in private homes, a few apartments, and room and board jobs. These listings are not inspected or approved by the University. Negotiations with off-campus landlords must be handled directly by the student. Because of the rapid turnover the names of landlords cannot be sent through the mail. Names of students as possible roommates are not available although available space shared with other students can be listed. The rush for housing usually starts about three weeks prior to the beginning of classes. Students arriving in Honolulu are encouraged to arrange for temporary lodging and are invited to come to the housing office for general information on current listings of available accommodations (Monday - Friday, 7:45-11:45 a.m.-
12:30-4:30 p.m.). The general housing picture is one of extreme shortage and this means expense and difficulty in the location of suitable housing.

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

Food Services. In addition to those in Gateway House, 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 approximately $2,000 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.
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.

OVERSEAS CAREER PROGRAM

The Overseas Career Program is a prescribed course of study designed to prepare Americans for service in Asia with governmental and international agencies, private institutions, and business; or service in fields concerned with Asians and Asian affairs. It is open only to students who are intended candidates for a graduate degree in one of the regular academic departments of the Univer-
sity and is designed to be useful to students who have not been abroad as well as to students who have lived in Asia.

Upon successful completion of the requirements of the Overseas Career Program (in addition to the requirements for a graduate degree in another field of study), an Overseas Career Certificate will be awarded. To obtain the certificate as well as the graduate degree will, in some cases, take a longer period of time than would be required for the degree alone. Requirements for the certificate include 15 hours of credit at the graduate level.

For further information, write the Director, J. M. Allison, LL.D., Office of Overseas Career Program, University of Hawaii.

**OFFICE OF UNIVERSITY PLACEMENT AND CAREER PLANNING**

The Office of University Placement and Career Planning 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.

**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.

**RESERVE OFFICERS TRAINING COURSE**

The graduate student is now offered the opportunity to be commissioned a second lieutenant in the U.S. Army after two years of ROTC training. This program extends the advantages of ROTC to students who have at least two full years remaining prior to completion of their advanced degree requirements. Applicants for the two-year ROTC program should apply to the department of military science on the University campus early in the spring semester of the year before they expect to enter the program.
Academic Information

ADMISSION

Deadlines. To insure completion of action on applications for admission to the Graduate Division, applications should be postmarked no later than May 1 for the fall semester, November 1 for the spring semester, and April 1 for the summer session.

Application.* Students with baccalaureate degrees from accredited United States 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 Hawaii; 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.)
4. Credential evaluation fee (out-of-state residents)

*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.
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.
3. Credential evaluation fee.
4. Records of examinations (GRE, MAT, ATGSB, etc.) as required by departments. (See special requirements under field listings.)
5. Statement of financial support.
6. Results of Test of English as a Foreign 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 four times each year—in January, March, June, and October. Applicants should plan to take TOEFL at the following times:

For admission in: Take the test the preceding:
June October or January
September January or March
February March, June, or October

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.

*See p. 21 for information relating to the University's English Language Institute, and its role in testing and evaluating the English proficiency of foreign students.
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 at least one month prior to the date of the examination 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 six times a year (usually January, February, April, July, October and December).

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 ATGSB is usually administered in November, February, April, July and August 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. 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.
ACADEMIC INFORMATION

UNCLASSIFIED STUDENTS

Applicants who have been denied admission as classified students will not be considered for unclassified status. Because of limited space and facilities, out-of-state 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. Students who fail to meet this requirement will not be permitted to register for the spring semester.

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 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 (including audit courses and thesis research 800). Graduate assistants registering with special permission for twelve semester hours (including audit) must pay the general fee ($18.00).

Late Registration. Registration for credit after the announced registration days is permitted only in exceptional cases and for valid reasons. The following rules govern such late registration: (1) during the first eight days of instruction, written approval must be secured from the dean concerned; (2) subsequent to the eighth day, students may register only as auditors and must have the written approval of the dean and the instructor concerned. Corresponding restrictions apply to summer session registration and are stated in the Summer Session Bulletin.

Auditors need not comply with these regulations, except that they cannot change to credit status after the above late registration periods.

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.

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 300-499 are upper-division undergraduate courses which may be used to fulfill advanced degree requirements. Courses numbered 500-599 are not generally applicable toward degree. These numbers are used to designate special institutes, in-service training, study tour, and refresher courses.

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. If the work is not completed then, the I will be changed to F. If the work is completed, the instructor will report a semester grade, taking the completed work into consideration.

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 ratios. Grades of F or WF are included in the computation of grade-point ratios for graduate students.

Grade Reports. At the end of each semester and the summer session, grades are sent to students by campus mail. Those desiring the report forwarded should leave a stamped self-addressed envelope at the campus mail office. Students in evening classes should leave stamped self-addressed envelopes at the office of the dean of the College of General Studies.

"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 withdrawal from courses is permitted and only within the following conditions:

1. The student has the approval of his adviser;
2. The student is in good standing (not on academic probation);
3. The student takes a maximum of two pass-fail courses in any one term;
4. The course will not be used to fulfill the requirements for a master's degree;
5. A pass grade for all courses taken on the pass-fail basis will be the equivalent of at least a C-. 
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.

Graduate students who are not working for graduate degrees, certificates, or diplomas must have a minimum grade-point ratio of 2.5 upon completion of 12 credits or more. Students failing to maintain this level of achievement will be denied further registration in the Graduate Division.

For purposes of these rules, a "semester" is the calendar period—and two summer sessions will equal one semester—regardless of the number of credits taken.

Two grades below B in undergraduate courses taken during the first semester as a graduate student at the University of Hawaii may be excluded when the Graduate Division computes the grade-point ratio if a petition, filed by the student and recommended for approval by the chairman of the graduate faculty, is approved by the Dean. If these grades are so excluded, the concomitant course credits may not be counted toward fulfillment of requirements for graduate degrees. Such waivers will not alter the official University record of student grades and grade-point ratios.

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 four times annually, in January, June, August and September. Commencement exercises are held in June and August. 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

MISERS 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 • Biophysics • 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: Architecture • 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, up to one-half of the total course credits required in a given field of study may be transferred, provided, however, that at least one-half the credits required in graduate courses (numbered 600 and above) are completed at the University of Hawaii. No credit may be transferred from another institution 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.

Progress Report Forms

The Graduate Division issues to each graduate field of study a set of printed forms for each new graduate student who enrolls. The graduate field of study uses these progress report forms to notify the Graduate Division of the student’s progress toward his degree. The “Summary of Procedure” after each degree discussed on the following pages lists the forms which are submitted to the Graduate Division and the copies which are sent to the student.

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 18 credit hours of course work and between 6–12 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 2 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 by January 15 for June graduation, May 15 for January graduation, and by February 1 for those who expect to complete their degree requirements during the summer session. The student may then enroll in the thesis research course (800) at the beginning of the next academic term. Students registering for thesis research after the announced registration period will be assessed a late registration fee or a change of registration fee, whichever is applicable.

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 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; appointment of interim adviser. (Progress Report Form I submitted to Graduate Division, with copy to student.)
3. General examination and admission to candidacy. (Form II submitted, with copy to student.)
4. Appointment of thesis committee. (Form III submitted, with copy to student.)
5. Approval of thesis topic. (Form IV submitted, with copy to student.)
6. Application for diploma.
7. Payment of graduation and thesis binding fee.
9. Final oral examination—optional. (Form VI submitted; student notified of results.)
10. Final copies of thesis submitted to Graduate Division.
11. Granting of the degree. (Form VII submitted.)

**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 • Biophysics • 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. 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.

**Final Examination.** A final examination is required of all Plan B candidates. This final examination may take one of several forms at the option of the candidate's major field of study. Possible forms may include a seminar appearance, a written comprehensive examination, an oral examination, some equivalent, or even combination of forms. This examination should be given at least three weeks before the end of the term during which the degree is conferred. All members of the graduate faculty shall be invited, if the examination is other than a written examination, in which case the program committee will conduct the examination. Should the student fail the final examination, he may be permitted to repeat the examination only if this is recommended by the graduate faculty concerned and if a petition, recommended for approval by the graduate faculty, is approved by the Dean of the Graduate Division. At least three months must elapse before such re-examination.

**Summary of Procedure**

1. Application for admission to the Graduate Division.
2. Preliminary conference; appointment of interim adviser.  
   (Progress Report Form I submitted to Graduate Division, with copy to student.)
3. General examination, admission to candidacy, and establishment of degree plan.  
   (Form II submitted, with copy to student.)
4. Appointment of program committee. (Form III submitted, with copy to student.)
5. Diploma application.
6. Final examination. (Form VI submitted; student notified of results.)
7. Payment of graduation fee.
8. Completion of course work.
9. Granting of the degree. (Form VII submitted.)
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 • Oceanography • 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 P.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 course, 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.

**Doctoral 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 doctoral 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 represented 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. At least eight months must elapse between the satisfactory completion of the comprehensive examination and the final oral examination.

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 doctoral committee, it will notify the Graduate Division. The candidate may then register for the dissertation research course (800) during the next registration period.

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 doctoral committee.

The candidate should look to the chairman of his doctoral 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 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 doctoral 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 signature page of the dissertation.

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

**Summary of Procedure**

1. Application for admission to the Graduate Division.
2. Preliminary conference; appointment of interim adviser.  
   (Progress Report Form I submitted to Graduate Division, with copy to student.)
3. Certification of proficiency in a foreign language; admission to candidacy.  
   (Form II submitted, with copy to student.)
4. Appointment of doctoral committee. (Form III submitted, with copy to student.)
5. Approval of dissertation proposal. (Form IV submitted, with copy to student.)
6. Certification of proficiency in second foreign language, where required; comprehensive examination. (Form V submitted.)
7. Diploma application.
8. Abstract of dissertation filed with the Graduate Division.
9. Final examination. (Form VI submitted.)
10. Copies of dissertation filed in Graduate Division.
11. Payment of graduation and dissertation binding fee.
12. Granting of the degree. (Form VII submitted.)

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 300-499 are undergraduate courses which may be 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

P. F. Philipp, Ph.D. (Chairman)—production economics
H. L. Baker, Ph. D.—forest economics
J. R. Davidson, Ph.D.—production economics
R. B. Hughes, Ph.D.—development
J. T. Ishida, Ph.D.—marketing
J. T. Keeler, M.S.—farm management
A. B. Larson, Ph.D.—price analysis
W. G. Marders, Ed.D.—rural sociology and extension
A. B. Paul, Ph.D.—marketing
H. Spielmann, 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

The department offers a master's degree program under Plan A (thesis) or Plan B (non-thesis), and a program leading to the Ph.D. Candidates for the M.S. degree are ordinarily drawn from students with undergraduate majors in agricultural economics, economics, or business administration. Applicants with other undergraduate training will be considered on an individual basis. Students with inadequate training in agricultural economics may be required to take appropriate undergraduate courses.

The Ph.D. program is designed to prepare the student for comprehensive examinations in four fields:

(1) General economics, including price and income theory.
(2) Agricultural economics, including farm management, production eco-
nomics, marketing, price analysis, market development, agricultural policy, agricultural economic development, and resource economics.

(3) Research methods.
(4) An individual field of specialization.

The dissertation will normally be written in one of the fields of specialization within agricultural economics, as listed in (2) above.

**AGRICULTURAL ECONOMICS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>410</td>
<td>Introduction to Quantitative Methods in Agricultural Economics (3)</td>
</tr>
<tr>
<td>423</td>
<td>Agricultural Cooperatives (3)</td>
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<td>424</td>
<td>Marketing of Tropical and Subtropical Agricultural Products (3)</td>
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<tr>
<td>425</td>
<td>Marketing of Livestock, Poultry and Dairy Products (3)</td>
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<td>426</td>
<td>Agricultural Economics Extension (3)</td>
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<td>428</td>
<td>Production Economics (3)</td>
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<tr>
<td>429</td>
<td>Agricultural Policy and Planning (3)</td>
</tr>
<tr>
<td>430</td>
<td>Agricultural Finance (3)</td>
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<td>431</td>
<td>Forest Economics (3)</td>
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<td>433</td>
<td>Advanced Farm Management and Plantation Economics (3)</td>
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<td>434</td>
<td>Statistical Methods</td>
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<td>435</td>
<td>Consumer Economics and Food Distribution (3)</td>
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<td>480</td>
<td>Computer Programming in Agricultural Economics Research (3)</td>
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<tr>
<td>624</td>
<td>Research Methodology</td>
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<td>624</td>
<td>Economics of Agriculture: Tropical Countries and Asia (3)</td>
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<td>626</td>
<td>Collection of Economic Data in Agriculture (3)</td>
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<td>629</td>
<td>Production Economics (3)</td>
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<td>630</td>
<td>Market Development for Agricultural Products (3)</td>
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<td>632</td>
<td>Economics of Agricultural Processing Industries (3)</td>
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<td>634</td>
<td>Advanced Agricultural Prices and Statistical Analysis (3)</td>
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<td>635</td>
<td>Seminar: Agricultural Price Analysis and Statistics (3)</td>
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<td>636</td>
<td>Seminar: Agricultural Policy (3)</td>
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<td>637</td>
<td>Resource Economics (3)</td>
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<td>638</td>
<td>Seminar: Land Use in Developing Countries (3)</td>
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<td>639</td>
<td>Agricultural Development Economics and Development Planning (3)</td>
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<td>699</td>
<td>Directed Research (arr.)</td>
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<tr>
<td>701</td>
<td>Seminar in Agricultural Economics (arr.)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
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</tbody>
</table>

**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
Tung Liang, Ph.D.—farm machinery, operations research
I-pai Wu, Ph.D.—irrigation engineering

**AFFILIATE FACULTY**

W. N. Reynolds, 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
FIELDS OF STUDY—AGRONOMY

the related fields of civil engineering, mechanical engineering, electrical engineering, mathematics, physics, food science, agronomy and soil science may be approved in a degree program. Normally, students are required to take Mathematics 402 and Agricultural Engineering 647. Candidates may specialize in tropical fruit and nut harvesting equipment, tropical fruit processing equipment, agricultural hydrology, surface irrigation engineering, physical properties of tropical fruits and soil dynamics. Required courses are marked with an asterisk.

AGRICULTURAL ENGINEERING

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>431</td>
<td>Agricultural Power and Equipment</td>
</tr>
<tr>
<td>435</td>
<td>Irrigation Principles and Practices</td>
</tr>
<tr>
<td>631</td>
<td>Analysis of Implement Design (3)</td>
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<tr>
<td>635</td>
<td>Farm Irrigation System Design (3)</td>
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<td>647</td>
<td>Methods of Agricultural Engineering (3)</td>
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<td>648</td>
<td>Post Harvest Process Engineering (3)</td>
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<td>699</td>
<td>Directed Research (arr.)</td>
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<td>Seminar (1)</td>
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<tr>
<td>°800</td>
<td>Thesis Research (arr.)</td>
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</tbody>
</table>

**Agronomy**

**GRADUATE FACULTY**

W. G. Sanford, Ph.D. (Chairman)—plant nutrition
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
J. R. Thompson, Ph.D.—crop production, pasture management
G. Uehara, Ph.D.—soil management
U. Urata, Ph.D.—cytogenetics, breeding of grasses and sugar cane
H. Y. Young, M.S.—plant chemistry, nutrition

**AFFILIATE GRADUATE FACULTY**

D. J. Heinz, Ph.D.—sugar cane breeding
M. Isobe, Ph.D.—sugar cane agronomy

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.

The Plan A (thesis required) program for M.S. is the only program offered. A minimum of 21 course credits is required, including a minimum of 12 credits, exclusive of research methods courses, in courses numbered 600-799. No more than 2 credits in directed research (Agronomy 699) may be allowed as course credits in fulfilling the above requirements.

Courses in the major field are to be selected from those listed below. All candidates must register for Agronomy 610 and for 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, plant breeding or pasture management.

**AGRONOMY**

- 310 Tropical Crop Production (3)
- 411 Sugar Cane Agronomy (3)
- 412 Pineapple Culture (2)
- 413 Pasture Management (3)
- 610 Physiology of Crop Production (3)
- 621 Breeding of Asexually Propagated Crops (2)
- 699 Directed Research (arr.)
- 701 Seminar in Advanced Agronomy (1)
- 710 Mineral Nutrition of Tropical Crops (2)
- 800 Thesis Research (arr.)

**SOIL SCIENCE**

- 640 Advanced Soil Chemistry (3)
- 650 Advanced Soil Fertility (4)
- 699 Directed Research (arr.)
- 704 Seminar in Advanced Soil Science (1)

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**American Studies**

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 an M.A. 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:
FIELDS OF STUDY—ANIMAL SCIENCES

1. The Humanities (literature, art, music, philosophy, religion).
2. The Social Sciences (anthropology, economics, geography, history, political science, sociology).

Plan A should include a minimum of 6 hours in each of the fields of study. Plan B should include a minimum of 9 hours in each of the fields of study. 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 No.</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>475</td>
<td>American Taste</td>
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<tr>
<td>485–486</td>
<td>Contemporary American Civilization (3) I, II</td>
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<tr>
<td>615</td>
<td>Leaders and Movements in American Thought (3) I, II</td>
<td></td>
</tr>
<tr>
<td>631</td>
<td>Criticism in the Mass Media (3) I</td>
<td></td>
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<tr>
<td>635</td>
<td>Perspectives in Comparative Literature (3) II</td>
<td></td>
</tr>
<tr>
<td>641</td>
<td>Asian Influences in American Civilization (3) I, II</td>
<td></td>
</tr>
<tr>
<td>650</td>
<td>American Civilization and the Overseas American (3) II</td>
<td></td>
</tr>
<tr>
<td>665</td>
<td>Seminar: Presidential Leadership &amp; American Civilization (3) I, II</td>
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<td>670</td>
<td>Seminar: Sociability in the United States (3) II</td>
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<tr>
<td>690</td>
<td>Introduction to Contemporary America (3) I, II</td>
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<td>701</td>
<td>Methods in American Studies (3) I</td>
<td></td>
</tr>
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<td>702</td>
<td>Proseminar (3) I, II</td>
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<tr>
<td>750</td>
<td>Seminar in the Interaction of Asia and America (3) II</td>
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<tr>
<td>799</td>
<td>Directed Research (arr.) I, II</td>
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<tr>
<td>800</td>
<td>Thesis Research</td>
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</table>

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
H. H. Furumoto, D.V.M., Ph.D.—pathology, virology
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
442-443 Physiology of Domestic Animals (4-4)
444 Animal Nutrition (4)
445 Animal Breeding (3)
446 Animal Diseases and Their Control (3)
641 Seminar in Animal Sciences (1)
642 Ruminant Nutrition (2)
643 Physiology of Reproduction (3)
645 Quantitative Genetics (3)
699 Directed Research (arr.)
800 Thesis Research (arr.)

Anthropology

GRADUATE FACULTY
T. W. Maretzki, Ph.D. (Department Chairman)—East Asia; psychological and applied anthropology, culture change
S. T. Dobbs, Ph.D.—culture and personality, education and anthropology, methods
A. G. Dewey, Ph.D.—Indonesia, Polynesia, Melanesia; social anthropology, culture change
D. Eyde, Ph.D.—Pacific; social organization
R. Firth, Ph.D.—Oceania, Southeast Asia; social and economic anthropology (visiting 1968-69)
R. Green, Ph.D.—Oceania, archeology, ethnology
W. P. Lebra, Ph.D.—East Asia; social anthropology, religion
R. I. Levy, M.D.—Polynesia; psychological anthropology
K. Luomala, Ph.D.—Polynesia and Micronesia; ethnology and folklore
L. F. Mason, Ph.D.—Micronesia; ethnology, applied anthropology, culture change
R. J. Pearson, Ph.D. (Coordinator of Graduate Studies)—Southeast Asia, East Asia, Hawaii; archeology
W. G. Solheim II, Ph.D.—Southeast Asia; archeology

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, communicational aspects of culture
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

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 welcome.* During the first semesters of graduate work, all students are expected to acquire a common knowledge of the basic areas in the field: biological anthropology, linguistics, archeology, social (including psychological) anthrop—

*Although there are no formal requirements for prior course work in anthropology, candidates may find that lack of previous training in anthropology may result in some extra work to fill existing gaps. Decisions concerning such needs are made by the coordinator for graduate studies after consultation of the entire graduate faculty following a recommendation of the student's advisory committee.
pology. A familiarity with the historical development of anthropology as a formal discipline, and with anthropological methods, is also expected of all students. Anthropology 650, 651 is designed to take up major issues and problems in biological, archaeological, and social anthropology. Linguistics courses are offered in the department of linguistics.

