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○ Academic dates of significance.
□ Holidays and Recesses.

**HOLIDAYS**

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<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>September 7 Labor Day</td>
<td>February 15 Presidents' Day</td>
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<tr>
<td>November 3 General Election Day</td>
<td>March 26 Kuhio Day</td>
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<tr>
<td>November 9 Veterans' Day</td>
<td>April 9-17 Easter Recess</td>
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<tr>
<td>November 26 Thanksgiving Day</td>
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<td>December 24—January 3, Christmas Recess</td>
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<td>Event</td>
<td>First Semester</td>
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<tr>
<td>Last day to file applications and renewals of application for admission</td>
<td>May 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>
</tr>
<tr>
<td>Last day to file petition for admission to doctoral program (only by currently enrolled UH master's candidates graduating at end of semester)</td>
<td>Jun. 30</td>
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<tr>
<td>Registration</td>
<td>Sept. 1</td>
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<tr>
<td>Instruction begins</td>
<td>Sept. 8</td>
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<tr>
<td>Last day of registration for credit</td>
<td>Sept. 16</td>
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<tr>
<td>Last day to change from audit to credit</td>
<td>Sept. 16</td>
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<tr>
<td>Last day to add courses for credit</td>
<td>Sept. 16</td>
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<tr>
<td>Last day to file diploma applications</td>
<td>Sept. 28</td>
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<tr>
<td>Last day of removal of incompletes</td>
<td>Nov. 25</td>
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<tr>
<td>Last day of withdrawal from courses</td>
<td>Nov. 18</td>
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<tr>
<td>Last day to process Pass-Fail option</td>
<td>Nov. 18</td>
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<tr>
<td>Last day to change from credit to audit</td>
<td>Nov. 18</td>
</tr>
<tr>
<td>Last day for final examinations, Plan A and Ph.D.</td>
<td>Nov. 23</td>
</tr>
<tr>
<td>Theses and dissertations due in Graduate Division</td>
<td>Nov. 30</td>
</tr>
<tr>
<td>Last day for submission of Plan B final exam results</td>
<td>Dec. 7</td>
</tr>
<tr>
<td>Last day for titles of theses &amp; dissertations to be filed with Graduate Division</td>
<td>May 15</td>
</tr>
<tr>
<td>Last day of instruction</td>
<td>Dec. 16</td>
</tr>
<tr>
<td>Final examinations begin</td>
<td>Dec. 17</td>
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<tr>
<td>Term ends</td>
<td>Dec. 23</td>
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<tr>
<td>Commencement</td>
<td>Dec. 20</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

ADMINISTRATIVE OFFICERS

Harlan Cleveland, A.B., LL.D., L.H.D., D.C.L., Litt. D., President of the University
Richard H. Kosaki, B.A., M.A., Ph.D., Vice-President of the University
Kenneth K. Lau, B.A., J.D., LL.M., Vice-President for Business Affairs
Robert M. Kamins, B.A., M.A., Ph.D., Dean for Academic Development
H. Brett Melendy, A.B., M.A., Ph.D., Interim Dean for Academic Development
Robert E. Potter, A.B., M.A., Ph.D., Associate Dean for Academic Development
Alfred L. Ellingson, B.A., B.S., Director of Student Services
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THE UNIVERSITY OF HAWAII, the state-supported system of public higher education in Hawaii, conducts diverse programs in education, research and service for the state, the nation and the world community. It operates teaching and research facilities at more than 50 locations throughout the Hawaiian Islands and participates in international service and research activities in the Pacific Basin and Asian countries.

Throughout its history, a distinctive geographical and cultural setting has helped the University achieve excellence in certain areas of study. Geographical location has led to concentration in oceanography, marine biology and interdisciplinary studies of tropical environments, problems and resources. The physical characteristics of Hawaii have focused interest on natural phenomena in geophysics such as tsunami research, volcanology, astronomy and astrophysics. Hawaii's multi-racial culture and its ties with Asia have created a favorable environment for the study of various aspects of diverse cultural systems, including such subjects as linguistics, genetics, philosophy and inter-race relations.

The University offers course work leading to the bachelor's degree in 65 fields. The Graduate Division offers work leading toward the master's degree in 66 fields and the doctorate in 31.

In addition to its instructional program, the University conducts organized research in several fields. Special units initiate and conduct research in economics, education, biomedicine, Pacific and Asian linguistics, social sciences, water resources, marine biology, geosciences, astronomy, genetics and agriculture.