The graduate program is designed to allow specialization within two broad fields of anthropology: social and psychological anthropology, and archeology. 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.

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 during the first year, students are free to develop their specialized interests. All students are required to take Anthropology 400, 410, 700, and two offerings of 750. All students must demonstrate reading knowledge of one foreign language useful in the candidate's research or area of specialization. The M.A. candidate who selects Plan A (thesis) must pass a final oral examination on subject materials related to the thesis. For candidates who select Plan B (non-thesis) an oral examination is given only after all other requirements are satisfied.

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 dissertation proposal and conducting dissertation 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 the faculty.

Required courses or their equivalents are Anthropology 400, 410, 700, either 710 or 420-421 and 4 semester offerings of 750. Ph. D. candidates are examined for a reading knowledge of one foreign language, as required by the Graduate Division. The department of anthropology requires competence in a second field language which may be spoken rather than written, or in com-
puter skills. An intensive oral examination is given to all Ph.D candidates prior to the beginning of field research. This examination is administered by the Ph.D. thesis committee; all members of the department's graduate faculty attend as participating examiners. This examination will test for general knowledge in the geographical area in which the candidate is specializing as well as for the areas of theory pertinent to the candidate's special field of interest. The doctoral dissertation must be based on fieldwork. Such fieldwork should not be less than eight months, but is normally expected to last at least one year. The department requests a copy of both M.A. and Ph.D theses for the department files.

Courses for the graduate program may be selected from those listed below and from offerings in related fields of study with approval of 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.

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

400 Anthropological Statistics (3)
410 Foundations of Anthropological Method (3)
420-421 Archeological Techniques (3-3)
440 Regional Cultures of Asia (3)
(1) Continental East Asia
(2) Continental Southeast Asia
(3) Insular Southeast Asia
(4) South Asia
410 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
470 Arts in Cultural Perspective: Folklore (3)
(Art 474, Primitive Art, and Music 471, Music of Non-literate Peoples)
480 Anthropological Applications (3)
(1) Development administration
(2) Health
(3) Education (ED EF 480)
650-651 Proseminar: General Anthropology (6-6)
660 Social Organization (3)
665 Psychological Anthropology (3)
670 Archeology (3)
675 Comparative Religion (3)
690 Ecological Anthropology (3)
699 Directed Reading or Research (arr.)
FIELDS OF STUDY—ART AND ARCHITECTURE

700 History of Anthropology (3)
710 Anthropological Techniques (3)
750 Research Seminar (3)
   (1) Archeology
   (2) Linguistics
   (3) Ethnography
   (4) Social Anthropology
800 Thesis Research (arr.)
   Anthropology Seminar (no credit)

Art and Architecture

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. Havaas, M.F.A.—weaving, textile design
C. F. Horan, M.A.—design
S. Kimura, M.A.—illustration
K. G. Kingrey, M.A.—design
C. Mahoney, Dip. AA—tropical architecture
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

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, (6) architecture. The thesis includes an exhibition of original work in the chosen medium. Intended candidates must present the equivalent of an undergraduate major in art or architecture 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.

**ARCHITECTURE**

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<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tr>
<td>405-406</td>
<td>Advanced Physical Systems</td>
<td>4-4</td>
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<tr>
<td>413-414</td>
<td>Professional Practice</td>
<td>3-3</td>
</tr>
<tr>
<td>423-424</td>
<td>Environmental Controls</td>
<td>3-3</td>
</tr>
<tr>
<td>433-434</td>
<td>Architectural Design</td>
<td>6-6</td>
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<tr>
<td>495</td>
<td>Elements of Urban Design</td>
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<tr>
<td>616</td>
<td>Professional Practice</td>
<td>3</td>
</tr>
<tr>
<td>640</td>
<td>Architecture and Planning in Tropic Areas</td>
<td>4</td>
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<tr>
<td>690</td>
<td>Seminar on Tropical Architecture</td>
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<td>699</td>
<td>Directed Work</td>
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**ART**

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<tr>
<td>407</td>
<td>Advanced Photography</td>
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<tr>
<td>470</td>
<td>Renaissance Through Rococo</td>
<td>3</td>
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<tr>
<td>471</td>
<td>Art and Architectural Field Studies (arr.)</td>
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<tr>
<td>472</td>
<td>Primitive Art</td>
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<td>473</td>
<td>Arts of the Pacific</td>
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<tr>
<td>483</td>
<td>Modern Art of Japan</td>
<td>3</td>
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<tr>
<td>485</td>
<td>Applied Arts of China</td>
<td>3</td>
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<td>491</td>
<td>Art of Islam</td>
<td>3</td>
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<td>617</td>
<td>Printmaking</td>
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<td>624</td>
<td>Painting</td>
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<td>630</td>
<td>Textile Design</td>
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<tr>
<td>638-639</td>
<td>Weaving</td>
<td>3-3</td>
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<td>631</td>
<td>Rug and Tapestry Techniques</td>
<td>3</td>
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<td>646</td>
<td>Ceramics</td>
<td>3</td>
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<td>648</td>
<td>Ceramic Glazes and Clay Bodies</td>
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<td>649</td>
<td>Ceramics</td>
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<td>663-664</td>
<td>Visual Communication</td>
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<td>665</td>
<td>Advanced Typography</td>
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**Asian Studies**

**GRADUATE FACULTY**

- **H. J. Wiens, Ph.D. (Director)—geography**
- **F. C. Hung, Ph.D. (Chairman)—economics**
- **F. W. Riggs, Ph.D. (Chairman)—political science**
- **N. M. Bowers, Ph.D. (Chairman)—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 of the fol­
lowing disciplines: anthropology, economics, geography, history, political sci­
ence, philosophy, and sociology; (2) a minimum of 6 hours of Asian courses
outside the field of concentration; (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
A. M. Boesgaard, Ph.D.—stellar 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 astron­
omy 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. Courses 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)
*627 Galactic Structure I (3)
628 Galactic Structure II (3)
629 Astrophysical Techniques (3)
724 Solar Physics (3)
725 Planetary Physics (3)
732 Astrophysical Spectra (3)
733 Special Topics in Astronomy (3)

**Biochemistry and Biophysics**

**GRADUATE FACULTY**

L. H. Piette, Ph.D. (Acting Chairman)—mechanisms of organic and biological reactions, electron paramagnetic resonance
J. A. Bassham, Ph.D. (Visiting)—energy transport mechanisms
I. R. Gibbons, Ph.D.—cytology, electron microscopy
F. C. Greenwood, Ph.D.—biochemical endocrinology; metabolism of protein hormones
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; hydrogenase enzymes; energy transfer mechanisms
T. Winnick, Ph.D.—metabolism and biosynthesis of proteins and peptides
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 and mathematics and physics. 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, mathematics, and physics. The students may participate in research programs in the area of enzyme structure and mode of action, protein and hormone biosynthesis, virus and nucleic acid structure, studies on the genetic mechanisms, bioenergetics and applications of electron spin resonance to the elucidation of membrane structure, cancer and antibody antigen interaction. Academic and industrial careers as well as service in government are available to graduates of this program. Available courses are listed below.

**BIOCHEMISTRY**

441 Basic Biochemistry (3)
442 Basic Biochemistry Laboratory (1)
601-602 General Biochemistry (3-3)
611-612 General Biochemistry Laboratory (2-2)
605 Medical Biochemistry (4)
### Fields of Study—Botany

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<td>710</td>
<td>Special Topics in Enzymology (2)</td>
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<td>715</td>
<td>Advanced Carbohydrate Metabolism (2)</td>
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<td>720</td>
<td>Bioenergetics (2)</td>
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<tr>
<td>730</td>
<td>Nucleic Acids and Viruses (2)</td>
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<td>740</td>
<td>Advanced Protein Chemistry (2)</td>
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<td>671-672</td>
<td>Seminar (1-1)</td>
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<td>Directed Research (arr.)</td>
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### Biophysics

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<td>Survey of Biophysics (3-3)</td>
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<td>603</td>
<td>Biophysics Laboratory (3)</td>
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<tr>
<td>701</td>
<td>Molecular Structure and Function of Chromosomes (2)</td>
</tr>
<tr>
<td>702</td>
<td>Electron &amp; Nuclear Magnetic Resonance Studies in Biological Systems (2)</td>
</tr>
<tr>
<td>703</td>
<td>Conformational Analysis of Biopolymers (2)</td>
</tr>
<tr>
<td>704</td>
<td>The Role of Free Radicals in Biological Systems (2)</td>
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### Botany

**Graduate Faculty**

- **N. P. Kefferd, Ph.D. (Chairman)**—regulation of development and growth
- **E. K. Akamine, M.S.**—post harvest physiology, tropical fruits
- **G. E. Baker, Ph.D.**—mycology, fungal ecology and pathology
- **A. J. Bernatowicz, Ph.D.**—algal systematics
- **M. L. Bristol, Ph.D.**—ethnobotany, economic botany
- **H. F. Clements, Ph.D.**—sugar cane physiology, crop-logging
- **B. J. Cool, Ph.D.**—mineral nutrition, salt uptake
- **M. S. Doty, Ph.D.**—marine ecology
- **D. J. C. Friend, Ph.D.**—quantitative growth, radiation effects
- **C. H. Lamoureux, Ph.D.**—developmental morphology of ferns
- **D. Mueller-Dombois, Ph.D.**—tropical and pioneer ecology
- **S. Nakata, Ph.D.**—developmental physiology of tree crops
- **E. W. Putman, Ph.D.**—carbohydrate biochemistry
- **S. M. Siegel, Ph.D.**—exobiology, stress physiology and biochemistry
- **A. C. Smith, Ph.D.**—evolution and systematics

**Affiliate Faculty**

- **F. R. Fosberg, Ph.D.**—tropical ecology and systematics
- **B. Krauss, M.S.**—anatomy of the pineapple plant
- **L. G. Nickell, Ph.D.**—physiology of sugar cane
- **P. van Royen, Ph.D.**—systematics of tropical species
- **W. H. Wagner, Ph.D.**—systematics

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 four broad areas: environmental botany; physiology and biochemistry; structure and development; and systematics and evolution. Appropriate organisms for research may be selected from the algae, fungi, ferns, or flowering plants, representing tropical, marine or economic plants. Courses available for the graduate program are listed below.
BOTANY

410  Plant Anatomy (3)
412  Microtechnique (3)
430  Mycology (3)
436  Medical Mycology (3)
440  Environmental and Space Biology I (2)
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  Phycology (3)
610  Botanical Seminar (1)
612  Advanced Botanical Problems (arr.)
613  Morphology Seminar (2)
618  Cytology (3)
620  Primitive Angiosperms and Phytogeographic Theory (4)
631  Marine Phytoplankton (3)
640  Environmental and Space Biology II (2)
660  Environmental Phytoecology (2)
651  Dynamics of Marine Productivity (3)
662  Advanced Taxonomy (3)
665  Nomenclature Seminar (2)
670  Inorganic Physiology and Water Relations (3)
671  Energetics and Biosynthesis in the Plant Kingdom (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)
684  Phycology—Rhodophyta (2)
699  Directed Research (arr.)
799  Directed Research (arr.)
800  Thesis Research (arr.)

Business Administration

GRADUATE FACULTY

J. Miccio, Ed.D. (Chairman)—management
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
H. D. Bess, Ph.D.—transportation
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
FIELDS OF STUDY—BUSINESS ADMINISTRATION

M. E. Hopkins, Ph.D.—personnel management, industrial relations
T. Ige, Ph.D.—business economics
L. W. Jacobs, Ph.D.—management, marketing, industrial relations
E. Jacobsen, Ph.D.—accounting, finance
S. Kim, Ph.D.—business economics
A. L. Kirkpatrick, M.A.—business economics, money and banking
S. S. O. Lee, Ph.D.—accounting
H. D. Lowe, D.B.A.—accounting
J. R. Omps, Ph.D.—accounting
E. C. Pendleton, Ph.D.—labor economics, industrial relations
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

The objective of the College of Business Administration is to provide service to the state of Hawaii and the Pacific area by meeting their needs for an institution of top quality, offering opportunities for the development of administrative skills (or those skills required for the successful management of business organizations). The M.B.A. program is designed to fulfill this objective by offering to qualified people of various educational and cultural backgrounds the opportunity of studying business administration in a multi-cultural environment. The curriculum is set up so that students receive a broad base of graduate level knowledge on which to develop their decision-making skills. The methods of teaching vary from lecture and seminar courses to those in which the case study method is predominant, and the material covered relates to both large and small business management and freely incorporates studies of an international nature. The M.B.A. program is presently being offered on the Manoa Campus in Honolulu and also in Japan.

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 ATGSB 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 I, Foundation Courses</th>
<th>9 hours</th>
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<tbody>
<tr>
<td>Group II, Core Courses</td>
<td>15 hours</td>
</tr>
<tr>
<td>Group III, Business Electives</td>
<td>9 hours</td>
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<tr>
<td>Group IV, Integration Course</td>
<td>3 hours</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>36 hours</strong></td>
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</tbody>
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*For further information, see Graduate Program Leading to the Master of Business Administration issued by the College of Business Administration, University of Hawaii.
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 must have completed any relevant Foundation or Core course before taking an elective course in the same subject.

<table>
<thead>
<tr>
<th>Group I</th>
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<tbody>
<tr>
<td>Bus 605 Behavioral Science for Business (3)</td>
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<tr>
<td>Bus 610 Economic Analysis for Business (3)</td>
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<tr>
<td>Bus 615 Quantitative Methods for Business (3)</td>
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<tr>
<th>Group II</th>
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<tbody>
<tr>
<td>Bus 620 Accounting (3)</td>
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<tr>
<td>Bus 625 Administration (3)</td>
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<tr>
<td>Bus 630 Finance (3)</td>
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<tr>
<td>Bus 635 Marketing (3)</td>
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<tr>
<td>Bus 640 Personnel and Industrial Relations (3)</td>
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<table>
<thead>
<tr>
<th>Group III</th>
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<tbody>
<tr>
<td>Accounting</td>
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<tr>
<td>Acc 760 Advanced Accounting (3)</td>
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<td>Acc 761 Advanced Cost and Controllership (3)</td>
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<tr>
<td>Acc 762 Advanced Taxes (3)</td>
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<tr>
<td>Acc 763 Accounting History and Theory (3)</td>
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<tr>
<td>Acc 770 Contemporary Accounting Theory (3)</td>
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<tr>
<td>Acc 771 Seminar in Advanced Accounting (3)</td>
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<table>
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<tr>
<th>Business Analysis and Statistics</th>
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<tr>
<td>BAS 780 Statistical Decision Theory (3)</td>
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<tr>
<td>BAS 781 Operations Research (3)</td>
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<tr>
<td>BAS 782 Quantitative Methods of Business and Economic Forecasting (3)</td>
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<tr>
<th>Business Economics</th>
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<tbody>
<tr>
<td>BEc 791 Managerial Economics (3)</td>
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<tr>
<td>BEc 792 Current Economic Problems (3)</td>
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<tr>
<td>BEc 793 Capital Markets and International Finance (3)</td>
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<tbody>
<tr>
<td>Fin 700 Problems in Business Finance (3)</td>
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<tr>
<td>Fin 701 Investment Analysis and Management (3)</td>
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<td>Fin 702 The Financial System (3)</td>
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<th>Insurance</th>
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<td>Ins 711 Risk Management (3)</td>
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<th>Law</th>
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<tr>
<td>Law 770 Legal Environment of Business (3)</td>
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<th>Management</th>
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<tr>
<td>Mgt 720 Organization Theory and Practice (3)</td>
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<tr>
<td>Mgt 721 Comparative Management (3)</td>
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<tr>
<td>Mgt 722 Production and Operations Management (3)</td>
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<th>Marketing</th>
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<tbody>
<tr>
<td>Mkt 730 Mass Marketing Management (3)</td>
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<tr>
<td>Mkt 731 Marketing Communication and Promotional Strategy (3)</td>
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<tr>
<td>Mkt 732 Marketing Research Methodology (3)</td>
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<table>
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<tr>
<th>Personnel and Industrial Relations</th>
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<tbody>
<tr>
<td>PIR 740 Management Staffing and Development (3)</td>
</tr>
<tr>
<td>PIR 741 Problems in Organizational Health (3)</td>
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<tr>
<td>PIR 742 Problems and Practices of Labor Dispute Settlement (3)</td>
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</tbody>
</table>
FIELDS OF STUDY—CHEMISTRY

Real Estate
RE 710 Real Estate (3)
RE 711 Advanced Real Estate: Land Development (3)

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

Group IV
Bus 745 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
T. T. Bopp, Ph.D.—physical chemistry, nuclear magnetic resonance
R. A. Duce, Ph.D.—nuclear and atmospheric chemistry, trace element analysis by neutron activation analysis
J. W. Gilje, Ph.D.—inorganic chemistry, boron hydride chemistry, phosphorus and nitrogen chemistry
A. T. Hubbard, Ph.D.—electroanalytical chemistry, thin layer electrodes, platinum complexes, fused salts
J. L. Ihrig, Ph.D.—reaction mechanisms, free radicals, kinetics, magnetochemistry
E. F. Kiefer, Ph.D.—organic chemistry, small ring compounds, olefin transition metal complexes, nuclear magnetic resonance
H. O. Larson, Ph.D.—natural products, new synthetic methods, rearrangements
R. S. H. Liu, Ph.D.—organic photochemistry
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, hydrolysis and hydration phenomena
P. J. Scheuer, Ph.D.—organic chemistry, structure determination of natural products
K. Seif, Ph.D.—physical chemistry, structure determination by X-ray crystallography
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 co-ordinated ligands
H. Zeitlin, Ph.D.—oceanographic chemistry, reflectance spectrophotometry

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

Graduate study in chemistry has three aspects: course work, independent study, and research. A thesis based on original research is the most important part of the master’s or doctor’s degree. Comprehensive examinations taken by Ph.D. candidates encourage a student to read the original literature in his field of interest.
Intended candidates for the M.S. or Ph.D. must present the following minimum undergraduate preparation in 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.

The department of chemistry at the University of Hawaii offers comprehensive research and study opportunities in analytical, inorganic, organic, physical and environmental chemistry in a well-equipped, modern facility. Additional details of programs may be found in a departmental brochure.

**CHEMISTRY**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>424</td>
<td>Preparative Inorganic Chemistry (3)</td>
<td>753</td>
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<tr>
<td>445</td>
<td>Modern Synthetic Methods (4)</td>
<td>756</td>
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<tr>
<td>621</td>
<td>Introductory Quantum Chemistry (3)</td>
<td>799</td>
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<tr>
<td>622</td>
<td>Advanced Inorganic Chemistry I (3)</td>
<td>800</td>
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<tr>
<td>623</td>
<td>Advanced Inorganic Chemistry II (3)</td>
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<tr>
<td>631</td>
<td>Instrumental Methods of Analysis (4)</td>
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<tr>
<td>632</td>
<td>Electroanalytical Chemistry (3)</td>
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<tr>
<td>633</td>
<td>Introduction to Spectroscopy (3)</td>
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<tr>
<td>641</td>
<td>Advanced Organic Chemistry: Structure and Stereochemistry (3)</td>
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<tr>
<td>642</td>
<td>Advanced Organic Chemistry: Mechanisms (3)</td>
<td></td>
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<tr>
<td>651-652</td>
<td>Intermediate Physical Chemistry (3-3)</td>
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</tr>
<tr>
<td>655</td>
<td>Radiochemistry and Nuclear Reactions (3)</td>
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<tr>
<td>656</td>
<td>Radiochemical Techniques (1)</td>
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<tr>
<td>691-692</td>
<td>Seminar (1-1)</td>
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<tr>
<td>721-722</td>
<td>Special Topics in Inorganic Chemistry (arr.)</td>
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<tr>
<td>731-732</td>
<td>Special Topics in Analytical Chemistry (arr.)</td>
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<tr>
<td>741-742</td>
<td>Special Topics in Organic Chemistry (arr.)</td>
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<tr>
<td>744</td>
<td>Organic Applications of Spectroscopy (3)</td>
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<tr>
<td>751-752</td>
<td>Special Topics in Physical Chemistry (arr.)</td>
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**Chinese**

**GRADUATE FACULTY**

J. DeFrancis, Ph.D. (Chairman)—applied linguistics and civilization
J. D. Froodham, Ph.D. (Visiting)—classical literature
P. H. Lee, Ph.D.—comparative literature
C. T. Lo, Ph.D.—traditional literature
L. P. H. Winters, M.A.—traditional and modern literature
J. Young, Ph.D.—applied linguistics and civilization

Both Plan A (thesis) and Plan B (non-thesis) M.A. programs in each of the following major fields are available: (1) language, (2) literature, and (3) teaching Chinese as a second language (CHISL).

Under Plan A (thesis), a minimum of 21 hours of course work, including at least 18 credit hours in the major field, plus 9 hours of thesis research is required. A minimum of 12 credits in the major field must be earned in courses numbered 600 or higher including the graduate seminar, Chinese 750.
Under Plan B (non-thesis), a minimum of 30 hours of course work, including at least 18 credit hours in the major field, is required. A minimum of 18 credits in the major field must be earned in courses numbered 600 or higher including the graduate seminar, Chinese 750.

Intended candidates must have a B.A. in Chinese or have had equivalent preparation in the discipline. Additional details regarding the program may be found in separate departmental circulars summarizing the prerequisites, required courses, and suggested electives for each of these fields.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Notes</th>
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<tbody>
<tr>
<td>401-402</td>
<td>Fourth-Level Chinese (3-3)</td>
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<tr>
<td>404</td>
<td>Accelerated Fourth-Level Chinese (6)</td>
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<tr>
<td>*421-422</td>
<td>Advanced Chinese Conversation (3-3)</td>
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<tr>
<td>431-432</td>
<td>Chinese for Reading Knowledge (3-3)</td>
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<tr>
<td>*433-434</td>
<td>Selected Readings in Chinese (3-3)</td>
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<tr>
<td>435-436</td>
<td>Introductory Classical Chinese (3-3)</td>
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<td>437-438</td>
<td>Advanced Classical Chinese (3-3)</td>
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<tr>
<td>440</td>
<td>Chinese Composition (2)</td>
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<tr>
<td>451-452</td>
<td>Structure of Chinese (3-3)</td>
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<tr>
<td>453-454</td>
<td>Study of Chinese Characters (2-2)</td>
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<tr>
<td>461</td>
<td>Introduction to Chinese Literature—Modern (3)</td>
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<tr>
<td>*462</td>
<td>Introduction to Chinese Literature—Traditional (3)</td>
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<td>490</td>
<td>Reference Materials for Chinese Studies (3)</td>
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<td>611-612</td>
<td>Contemporary Chinese Literature (3-3)</td>
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<td>613-614</td>
<td>Chinese Poetry (3-3)</td>
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<td>616</td>
<td>History of Chinese Literary Criticism (3)</td>
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<td>617</td>
<td>Traditional Chinese Fiction (3)</td>
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<td>618</td>
<td>Traditional Chinese Drama (3)</td>
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<td>619-620</td>
<td>Chinese Etymology (3-3)</td>
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<td>631</td>
<td>Chinese Phonology (3)</td>
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<td>632</td>
<td>Chinese Dialects (3)</td>
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<td>641</td>
<td>Contrastive Analysis of Mandarin and English:</td>
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<td></td>
<td>Phonology (3)</td>
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<tr>
<td>642</td>
<td>Contrastive Analysis of Mandarin and English:</td>
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<tr>
<td></td>
<td>Morphology and Syntax (3)</td>
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<tr>
<td>643-644</td>
<td>Methodology in Teaching Chinese as a Second Language (3-3)</td>
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<tr>
<td>*651</td>
<td>Historical and Philosophical Texts: Pre-T'ang Period (3)</td>
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<tr>
<td>*652</td>
<td>Historical and Philosophical Texts: T'ang-Ch'ing Periods (3)</td>
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<td>693-694</td>
<td>Methods in Chinese Studies (3-3)</td>
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<tr>
<td>750</td>
<td>Research Seminar in Chinese (3)</td>
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<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
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</tbody>
</table>

*New courses.

Civil Engineering

GRADUATE FACULTY

T. Mitsuda, Ph.D. (Chairman)—applied mechanics
C. L. Bretschneider, Ph.D.—ocean engineering
A. N. L. Chiu, Ph.D.—structures
J. R. Evans, M.S.—soil mechanics
M. L. P. Go, Ph.D.—structures
R. A. Grace, Ph.D.—hydrology, hydraulics
H. P. Harrenstien, Ph.D.—applied mechanics
R. W. Haselwood, M.S.—transportation and soil 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

411 Applied Probability and Statistics in Engineering (3)
471 Advanced Dynamics (3)
487 Prestressed Concrete (3)
621 Advanced Fluid Mechanics I (3)
622 Advanced Fluid Mechanics II (3)
624 Flow in Porous Media (3)
626 Surface Water Hydrology (3)
627 Ground Water Hydrology (3)
641 Ocean Engineering (3)
642 Coastal and Harbor Engineering (3)
644 Ocean Hydrodynamics Laboratory (2)
651 Soil Mechanics (3)
655 Applied Soil Mechanics I (3)
656 Applied Soil Mechanics II (3)
671 Theory of Elasticity I (3)
672 Theory of Elasticity II (3)
673 Theory of Plasticity (3)
674 Stability of Structures (3)
675 Theory of Vibrations (3)
676 Structural Dynamics (3)
677 Energy Methods in Applied Mechanics (3)
678 Theory of Plates (3)
679 Theory of Thin Shells (3)
681 Advanced Indeterminate Structures (3)
682 Numerical Methods of Structural Analysis (3)
683 Advanced Reinforced Concrete Design I (3)
684 Advanced Reinforced Concrete Design II (3)
685 Plastic Analysis of Metal Structures (3)
696 Selected Topics in Civil Engineering (3)
697 Seminar in Civil Engineering I (1)
698 Seminar in Civil Engineering II (1)
699 Directed Reading or Research (arr.)
800 Thesis Research (arr.)

Refer to the General Catalog for course descriptions.
SPECIAL PROGRAM IN
ENVIRONMENTAL AND SANITARY ENGINEERING

In addition to the regular graduate faculty in engineering, the following are utilized in this program: N. C. Burbank, Sc.D. (Program Adviser); H. W. Klemmer, Ph.D.; R. K. C. Lee, M.D., Dr. P. H.; R. M. Worth, M.D., M. P. H., Ph. D.; R. H. F. Young, Sc.D.; and A. Q. Y. Tom, Sc.D. (of the Affiliate Graduate Faculty).

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 600-601, 658, 663, 664, 681, 771, 791; Chemistry 655, 656; Zoology 330, 417, 620, 629, 718; Microbiology 625, 632, 655; Civil Engineering 621, 622, 624, 655, 656.

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

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Drama and Theatre

GRADUATE FACULTY

E. Ernst, Ph. D. (Chairman) — Oriental theatre, aesthetics
J. Brandon, Ph.D. — Oriental theatre, playwriting
E. Langhans, Ph.D. — theatre history
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 and theatre portions
of the Graduate 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 461-462, 610, 660, and 6 credits from 620, 630, 640, or 650. 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 610 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 610, 664, 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**

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<tr>
<th>Course</th>
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<td>Design in the Theatre (3)</td>
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<td>352</td>
<td>Costume for the Stage (3)</td>
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<td>370</td>
<td>Creative Dramatics (3)</td>
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<td>372</td>
<td>Drama in Performance (3)</td>
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<td>381-382</td>
<td>Dance Techniques (3-3)</td>
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<td>384</td>
<td>Ballet Technique (3)</td>
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<td>388</td>
<td>Dance Composition (3)</td>
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<td>410</td>
<td>Theatre Management (3)</td>
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<td>461-462</td>
<td>History of the Theatre (3-3)</td>
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<td>464</td>
<td>Oriental Drama and Theatre (3)</td>
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<td>Dance History (3)</td>
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<td>Children's Theatre (3)</td>
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<td>Puppetry (3)</td>
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**FIELDS OF STUDY—ECONOMICS**

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<td>Advanced Acting Techniques</td>
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<td>699</td>
<td>Advanced Theatre Practice</td>
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<td>730</td>
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<td>Seminar in Aesthetics of the Theatre</td>
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<td>Thesis Research</td>
<td>(arr.)</td>
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**Economics**

**GRADUATE FACULTY**

B. Campbell, Ph.D. (Chairman)—macroeconomic theory, monetary theory
S. Comotini, Ph.D.—natural resource economics, international economics
W. Gorter, Ph.D.—international economics
F. Hung, Ph.D.—microeconomic theory, economic development
R. Kamins, Ph.D.—public finance
Y. Lim, Ph.D.—microeconomic theory, economic development
A. Mandel, Ph.D.—economic history
H. Oshima, Ph.D.—national income accounting, economic development
R. Pollack, Ph.D.—microeconomic theory, public finance
K. Tsukui, Ph.D.—macroeconomic theory, econometrics, development programming
J. Wise, Ph.D.—mathematical economics, cosmopolitan economics
Y. Yeh, Ph.D.—international economics, microeconomic theory
W. Miklius, Ph.D.—microeconomic theory, industrial organization

The M.A. program in economics is designed to prepare people for careers as research economists in government and business, for junior college teaching, and for advanced graduate studies leading to the Ph.D.

Students should have completed courses in elementary statistics and intermediate microeconomic and macroeconomic theory prior to entering the M.A. program. In addition, knowledge of calculus is strongly recommended. Students not having completed the above courses will be expected to do so before being admitted to candidacy.

All entering graduate students must take a qualifying exam to be given at the beginning of each semester. This exam is used for placement and guidance purposes. Economics 600, 601, and 421 (or its equivalent elsewhere) will be required of all M.A. candidates. Plan B candidates must pass a written examination in economic theory and in two other fields selected from the following: economic development, econometrics, mathematical economics, international economics, public finance, regional economics, monetary theory. In addition to writing an acceptable thesis, Plan A candidates must pass a written examination in economic theory. A maximum of 6 semester credits in outside fields is allowed in Plan A and 9 in Plan B.
ECONOMICS

400  Growth and Fluctuations (3)
404  History of Economic Thought (3)
405  Comparative Economic Systems (3)
411  Economic Development of Europe (3)
412  Economic Development of U.S. (3)
413  Economic Development of U.S.S.R. (3)
414  Economic Development of Japan (3)
415  Asian Economic Development (3)
420  Mathematical Economics (3)
421  Statistical Methods in Economic Analysis (3)
424  Econometrics (3)
430  Labor Economics (3)
440  Monetary Theory and Policy (3)
450  Public Finance (3)
452  State and Local Finance (3)
459  Case Studies in Public Finance (3) (Not offered in 1968-69)
460  International Trade Theory (3)
461  International Finance (3)
462  International Economic Policy (3)
470  Industrial Organization and Public Control of Business (3)
480  Transportation and Public Utilities (3) (Not offered in 1968-69)
490  Location Theory and Regional Analysis (3)
492  Regional Economic Development (3)
600  Macroeconomic Theory (3)
601  Microeconomic Theory (3)
602  Economic Growth and Fluctuations (3)
603  Selected Topics In Microeconomic Theory (3)
604  History of Economic Thought (3)
606  National Income Accounts (3)
610  Economic Development I (3)
611  Economic Development II (3)
614  Economic Development of Japan (3)
616  Economic Development of China (3)
618  Economic Development of Selected Asian Nations (3)
621  Mathematical Economics (3)
624  Econometrics I (3)  660  International Trade Theory (3)
626  Econometrics II (3)  662  International Finance (3)
627  Economic Programming (3)  690  Regional Economic Analysis (3)
640  Monetary Theory (3)  699  Directed Research (arr.)
650  Theory of Public Finance (3)  710  Seminar in Economic Development (3)
745  Workshop: Financial and Monetary Aspects of Economic Development (arr.)
             (Alt. yrs.; not offered in 1968-69)
760  Seminar in International Economics (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

C. R. Ingils, Ed.D.—school plant, supervision, educational leadership
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) the Graduate Record Examination and the Miller Analogies Test (a minimum score at the 50th percentile is required in both tests); (3) successful completion of EA 685 (the GRE and Miller Analogies tests will be administered during the course); and (4) the oral interview by the department of educational administration.

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.

A minimum of 15 semester hours in educational administration is required for completion of the M.Ed. under either Plan A or B.

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

EDUCATIONAL ADMINISTRATION

600 Theory of Administration (3)
610 School-Community Relations (3)
620 School Finance (3)
623 Administrative Problems in Physical Education (3)
       (Identical with HPE 623)
630 School Law (3)
650 School Personnel Practices (3)
660 School Plant (3)
670 School Supervision (3)
680 School Organization (3)
685 Educational Administration: Theory and Principles (3) †
699 Directed Research (arr.)
*700 Research Seminar in Educational Administration (3) ‡
720 Seminar and Internship in Administrative Leadership (arr.)

*M.S. candidates.
†EA 685 shall be taken during the 1st semester for those students working toward a M.Ed. in Educational Administration.
‡EA 700 shall be taken during the last semester of work for M.Ed. of Educational Administration candidates.
Seminar in School Supervision (3)
Seminar in Educational Administration (3)
(1) Elementary (5) Technical and Vocational
(2) Intermediate (6) Community College
(3) Secondary (7) Higher Education
(4) Adult
Thesis Research (arr.)

Educational Communications

GRADUATE FACULTY
W. A. Wittich, Ph.D. (Chairman)—educational communications and public administration
G. Z. Kucera, Ph.D.—communications and sociology
G. B. Mendelson, Ed.D.—communications and fine arts
R. M. Reed, M.A.—educational television
R. A. Sanderson, Ph.D.—educational communications
R. J. McBeath, Ph.D.—educational communications and philosophy

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 the following 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; (3) the production and use of needed graphics and films which are not currently available; and (4) participation as a media intern officially accepted by the administration of a public or private school.

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 performance on a departmental general examination; (3) his teaching or comparable experience; (4) the Graduate Record Examination: aptitude test (verbal and quantitative), and advanced test (Education code 34 only).

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

199 Workshop in Educational Media (1)
614 Audiovisual Media Systems (3)
620 Introduction to Instructional Materials Production (3)
623 Survey and Production of Asian Study Materials (1)
625 Production of Educational Film and Multimedia Presentations (3)
FIELDS OF STUDY—EDUCATIONAL FOUNDATIONS

630 Television in Education (3)
635 Advanced Educational Television (3)
640 Programmed Learning (3)
699 Directed Research (arr.)
700 Seminar in Educational Media Research (3)
710 Seminar in Organization and Administration of Media Programs (3)
800 Thesis Research (arr.)

Educational Foundations

GRADUATE FACULTY
R. Stueber, 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
W. H. Boyer, Ed.D.—philosophy, social foundations
A. M. Keppel, Ph.D.—history
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 undergraduate record, (2) his graduate record, (3) his scores on certain standardized examinations, and (4) 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. Only 2 credits of 699 can be included in Plan A. 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. Three credits of 699 must be included in Plan B.

In both Plan A and Plan B, requirements include 3 semester credits in educational psychology, 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, an-
thropolgy, 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**

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<tr>
<td>480</td>
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<td>Historical Foundations of Western Education (3)</td>
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<td>661</td>
<td>History of American Education (3)</td>
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<td>660</td>
<td>Philosophy of Education (1)</td>
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<td>670</td>
<td>Comparative Education: Europe and America (3)</td>
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<td>671</td>
<td>Comparative Education: Asia (3)</td>
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<td>681</td>
<td>The Church and the School (2)</td>
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<td>683</td>
<td>Social Foundations of Education (3)</td>
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<td>Education in America (3)</td>
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<td>Recent History of American Education (3)</td>
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<td>Educational Classics (2)</td>
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<td>761</td>
<td>History of American Higher Education (3)</td>
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<td>Seminar in Educational Theory (2)</td>
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<td>765</td>
<td>Comparative Ideologies and Education (3)</td>
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<td>Seminar in Problems in Education (2)</td>
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<td>770</td>
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**Educational Psychology**

**GRADUATE FACULTY**

- D. A. Leton, Ph.D. (Chairman)—school psychology
- D. C. Adkins, Ph.D.—statistics and measurement
- R. S. Alm, Ph.D.—remedial reading
- V. Bhushan, Ed.D.—statistics
- W. T. Carse, Ed.D.—school counseling
- F. E. Clark, Ed.D.—counseling, student personnel work
- D. R. Collins, Ed.D.—school counseling
- P. Dunn-Rankin, Ed.D.—statistics, computer application
- G. Y. Fujita, Ph.D.—statistics
- D. W. Fuldner, Ph.D.—counseling; group and individual
- D. K. McIntosh, Ed.D.—education of mentally retarded
- T. A. McIntosh, Ed.D.—psychological foundations in education
- A. M. Niyekawa-Howard, Ph.D.—social psychology, psycholinguistics
- I. E. Reid, Ph.D.—learning, measurement
- D. G. Ryans, Ph.D.—measurement
- A. W. Staats, Ph.D.—learning, language development

Applicants for the M.Ed. and Ph.D. programs in educational psychology must present a minimum of 18 semester hours in professional education.
courses. Twelve of these hours must be comprised of work in educational psychology or psychology and include courses in developmental psychology, psychological foundations in education and tests and measurements.

A minimum of 3 units in philosophy of education or history of education is required. This requirement may be met by the undergraduate course Foundations of American Education, or its equivalent.

M.Ed.*

At the time the student applies for admission to the program, the results of the Graduate Record Examination and the Miller Analogies Test must be submitted. Advancement to candidacy is based on the quality of the student’s work in the first semester of courses.

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

Plan A requires a minimum of 24 credit hours in a planned and approved sequence of courses, 18 of which will normally be in educational psychology, and 6 hours of thesis research.

Plan B requires a minimum of 30 hours in a planned and approved sequence of courses, 18 of which will normally be in educational psychology.

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 request potential candidates to complete the master’s degree before entering the doctoral program. Two semesters of resident credit may be granted for the master’s degree in educational psychology.

The current Ph.D. program in educational psychology offers three emphases: (1) counseling and guidance, (2) learning, and (3) measurement, statistics, and research design. Application for admission to the program must include: (1) the academic record of the candidate, (2) results of the Miller Analogies Test, and the Graduate Record Examination including the Aptitude tests, and an Advanced Achievement Examination, and (3) three letters of recommendation relating to the applicant’s academic and professional background. Admission to candidacy for the Ph.D. degree may be granted after

*The departmental requirements are in addition to those of the Graduate Division which are described in the “Academic Information” section of this catalog.
(1) one semester's work in the program, (2) the demonstration of competency in measurement, (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. All doctoral students will be expected to serve as research 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 foreign language if the student can provide appropriate justification.