The main campus is located in the Manoa Valley section of Honolulu, the capital of the state. The University maintains a second four-year campus at Hilo and there are three community college campuses on Oahu, one each on Maui, Kauai, and Hawaii.

Space observatories and associated research facilities of the University are located on the islands of Maui and Hawaii. The Hawaii Institute of Marine Biology, operated by the University, is located on Coconut Island in Windward Oahu. The University conducts the largest Peace Corps training program in the nation and its facilities are located on the islands of Hawaii and Molokai. Branches of the Hawaii Agricultural Experiment Station are located on five of the major islands of the state.

History. The University of Hawaii was founded in 1907 as a federal land-grant institution specializing in agriculture and the mechanic arts. Referred to as the College of Hawaii, it was launched with five regular students and 12 faculty members on a temporary campus in downtown Honolulu. In 1912 the
General Information

Campus was moved to its present location in Manoa where an initial ninety acres were set aside for buildings. With the addition of a College of Arts and Sciences in 1920, the institution became the University of Hawaii.

In the following two decades, the University began to develop a special interest in bridging the East and West. A period of physical and academic expansion followed World War II, and new responsibilities and opportunities for growth were presented to the University when Hawaii became a state in 1959.

In 1960 the federal government created the East-West Center on the Manoa campus. Officially called the Center for Cultural and Technical Interchange between East and West, it aims to promote mutual understanding among the nations of the world through its exchange and service programs.

The University accepted a new task in 1964 when the state legislature authorized it to operate a state-wide community college system. With four state-owned technical schools for a base, the system's fifth campus in Leeward Oahu opened in September 1968, and a sixth in Hilo was added in 1969. The community colleges offer a variety of college transfer and general education curricula on all campuses and award associate degrees.

Colleges and Schools. The academic work of the University is administered by the following units: the colleges of Arts and Sciences, Business Administration, Education, Engineering, Health Sciences and Social Welfare, and Tropical Agriculture and the Division of Continuing Education. Included in the College of Tropical Agriculture are the Cooperative Extension Service and the Hawaii Agricultural Experiment Station. The School of Travel Industry Management is part of the College of Business Administration. Four professional schools are included in the College of Health Sciences and Social Welfare: School of Medicine, School of Nursing, School of Public Health and School of Social Work. The School of Library Studies is an additional professional school.

An Honors Program embraces all colleges. The Graduate Division assumes the major role in the organization and development of graduate programs.

Accreditation. The University is accredited by the Western Association of Schools and Colleges. Professional programs in the curriculum are individually accredited by appropriate agencies. Students may transfer credits to other American or foreign universities on the same basis as course credits are transferred by other accredited American universities.

Academic Year. The academic year is divided into two 17-week semesters, a 12-week Summer Session which offers two 6-week terms, and a 2-week Interim Period between semesters.

Administrative Organization. Governance of the University of Hawaii is vested in a board of regents appointed by the governor of the state.

The president of the University serves as executive officer of the board of regents and as such is responsible for educational leadership and is the administrative head of the University. The president's staff includes vice-presidents, the secretary of the University, assistants to the president, an office of international programs, and the director of University relations and development.
GENERAL INFORMATION

The council of deans advises the vice-president for academic affairs on matters of academic policy. The faculty senate is similarly advisory to the president and the board of regents.

Colors, Seal and Motto. The University of Hawaii colors are green and white. The rainbow, a frequent sight in Manoa Valley, is the popular campus symbol, and the University teams traditionally are nicknamed “The Rainbows.” The University seal contains a torch and book titled Malamalama (The Light of Knowledge) in the center of a circular map of the Pacific, surrounded by the state motto, Ua Mau Ke Ea o Ka Aina i Ka Pono (The Life of the Land is Preserved in Righteousness). The University motto, inscribed in both the Hawaiian and English language on Founders’ Gate at the entrance to the Manoa campus on University Avenue, is “Above all nations is humanity.”

Inquiries. Prospective students should address inquiries to the following offices.


Other Campuses. Hilo campus: Hilo Campus, University of Hawaii, Hilo, Hawaii 96720. Community colleges: Honolulu Community College, 874 Dillingham Boulevard, Honolulu, Hawaii 96817; Kapiolani Community College, 620 Pensacola Street, Honolulu, Hawaii 96814; Leeward Community College, 96-050 Farrington Highway, Pearl City, Hawaii 96782; Kauai Community College, RR 1, Box 216, Lihue, Kauai, Hawaii 96766; Maui Community College, 310 Kaahumanu Avenue, Kahului, Maui, Hawaii 96732; Hawaii Community College, 1175 Manono Street, Hilo, Hawaii 96720.