**EDUCATIONAL PSYCHOLOGY**

<table>
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<th>Course Code</th>
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<td>404</td>
<td>Education of Exceptional Children (3)</td>
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<td>405</td>
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<td>408</td>
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<td>Clinical Procedures in Reading (3)</td>
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<td>Advanced Problems of Educational Measurement and Evaluation (3)</td>
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<td>729</td>
<td>Scaling Qualitative Data (3)</td>
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<td>768</td>
<td>Seminar in Educational Psychology (3)</td>
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<td>(1) General, (2) Learning, (3) Measurement, (4) Research and Statistics, (5) Psycho-Social Development</td>
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<td>800</td>
<td>Thesis Research (arr.)</td>
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</table>
Electrical Engineering

GRADUATE FACULTY
B. Kinariwala, Ph.D. (Chairman)—system theory; signal theory
N. Abramson, Ph.D.—information theory and coding; pattern recognition, satellite communications
G. Fang, Ph.D.—plasma dynamics; physical electronics; ocean acoustics
B. S. M. Granborg, Ph.D.—automatic control systems
H. H. H. Hwang, Ph.D.—power system analysis; energy conversion
F. F. Kuo, Ph.D.—system theory; computer applications
C. E. Lenz, Ph.D.—automatic control; systems engineering
S. Lin, Ph.D.—information theory; error-correcting codes
K. Najita, M.S.—electromagnetic theory
W. W. Peterson, Ph.D.—error-correcting codes; information theory; computers
T. H. Roelofs, Ph.D.—radio wave propagation; ionospheric physics
P. F. Weaver, Ph.D.—radio science; ionospheric physics
E. J. Weldon, Jr., Ph.D.—error correcting codes; data communications
P. C. Yuen, Ph.D.—radio science, satellite communications

M.S.
Intended candidates for the M.S. degree in electrical engineering must present the B.S. degree in electrical engineering or the equivalent. Both Plan A and Plan B are available. Plan A includes 12 credits in EE 800, Thesis Research. Plan B requires 30 credits of graduate study in approved technical courses. In both plans, at least 18 credits must be in courses numbered above 600.

Ph.D.
Intended candidates for the Ph.D. degree 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. degree 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 as an intended Ph.D. candidate 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. After appointment of the committee, the student should work out a tentative program of courses which meets with 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 given by his entire committee, and may be preceded at the discretion of individual committee members by an 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 his dissertation.

**Electrical Engineering**

422 Electronic Instrumentation (3)
423 Instrumentation Laboratory (1)
427 Topics in Physical Electronics (3)
435 Power System Analysis (3)
436 Direct Energy Conversion (3)
441 Principles of Communications (3)
446 Information Theory and Coding (3)
451 Feedback Control Systems (3)
452 Feedback Control Systems Laboratory (1)
461 Digital Techniques (3)
462 Digital Techniques Laboratory (1)
463 Analog Computers (3)
466 Computer Organization and Programming Techniques (3)
467 Algorithmic Languages (3)
473 Microwave Theory and Techniques (3)
475 Radio-wave Propagation (3)
491-492 Special Topics in Electrical Engineering (3–3)
495–496 Special Topics Laboratory (1–1)
611–612 Network Synthesis (3–3)
613 Linear System Analysis (3)
614 Analysis of Nonlinear Systems (3)
623 Advanced Electronic Instrumentation (3)
627 Advanced Topics in Physical Electronics (3)
641 Introduction to Linear Systems and Noise (3)
646 Signal and Noise Theory (3)
647 Applied Statistical Decision Theory (3)
648 Error-Correcting Codes (3)
651 Advanced Feedback Control Systems (3)
GRADUATE FACULTY
E. C. Jenkins, Ph.D. (Chairman)—elementary curriculum, supervision, language arts
F. G. Braun, Ed.D.—language arts, mathematics education, elementary
A. B. Carr, Ed.D.—science education, elementary
E. D. Hayes, Ph.D.—creative expression, language arts
A. M. S. Inn, Ed.D.—social studies education
A. L. Pickens, Ed.D.—art education
M. R. Porter, Ph.D.—curriculum, supervision (on leave)
M. E. Reddin, Ph.D.—early childhood education, language arts

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.

Admission to candidacy is based upon (1) the quality of the student’s undergraduate record, (2) his performance on the general 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 are 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 in foundations of education, 9-15 in elementary education, and 9-15 in related fields. Additional hours may be required depending upon the 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.

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

CURRICULUM AND INSTRUCTION

619 Children’s Literature in the Elementary Curriculum (3)
620 Teaching Reading in the Elementary School (3)
621 Modern Language Arts Program, Elementary (3)
Elementary School Curriculum (3)

The Elementary Science Curriculum (3)

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.)

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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
R. H. Canary, Ph.D.—American literature
R. Creames, Ph.D.—modern English grammar
A. G. Day, Ph.D.—American literature, writing, Pacific literature; comparative literature
A. Friedson, Ph.D.—20th-century literature
J. W. Frierson, Ph.D.—Victorian literature
T. H. Fujimura, Ph.D.—Restoration literature, drama
W. T. Furniss, Ph.D.—Renaissance literature
J. Gray, Ph.D.—literary criticism and theory
W. E. Huntsberry, M.A.—writing
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. Lowery, Ph.D.—Elizabethan literature
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.

In addition to the regular concentration in English and American literature, the department now offers a concentration in the English language.

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.

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<td>*402</td>
<td>History of the English Language (3)</td>
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<td>404</td>
<td>English Phonology (3)</td>
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<td>408</td>
<td>History of Rhetoric (3)</td>
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<td>421</td>
<td>English Drama to 1642 (3)</td>
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<td>431, 432</td>
<td>The English Novel (3, 3)</td>
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<td>433</td>
<td>Twentieth-Century British Novel (3)</td>
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<td>442</td>
<td>Chaucer (3)</td>
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<td>445, 446</td>
<td>Shakespeare (3, 3)</td>
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<td>Milton (3)</td>
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<td>Medieval English Literature (3)</td>
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<td>Sixteenth-Century English Literature (3)</td>
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<td>454</td>
<td>Early Seventeenth-Century English Literature (3)</td>
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<td>456</td>
<td>Restoration Literature (3)</td>
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<td>457, 458</td>
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<td>461</td>
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<td>Victorian Literature (3, 3)</td>
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<td>469</td>
<td>Studies in British Literature (3)</td>
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<td>471, 472</td>
<td>American Literature (3, 3)</td>
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<td>Studies in American Literature (3)</td>
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<td>480</td>
<td>Literature of the Pacific (3)</td>
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<td>482</td>
<td>Narratives of Oral Tradition (3)</td>
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<td>483, 484</td>
<td>Modern Dramatic Literature (3, 3)</td>
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<td>487</td>
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<td>*630</td>
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<td>Literary Genres and Problems (3)</td>
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<td>791</td>
<td>Student Teaching of College Composition (3)</td>
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<td>799</td>
<td>Directed Research (arr.)</td>
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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
W. Carter, Ph.D. (Professor Emeritus)—insect transmission of plant pathogens
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 pathogens
T. Nishida, Ph.D.—ecology
M. Sherman, Ph.D.—toxicology
M. Tamashiro, Ph.D.—insect pathology
L. D. Tuthill, Ph.D.—taxonomy

AFFILIATE FACULTY

C. J. Davis, B.S.—biological control
J. L. Gressitt, Ph.D.—taxonomy
C. R. Joyce, Ph.D.—medical entomology
K. Sakimura, B.S.—pineapple insects
N. A. Wilson, Ph.D.—acarology
C. M. Yoshimoto, Ph.D.—hymenoptera

The department offers the master of science and doctor of philosophy degrees in entomology with specialization in acarology, biological control of insect and weed pests, insect ecology, insect pathology, insect toxicology, insect transmission of plant pathogens, medical and veterinary entomology, systematics and tropical economic entomology.

The unique geographical location of Hawaii is especially favorable for entomological research on ecological and phylogenetic studies related to geographical isolation. Many of our insect species have been accidentally introduced from all parts of the world and the endemic and exotic elements of our insect fauna provide unique opportunities for the study of adaptation of a species to new surroundings. Furthermore, our location is suitable for studies on insects of the tropical areas of the Pacific and Orient.

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, genetics, and physics. 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

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<td>661</td>
<td>Medical and Veterinary Entomology</td>
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<td>662</td>
<td>Advanced Systematic Entomology</td>
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<td>663</td>
<td>Scale Insects</td>
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FIELDS OF STUDY—FOOD SCIENCE

664 Immature Insects (3)
671 Insect Ecology (3)
672 Acarology (3)
673 Insect Pathology (3)
675 Biological Control of Pests (3)
680 Insect Toxicology (4)
686 Insect Transmission of Plant Pathogens (3)
697 Entomology Seminar (1)
699 Directed Research (arr.)
800 Thesis Research (arr.)

ZOLOGY

*602 Preparation of Scientific Manuscripts (1)

Food Science

GRADUATE FACULTY
H. A. Frank, Ph.D. (Chairman)—food science, food microbiology
A. Bevenue, B.S.—food safety
E. Ross, Ph.D.—food science and technology
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

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 in the related fields of agricultural engineering, chemistry, biochemistry and biophysics, microbiology, and nutrition. Courses required for all candidates are marked with an asterisk.

Both Plan A (thesis) and Plan B (non-thesis) are available. Under Plan A, a minimum of 18 semester hours of course work and 12 semester hours of thesis research will be required. Thesis work in food science includes the following areas: food technology, biochemistry, chemistry, microbiology, engineering, and food irradiation. Under Plan B, a minimum of 30 semester hours of course work is required.

FOOD SCIENCE

601 Principles in Food Science and Technology (3)
603 Microbiology of Foods (3)
604 Laboratory Methods for Food Microbiology (2)
610 Principles of Tropical Food Processing and Preservation (3)
611 Chemistry and Technology of Tropical Food Products (3)
*620 Seminar (1)
699 Directed Research (arr.)
*701 Recent Advances in Food Research (1)
730 Biochemical and Chemical Aspects of Foods (3)
799 Directed Research (arr.)
800 Thesis Research (arr.)
French

GRADUATE FACULTY
E. Jackson, Ph.D. (Chairman)—19th-century novel
D. B. Aspinwall, Ph.D.—poetry
J. O. Borel, Ph.D.—19th- and 20th-century novel and poetry
H. Niedzielski, Ph.D.—medieval language and literature, and phonetics

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 desiring the experience of writing a thesis. Plan B is primarily intended for those desiring additional course work in linguistics and the methodology of language teaching. 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, 21 hours of course work and 9 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 EL630 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 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 Code</th>
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<tr>
<td>406</td>
<td>Structure of French (1) II</td>
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<td>411</td>
<td>Masterpieces of 17th-Century Literature (3) I</td>
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<td>413</td>
<td>Masterpieces of 18th-Century Literature (3) II</td>
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<td>415-416</td>
<td>Masterpieces of 19th-Century Literature (2-2)</td>
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<td>420</td>
<td>20th-Century Novel (1) I or II</td>
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<td>421</td>
<td>20th-Century Theatre (3) I or II</td>
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<td>422</td>
<td>20th-Century Poetry (3) I or II</td>
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FIELDS OF STUDY—GENETICS

601 Seminar in Contemporary French Literature (3) I or II
602 Seminar in French Poetry (3) I or II
609 French Renaissance (3) II
661 Stylistics (2) I
666 Seminar in History of French Literary Criticism (2) I or II
671 History of the Language (2) I
672 Medieval Literature (2) II
681 The Novel in France (3) I or II
690 The Theatre in France until 1843 (3) I
699 Directed Research (arr.) I, II
735 Seminar in French Literature (3) I or 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., D.Sc. (Chairman)—genetic polymorphisms
L. E. A. Beckman, Ph.D.—biochemical genetics
R. K. Blaisdell, M.D.—clinical genetics
Y. Hiraizumi, Dr. Sci.—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
W. K. T. Shim, M.D.—pediatric genetics
J. B. Smith, Ph.D.—cytogenetics
S. H. Waxman, M.D.—cytogenetics

Both an M.S. and Ph.D. in genetics are offered, but departmental policy is to accept only those students whose intention is to work towards the Ph.D. degree. The required course work for both degrees is the same, namely Genetics 618, 628, 650, 4 semesters of 654 and Biochemistry 605. The M.S. may be completed only under Plan A. The Ph.D. is completed by submission of an acceptable dissertation. Normally candidates for a degree in genetics would work through the M.S. to a Ph.D. However candidates with an M.S. in an appropriate discipline may register for the Ph.D. program.

The department is considered strong in population genetics and biochemical genetics. Candidates are expected to indicate their main area of interest before acceptance by the department, and are assigned tentatively to their major professor before admission. However, this does not preclude subsequent reassignment if the student and professors concerned agree. A departmental brochure giving further details is available on request to the department chairman.
Intended candidates must have or acquire adequate preparation in biology, calculus, chemistry through organic chemistry, genetics, and physics. Additional preparation will depend on the area of genetics in which the candidate wishes to do his thesis or dissertation research. For population genetics and statistical genetics an adequate mathematical background is desirable. For human genetics the preparation should include anthropology; for plant genetics the preparation should include cytology, plant anatomy, taxonomy and physiology. The Graduate Record Examination and two letters of recommendation are required of all applicants.

**GENETICS**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>611</td>
<td>Genetics for Medical Students</td>
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<tr>
<td>618</td>
<td>Cytogenetics</td>
</tr>
<tr>
<td>625</td>
<td>Advanced Topics in Genetics</td>
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<tr>
<td>650</td>
<td>Population Genetics</td>
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<tr>
<td>654</td>
<td>Seminar</td>
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<td>660</td>
<td>Statistical Methodology in Genetics</td>
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<td>699</td>
<td>Directed Research</td>
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<tr>
<td>800</td>
<td>Thesis Research</td>
</tr>
</tbody>
</table>

**Geography**

**GRADUATE FACULTY**

- R. J. Fuchs, Ph.D. (Chairman)—economic and urban geography, Soviet Union
- R. W. Armstrong, Ph.D.—medical geography, human ecology, quantitative methods
- N. M. Bowers, Ph.D.—South Asia, Micronesia, political geography
- J. H. Chang, Ph.D.—climatology, China
- S. D. Chang, Ph.D.—China, cartography, airphoto and image interpretation
- D. W. Fryer, Ph.D.—economic development, Southeast Asia
- D. H. Kornhauser, Ph.D.—Japan, urbanization and impacts of technological change
- G. Krumme, Ph.D.—economic geography, location theory, regional economic analysis (on leave 1968/69)
- C. A. Manchester, Jr., Ph.D.—Japan, history of geographical thought, historical geography
- P. N. D. Pirie, Ph.D.—population geography, Pacific (on leave 1968/69)
- F. R. Piets, Ph.D.—cultural geography, East Asia, computer applications
- J. M. Street, Ph.D.—tropical biogeography and agricultural geography, New Guinea
- H. J. Wiehn, Ph.D.—cultural and historical geography of China, regional geography of Asia and the Pacific Islands

The department offers programs of graduate study and research leading to the M.A. and Ph.D. degrees. Faculty interests and supporting strengths of the University provide advantages for studies of tropical environments (climatology, biogeography, soils geography), man-environment systems, and geographic problems of resource management and economic development (population, migration, urban and regional systems). The regional focus of interest is Asia and the Pacific, including Hawaii. Students are encouraged to decide early upon their fields of specialization. They must expect to cross disciplinary lines and incorporate within their programs considerable work in related fields.
M.A.

Applicants for admission to the M.A. program in geography must provide the following information: (1) two transcripts; (2) Graduate Record Examination scores (aptitude tests only); (3) completed application forms (available from the department and the Graduate Division).

Applicants are expected to have had a broadly based undergraduate education encompassing basic courses in the physical sciences, social sciences and humanities, and a reading knowledge of a foreign language. Intended candidates for the M.A. or Ph.D. need not have had an undergraduate major in geography; students from related fields are welcome.

Incoming students are administered a written examination designed to reveal the quality of their preparation for advanced work. (A suggested reading list is available upon request). On the basis of this exam the advisor will decide if there are subject areas of weakness which are to be remedied by independent reading, or by audit or credit courses.

The department offers both Plan A (thesis) and Plan B (non-thesis) programs. Plan A is the usual program but Plan B may be permitted at the discretion of the department. Plan A requires 24 semester hours and a thesis worth an additional 6 hours. Plan B requires 30 semester hours and the submission of three research papers of thesis quality, but not thesis length.

The master's candidate is expected to acquire (1) a basic knowledge of concepts and theory in the major fields of geography; (2) basic competence in research design and techniques; (3) familiarity with the development of geographic thought; (4) a beginning specialization in a subfield of geography. In consultation with the advisor, the candidate will plan a coherent study program of departmental offerings and pertinent courses from other departments. All students are required to take Geography 690, 691, 791. Also required is a quantitative methods course (Geography 380) or alternatively the candidate may pass the final examination for the course.

All candidates will be tested for their fields of specialization in an oral examination; in the case of Plan A candidates the exam will extend to the proposed thesis problem. The Plan A candidate will defend the completed thesis in a departmental seminar; the Plan B student will present and defend one of the submitted research papers.

Ph.D.

Admission to the Ph.D. program is highly selective and based upon demonstrated competence in previous work and promise of research ability. Applicants must submit the materials required for M.A. admission and, in addition, three letters of reference.

The program will consist of advanced courses and research seminars in the department, independent reading and research, and work in related disciplines. There will be no formal requirement of a specified number of
Each program will be individually prepared by the advisory committee to fit the needs of the student. Each candidate will be expected to have taken the core program required for M.A. candidates, or its equivalent. In addition, common elements of all Ph.D. programs shall include: (1) demonstrated competence in research design, the collection and evaluation of data and geographic model building; (2) adequate work in a supporting discipline(s) related to the fields of specialization in geography to a point where the candidate is familiar with the relevant theory and methods of the other disciplines(s); (3) advanced technique competency as may be required by the research topic.

All Ph.D. candidates must demonstrate competence in a foreign language with an extensive literature in geography; in addition, candidates must demonstrate competence in a second language approved by the advisory committee or if relevant, offer instead an approved program of advanced work in mathematics and quantitative methods.

Written comprehensive examinations are administered covering the major fields of geography. Prior to beginning the dissertation field work, an oral examination is given covering the fields of specialization and the dissertation proposal. As a general rule dissertations will be based on field work. Upon completion of the dissertation the candidate will present and defend his results before the thesis committee and graduate faculty.

**Systematic Physical Geography**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>300</td>
<td>Introduction to Climatology</td>
<td>3</td>
</tr>
<tr>
<td>310</td>
<td>Physical Geography</td>
<td>3</td>
</tr>
<tr>
<td>314</td>
<td>Geography of the Tropics</td>
<td>3</td>
</tr>
<tr>
<td>400</td>
<td>Advanced Climatology</td>
<td>3</td>
</tr>
<tr>
<td>415</td>
<td>Medical Geography</td>
<td>3</td>
</tr>
<tr>
<td>600</td>
<td>Seminar in Climatology</td>
<td>3</td>
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**Systematic Cultural Geography**

<table>
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<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>326</td>
<td>Conservation and Utilization of Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>330</td>
<td>Population Geography</td>
<td>3</td>
</tr>
<tr>
<td>335</td>
<td>Political Geography</td>
<td>3</td>
</tr>
<tr>
<td>339</td>
<td>Geography of Exploration</td>
<td>3</td>
</tr>
<tr>
<td>351</td>
<td>Elements of Regional Science</td>
<td>3</td>
</tr>
<tr>
<td>420</td>
<td>Location Theory and Regional Analysis</td>
<td>3</td>
</tr>
<tr>
<td>421</td>
<td>Urban Geography</td>
<td>3</td>
</tr>
<tr>
<td>620</td>
<td>Regional Economic Analysis</td>
<td>3</td>
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**Area Courses**

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<th>Course</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>340</td>
<td>Geography of the United States and Canada</td>
<td>3</td>
</tr>
<tr>
<td>345</td>
<td>Geography of the Soviet Union</td>
<td>3</td>
</tr>
<tr>
<td>350</td>
<td>Geography of Asia</td>
<td>3</td>
</tr>
<tr>
<td>352</td>
<td>Geography of Japan</td>
<td>3</td>
</tr>
<tr>
<td>353</td>
<td>Geography of China</td>
<td>3</td>
</tr>
<tr>
<td>355</td>
<td>Geography of South Asia</td>
<td>3</td>
</tr>
<tr>
<td>356</td>
<td>Geography of Southeast Asia</td>
<td>3</td>
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</table>
FIELDS OF STUDY—GEOSCIENCES

361 Geography of Australia and New Zealand (2)
365 Geography of the Pacific (3)
368 Geography of Hawaii (3)
650 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)

Techniques and Methodology

370 Airphoto and Image Interpretation (2)
375 Cartography (3)
380 Quantitative Methods in Geography (3)
680 Advanced Quantitative Methods in Geography (3)
685 Computer Applications in Geography (3)

Reading, Research, General

638 Historical Geography (3)
690 Pro-Seminar in Geography (5)
691 History of Geographic Thought (3)
700 Seminar in Geography (3)
750 Research Seminar in Geography (3)
   (1) climatology
   (2) biogeography
   (3) medical geography
   (4) resource management
   (5) population geography
   (6) economic geography
   (7) urban geography
   (8) geographic aspects of economic development
   (9) cultural geography
791 Field Camp (1)
799 Directed Research (arr.)
800 Thesis Research (arr.)