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 Cooperative Extension Service and the Hawaii Agricultural Experiment Station are discussed under the College of Tropical Agriculture. The Center for Engineering Research is discussed under the College of Engineering.

In accordance with the legislation which created it, the Economic Research Center conducts short- and long-term research studies of direct pertinence to the economic welfare and development of Hawaii. In cooperation with the resident academic departments of the UH, the Center offers research training to advanced students.
GENERAL INFORMATION

The Education Research and Development Center adopts an interdisciplinary behavioral science approach to the conduct of basic and applied research, evaluation and development concerned with educational 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.

The Division of Educational Broadcasting is responsible for all of the production and transmission functions of the Hawaii Educational Television Network, which, through its chain of transmitters, serves the entire state of Hawaii. Its studios, located on the University of Hawaii campus, form a production center for the creation of teaching materials broadcast daily into classrooms in the public schools throughout the State. In addition, a wide range of program materials are produced, or acquired from other sources, to serve the general public with information in the arts, political affairs, and public concerns. Direct, college-level, teaching materials for “closed circuit” use on campus are also produced, and the studios serve as a laboratory for students in speech and educational communications courses.

The University Instructional Resources Service Center is staffed by instructional and media specialists. Upon request they offer assistance and consultation to faculty in the examination of instructional objectives, overall strategy planning, organization of instructional media, development of evaluating systems, and the necessary follow-up for effective development and implementation of programs.

The selection, location, production, evaluation and effective use of media are coordinated for faculty and staff by the Center which has three major sections. Instructional Systems operates the closed circuit television system, twelve multi-media auditoria and Varsity Theatre. Graphics prepares and develops a wide range of graphic materials including transparencies for projection and diagrams, by using various processes such as diazo and photography. The Media Lab is used for demonstrations, media workshops and videotaping for instructional self-analysis. It also includes self-service facilities where equipment and materials are provided for faculty who wish to make their own transparencies and other instructional materials.

The Thomas Hale Hamilton Library, located on the Mall, houses the main book and periodical collections of the University of Hawaii Library. Maximum utilization of the library's resources is the aim of the organizational plan which places a humanities, social science and science-technology reference librarian near the reference materials and current periodicals of the respective broad subject area. Hamilton's openstacks contain approximately 605,000 volumes, including over 13,000 currently received serial titles. Microform and the major research collections are located in Hamilton except these listed below which will
remain in Sinclair Library until Phase II of the Hamilton Library is completed. The four-story building which provides space for 955 readers has an open reading lanai on the top floor.

**Gregg M. Sinclair Library**, located at University Avenue and Campus Road, houses the Undergraduate Collection, as well as the Government Documents, Rare Books, Archives, Hawaiian & Pacific research collections, and the East-West Center Library’s Oriental Collection. As the undergraduate library, Sinclair has the Reserve Books (graduate and undergraduate), a collection of college catalogs, a collection of children’s literature, and a listening center where course-related material is available via a dial-access retrieval system. Sinclair Library has an 85,000 volume undergraduate collection and seats for 2,000 readers.

**Audio-Visual Services** located in Sinclair Library circulates the library’s collections of approximately 900 film titles, as well as filmstrips, media kits, phonodiscs, slides, tapes and transparencies. Portable equipment to utilize effectively these resources is lent upon request. A-V Services also maintains pools of such equipment conveniently located in eleven classroom buildings on campus. This Library unit will assist any department on campus in obtaining maintenance service for departmental audio-visual equipment.

Audio-Visual Services operates the Listening Center in Sinclair Library and also provides such services as PA systems for special events and tape duplications.

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
GENERAL INFORMATION

Land and Natural Resources—Division of Fish and Game, and the U.S. Bureau of Sport Fisheries and Wildlife—Division of Fishery Services.

The Hawaii Institute of Geophysics was organized to take advantage of the unique position of Hawaii as a national laboratory for conducting geophysical research in the broad field of the earth sciences. In cooperation with academic departments devoted to the physical sciences, the institute conducts research programs and provides advanced training in geodesy, aeronomy, meteorology, oceanography, solid earth geophysics, geology, soils and geochemistry. The main laboratory of the institute is located at 2525 Correa Road on the campus. The institute also maintains a cloud physics observatory at Hilo, Hawaii, a ship operations facility at Pier 18, Honolulu, and a seismographic observatory in upper Manoa Valley.