Geosciences

C. S. Ramage, Sc.D. (Department Chairman and Sub-chairman for Meteorology)—
tropical meteorology
D. C. Cox, Ph.D. (Sub-chairman for Hydrology)—hydrology, ground-water and
engineering geology
S. H. Laurila, Ph.D. (Sub-chairman for Geodesy)—geodesy
G. A. Macdonald, Ph.D. (Sub-chairman for Geology)—volcanology, igneous petrology
G. H. Sutton, Ph.D. (Sub-chairman for Solid Earth Geophysics)—seismology, exploration
geophysics
A. T. Abbott, Ph.D.—ore deposits, geomorphology
W. M. Adams, Ph.D.—seismology, applied geophysics
J.-H. Chang, Ph.D.—climatology
W. C. Chiu, Ph.D.—atmospheric turbulence and oscillations
K. I. Daugherty, M.S.—physical geodesy
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
M. A. Khan, Ph.D.—satellite geodesy
L. S. Lau, Ph.D.—ground and surface water hydrology
A. Malahoff, Ph.D.—geomagnetism, gravity
M. Manghnani, Ph.D.—geochemistry, geophysics
R. M. Moerly, Jr., Ph.D.—sedimentology, marine geology
J. J. Naughton, Ph.D.—geochemistry
K. A. Pankiwskyj, Ph.D.—metamorphic geology, silicate phase petrology
J. C. Rose, Ph.D.—gravity, marine geophysics
A. H. Woodcock, D.Sc.—cloud physics
G. P. Woollard, Ph.D.—gravity, seismology, geomagnetism
E. J. Workman, Ph.D.—atmospheric electricity, cloud electrification
I-pai Wu, Ph.D.—surface water hydrology
K. Wyrtki, Ph.D.—air-sea interaction

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)

M.S. A minimum of 18 credit hours of course work and 12 credit hours of thesis research, as well as a reading knowledge of one foreign language with useful scientific literature in the field of the candidate.

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

Geodesy

Intended candidates should have a B.S. or B.A. degree with a major in one of the following fields: mathematics, physics, geodesy, geology, geophysics or civil engineering. Prior to entering the graduate program, the student should have taken the equivalent of University of Hawaii offerings in Civil Engineering 111 (Surveying), Civil Engineering 311 (Photogrammetry) and Geography 235 (Map and Airphoto Interpretation) or equivalent knowledge of those topics gained through practical experience. Deficiencies in undergraduate preparation must be made up. As a minimum requirement, he also should have one year of geology and be knowledgeable in general physics and mathematics through calculus.

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.

**GEODYSCE**

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

**GEODESY**

437 Introduction to Geodetic Science (3)
481 Potential Theory and Gravity (3)
482 Elements of Satellite Geodesy and Celestial Mechanics (3)
681–682 Physical Geodesy (3–3)
683 Satellite Geodesy (3)
684 Advanced Geodesy (3)
685 Adjustment Computation (3)
687 Geodetic Astronomy (3)

**GEOLOGY**

301 Mineralogy (3)
302 Petrology (3)
303 Structural Geology (3)
316 Geomorphology (3)
320 Marine Geology (3)
410 Historical Geology (3)
411 Paleontology (3)
412 Micropaleontology (3)
424 Optical Mineralogy (4)
425 Geochemistry (3)
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<th>Course</th>
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<tr>
<td>426</td>
<td>Igneous and Metamorphic Petrography</td>
<td>3</td>
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<tr>
<td>427</td>
<td>Sedimentary Petrology</td>
<td>3</td>
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<tr>
<td>430</td>
<td>Geology of Asia</td>
<td>2</td>
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<tr>
<td>440</td>
<td>Economic Geology</td>
<td>2–2</td>
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<tr>
<td>601</td>
<td>Seminar in Volcanology</td>
<td>2</td>
</tr>
<tr>
<td>602</td>
<td>Seminar in Petrology</td>
<td>2</td>
</tr>
<tr>
<td>607</td>
<td>Seminar in Ore Deposits</td>
<td>2</td>
</tr>
<tr>
<td>609</td>
<td>Seminar in Geomorphology</td>
<td>2</td>
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<tr>
<td>614</td>
<td>Advanced Field Study</td>
<td>arr.</td>
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<tr>
<td>617-618</td>
<td>Seminar in Geotectonics</td>
<td>3</td>
</tr>
<tr>
<td>619-620</td>
<td>Sedimentology and Stratigraphy</td>
<td>3–3</td>
</tr>
<tr>
<td>624</td>
<td>Topics in Geochemistry</td>
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<tr>
<td>625</td>
<td>Seminar in Current Research Topics</td>
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**HYDROLOGY**

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<td>306</td>
<td>Work of Water</td>
<td>4</td>
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<td>411</td>
<td>Hydrogeology</td>
<td>4</td>
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<tr>
<td>601</td>
<td>Seminar in Engineering and Ground-water Geology</td>
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**METEOROLOGY**

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<tbody>
<tr>
<td>640</td>
<td>Advanced Tropical Meteorology</td>
<td>3</td>
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<tr>
<td>642</td>
<td>Atmospheric Turbulence</td>
<td>3</td>
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<td>643</td>
<td>Cloud Physics</td>
<td>3</td>
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<td>644</td>
<td>Physical Meteorology</td>
<td>3</td>
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<td>646</td>
<td>Statistical Meteorology</td>
<td>3</td>
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<tr>
<td>745</td>
<td>Numerical Analysis and Prediction</td>
<td>5</td>
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<tr>
<td>710</td>
<td>Advanced Theoretical Meteorology I</td>
<td>3</td>
</tr>
<tr>
<td>711</td>
<td>Advanced Theoretical Meteorology II</td>
<td>3</td>
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<tr>
<td>712</td>
<td>Special Topics in Meteorology</td>
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<td>761</td>
<td>Seminar in Meteorology</td>
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**SOLID EARTH GEOPHYSICS**

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<tbody>
<tr>
<td>311</td>
<td>Seismology</td>
<td>3</td>
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<tr>
<td>360</td>
<td>Principles of Geophysics</td>
<td>3</td>
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<tr>
<td>463</td>
<td>Physical Properties of Earth Matter</td>
<td>3</td>
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<tr>
<td>465-466</td>
<td>Geophysical Exploration</td>
<td>3–3</td>
</tr>
<tr>
<td>655</td>
<td>Seismic Source Mechanisms</td>
<td>3</td>
</tr>
<tr>
<td>656</td>
<td>Seismic Propagation Phenomena</td>
<td>3</td>
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<tr>
<td>657</td>
<td>Analysis and Synthesis of Seismograms</td>
<td>3</td>
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<tr>
<td>658</td>
<td>Seismometry and Seismological Model Study</td>
<td>3</td>
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<tr>
<td>660</td>
<td>Seminar in Solid Earth Geophysics</td>
<td>arr.</td>
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<tr>
<td>661</td>
<td>Marine Geophysics</td>
<td>3</td>
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<tr>
<td>662</td>
<td>Principles of Theoretical Geophysics</td>
<td>3</td>
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<tr>
<td>663</td>
<td>Numerical Methods in Geophysical Data Analysis</td>
<td>2</td>
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</tbody>
</table>

**German**

**GRADUATE FACULTY**

- R. Seymour, Ph.D. (Chairman)—Germanic linguistics
- D. Dauer, Ph.D.—18th- and 19th-century German literature and philosophy
- I. Guentherodt, Ph.D.—dialectology, modern German language and linguistics
- A. Moore, M.A.—20th-century literature and stylistics

Plan A (thesis) and Plan B (non-thesis), are designed to meet the needs of two different types of students. Plan A is intended primarily for those desiring the experience of writing a thesis. Plan B is intended primarily for
those desiring additional course work in linguistics and the methodology of language teaching.

**Admission.** In addition to the requirements of the Graduate Division, candidates should have majored in German as undergraduates. Applicants with less than a 3.0 average in their German major may be admitted provisionally. All must demonstrate, by means of a tape recording or by personal interview, an acceptable accent and a reasonable degree of fluency in German. Candidates should also present a minimum of 6 semester hours of related work (art, linguistics, history, philosophy, etc.).

**Degree requirements.** A preliminary conference and examination will be administered to determine the student's program and objectives. By September 30 the candidate must also take the M.L.A. Proficiency Examinations (speaking, reading, writing, and understanding) unless he presents satisfactory scores taken within the previous year.

Plan A (thesis) requires a minimum of 18 hours of course work (12 of which must be numbered 600-799, including at least one seminar and excluding the research methods course) and 6 credit hours of thesis research. Comprehensive examinations, thesis and defense of thesis complete the degree. Plan B (non-thesis) requires a minimum of 18 credits in courses numbered 600-799 (including at least one seminar and excluding the research methods course) and no more than 12 hours selected from approved related courses. Comprehensive examinations, together with a seminar appearance after presentation of a paper, complete the degree.

**GERMAN**

<table>
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<tr>
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<tbody>
<tr>
<td>406</td>
<td>Structure of the German Language (3)</td>
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<tr>
<td>419</td>
<td>Enlightenment through Post-Classicism (3)</td>
</tr>
<tr>
<td>420</td>
<td>Romanticism through Realism (3)</td>
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<tr>
<td>421</td>
<td>Naturalism through Neo-Romanticism (3)</td>
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<tr>
<td>422</td>
<td>Literary Currents Since World War I (3)</td>
</tr>
<tr>
<td>601</td>
<td>History of the German Language (3)</td>
</tr>
<tr>
<td>602</td>
<td>Stylistics (2)</td>
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<tr>
<td>609-610</td>
<td>Middle High German (3-3)</td>
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<tr>
<td>651</td>
<td>Seminar: The German Novelle (3)</td>
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<tr>
<td>652</td>
<td>Seminar: German Drama (3) II</td>
</tr>
<tr>
<td>653</td>
<td>Seminar: Lyric Poetry (3)</td>
</tr>
<tr>
<td>655-656</td>
<td>Faust I (3) and Faust II (3)</td>
</tr>
<tr>
<td>699</td>
<td>Directed Research (arr.)</td>
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<tr>
<td>800</td>
<td>Thesis Research (6-12)</td>
</tr>
</tbody>
</table>

**History**

**Graduate Faculty**

- A. W. Saville, Ph.D. (Chairman)—modern Europe, Germany
- 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
S. J. Hurwitz, Ph.D.—modern England, modern Europe, historiography
D. Johnson, Ph.D.—United States diplomatic, Latin America, United States in the Pacific
W. Johnson, Ph.D.—recent United States
H. H. W. Kang, Ph.D.—Far East, Korea
D. W. Y. Kwok, Ph.D.—modern China, Chinese thought
H. J. Lamley, Ph.D.—modern China
H. F. Margulies, Ph.D.—United States political, the Progressive Era
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
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.—Far East, modern Japan
S. Sakamaki, Ph.D.—Japan, the Ryukyus
J. Sharma, Ph.D.—South Asia
M. Shinoda, Ph.D.—Far East, pre-modern Japan
M. P. Speidel, Ph.D.—ancient Europe, Roman Empire
J. Stalker, Ph.D.—recent United States social and economic
B. Stein, Ph.D.—India
R. Van Niel, Ph.D.—Southeast Asia, Indonesia
W. F. Vella, Ph.D.—Southeast Asia, Thailand
J. A. White, Ph.D.—Russia, Russia in Asia

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 601 and 602), 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 601 and 602) 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 below 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 601 and 602.

### Asia

**HISTORY**

| 401–402 | History of South Asia |
| 405–406 | History of Southeast Asia |
| 409–410 | History of China |
| 413–414 | History of Japan |
| 417–418 | History of Korea |
| 654 | Seminar in Mainland Southeast Asian History |
| 655 | Seminar in Island Southeast Asian History |
| 661 | Seminar in Chinese History |
| 663 | Seminar in Indian History |
| (1) Ancient India | (3) Muslim India |
| (2) South India | (4) Modern South Asia |
| 665 | Seminar in Japanese History |
| 667 | Seminar in Korean History |
| 701 | Research Materials and Methods in Asian History |
| 713–714 | Chinese Historical Literature |
| 717–718 | Chinese Intellectual History |
| 721–722 | China from Classical Antiquity to 750 |
| 731 | Seminar in Political History of Modern Japan |
| 733–734 | Japanese Intellectual History |
| 735–736 | Seminar on Pre-Modern Japan c. 850–1800 |

### The Pacific

| 421 | Australia and New Zealand |
| 422 | History of Oceania |
| 424 | History of the Hawaiian Islands |
| 425 | The United States in the Pacific |
| 675 | Seminar in Pacific History |
### Americas

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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>461</td>
<td>Colonial America to 1790</td>
</tr>
<tr>
<td>462</td>
<td>The Young Republic: U.S. History 1789-1841</td>
</tr>
<tr>
<td>463</td>
<td>Crisis of the Union: U.S. History 1841-1877</td>
</tr>
<tr>
<td>464</td>
<td>The Age of Industry: U.S. History 1877-1920</td>
</tr>
<tr>
<td>465</td>
<td>Troubled Peace: U.S. History 1920-1941</td>
</tr>
<tr>
<td>466</td>
<td>America and World Leadership: The U.S. Since 1941</td>
</tr>
<tr>
<td>471-472</td>
<td>Diplomatic History of the United States</td>
</tr>
<tr>
<td>475</td>
<td>Constitutional History of the United States</td>
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<td>477</td>
<td>Economic History of the United States</td>
</tr>
<tr>
<td>481-482</td>
<td>American Thought and Culture</td>
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<tr>
<td>483</td>
<td>The West in American History</td>
</tr>
<tr>
<td>484</td>
<td>The South in American History</td>
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<td>485</td>
<td>The City in American History</td>
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<td>486</td>
<td>Representative Americans</td>
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<tr>
<td>487-488</td>
<td>History of Latin America</td>
</tr>
<tr>
<td>631</td>
<td>Advanced Problems and Reading in American History</td>
</tr>
<tr>
<td>632</td>
<td>The Colonial Period in American History</td>
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<tr>
<td>636</td>
<td>Seminar in Nineteenth-Century American History</td>
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<tr>
<td>637</td>
<td>The Progressive Period in American History</td>
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<td>638</td>
<td>Seminar in Recent American History</td>
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<tr>
<td>640</td>
<td>Seminar in American Social and Intellectual History</td>
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<td>641</td>
<td>Seminar in American Diplomatic History</td>
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### Europe

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<tr>
<th>Course</th>
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<tr>
<td>427-428</td>
<td>Greek and Roman Civilizations</td>
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<tr>
<td>431-432</td>
<td>Medieval Europe, 300-1300</td>
</tr>
<tr>
<td>435</td>
<td>Renaissance and Reformation, 1300-1600</td>
</tr>
<tr>
<td>437</td>
<td>Early Modern Europe, 1600-1800</td>
</tr>
<tr>
<td>439</td>
<td>Europe in the Nineteenth Century</td>
</tr>
<tr>
<td>440</td>
<td>Europe since Versailles</td>
</tr>
<tr>
<td>441-442</td>
<td>East Central Europe</td>
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<tr>
<td>443-444</td>
<td>History of Germany</td>
</tr>
<tr>
<td>445-446</td>
<td>History of France</td>
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<td>447-448</td>
<td>History of England</td>
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<td>449-450</td>
<td>History of Russia</td>
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<tr>
<td>451-452</td>
<td>Modern Russia and Soviet Foreign Policy</td>
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<tr>
<td>453-454</td>
<td>Intellectual History of Russia and the Soviet Union</td>
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<tr>
<td>455-456</td>
<td>European Intellectual History</td>
</tr>
<tr>
<td>459</td>
<td>Constitutional History of England</td>
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<td>611</td>
<td>Seminar in European History</td>
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<tr>
<td>618</td>
<td>British Empire and Commonwealth</td>
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<tr>
<td>619</td>
<td>Seminar in Russian History</td>
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<td>620</td>
<td>Seminar in Russian Foreign Policy</td>
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### Historiography, Historical Method, and Directed Research

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<th>Course</th>
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<tbody>
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<td>601</td>
<td>Seminar in Historical Method</td>
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<tr>
<td>602</td>
<td>Seminar in Historiography</td>
</tr>
<tr>
<td>799</td>
<td>Directed Research</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research</td>
</tr>
</tbody>
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**Horticulture**

**GRADUATE FACULTY**
D. P. Watson, Ph.D. (Chairman)—ornamentals
J. L. Brewbaker, Ph.D.—radiation genetics
J. C. Gilbert, Ph.D.—vegetable breeding
R. A. Hamilton, Ph.D.—tropical fruit improvement
R. W. Hartmann—plant breeding and genetics
H. Kamemoto, Ph.D.—ornamental cytogenetics
H. Y. Nakasone, Ph.D.—tropical fruit breeding
R. T. Poole, Ph.D.—ornamental nutrition
R. R. Romanowski, Ph.D.—crop physiology
Y. Sagawa, Ph.D.—developmental morphology and cytogenetics
R. M. Warner, Ph.D.—tropical fruit ecology

**AFFILIATE FACULTY**
D. J. Heinz, Ph.D.—sugar cane cytogenetics
K. R. Kerns, M.S.—plant breeding
B. Krauss, M.S.—plant physiology and morphology
L. G. Nickell, Ph.D.—plant physiology
J. B. Smith, Ph.D.—plant genetics

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)
- 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)
- 662 Advanced Tropical Fruit Science (3)
- 664 Orchidology (3)
- 666 Radiation Biology (3)
- 667 Horticulture Seminar (1)
- 668 Growth Regulators in Horticulture (2)
- 691 Crop Ecology (3)
- 699 Directed Research (arr.)
- 711 Special Topics in Experimental Horticulture (arr.)
- 800 Thesis Research (arr.)
Japanese

GRADUATE FACULTY

J. T. Araki, Ph.D. (Chairman)—literature
N. Fujioka, M.A.—grammar
B. Hoffer, Ph.D.—linguistics
H. Ikeda, Ph.D.—folklore and bibliography
Y. Uyehara, M.A.—contemporary literature and poetry
V. H. Viglielmo, Ph.D.—literature
J. Young, Ph.D.—applied linguistics, civilization

Both Plan A (thesis) and Plan B (non-thesis) M.A. programs in each of the following major fields are available: (1) language, (2) literature, and (3) teaching Japanese as a second language (JASL).

Under Plan A (thesis), a minimum of 21 hours of course work, including at least 18 credit hours in the major field, plus 9 hours of thesis research is required. A minimum of 12 credits in the major field must be earned in courses numbered 600 or higher including the graduate seminar, Japanese 750.

Under Plan B (non-thesis), a minimum of 30 hours of course work, including at least 18 credit hours in the major field, is required. A minimum of 18 credits in the major field must be earned in courses numbered 600 or higher including the graduate seminar, Japanese 750.

Intended candidates must have a B.A. in Japanese or have had equivalent preparation in the discipline. Additional details regarding the program may be found in separate departmental circulars summarizing the prerequisites, required courses, and suggested electives for each of these fields.