The Hawaii Institute of Marine Biology, established in 1950, with facilities on Coconut Island in Kaneohe Bay and at Kewalo Basin, 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 an applied resource development and exploitation research under the Sea Grant Program.

The Industrial Relations Center, established in 1948, seeks to promote understanding of labor-management relations problems, techniques and policies. It serves labor, management and the community by providing information on personnel and industrial relations. The center maintains a library containing the basic information services, as well as current publications; provides reference service; and assists in conducting conferences, lectures and group discussions, and in training of advanced students. Research studies in basic industrial relations problems are published by the center, as well as a monthly Newsletter, a bimonthly Selected Acquisitions List, reprints, reading materials and bibliographies.

The Labor-Management Education Program, instituted in 1965, is under the general supervision of the Industrial Relations Center, College of Business Administration. Its objectives are to provide basic leadership training for those associated with management and labor, to promote (1) understanding by both: groups of the fundamental problems of mutual interest with which they deal; (2) knowledge of the factors which are essential to productive relations between them; and (3) appreciation of the public’s interest in the satisfactory solution of their common problems. In addition to its schedule of general courses, the program conducts special courses, one-day and week-end institutes, conferences and staff training programs.

The Institute for Astronomy was founded in July 1967, to assume responsibility for the development of the University’s research programs in astronomy. In cooperation with the department of physics and astronomy, with
which certain of its staff share appointments, the institute provides graduate training on the Manoa campus and at its observing facilities. The institute operates observatories on Mount Haleakala, Maui, for studies of the sun (especially the corona) and of the zodiacal light. On Mauna Kea, Hawaii, an observatory for planetary and stellar studies, equipped with an 88-inch and two 24-inch telescopes, has recently been completed. A space astronomy program has obtained high resolution ultraviolet spectrograms of the sun from rockets, and is planning work based on satellites and space probes. The offices of the scientific staff, laboratories for data reduction and instrument development, and shops for instrument construction and maintenance, are located on the Manoa campus.

The Institutional Research Office is responsible for conducting and coordinating research relating to the University of Hawaii. An advisory committee aids in selecting institutional studies which are necessary for the University to function effectively and to plan realistically for the future. The office also develops and analyzes data on students, faculty and academic programs.

The Laboratory of Sensory Sciences performs basic research on all the sensory capabilities of man and other animals. Vision, hearing, taste, smell and the senses of the body are studied as well as their associated nerve reactions. In the laboratory are included the scientists, students and equipment in the disciplines of biophysics, psychophysics, electrophysiology, neurology and behavior, all investigating in common, but from different viewpoints, the basic question of the nature of sensation. This interdisciplinary approach, plus the year-round availability of marine animals for study in Hawaii, makes the laboratory unique in the study of the sensory processes.

The Land Study Bureau is the center of land research for the University and the state of Hawaii. The bureau plans and conducts a dynamic program of basic and applied research, and publishes its findings, with the objective of achieving highest and best use of the lands of Hawaii. Research is interdisciplinary with a broad base in the physical and social sciences. The bureau participates in the teaching program of the University and provides data for and works cooperative­ly with students, faculty and staff (including the East-West Center) as they seek solutions to Hawaii's environmental, economic and social problems. The bureau also advises and participates in the technological and economic development of areas throughout the Pacific and Asia.

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

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 1954. Several hundred species of exotic trees and shrubs are established, inventoried and maintained, providing the University and scientific community with an unrivaled facility for research on tropical and subtropical plants.

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

The Pacific Biomedical Research Center encourages investigations in the areas of subcellular biology, microbiology, cell structure and function, regulatory biology, genetics, behavioral sciences, epidemiology and other areas of medical research. 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 microbiology, physiology, biochemistry, biophysics, and psychology, in which it fosters and facilitates research projects of biomedical interest.

The Pacific Urban Studies and Planning Program is a multidisciplinary endeavor, located in the College of Arts and Sciences and directed by the participating academic departments and professional schools — architecture, economics, engineering, geography, political science, public health, social work and sociology. These departments and schools join with the program in offering graduate studies emphasizing planning and urban and regional development. The program also sponsors and facilitates problem-oriented research on urban and planning problems, particularly those relevant to Hawaii, the Pacific Basin and Asia and participates in, coordinates with and supports related University efforts.

The Population Genetics Laboratory was established in 1968 to conduct research in human genetics, especially on peoples of the Pacific Basin. The CDC 3100 computer at the laboratory is used also by visiting investigators from other institutions. The laboratory has been designated by the World Health Organization as its International Reference Centre for Processing of Human Genetics Data.

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 provides an opportunity for Asian and American scholars to participate in cooperative research.

The Social Welfare Development and Research Center, operated by the
School of Social Work, is involved in social welfare planning efforts, particularly in the fields of juvenile delinquency and youth development. It offers consultation and training to agency and interagency programs through workshops, seminars, special University courses and other projects.

The Speech and Hearing Clinic is operated by the division of speech pathology and audiology 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 Speech Communication Center provides programs for students discovered to need special attention to improvement of their communication skills. The department of speech-communication conducts the evaluation program for the University. Students may be referred by their instructors for evaluation at any time. Persons whose skills are evaluated as below criterion are trained in the center until these skills are re-evaluated as at or above criterion (usually after fewer than twenty clock hours of training). Within the space available, the center accepts, on a fee basis, persons not enrolled in the University. The center also engages in basic and applied research and provides training of researchers in speech-communication.

The Statistical and Computing Center operates an IBM 7040-1401 system and an IBM 360/65 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 and monographs, particularly those dealing with Hawaii, the Pacific and the Orient; regional books; and three scholarly journals, Pacific Science, Philosophy East and West and Oceanic Linguistics.

The Press is a member of the Association of American University Presses and the American Book Publishers Council. It was established in 1947 as a division of the University operating with the guidance of an advisory committee of seven members, drawn from the administration and faculty and appointed by the president. Book manuscripts should be sent to the director, journal papers to the respective editors-in-chief.

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 Waikiki Aquarium is a state-owned museum specializing in Hawaiian aquatic exhibits. It is located in Waikiki and is operated by the University of Hawaii as a place for the education, recreation and inspiration of Hawaii's residents and visitors.

The Water Resources Research Center, established in 1964, plans and
conducted 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.

INTERNATIONAL PROGRAMS

The Office of International Programs aids the University in its international programming efforts by providing information, informal coordination and services as required. The office provides on-campus assistance to foreign visitors engaged in related international programs, as needed.

The assistant to the president for International Programs provides general administrative support and program guidance to the University’s training centers; coordinates all business, administrative and training aspects of the University’s international contracts; 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.

With the establishment of the new Center for Cross-Cultural Training and Research, the University’s efforts in training and research will be consolidated into one organizational unit. Training for Peace Corps, the Agency for International Development, the private sector and for many Asian organizations will be carried on at the Center’s headquarters in Hilo, and other sites throughout the state and in Asia. The University continues to train more people for service in Asia and the Pacific than any other American institution.

The Center for Cross-Cultural Training and Research is administratively responsible to the Chancellor of the University of Hawaii at Hilo, maintaining close liaison with the Manoa campus and the international community through an advisory council.

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 Hawaiian Fruit Flies Investigations laboratory is maintained on the campus by the U. S. Department of Agriculture, Entomology Research Division. Its principal objectives are the development of basic information on, and methods for the control and eradication of fruit fly agricultural pests, and recommendations under which produce can be treated and passed through quarantine into mainland and other markets. A substation is located at the Waiakea Experiment Farm near Hilo. The laboratory cooperates with the department of entomology, and other University and state agencies.

The Hawaiian Sugar Planters' Association provided the funds for building the Agricultural Engineering Institute with shop facilities for instruction and research. The association donated its renowned Lyon Arboretum, a dense botanical tree garden maintained by HSPA since 1919 and now used as an experimental lab by the University's botany department. HSPA has provided grants to the departments of agronomy and soils and plant pathology. It also supports a continuing graduate fellowship in entomology and supervises graduate students in research. Staff scientists and engineers serve as members of the affiliate graduate faculty and work on joint research projects with the University.

The Honolulu Academy of Arts has important collections of both Occidental and Oriental art. Installations of the permanent collection are augmented by a diversified schedule of temporary exhibitions including historical and temporary material from world-wide sources and a research library for Academy members, scholars and students.

The Pacific and Asian Affairs Council provides a World Affairs Program as an educational service to all public and private secondary schools throughout the state. The program operates in the schools as a major curriculum supplement. To produce the program, PAAC coordinates educational and professional resources in international affairs.

The Pineapple Research Institute of Hawaii, supported by the pineapple industry, has most of its scientific staff on the affiliate graduate faculty of the University. Offices and laboratories are located on a 150-acre experimental farm near Wahiawa, Oahu.