JAPANESE

401-402 Fourth-Level Japanese (3-3)
404 Accelerated Fourth-Level Japanese (6)
*411-412 Advanced Japanese Aural Comprehension (3-3)
*421-422 Advanced Japanese Conversation (3-3)
*431-432 Selected Readings in Japanese (3-3)
*435-436 Introduction to Japanese Documentary and Epistolary Styles (3-3)
440 Advanced Japanese Composition (2)
451-452 Structure of Japanese (3-3)
455-456 Topics in Japanese Grammar (3-3)
457-458 Japanese Grammar—Classical (3-3)
461 Introduction to Modern Japanese Literature (3)
464 Introduction to Traditional Japanese Literature (3)
490 Reference Materials for Japanese Studies (3)
*491-492 Japanese Interpretation (3-3)
609-610 Japanese Poetry (3-3)
611-612 Contemporary Japanese Literature (3-3)
614 Edo Literature (3)
615 Medieval Japanese Literature (3)
616 Classical Japanese Literature (3)
621-622 History of Japanese Literary Criticism (3-3)
*623 Japanese Folklore (3)
631-632 History of the Japanese Language (3-3)

*New courses.
Fields of Study—Library Studies

641–642  Contrastive Study of Japanese and English Structure (3–3)
643–644  Methodology in Teaching of Japanese as a Second Language (3–3)
690      Japanese Bibliography (3)
750      Research Seminar in Japanese (3)
800      Thesis Research (arr.)
AP 690   Directed Reading (arr.)
AP 699   Directed Research (3)
AP 761–762 Seminar in East Asian Comparative Literature (3–3)

Library Studies

Faculty
R. D. Stevens, Ph.D. (Associate Dean)—administration, government documents
M. M. Andrews, M.S. in L.S.—administration, management, reader services, social functions of libraries
M. W. Ayrault, M.S. in L.S.—cataloging
V. Crozier, B.S. in L.S.—government documents
C. Dang, M.S. in L.S.—building library collections
R. W. DeAngelo, M.S. in L.S.—children’s literature
E. Ferguson, B.S. in L.S.—special libraries
I. W. Harris, Ph.D.—reference, reader services
J. R. Hunt, M.A. in L.S.—administration
M. Jackson, M.A. in L.S.—social functions of libraries
A. Kamida, M.L.S.—cataloging
D. C. McAlister, B.Ed., B.S. in L.S.—cataloging
D. W. McNeil, M.S. in L.S.—building library collections
E. T. Schofield, Ed.D.—audio-visual, children’s literature
H. S. Sharp, M.S. in L.S.—reference, business and economics
R. R. Shaw, Ph.D.—documentation
M. Tsui, M.L.S.—reference
S. L. West, B.S. in L.S.—reference, building library collections
J. Wheelwright, M.S. in L.S.—business and economics

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

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.

Linguistics

GRADUATE FACULTY

G. W. Grace, Ph.D. (Chairman)—theoretical, comparative, and historical linguistics, ethnolinguistics, Austronesian languages
B. W. Bender, Ph.D.—descriptive and applied linguistics, Micronesian languages
B. G. Biggs, Ph.D.—descriptive and comparative linguistics, Polynesian and Oceanic languages
S. H. Elbert, Ph.D.—comparative and historical linguistics, Hawaiian, 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, Melanesian languages
A. J. Schütz, Ph.D.—descriptive linguistics, field methods, Fijian, other Melanesian, and Polynesian languages
L. C. Thompson, Ph.D.—historical and comparative linguistics, field methods, North American Indian linguistics and Southeast Asian linguistics
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
Students admitted to graduate programs in linguistics normally have a background in at least one foreign language. Some background in mathematics or one of the sciences is also useful.

The faculty represents a variety of theoretical viewpoints. The various faculty members are especially well qualified to direct research on languages of the Pacific and parts of Asia and the Americas. Fields of special competence include descriptive and comparative linguistics, general linguistic theory, language contact and dialectology, and ethnolinguistics.

Departmental Requirements

In addition to the following departmental requirements the requirements of the Graduate Division are also applicable.

A core of courses (410, 421, 422, 621, 622, 630, 645) is required of all advanced degree candidates who have not had equivalents elsewhere. All students are also required to take at least one advanced seminar.

M.A.

The department offers both Plan A and Plan B programs. Besides the general requirements of the Graduate Division, both of these programs require that the student demonstrate competence in one language other than his native language. The choice of language must be approved by the graduate faculty in linguistics, and the examination must be passed at least one full semester before the candidate takes his final examination.

Plan A requires a thesis (12 units) and a minimum of 18 units of course work. However, all candidates must have taken at least one advanced seminar and must have completed the core of courses outlined above.

Plan B requires a minimum of 30 units approved by the candidate's program committee. It also requires a final written examination near the end of the course work.

Ph.D.

Ph.D. students must pass a qualifying examination, a comprehensive examination, and a final oral examination in defense of the dissertation. The qualifying examination is normally taken at a point soon after the completion of the core of courses. The final examination for the M.A. degree may also serve as the qualifying examination for the Ph.D.

The student must also demonstrate competence in two languages other than his native language. One of the languages must be English, French, German, or Russian. Furthermore, one of the language examinations must satisfy the language requirements established by the Graduate Division. Both languages must be approved by the graduate faculty in linguistics. Students are admitted to candidacy after demonstrating competence in both languages and performing successfully on the comprehensive examination.

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, mathematics, philosophy, and psychology.

The courses of the department (listed below) are offered to guide the student in his preparation for the various examinations, although he must expect to do individual study in areas not covered by course offerings. Generally, the courses numbered below 700 are designed to provide the student with a sound introduction to traditional descriptive, comparative, and transformational-generative approaches.

Those bearing numbers in the 700's are seminars, and a number of the seminars with repeatable course numbers—750, 760, and 770—may be offered in a typical semester, depending on the interests of the resident faculty and students. In any given semester there are normally a number of seminars dealing with geographical areas, particular language families, the structures of individual languages, and particular theoretical problems. A major portion of the work done beyond the M.A. level will be in seminars and directed research.

Linguistics

<table>
<thead>
<tr>
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<td>General Linguistics (3)</td>
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<tr>
<td>410</td>
<td>Articulatory Phonetics (3)</td>
</tr>
<tr>
<td>421</td>
<td>Introduction to Phonological Analysis (3)</td>
</tr>
<tr>
<td>422</td>
<td>Introduction to Grammatical Analysis (3)</td>
</tr>
<tr>
<td>611</td>
<td>Acoustic Phonetics (3)</td>
</tr>
<tr>
<td>615</td>
<td>The Nature of Language (3)</td>
</tr>
<tr>
<td>621</td>
<td>Phonology (3)</td>
</tr>
<tr>
<td>622</td>
<td>Grammar (3)</td>
</tr>
<tr>
<td>630</td>
<td>Field Methods (3)</td>
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<td>641</td>
<td>Introduction to Comparative Method (3)</td>
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<tr>
<td>650-651</td>
<td>Advanced Linguistic Analysis (3–5)</td>
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<td>699</td>
<td>Directed Research (arr.)</td>
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<tr>
<td>730</td>
<td>Seminar (3)</td>
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<tr>
<td>760</td>
<td>Problems in Comparison and Pre-History (3)</td>
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<tr>
<td>770</td>
<td>Areal Linguistics (3)</td>
</tr>
<tr>
<td>780</td>
<td>Ethnolinguistics (3)</td>
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<tr>
<td>800</td>
<td>Thesis or Dissertation Research (arr.)</td>
</tr>
</tbody>
</table>

Mathematics

Graduate Faculty

P. R. Halmos, Ph.D. (Chairman)—analysis
E. H. Mookini, Ph.D. (Associate Chairman)—analysis
C. Gregory, Ph.D.—applied mathematics
E. Groth, Ph.D.—applied mathematics
A. Mader, Ph.D.—group theory
N. Nobusawa, Ph.D.—algebra
K. Rogers, Ph.D.—algebra, number theory
C. Weinbaum, 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. This comprehensive examination covers the area of algebra, complex and real analysis.

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)
- **406** Difference Methods for Differential Equations (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)
- **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)
- **649** Topics in Mathematics (3)
- **750** Seminar (1)
- **799** Directed Research (arr.)
- **800** Thesis Research (arr.)

**Mechanical Engineering**

**GRADUATE FACULTY**

- J. C. Burgess, Ph.D. (Chairman)—mechanics
- R. M. Fand, Ph.D.—heat transfer; fluid mechanics
- J. S. Fox, Ph.D.—thermodynamics; gas dynamics
- H. A. Gaberson, Ph.D.—mechanics; dynamics
- K. M. Htun, Ph.D.—materials processing
- J. Larsen-Badse, Ph.D.—materials science; corrosion
- W. Stuiver, Ph.D.—mechanics; space dynamics

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. The department offers both Plan A (thesis) and Plan B (non-thesis).

Graduate students in mechanical engineering are given wide latitude in formulating their programs of study. The department places no requirements on the student's program other than the following: it must fulfill Graduate Division requirements, it must be cohesive and represent a clear plan, and it must meet the approval of the student's thesis/program committee. Each student is encouraged to look outside the department for courses which
contribute toward a cohesive and clear educational plan having mechanical engineering as its central focus.

Applicants for admission to study must present a B.S. degree or its equivalent in engineering or science. Applicants for graduate assistantships must have the results of the Aptitude and Advanced Engineering Tests of the Graduate Record Examination sent to the department chairman before the application can be considered. Others are strongly urged to have the results of the Aptitude and appropriate Advanced test sent to the department chairman. Choice of Plan A or Plan B and identification of an interim adviser are required before the general examination will be given. The nature of the general examination is determined by the interim adviser after conference with the intended candidate.

Candidates must present 30 credit hours for the M.S. degree. Candidates are expected to attend all department seminars. Those electing Plan A are required to register for a total of 8 credit hours of ME 800 and to present an acceptable thesis. A final examination is given to each candidate during his last semester of residence. For candidates enrolled under Plan A, the final examination consists of a seminar appearance; for those enrolled under Plan B, it consists of an oral examination.

Mechanical engineering courses acceptable toward the M.S. degree are identified in the following list:

**Mechanical Engineering**

- ME 422 (475) Heat Transfer (3)
- ME 424 (346) Introduction to Gas Dynamics (3)
- ME 431 (460) Electronic Processes in Materials (3)
- ME 433 Failures in Materials (2)
- ME 441 Thermal Material Processing (3)
- ME 451 (343) Automatic Control (3)
- ME 455 (335) Nuclear Power Engineering (3)
- ME 471 (477) Fundamentals of Space Dynamics (3)
- ME 473 Mechanical Vibration and Shock (3)
- ME 474 Fundamentals of Acoustics (3)
- ME 496 Mechanical Engineering Topics (arr.)
- ME 611 (601) Classical Thermodynamics (3)
- ME 612 (602) Statistical and Nonequilibrium Thermodynamics (3)
- ME 621 (605) Conduction Heat Transfer (3)
- ME 622 (606) Convection Heat Transfer (3)
- ME 623 Radiation Heat Transfer (3)
- ME 624 (610) Gasdynamics (3)
- ME 626 Viscous and Turbulent Flows (3)
- ME 630 Materials Science Laboratory (2)
- ME 631 Mechanical Properties of Materials (3)
- ME 635 Corrosion Theory (3)
- ME 636 Materials for the Ocean Environment (2)
- ME 671 (640) Mechanics of Continua I (3)
- ME 672 Mechanics of Continua II (3)
- ME 696 Advanced Topics in Mechanical Engineering (arr.)
- ME 697 Seminar (1)
- ME 699 Directed Reading or Research (arr.)
- ME 800 Thesis (arr.)
FIELDS OF STUDY—MICROBIOLOGY

Microbiology

GRADUATE FACULTY
A. A. Benedict, Ph.D. (Chairman)—immunochemistry
L. R. Berger, Ph.D.—general microbiology and microbial physiology
O. A. Bushnell, Ph.D.—medical bacteriology
G. W. Chu, Sc.D.—host-parasite relationships
D. E. Contois, Ph.D.—general microbiology and microbial physiology
C. E. Folsome, Ph.D.—microbial genetics
H. A. Frank, Ph.D.—food microbiology
K. R. Gundersen, Ph.D.—marine microbiology
J. B. Hall, Ph.D.—comparative biochemistry and virology
M. Herzberg, Ph.D.—host-parasite relationships and immunology
H. R. Hohl, Ph.D.—ultrastructure and morphogenesis
P. C. Loh, Ph.D.—virology
B. Z. Siegel, Ph.D.—comparative biochemistry

AFFILIATE FACULTY
C. Yuen, Ph.D.—virology
L. Rosen, Ph.D.—virology

The department offers programs leading to the M.S. and Ph.D. in microbiology with areas of specialization in microbial biochemistry, genetics, and ultrastructure; the biology of infectious diseases; the biochemistry and genetics of viruses; immunology and immunochemistry; marine microbiology and developmental and cell biology. Studies in microbiology emphasize fundamental biological, biochemical, and physical-chemical approaches and not those primarily of an applied or diagnostic nature.

Intended candidates should have adequate undergraduate preparation in both biological and physical sciences, including microbiology, a basic course in either biology, botany, or zoology, and courses in organic chemistry, biochemistry, calculus, and physics. Intended Ph.D. candidates are urged to complete a course in physical chemistry. Deficiencies in undergraduate preparation can be made up in graduate study. Official scores of the Graduate Record Examination and two letters of recommendation are required of all applicants.

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

MICROBIOLOGY

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>625</td>
<td>Immunochemistry (4)</td>
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<tr>
<td>632</td>
<td>Advanced Microbial Physiology (3)</td>
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<tr>
<td>642</td>
<td>Marine Microbiology (4)</td>
<td></td>
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<tr>
<td>655</td>
<td>Virology (2)</td>
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<tr>
<td>657</td>
<td>Virology Laboratory (3)</td>
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</tr>
<tr>
<td>661</td>
<td>Ultrastructure of Microorganisms (3)</td>
<td></td>
</tr>
<tr>
<td>665</td>
<td>Electron Microscopy (2)</td>
<td></td>
</tr>
<tr>
<td>671</td>
<td>Microbial Genetics (4)</td>
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<tr>
<td>681</td>
<td>Host-Parasite Relationships (3)</td>
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<tr>
<td>*690</td>
<td>Seminar (1)</td>
<td></td>
</tr>
<tr>
<td>*699</td>
<td>Directed Research (arr.)</td>
<td></td>
</tr>
<tr>
<td>795</td>
<td>Special Topics in Microbiology (arr.)</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
<td></td>
</tr>
</tbody>
</table>
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.

The M.A. in music is offered with a concentration in dance ethnology, 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.

Applicants should take the Aptitude and Advanced Music Test of the Graduate Record Examination and have reports sent to the music department. For concentration in ethnomusicology and dance ethnology some undergraduate background in cultural anthropology is desirable and, depending on the field of thesis research, may be required. For concentration in dance ethnology a background in movement notation is required. For concentration in music education a record of teaching experience should be presented. For concentration in composition three original compositions should be submitted which are representative of previous work in various forms and media. 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.

Before being admitted to candidacy the student is required to successfully complete the general examination. This is divided into three parts, covering (1) a basic theory background as included in the first two years (one year for dance ethnology) 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.

Concentrations in composition, dance ethnology, ethnomusicology and musicology follow the thesis plan only (Plan A). 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 other
concentrations a foreign language or languages appropriate to the field of
thesis research or performance may be required as determined by the super­
vising 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 Euro­
pean languages, philosophy, psychology, sociology, or other disciplines closely
related to the field of thesis research as determined by the supervising com­
mittee. A seminar in the field of concentration is required of all candidates.

<table>
<thead>
<tr>
<th>COURSE</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>401</td>
<td>Ensemble (1)</td>
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<tr>
<td>402</td>
<td>University Concert Choir (1)</td>
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<tr>
<td>403</td>
<td>University Symphony Orchestra (1)</td>
</tr>
<tr>
<td>409</td>
<td>University Concert Band (1)</td>
</tr>
<tr>
<td>451</td>
<td>Advanced String Methods (2)</td>
</tr>
<tr>
<td>452</td>
<td>Advanced Woodwind Methods (2)</td>
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<tr>
<td>453</td>
<td>Advanced Brass Methods (2)</td>
</tr>
<tr>
<td>455</td>
<td>Advanced Percussion Methods (2)</td>
</tr>
<tr>
<td>457</td>
<td>Pacific and Asian Music in Education (2)</td>
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<tr>
<td>458</td>
<td>Voice Methods (2)</td>
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<td>459</td>
<td>Piano Methods (2)</td>
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<td>461</td>
<td>Symphonic Music (2)</td>
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<td>462</td>
<td>Choral Music (2)</td>
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<td>463</td>
<td>Opera (2)</td>
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<td>464</td>
<td>Twentieth Century Music (2)</td>
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<tr>
<td>469</td>
<td>Keyboard Music (2)</td>
</tr>
<tr>
<td>470</td>
<td>Art Music of Asia (2)</td>
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<tr>
<td>471</td>
<td>Music of Non-Literate Peoples (3)</td>
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<tr>
<td>481-482</td>
<td>Advanced Orchestration (2-2)</td>
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<tr>
<td>483-484</td>
<td>Counterpoint (2-2)</td>
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<tr>
<td>485-486</td>
<td>Form and Analysis (2-2)</td>
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<tr>
<td>487-488</td>
<td>Composition (2-2)</td>
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<tr>
<td>489-490</td>
<td>Advanced Composition (2-2)</td>
</tr>
<tr>
<td>491-492</td>
<td>Movement Notation (2-2)</td>
</tr>
</tbody>
</table>

*Graduate credit not available to candidates for a degree in composition.
†Graduate credit not available to candidates for a degree in musicology.
Regional Musics (1)  
(1) Asia  
(2) Oceania  

Advanced Problems in Music Theory (2)  
(1) counterpoint  
(2) form and analysis  
(3) orchestration  
(4) pedagogy  
(5) transcription of performance practices  
(6) movement analysis  

Directed Work (arr.)  
Thesis Research (arr.)

Nursing

GRADUATE FACULTY

M. Dunlap, Ed.D. (Chairman)—nursing practice theory and curriculum  
L. Bermosk, M. Litt.—mental health-psychiatric nursing  
Y. Gross, M.S.—community health nursing  
M. Olson, Ph.D.—research and leadership theory  
M. Patterson, Ed.D.—administration and organization of nursing services

The program covers four semesters and leads to a master of science degree under Plan B (non-thesis). It consists of a minimum of 35 semester hours including the requirements of: (1) one research course; (2) one advanced nursing seminar and practicum; (3) a minimum of 18 credit hours in nursing; (4) 24 credit hours in courses numbered 600 and above; and (5) study in related cognate fields.

In addition to requirements for admission to the Graduate Division, applicants must present evidence of: (1) a baccalaureate degree with a major in nursing from an accredited institution whose program is substantially equivalent to that given at the University of Hawaii; (2) completion of a course in elementary statistics; (3) licensure in Hawaii for the practice of nursing; and (4) official scores of the aptitude test of the Graduate Record Examination and of the Miller Analogies Test.

The general examination for admission to candidacy is given in the final week of the first semester. It is designed to test the student’s abilities to conceptualize and to undertake graduate study in the selected area of specialization. Upon admission to candidacy, a program committee of three graduate faculty members is selected by the student, two of whom shall be from the School of Nursing faculty. The seminar appearance and examination is scheduled four weeks before the end of the semester during which the degree is conferred, at which time the student is examined by the program committee.

There are four main elements in the graduate curriculum: nursing practice theory, nursing research, nursing concepts and cognates from related fields.

Areas of specialization are offered in the following: (1) Mental Health-Psychiatric Nursing which focuses on the clinical specialist practitioner in one to one relationship therapy, group therapy and family therapy in the context of community psychiatry. (2) Community Health Nursing which pre-
pares a community health nursing specialist who will deliver family-centered nursing care in a variety of community settings. (3) Administration of Organized Nursing Services which focuses on the preparation of nurses for supervisory and administrative leadership in organized nursing services.

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

**COURSES REQUIRED OF ALL MAJORS**

N 600-601 Methods of Research (3-3) Yr.

OR

N 602 Orientation to Nursing Research (3) II

N 607 Nursing Practice Theory (3) I

**COURSES TO FULFILL REQUIREMENTS OF THE AREAS OF SPECIALIZATION**

N 610 Curriculum Development (3) I, II

N 611 Socio-cultural Community Influences on Nursing Services (3) I, II

N 615 Interaction Processes (3) I, II

N 617 Bio-physical concepts of nursing practice (3) I, II (not offered until Fall 1969)

N 621 Concepts of Leadership in Nursing (3) I, II

N 625 Advanced Nursing Concepts I (3) I, II
  - A. Mental Health-Psychiatric Nursing
  - B. Community Health Nursing
  - C. Administration of Organized Nursing Services

N 627 Advanced Nursing Concepts II (3) I, II
  - A. Mental Health-Psychiatric Nursing
  - B. Community Health Nursing
  - C. Administration of Organized Nursing Services

N 630 Advanced Nursing Seminar (2) II
  - A. Mental Health-Psychiatric Nursing
  - B. Community Health Nursing
  - C. Administration of Organized Nursing Services

N 640 Advanced Nursing Practicum (4-6) II
  - A. Mental Health-Psychiatric Nursing
  - B. Community Health Nursing
  - C. Administration of Organized Nursing Services

N 655-656 Advanced Psychiatric Concepts (3-3) Yr.

N 699 Directed Study or Research (arr.) I, II

**COGNATES**

Psych 600 Group Dynamics (3)

IS 600

OR

BA 625 Theory of Administration (3)

PH 603 Organization of Medical Care Systems (3)

PH 613 Principles of Epidemiology (1-1)

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**Nutrition**

**GRADUATE FACULTY**

J. R. Beaton, Ph.D. (Chairman)—energy, environmental nutrition, endocrinology

D. M. Hilker, Ph.D.—carbohydrate metabolism, enzymology

I. J. Lichton, Ph.D.—fluids and electrolytes, endocrinology

B. R. Standal, Ph.D.—protein, lipid metabolism

F. Young, Ph.D.—lipid metabolism, atherosclerosis
In addition to the faculty listed above, the following faculty members participate in the graduate program in nutrition: D. R. Bassett, M.D. (Medicine), M. L. Brown, Ph.D. (Public Health), T. A. Rogers, Ph.D. (Physiology), and E. Ross, Ph.D. (Food Science).

Intended candidates for the M.S. in nutrition must present an undergraduate major in foods and nutrition or equivalent preparation in a related field which includes, as a minimum, qualitative and quantitative chemical analysis, organic chemistry, biochemistry, vertebrate zoology or physiology and general physics. Undergraduate deficiencies, as determined by the faculty, must be completed during the program of study. Courses for the graduate major will be selected from those listed below along with such courses in related fields as may be considered advisable. Only Plan A (thesis) is offered. Required courses are marked with an asterisk.

### NUTRITION

- 676 Nutrition: Metabolic Diseases (2)
- 677 Nutrition in Reproduction, Growth and Development (3)
- 678 Nutrition in Aging (2)
- 680 Research Methods in Nutrition (3)
- 681 Seminar (1)
- 682 Nutritional Status (1)
- 684 Lipids in Health and Diseases (2)
- 684-686 Advanced Human Nutrition (1-1)
- 699 Directed Readings and Research (arr.)
- *801 Thesis (arr.)

### Ocean Engineering

**GRADUATE FACULTY**

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

**AFFILIATES**

- E. Link—Ocean Systems
- G. Miller—ESSA

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 22 credit hours of course work and 8 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 credits must be taken outside of the undergraduate field of specialization. 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:

- OE 603 Ocean Engineering Environment (3)
- OE 697–698 Ocean Engineering Seminar (1–1)
- Ocn 620 Physical Oceanography (3)
- CE 641 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:

**OCEAN ENGINEERING**

- OE 605 Naval Architecture in Ocean Engineering (3)
- OE 606 Dynamics of Offshore Floating Structures (3)
- OE 608 Submarine Vehicle Naval Architecture (3)

**CIVIL ENGINEERING**

- CIV 621 Advanced Fluid Mechanics I (3)
- CIV 622 Advanced Fluid Mechanics II (3)
- CIV 635 Environmental and Sanitary Engineering Chemistry (4)
- CIV 636 Environmental and Sanitary Engineering Microbiology (4)
- CIV 642 Coastal and Harbor Engineering (3)
- CIV 644 Ocean Hydrodynamics Laboratory (2)
- CIV 653 Applied Soil Mechanics (3)
- CIV 671 Theory of Elasticity (3)
- CIV 674 Stability of Structures (3)
- CIV 675 Theory of Vibrations (3)
- CIV 676 Structural Dynamics (3)
- CIV 678 Theory of Plates (3)
- CIV 679 Theory of Thin Shells (3)
- CIV 681 Advanced Indeterminate Structures (3)
- CIV 682 Numerical Methods of Stress Analysis (3)
- CIV 683 Advanced Reinforced Concrete Design (3)

**ELECTRICAL ENGINEERING**

- ELE 623 Advanced Electronic Instrumentation (3)
- ELE 651 Advanced Feedback Control Systems (3)
- ELE 652 Optimization Techniques in Control Systems (3)
- ELE 655 Sampled-Data Control Systems (3)
- ELE 661 Theory of Digital Machines (3)
- ELE 671–672 Electromagnetic Theory and Applications (3–3)

**MECHANICAL ENGINEERING**

- MECH 611 Classical Thermodynamics (3)
- MECH 621–622 Conduction Heat Transfer (3–1)
- MECH 631 Mechanical Properties of Materials (3)
- MECH 636 Materials for the Ocean Environment (2)
The University currently offers a master's and a doctoral program in physical, chemical, geological, and biological oceanography.

Intended candidates should have a major in physics, chemistry, geology, geophysics, engineering, mathematics, biology, zoology, or botany. A minimum of one year of calculus, physics, and chemistry is required of all students prior to admittance. Depending upon the specific areas of interest, undergraduate deficiencies, if any, will be determined by the faculty. Preparation in at least one foreign language is strongly recommended as one is required for the M.S. and two for the Ph.D.

Generally the student's first year is devoted to removing deficiencies and completing the four basic oceanography courses. Subsequently the student specializes depending on his disciplinary inclination.

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

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.
Intended candidates for the M.A. in Pacific Islands studies must have an undergraduate background of 18 hours of credit (or the equivalent) dealing with the Pacific Islands area in such fields as anthropology, art, geography, history, linguistics, literature, music, political science, and sociology. The program requires a basic course in anthropology, geography or history of the Pacific Islands. Candidates are urged to have a reading knowledge of French, German, Hawaiian, Japanese, or Spanish and to utilize the 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 pertinent to the Pacific Islands in other fields, such as chemistry, microbiology, and nutrition, may be substituted. (Courses marked with an asterisk may but do not necessarily focus on the Pacific, and the instructor should be consulted before enrolling.)

AGRICULTURAL ECONOMICS

625 Economics of Agriculture: Tropical Countries and Asia (3)*
638 Land Use in Developing Countries (3)*
639 Agricultural Development Economics and Development Planning (3)*

ANTHROPOLOGY

450 Regional Cultures of Oceania (3)
   (1) Hawaii
   (2) Micronesia
   (3) Polynesia
   (4) Melanesia
### ART AND ARCHITECTURE
- **460** Regional Archeology (3)
- **699** Directed Research (arr.)
- **750** Research Seminar (in Oceania)(3)

### ENGLISH
- **480** Literature of the Pacific (3)
- **482** Narrative of Oral Tradition (3)
- **799** Directed Research (arr.)

### GEOGRAPHY
- **665** Seminar in Geography of the Pacific (3)
- **799** Directed Research (arr.)

### HISTORY
- **421** Australia and New Zealand (3)
- **422** History of Oceania (3)
- **424** History of the Hawaiian Islands (3)
- **425** The United States in the Pacific (3)

### MUSIC
- **401(78)** Oceanic Ensemble (1)
- **401(98)** Oceanic Dance (1)
- **417** Asian and Pacific Music in Education (2)
- **471** Music of Non-literate Peoples (3)
- **600** Seminar (in Ethnomusicology)(3)

### PACIFIC ISLANDS
- **699** Directed Research (arr.)
- **800** Thesis Research (arr.)

### POLITICAL SCIENCE
- **640** Comparative Government and Politics (3)
- **699** Directed Research (arr.)

### PSYCHOLOGY
- **665** Cross-Cultural Psychology (3)
- **699** Directed Research (arr.)

### PUBLIC HEALTH
- **664** Infectious Diseases of Man in the Pacific (3)

### SOCIOLOGY
- **430** Race Relations in the Pacific (3)
- **722** Seminar in Group Relations (3)
- **799** Directed Research (arr.)

### SPEECH
- **499** Special Problems (arr.)
- **784** Seminar in Intercultural Communications (3)

### ZOOLOGY-BOTANY
- **410** Natural History of the Hawaiian Islands (3)

### Pharmacology

**Graduate Faculty**

- W. C. Cutting, M.D. (Chairman)—chemotherapy
- M. H. Baslow, Ph.D.—marine pharmacology
- L. J. Cassette, Ph.D.—toxicology
- S. C. Chou, Ph.D.—molecular pharmacology
- E. Furusawa, M.D.—virus chemotherapy
- T. J. Haley, Ph.D.—toxicology
- J. F. Lenney, Ph.D.—biochemical pharmacology
The department of pharmacology offers the requisite work for medical students, and also both the M.S. and Ph.D. degrees.

Intended candidates for the M.S. or Ph.D. in pharmacology must have or acquire adequate preparation in biology, chemistry, physics and mathematics. The course work required includes basic courses in related sciences, or demonstrated competence 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. Courses in pathology and clinical medicine will be recommended for some students.

**PHARMAZCOLOGY**

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>600</td>
<td>Pharmacology: Actions &amp; Uses of Drugs</td>
<td>3</td>
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<tr>
<td>610</td>
<td>Pharmacology of Marine Toxins</td>
<td>1</td>
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<tr>
<td>613-614</td>
<td>Seminar in Pharmacology</td>
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<tr>
<td>615</td>
<td>Clinical Toxicology</td>
<td>2</td>
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<td>616</td>
<td>Structure Action Relationships</td>
<td>3</td>
</tr>
<tr>
<td>617</td>
<td>Bioassay</td>
<td>4</td>
</tr>
<tr>
<td>619</td>
<td>Experimental Pharmacodynamics</td>
<td>3</td>
</tr>
<tr>
<td>699</td>
<td>Directed Research</td>
<td>arr.</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research</td>
<td>arr.</td>
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</tbody>
</table>

**Philosophy**

**GRADUATE FACULTY**

W. E. Nagley, Ph.D. (Chairman)—philosophy of religion, existential philosophy
A. Borgmann, Ph.D.—metaphysics, phenomenology, philosophy of language
C. Y. Cheng, Ph.D.—Chinese philosophy, Taoism and Ch'an Buddhism
C. Y. Cheng, Ph.D.—philosophy of language, Chinese logic and methodology, Confucian philosophy
E. Deutsch, Ph.D.—Indian and comparative philosophy
K. K. Inada, Ph.D.—Buddhist philosophy, Asian thought
A. Kaplan, Ph.D.—aesthetics, methodology of the human sciences, philosophy of religion
H. E. McCarthy, Ph.D.—history of philosophy, philosophy of art, philosophy and literature

Intended candidates for the M.A. or the Ph.D. must present a minimum undergraduate background of 30 credits in philosophy, including courses in history of philosophy, ethics, and logic. 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.

M.A. candidates must demonstrate proficiency in a foreign language (i.e., a language other than English) which the department approves. Reading competence in two foreign languages, selected to accord with the area of dissertation research, are required of each candidate for the Ph.D. degree.

### Western

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<tr>
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<td>405</td>
<td>American Philosophy (3)</td>
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<td>410</td>
<td>Philosophy of the Physical Sciences (3)</td>
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<td>Symbolic Logic II (3)</td>
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### Asian and Comparative

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<td>Theravada Buddhist Philosophy (3)</td>
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<td>Mahayana Buddhist Philosophy (3)</td>
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<td>Ch'an (Zen) Philosophy (3)</td>
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<td>799</td>
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### Physics

**GRADUATE FACULTY**

J. R. Holmes, Ph.D. (Chairman)—optics, spectroscopy
R. J. Cence, Ph.D.—elementary particles
P. N. Dobson, Ph.D.—theoretical 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 (on leave 1968-69)
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.—theoretical physics
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 hour of undergraduate credits in physics, including atomic and nuclear physics, electromagnetism, mechanics, optics, and thermodynamics. 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.

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<td>Modern Physics Laboratory II (1 or 2)</td>
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<td>Relativistic Quantum Mechanics (3)</td>
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<td>Thesis Research (arr.)</td>
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**Physiology**

**GRADUATE FACULTY**

- T. A. Rogers, Ph.D. (Chairman)—environmental physiology
- S. Backin, M.D.—neurophysiology
- M. L. Brown, Ph.D.—physiology in nutrition
- I. F. G. Hampton, Ph.D.—environmental physiology, exercise
- S. K. Hong, M.D., Ph.D.—environmental and renal physiology
- F. I. Kamemoto, Ph.D.—endocrinology, osmoregulation
- I. J. Lichton, Ph.D.—endocrinology, fluid balance
- T. O. Moore, Ph.D.—environmental physiology, biorhythms
- M. D. Rayner, Ph.D.—nerve-muscle physiology
- O. Wayman, Ph.D.—reproductive physiology
- G. C. Whittow, Ph.D.—thermoregulation
- P. B. van Weel, Ph.D.—physiological ecology

**AFFILIATE FACULTY**

- C. F. Aquadro, M.D.—diving, hyperbarism

Intended candidates for the M.S. or Ph.D. in physiology 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**

- 602 Medical Physiology (6)
- 603–604 Seminar in Physiology (1–1)
- 699 Directed Research (arr.)
- 800 Thesis Research (arr.)

**Plant Pathology**

**GRADUATE FACULTY**

- I. W. Buddenhagen, Ph.D. (Chairman) — bacterial diseases, post-harvest diseases
- M. Aragaki, Ph.D. — fungal physiology, disease resistance, disease control
- O. V. Holzmann, Ph.D. — nematology, general plant pathology
- J. E. Hunter, Ph.D. — virology, general plant pathology
- M. Ishii, Ph.D. — virology
- D. S. Meredith, Ph.D. — epidemiology of plant diseases
- 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.

Dissertation research in plant pathology may be conducted by Ph.D. students in botany, entomology, horticulture and related fields.

**PLANT PATHOLOGY**

- 605 Clinical Plant Pathology (2)
- 610 Principles of Plant Disease Control (3)
**Political Science**

**GRADUATE FACULTY**

M. N. Goldstein, Ph.D. (Chairman)—political theory, politics
T. Becker, Ph.D.—judicial process, political theory
R. S. Cahill, Ph.D.—politics, political theory
H. J. Friedman, Ph.D.—comparative administration, comparative 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
N. Meller, Ph.D.—public administration, legislative behavior
R. M. Miwa, Ph.D.—political theory, legislative process
C. Neff, Ph.D.—international relations, comparative politics
G. D. Paige, Ph.D.—political development, leadership
F. W. Riggis, Ph.D.—comparative administration, development administration
I. H. Rohter, Ph.D.—political psychology, racial ideologies
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.

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.
Students working for the doctorate are required to take two courses, Political Science 600 (Scope and Method) and 601 (Research Design). In addition, they are strongly urged to take two additional courses in their first year: 602, Section A (Introductory Statistical Analysis) and 602, Section B (Multivariate Analysis). These last two courses are prerequisite to a number of second and third year courses, and the four courses are constructed as a sequence. Students pursuing the master's degree need not take the second semester of the methods sequence.

All courses numbered above 602 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**

**POLITICAL SCIENCE**

600 Scope and Methods of Political Science (3)
601 Political Analysis, Theory Building and Techniques (3)
602 Research Practicum (3)
610 Political Thought (3)
710 Seminar: Political Thought (3)

**Decision Making**

620 American Government (3)
630 Public Administration Theory (3)
640 Functional Aspects of Public Administration (3)
650 Public Law and Judicial Systems (3)
660 Politics (3)
720 Seminar: American Government (3) 760 Seminar: Judicial Systems (1)
740 Seminar: Public Administration (3) 770 Seminar: Politics (1)

**Political Development**

620 Comparative Government and Politics (3)
630 Public Administration Theory (3)
640 Public Law and Judicial Systems (3)
650 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) 730 Seminar: International Relations (3)
631 International Relations of Asia (3)

**General**

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

**Psychology**

**GRADUATE FACULTY**

J. M. Digman, Ph.D. (Chairman)—multivariate analysis, personality
A. Arkoff, Ph.D.—clinical, higher education
H. M. Bitner, Ph.D.—counseling
R. J. Blanchard, Ph.D.—physiological basis of animal behavior
### FIELDS OF STUDY—PSYCHOLOGY

- D. H. Crowell, Ph.D.—infant psychophysiological development
- A. L. Diamond, Ph.D.—psychophysics
- R. G. Gallimore, Ph.D.—personality development, personality and culture
- H. Groth, Ph.D.—infant responsiveness, physiological
- L. M. Herman, Ph.D.—human performance, discrimination learning
- D. W. Lewit, Ph.D.—social behavior, group processes
- H. H. Mansson, Ph.D.—cross-cultural psychology, cognitive dissonance
- J. Michel, Ph.D.—individual and group psychotherapy
- S. I. Shapiro, Ph.D.—verbal learning, human memory
- A. W. Staats, Ph.D.—human learning, applied behavior analysis
- R. G. Tharp, Ph.D.—clinical
- D. L. Watson, Ph.D.—personality measurement
- H. B. Weaver, Ph.D.—applied, social

### AFFILIATE FACULTY
- H. Gudeman, Ph.D.—clinical

Intended candidates for graduate degrees must present 18 hours of undergraduate work in psychology, including general and experimental psychology and statistics.

Programs leading to the Ph.D. are available in four fields of specialization: General-Experimental, Developmental, Social-Personality, Clinical. Applicants interested in further information should write to the chairman directly.

Intended candidates for the Ph.D. may, under special circumstances, offer 24 course credits in lieu of the M.A. degree, although all students without the M.A. degree from an American university must enter the program 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 concerning programs, facilities, and financial assistance are available from the department.

### PSYCHOLOGY

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<td>History of Psychology</td>
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<td>424</td>
<td>Abnormal Psychology</td>
<td>3</td>
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<td>425</td>
<td>Psychological Testing</td>
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<td>Industrial Psychology</td>
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#### Quantitative Methods

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<td>602</td>
<td>Statistical Analysis</td>
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<td>603</td>
<td>Design and Analysis of Psychological Experiments</td>
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<td>604</td>
<td>Scaling Methods</td>
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<td>Problems of Measurement and Evaluation</td>
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<td>606</td>
<td>Multivariate Methods</td>
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<td>Introduction to Mathematical Models</td>
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#### Experimental Psychology & Methodology

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<td>Experimental Method in Social Psychology</td>
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<td>Survey Research Methods</td>
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<td>Social Learning and Personality (3)</td>
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<td>Research in Developmental Psychology (3)</td>
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<td>Group Dynamics (3)</td>
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<td>Attitude Development and Change (3)</td>
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<td>Cross-Cultural Psychology (3)</td>
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<td>Psychology and Social Issues (3)</td>
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### Other

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<tr>
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<td>Seminar (3)</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>Thesis, Dissertation Research (arr.)</td>
<td></td>
</tr>
</tbody>
</table>

### Public Health

**GRADUATE FACULTY**

- R. K. C. Lee, M.D., Dr.P.H. (Dean)—public health administration
- M. L. Brown, Ph.D.—public health nutrition
- N. C. Burbank, Jr., Sc.D.—environmental health and sanitary engineering
- D. F. B. Char, M.D.—maternal and child health
- C. S. Chung, Ph.D.—biostatistics
- E. W. Clark, M.P.H.—public health education
- A. Connor, M.D., M.P.H.—maternal and child health
- D. L. Davenport, M.P.H.—public health education
- S. Furuno, M.S.P.H., Ph.D.—mental retardation
- J. Grossman, M.P.H., Ph.D.—public health education
- E. R. Jenney, M.D., M.P.H.—population and family planning studies
- A. Manoharan, M.B.B.S., Dr.P.H.—international health
- T. Masuda, M.P.H., Dr.P.H.—environmental sanitation
FIELDS OF STUDY—PUBLIC HEALTH

Y. S. Matsumoto, Ph.D.—population and family planning studies
R. E. Mytinger, Dr.P.H.—health services administration
C. B. Park, M.D., Dr.P.H.—biostatistics
R. R. Sachs, M.D., M.P.H.—public health administration
A. D. Schwartz, M.D., M.P.H.—mental health
R. Y. Suehiro, M.P.H.—international health
E. Voulgaropoulos, M.D., M.P.H.—international health
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 administration
L. Rosen, M.D., Dr.P.H.—epidemiology

The School of Public Health, accredited in 1965, offers programs leading to the M.P.H. and M.S. degrees.