The Biological Laboratory, Honolulu, of the U.S. Bureau of Commercial Fisheries is located adjacent to the campus. Several of its senior staff members hold appointments on the affiliate graduate faculty. The laboratory's mission is to conduct research on the oceanography and the fishery resources of the central Pacific Ocean. Its library, a comprehensive collection of works in the marine sciences, is available for use by students and faculty of the University. Requests for information should be addressed to the Director of Biological Laboratory, Honolulu, Bureau of Commercial Fisheries, P. O. Box 3830, Honolulu, Hawaii 96812.

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.
GENERAL INFORMATION

TUITION AND FEES

(Tuition and fees subject to change)

Tuition and fees for graduate students are the same as for undergraduates.

Application Fee*

Out-of-state applicants pay a $10.00 application fee for each application postmarked before September 1, 1970. From September 1, 1970, a $10.00 application fee will be required of all applicants, in-state as well as out-of-state, for each application postmarked after August 31, 1970.

Tuition

Students registered for 12 or more credit hours in any semester pay $85.00. Nonresidents pay $340.00 per semester.

Students registered for fewer than 12 credits during the regular session pay $9.00 per credit hour. Nonresidents pay $30.00 per credit hour.

Division of Continuing Education and Summer Session. Students registered in the division of continuing education and summer session pay $20.00 per credit hour. Nonresidents pay $30.00 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 treasury 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 graduation and thesis binding fees should be made at the treasury 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.

*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, and does not carry credit toward tuition in 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:

- 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

Graduate Assistantships. The University offers a number of graduate 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 or technical assistants and carry a limited program of study. The initial remuneration is $3378 payable in twelve monthly installments, and waiver of tuition 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 from fall registration week through spring commencement. 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. 29 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 in the following list:
GENERAL INFORMATION

Castle and Cooke Grant
Danforth Graduate Fellowships
NDEA, Title IV, Graduate Fellowship Program
EPDA, Part C, Teacher Fellowship
EPDA, Part E, Community College Instructors
NEDFL, Title VI, Modern Foreign Language Fellowships in Asian Studies
Summer Institutes
Hawaii Teacher Corps Program
NIMH Predoctoral Research Fellowships
National Science Foundation Graduate Traineeships
Nursing Training Programs
Public Health Service Predoctoral Fellowships
Public Health Service Traineeships
Social Work Training Programs
Fellowships in Librarianship, Title II-B
Rehabilitation Services Administration Training Programs:
  Speech Pathology & Audiology
  Social Work
  Public Health

Mr. H. Roy McArdle
University Placement Officer
Dr. Shosuke Goto, Assistant Dean
College of Tropical Agriculture
Department Chairman
Dean, College of Education
Dean, College of Education
Mr. Windsor Hackler, Executive Secretary
Asian Studies Program
Dean, Summer Session
Hawaii Teacher Corps
85220 MacArthur Street, Waianae, HI 96792
National Institutes of Health
Bethesda, Maryland 20014
Associate Dean, Research & Fellowships
Graduate Division
Dean, School of Nursing
Chief, Career Development Review Branch,
Division of Research Grants
National Institutes of Health
Bethesda, Maryland 20014
Dean, School of Public Health
Dean, School of Social Work
Dean, Graduate School of Library Studies
Dr. Merle Ansberry, Speech Clinic
Dean, School of Social Work
Dean, School of Public Health

FINANCIAL AIDS

The University of Hawaii participates in the National Defense Student Loan, College Work Study and Guaranteed Loan Programs. All of these are Federally sponsored programs and are administered in accordance with Federal laws and guidelines.

Applications and information may be obtained from the Director of Financial Aids, 1627-A Bachman Place, Honolulu, Hawaii 96822. Applications should be returned by March 1 for consideration for the following school year. No action will be taken on applications for financial assistance until the student has been officially admitted to the University of Hawaii.

In applying for a Guaranteed Loan, first contact the State Guarantee Agency in the state where you maintain legal residence.

All new out-of-state students should also submit a Parents' Confidential Statement (PCS) through the College Scholarship Service. Application blanks may be obtained by writing to College Scholarship Service, Box 176, Princeton,
NEW JERSEY 08540; BOX 881, EVANSTON, ILLINOIS 60201; OR BOX 1025, BERKELEY, CALIFORNIA 94701.

Besides the Federal programs described above, the University maintains information about jobs in the community and on campus to assist students who seek part-time employment to defray a part of their expenses. Students are cautioned, however, about depending only on part-time work to meet the expenses of Hawaii's high cost of living. Applications for employment must be filed in person.