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 11 semester hour 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 12 months. 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, they are limited to only certain areas of emphasis, and they usually require from 18 to 21 months to complete their programs. (Refer to Public Health Bulletin.)

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 11 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, comprehensive health planning, environmental sanitation, epidemiology, health services administration, international health, maternal and child health, mental health, mental retardation, population and family planning studies, public health administration, 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

*600 Public Health Organization and Administration I (2)
*601 Public Health Organization and Administration II (2)
602 Seminar in Medical Care Organization (2)
603 Organization of Medical Care Systems (3)
604 Institutional Health Care Facilities (3)
605 Non-Institutional Health Care Facilities (2)
606 Economics for Health Administrators (3)
607 Seminar in Health Services Administration (1)
611 Information Systems for Comprehensive Health Planning (2)
612 Health Aspects of Physical Planning and Community Design (2)
613 Seminar in Comprehensive Health Planning (2)
616 Basic Concepts of International Health (2)
617 Comparative Public Health Systems (3)
618 Seminar in International Health (2)
624 Community Mental Health (2)
629 Dental Public Health (2)
631 Public Health Nutrition I (2)
632 Public Health Nutrition II (2)
633 Seminar in Public Health Nutrition (1)
636 Medical Aspects of Disability (3)
642 Maternal and Child Health I (2)
643 Maternal and Child Health II (2)
644 The Handicapped Child (2)
645 Principles of Comprehensive Maternity Care (1)
646 Health Services for the Mentally Retarded (2)
649 Family Planning in Theory and Practice (2)
650 Demography and World Population Problems (3)
651 Fertility and Reproduction (2)
652 Staff Seminar in Population Dynamics (2)
*655 Public Health Statistics (3)
656 Biostatistics (3)
657 Statistical Analysis (1)
658 Seminar in Biostatistics (1)
*663 Principles of Epidemiology (2)
664 Infectious Diseases of Man in the Pacific Area (3)
665 Public Health Aspects of Chronic Diseases (2)
FIELDS OF STUDY—SECONDARY EDUCATION

670 Socio-Cultural Aspects of Health and Illness (3)
673 Educational Approach to Public Health (2)
674 Community Health Education Laboratory I (2)
675 Group Methods in Public Health (2)
676 Health Information Processes in Public Health—Theory and Practice (2)
677 Educational Program Evaluation in Public Health (2)
678 In-Service Training and Staff Development in Public Health (2)
679 Environmental Health (2)
682 Vector Control in Environmental Health (3)
683 Occupational Health I (2)
700 Management of Health Services (3)
701 Planning and Control of Health Services (4)
736 Seminar on Health of the School-Age Child (2)
746 Techniques in Demographic Analysis (2)
747 Statistical Methods in Epidemiological Research (3)
763 Advanced Community Health Education (2)
764 Advanced Community Health Education Laboratory II (2)
765 Advanced Seminar in Special Public Health Education Problems (2)
771 Environmental Control of Disease Through Food Protection (2)
772 Environmental Factors in Health Problems (3)
773 Measurement of Environmental Factors (3)
791 Advanced Public Health Practice in (Area of Emphasis) (3)
792 Seminar in Public Health (1-5)
799 Directed Research in (Area of Emphasis) (arr.)
800 Thesis Research (arr.)

Secondary Education

GRADUATE FACULTY
R. S. Alm, Ph.D.—language arts and reading
E. F. Chui, Ph.D.—physical education
J. N. Fultz, Ed.D.—social studies education
A. W. S. In, Ph.D.—secondary education, administration
R. M. Martin, Ph.D.—secondary education, administration, supervision, curriculum
J. D. Morris, Ed.D.—business education
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
D. H. Thompson, M.S.—physical education
N. Whitman, Ph.D.—mathematics education

Intended candidates for the M.Ed must present successful academic performance in the areas of societal and psychological foundations of education, and teaching principles and practices 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 Ed CI 635 or 636, 640*, Ed EP 708, one of Ed EF 650, 651, 660 or 683, and Ed CI 800.
Plan B: The program requires a minimum of 30 semester credit 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 Ed CI 635 or 636, 640*, 733 and one in Educational Foundations (recommended: Ed EF 650, 651, 660, 683).

**CURRICULUM AND INSTRUCTION**

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>439</td>
<td>The Business Education Curriculum (3)</td>
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<tr>
<td>634</td>
<td>Extraclass Activities in Secondary Schools (2)</td>
</tr>
<tr>
<td>635</td>
<td>Junior High School Curriculum (3)</td>
</tr>
<tr>
<td>636</td>
<td>Secondary School Curriculum (3)</td>
</tr>
<tr>
<td>637</td>
<td>Art in Secondary Education (3)</td>
</tr>
<tr>
<td>640</td>
<td>Seminar in Special Methods (3)</td>
</tr>
<tr>
<td>699</td>
<td>Directed Research (arr.)</td>
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<tr>
<td>733</td>
<td>Seminar in Curriculum (3)</td>
</tr>
<tr>
<td>737</td>
<td>Foundations in Art Education (3)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
</tr>
</tbody>
</table>

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

**Social Work**

**GRADUATE FACULTY**

- P. F. DelliQuadri, M.S.S.W (Dean)—social services
- R. Fisher, M.S.S.A.—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, cultural factors, research
- B. M. Polemis, Ph.D.—research
- G. F. Schnack, M.D.—psychiatry
- M. Sikkema, Ph.D.—cultural factors, international social work
- R. Takasaki, M.P.A.—administration
- A. M. Takase, M.S.—field work
- K. C. Tyson, M.S.—field work
- W. A. Walsh, Ph.D.—casework, human behavior and social environment

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 52 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 behavior in the social environment, 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**

- 627 Social Services (2)
- 628 Social Services (2)
- 633 Legal Aspects of Social Work (2)
FIELDS OF STUDY—SOCIOLOGY

656 Social Welfare Organization and Administration (2)
780 Administrative Methods in Social Work
781 Seminar in Social Welfare Policy (2)
785 Methods of Supervision in Social Work (2)

Human Behavior in the Social Environment

610–611 Human Behavior and Social Environment (3–3)
775 Advanced Social Psychiatry (2)
790 Cultural Factors in Social Work Practice (2)

Social Work Methods

605–606 Social Casework (2–2), or
608–609 Social Group Work (2–2)
612 Group Work Program Activities (1–1)
613 Community Organization (2)
660–661 Supervised Field Work (3–3)
760–761 Advanced Supervised Field Work (4–4)
765 Advanced Social Casework (2)
766 Seminar in Social Casework (2)
770 Advanced Social Group Work (2)
771 Seminar in Social Group Work (2)
777 Community Development in Social Work (2)
787 Current Practice in Community Organization (2)

Research

652 Social Research and Statistics (2)
798–799 Seminar in Research (3–3) or 800 Thesis Research

Sociology

GRADUATE FACULTY

D. S. Yamamura, Ph.D. (Chairman)—methodology and statistics, demography and ecology
H. V. Ball, Ph.D.—sociology of law, penology
H. R. Barringer, Ph.D.—methodology, comparative sociology
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
G. G. Kassebaum, Ph.D.—medical sociology; comparative sociology, social deviance
I. Krauss, Ph.D.—social stratification, urban sociology
R. E. Sakumoto, 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

Intended candidates for the M.A. should present an adequate undergraduate preparation in sociology. Prior to admission, applicants must submit official scores of the General Aptitude and advanced tests of sociology from the Graduate Record Examination (GRE). Students with undergraduate majors in fields other than sociology may apply for the graduate program by submitting GRE advanced examination scores in their areas of specialization as undergraduates, plus the General Aptitude Examination scores. Any deficiencies in undergraduate sociology must be rectified in the first year of graduate training.

All M.A. candidates must complete satisfactorily (i.e. with a “B” or better
grade in each course) a set of four core courses (Soc 610–611, 612, 613), normally in the first year of graduate work. An undergraduate course in elementary statistics is a prerequisite for entrance to Soc 610–611. Students regarded as deficient in undergraduate preparation may be required to postpone these "core" courses until the second year of graduate work. Decisions concerning these and other requirements will be made by the graduate adviser in consultation with students prior to registration.

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**

- 410 Population and Society (3)
- 415 The Agrarian Community (3)
- 416 The Urban Community (3)
- 421 People and Institutions of China (3)
- 426 People and Institutions of Japan (3)
- 427 People and Institutions of Korea (3)
- 430 Race Relations in the Pacific (3)
- 441 The Family (3)
- 443 Sociology of Religion (3)
- 445 Sociology of Education (3)
- 447 Industrial Sociology (3)
- 449 Social Stratification (3)
- 455 Juvenile Delinquency (3)
- 465 Sociology of Small Groups (3)
- 470 Collective Behavior and Social Movements (3)
- 481 Methods of Social Research (3)
- 485 Social Statistics (3)
- 491 Sociological Theory (3)
- 610 Methods and Statistics I (3)
- 611 Methods and Statistics II (3)
- 612 Classics of Sociological Theory (3)
- 613 Concepts and Propositions in Sociology (3)
- 714 Seminar in Methods of Research (3)
- 715 Seminar in Social Statistics (3)
- 716 Seminar in Theory Construction (3)
- 720 Seminar in Social Organization (3)
- 721 Seminar in Social Institutions (3)
- 722 Seminar in Group Relations (3)
- 730 Seminar in Social Disorganization (3)
- 731 Seminar in Social Change (3)
- 740 Seminar in Social Psychology (3)
- 741 Seminar in Culture and Communication (3)
- 750 Seminar in Demography and Human Ecology (3)
- 751 Seminar in Urban and Rural Sociology (3)
- 799 Directed Research (arr.)
- 800 Thesis Research (arr.)
Intended candidates for the M.S. or Ph.D. in soil science must present 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 chemistry, mathematics, physics, geosciences, botany, agronomy, microbiology and agricultural engineering (irrigation).

The Plan A (thesis required) program for M.S. is the only program offered. A minimum of 21 course credits is required, including a minimum of 12 credits, exclusive of research methods courses, in courses numbered 600–799. No more than 2 credits in directed research (Soils 699) may be allowed as course credits in fulfilling the above requirements.

The degree of Ph.D. in soil science is awarded only for distinguished scholarly achievement. The dissertation which is a significant original contribution to basic knowledge in the candidate's field is required. Only students with superior academic records in predoctoral programs will be accepted into the program. Mathematical preparation at least to the level of differential and integral calculus is strongly recommended.

An intended candidate for the Ph.D. will be required to demonstrate by examination advanced proficiency in one or more of the following fields: physical chemistry, organic chemistry, geochemistry, biochemistry, plant physiology, genetics, physics, geophysics, biophysics, mathematics, microbiology. He will also be required to take a predoctoral examination similar in nature to the general examination taken by all candidates for M.S. degrees. He will also be required to take written and/or oral comprehensive examinations and a final examination which will include a public defense of his dissertation. Prior to taking his comprehensive examinations he must demonstrate proficiency by examination in either French, Spanish, German or Russian.

Courses in the major field are to be selected from those listed below. Supplementary courses in related fields will be required as determined by the area of specialization. Candidates for M.S. and Ph.D. may specialize in tropical soil genesis and characterization, soil chemistry, soil physics, soil mineralogy, soil fertility, soil salinity or soil management.
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.I.A. and E.T.S. Required courses are marked with an asterisk; those numbered between 400 and 499 not taken as part of the undergraduate preparation must form part of the M.A. program. A minimum of 10-12 hours in Spanish literature courses is normally required of all candidates.

SPANISH

403-404 Advanced Oral Practice (3-3)
405 Spanish-English Translation (3)
431 Structure of Spanish (3)
441 History of the Spanish Language (3)
444 Spanish Dialectology (3)
461-466 Modern and Contemporary Spanish Literature (3-3)
481-486 Spanish American Novel (3-3)
490 Hispano-Philippine Literature (2)
621-626 Stylistics and Advanced Composition (3-3)
658 Seminar in Spanish Linguistics (3)
661 Spanish Literature Prior to the Golden Age (3)
670 Spanish Literature of the Golden Age (3)
697 Seminar in Hispanic Literature (3)
699 Directed Research (arr.)
800 Thesis Research (arr.)
HISTORY
487-488 History of Latin America (3-3)

LINGUISTICS
320 General Linguistics (3)
410 Articulatory Phonetics (3)
421 Introduction to Phonological Analysis (3)
422 Introduction to Grammatical Analysis (3)

EUROPEAN LANGUAGES
610 Contrastive Analysis of Spanish and French with English (3)
621 Comparative Romance Linguistics (3)
630 Seminar in Research Methods (1)

SECONDARY EDUCATION
335 Foreign Languages, Secondary (3)
640 Seminar in Special Methods (3)

ENGLISH
735 Seminar in Comparative Literature (3)

GEOGRAPHY
521 Geography of Europe (3)

Speech-Communication

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
B. H. Byers, Ed.D.—speech education
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
D. S. Ellis, Ph.D.—organizational communication, psychology—industrial, experimental research
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
S. E. Sanderson, Ph.D.—public address, interpretation, business and professional speaking
T. A. Welden, Ph.D.—speech education, rhetoric and public address, speech communication
H. H. Wong, Ph.D.—speech education, speech improvement, phonetics

The graduate program in speech-communication is currently undergoing extensive revision. The department offers the M.A. degree, Plan A or B.

Intended candidates may present a baccalaureate degree from a recognized university with a major in speech, communication, psychology, sociology, business administration, linguistics, education, or another related field. Applicants whose backgrounds are deficient for the successful pursuit of the M.A. degree may be required to strengthen certain areas.

For details of the program in speech-communication and for graduate course listings, please write the department chairman.
Speech Pathology and Audiology

GRADUATE FACULTY
M. Ansberry, Ph.D. (Chairman) 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 semester 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. These 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. The plan to be followed is determined by the student and his advisory committee. The decision is based upon specific interests of the student and his future educational and occupational objectives. These programs are so designed that the student who completes either should be able to meet the academic requirements for the certificate of clinical competence in both speech pathology and in audiology as established by the American Speech and Hearing Association. Under Plan A 36 semester credits plus a thesis are required; Plan B requires satisfactory completion of 44 semester credits of course work. The minimum length of time required for completion of either program by a regular graduate student who is admitted with no undergraduate deficiencies is one academic year of full-time graduate study plus two 12-week summer sessions.

Specialized courses offered at the graduate level are:

SPEECH PATHOLOGY AND AUDIOLOGY (SPA)

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<tr>
<th>Course Code</th>
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<tr>
<td>600</td>
<td>Research Methods (3)</td>
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<tr>
<td>610</td>
<td>Organic Disorders of Speech (3)</td>
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<tr>
<td>611</td>
<td>Auditory Training and Speech Reading (3)</td>
</tr>
<tr>
<td>612</td>
<td>Functional Disorders of Speech (3)</td>
</tr>
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<td>613</td>
<td>Language Development for Children with Hearing Deficiencies (3)</td>
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<td>701</td>
<td>Advanced Audiology (3)</td>
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<td>710</td>
<td>Advanced Practicum in Speech Pathology</td>
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<td>711</td>
<td>Advanced Practicum in Audiology</td>
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<td>720</td>
<td>Seminar in Speech Pathology</td>
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<tr>
<td>721</td>
<td>Seminar in Audiology</td>
</tr>
</tbody>
</table>

Section 1: General Clinical (3)  
Section 2: Public School (6)  
Section 1: General Clinical (3)  
Section 2: Public School (6)  
Section 1: Diagnostic Procedures  
Section 2: Functional Disorders (3)  
Section 3: Organic Disorders (1)  
Section 1: Diagnostic Procedures (3)  
Section 2: Rehabilitation (3)
Teaching English as a Second Language

GRADUATE FACULTY
R. C. Sittler, Ph.D. (Chairman)—teaching English as a second language; Romance linguistics
B. W. Bender, Ph.D.—Micronesian languages and linguistics; applied linguistics
R. H. Crymes, Ph.D.—English grammar; methods and materials in teaching English as a second language
G. Dykstra, Ph.D.—linguistics and learning programs
P. J. Heinberg, Ph.D.—automated instruction; experimental phonetics
M. F. Lester, Ph.D.—English grammar; linguistic theory
T. H. Plaister, M.A.—teaching English as a second language; testing second language learning; reading instruction
H. M. Schaafsma, M.A.—linguistics; applied linguistics; second language teaching
S. M. Tsuzaki, Ph.D.—Romance linguistics; language contact

The M.A. program in teaching English as a second language (TESL) is designed to prepare specialists in this field, particularly related to Asia and the Pacific Basin. Available both to American and foreign graduate students, this is a 36 credit, non-thesis program which includes coursework in general and applied linguistics, the structure and phonology of English, and methods and materials for TESL.

Students in this program are expected to have taken undergraduate coursework in American and/or British literature. Those having little or no such background may be required to take one or more undergraduate literature courses without credit toward the degree.

In addition to the general requirements of the Graduate Division, TESL program requirements include: (1) For native speakers of English, two years of college-level study of an Asian or Pacific language, or equivalent proficiency (demonstrated by examination). This requirement may be reduced to one year or the equivalent for students whose undergraduate major was in a European language. (2) For non-native speakers of English, attainment of special English proficiency standards set by the TESL program. Students who fail to satisfy these standards by the end of their program are awarded a certificate in lieu of the M.A. degree. Experience has shown that foreign students who score less than 550 on TOEFL will probably have difficulty in meeting the TESL English standards. (Coursework which may be necessary to meet the language requirements of (1) and (2) above is additional to the 36 credits specified by the program.)

Courses required of all program students total 18 credits, and are listed below. The remaining 18 credits are to be distributed equally between a minor area (English, Linguistics, or Speech-Communication), and elective courses. Because of problems of sequencing certain courses, entry into TESL is normally...
permitted only in Fall semesters. No program work is offered during summer sessions, although language training and some minor or elective courses may be available then.

Additional information relating to the matters discussed above, and to further program requirements, is contained in a program brochure. Those considering entry into the TESL program are urged to request this brochure from the chairman of the department of English as a second language, before applying for admission to the Graduate Division.

**LINGUISTICS**

- 320 General Linguistics (3)

**SPEECH**

- 412 Phonetics and Phonemics of American English (3)
  (English 404 may be substituted for Speech 412)

**ENGLISH**

- 401 Modern English Grammar (3)
- 404 English Phonology (3)
  (Speech 412 may be substituted for English 404)

**ENGLISH AS A SECOND LANGUAGE**

- 610 Teaching English as a Second Language (3)
- 710 Materials Development for TESL (3)
- 730 Seminar in Applied Linguistics (3)

### Zoology

**GRADUATE FACULTY**

- A. J. Berger, Ph.D. (Chairman) — ornithology, human and avian anatomy
- J. E. Alicata, Ph.D. — parasitology
- J. M. Arnold, Ph.D. — developmental biology
- A. H. Benson, Ph.D. — invertebrate zoology, systematics
- J. Branham, Ph.D. — experimental embryology
- V. E. Brock, M.A. — fishery biology, oceanography
- T. C. Cheng, Ph.D. — physiological parasitology
- G. W. Chu, Ph.D. — parasitology
- T. A. Ebert, Ph.D. — ecology
- 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
- J. E. Randall, Ph.D. — ichthyology
- E. S. Reese, Ph.D. — behavior, ecology, invertebrate zoology
- A. L. Tester, Ph.D. — fishery biology, biometry
- S. J. Townley, Ph.D. — invertebrate zoology, ecology, radio-biology
- P. B. van Weel, Ph.D. — physiology, physiological ecology

**AFFILIATE FACULTY**

- J. R. Hendrickson, Ph.D. — vertebrate zoology
- B. S. Rothschild, Ph.D. — fishery biology
- Y. Kondo, Ph.D. — malacology
- M. Takata, M.S. — fishery biology
- J. C. Marr, M.A. — fishery biology, population dynamics
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 calculus, 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. 702 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.

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