STATE HIGHER EDUCATION LOAN PROGRAM. This loan program is available to qualified full-time resident students attending the University of Hawaii. Payment of interest and principal is not required until six months after termination of full-time studies. The loan interest rate shall be one-half of the commercial loan interest rate prevailing in the State at the time the borrower ceases full-time studies.

VETERAN'S AFFAIRS. The Financial Aids Office assists veterans and/or their dependents with their enrollment at the University of Hawaii 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. Any addition or reduction in credit loan subsequent to initial registration in a semester or term must be reported immediately to the Financial Aids Office; this is the student's responsibility. Failure to properly report any changes in credit load promptly may result in overpayment and/or delayed payments. Inquiries regarding all veteran's affairs should be directed to the Veteran's Adviser, Financial Aids Office, University of Hawaii, 1627-A Bachman Place, Honolulu, Hawaii 96822.

LIVING ACCOMMODATIONS AND EXPENSES

The student must be fully aware of several problem areas in making plans to attend the University of Hawaii.

First, finding suitable housing will be a major problem unless handled in advance of academic registration. Acceptance to the University does NOT assure one of housing. Housing in this community is scarce, difficult to find and expensive.

Second, there is only a limited number of residence hall facilities on campus. Almost all of these assignments go to state of Hawaii residents since priority is given to these students. There are no facilities on campus for married students. The Student Housing Office keeps listings of available off-campus spaces but most of these are small units scattered throughout Honolulu. These units are limited and reserved usually a month or more in advance of a term. Remaining facilities are usually farther away from campus and very expensive.

The student is cautioned to be prepared to make temporary housing arrangements in hotels or other quarters, if possible in advance, and to bear in
mind that rental rates can quickly use up personal funds. He must utilize all possible avenues of searching for housing including newspapers, rental agencies, personal or professional contacts in the community or other sources.

Inquiries concerning student housing should be directed to the Student Housing Office, Johnson Hall-A, 2555 Dole Street, Honolulu, Hawaii 96822.

Gateway House, the only hall available to graduate students, 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 $436 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. However, these listings are very limited and quickly exhausted. Moreover, these 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. Spaces which are available to be shared with other students are listed in the office for convenience but names of individual students or roommate requests are not listed. The rush for housing usually starts about three weeks prior to beginning of classes. There is no place on campus to which luggage or mail may be forwarded ahead of arrival.

### Food Services

In addition to the Gateway House cafeteria, dining facilities on 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 $2,408 per year for board, room, tuition, registration and special course fees, and books. Off-campus housing may be higher. These estimates do not include the cost of medical or dental expenses, additional dependents or transportation. Students from outside the state should add the cost of transportation to and from Hawaii and additional items for adjustment in a new community.
STUDENT HEALTH SERVICE

The Student Health Service is set up to assist the student in protecting his health. Facilities are housed in the Student Health Service building located at 1710 East-West Road and include both an out-patient clinic and an infirmary. Most of the common everyday illnesses that occur in a student can be cared for through this service, and if simple bed care is indicated, the student may be admitted to the infirmary. The clinic hours run from 8:00 a.m. to 11:30 a.m. and 12:30 p.m. to 4:00 p.m., Monday through Friday and 9:00 a.m. to 11:00 a.m. on Saturdays. A nurse is available during off-duty hours for emergency services only.

Although the service is free, students must pay for drugs prescribed and there is an infirmary charge at $4.00 a day. The health care services are limited; supplemental health and accident insurance is therefore essential to provide the student with medical care beyond the scope of this service. For information about the ASUH sponsored health insurance plan, consult the Bureau of Student Activities or the Student Health Service.

The University requires that all newly registering daytime students undergo a complete medical examination, and the results of this examination must be submitted to the Student Health Service on the University of Hawaii Health Form for approval before medical clearance can be granted and registration completed. Medical services will be denied all students who do not comply with this requirement. Students who are returning to the University of Hawaii to continue their education after dropping out of the University for more than four years must resubmit this health form for approval. Payment for these preadmission medical examinations is the personal responsibility of the student.

Tuberculosis remains a distinct health hazard for all students. A tuberculin test performed within six months of enrollment is required. An annual chest x-ray is mandatory for all positive tuberculin reactors. For foreign students, a chest x-ray taken within six months of enrollment is required for entrance into school, so the above tuberculin test may be omitted.

Residents of University housing must obtain a medical clearance from the Student Health Service before they are permitted to reside in the residence halls. Students afflicted with any contagious illness must leave the residence hall for the duration of the contagious period of the illness.

COUNSELING AND TESTING CENTER

The Counseling and Testing Center's staff consists of professionally trained psychologists, psychiatrists, counseling psychiatric social workers, psychometrists and interns, who, as a team, function on the campus in the areas of student service, graduate training and academic research. Educational, vocational and personal counseling is available to students. Various aptitude, interest and other psychological tests are often used as aids in the counseling process. The center also maintains an educational and vocational library.
PLACEMENT AND CAREER PLANNING

The Office of University Placement and Career Planning assists students and alumni in the selection and pursuit of an optimum career. Services are provided in areas of self-analysis, vocational information, specific job opportunities, job campaigns, evaluation of offers, and graduate studies. The office cultivates the interest of prospective island, mainland and overseas employers and provides them with facilities to contact students and former students available for employment. Recruiting literature, annual statements, graduate and professional school bulletins, copies of the College Placement Annual and other career references are provided. Credential files are established for students interested in an academic career.

Campus interviews are scheduled with recruiting representatives of mainland and Hawaii organizations that offer career opportunities in business and industry, education and government. A number of recruiting firms are interested in hiring foreign students for employment in their home countries. In addition several hundred employment opportunities are listed with the office by employers who find it impractical to make campus visits.

Early registration is encouraged during the final year of study.

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 and special instructions may be obtained at the Office of University Relations in Bachman Hall, at the Traffic Desk in the Auxiliary Services building, and also during registration periods at the lanai area of the swimming pool located in the quarry. Ignorance of these rules and regulations will not excuse a student from the payment of fines for violations.

Parking permits are sold in the lanai of the swimming pool (quarry) during registration periods, and at the Traffic Desk in the Auxiliary Services building throughout the year.

INTERNATIONAL STUDENT OFFICE

The International Student Office serves both foreign and American students. It helps those from other countries with immigration requirements, financial problems, living arrangements and other University and community matters. Special orientation programs are held at the beginning of each semester; foreign students admitted to the University are notified in advance and urged to arrive in time to attend them.

The office, located in Webster Hall 101, advises American students who seek opportunities for overseas study, service and travel, and who wish to engage in international student activities while at the University of Hawaii.
RIGHTS AND FREEDOMS OF FOREIGN STUDENTS

The University of Hawaii, like all state universities, embraces those aspects of academic freedom which guarantee the freedom to teach and the freedom to learn. Free inquiry and free expression for both students and faculty are indispensable and inseparable. Students, whether from the United States or from foreign countries, as members of the academic community are encouraged to develop a capacity for critical judgment and to engage in sustained and independent search for truth.

Students from foreign countries, as full participants in the educational process at the University of Hawaii, have the right to pursue formal knowledge, verbal or written, in whatever directions and with whatever legitimately appropriate associations as are necessary, without fear of reprisal.

For its part, the University of Hawaii guarantees all students the freedom of silence. No student is required to engage in research on any topic or to make statements of any kind, unless it is his wish to do so.

The University of Hawaii would be most concerned if any government placed its own nationals in jeopardy for engaging in normal academic studies on its campus; it urges other governments to accept the concepts of academic freedom prevalent here if they intend for their nationals to study at this institution.

ENGLISH LANGUAGE INSTITUTE

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

Evaluation and Testing. 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. Excused from testing are the following classes of foreign students: (1) those who hold a degree from an accredited college or university in the United States, Australia, Canada, England, New Zealand or any other country in which the principal language is English; (2) those with TOEFL scores of 650 or higher.

Assignment to ELI Courses. All foreign students enrolled in ELI courses are assigned to a program of ELI instruction designed to serve individual needs. Courses are offered at basic, intermediate, and advanced levels in oral fluency, structure, reading, and writing. ELI courses cannot be taken in auditor status.

Waivers. Graduate students may have any or all of their recommended ELI
courses waived, at the discretion of their academic department. A signed waiver form must be submitted to the ELI office in Moore Hall, Room 570.

**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 in the fall and spring semesters 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, except for the summer session only, at which time they may be admitted on a space-available basis, providing they fulfill one of the admissions criteria, as stated in the summer session catalog.

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**EAST-WEST CENTER**

The East-West Center—formally known as 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, as mandated by Congress, which provides annual appropriations for its support, is to promote better understanding and relations among the peoples of Asia, the Pacific area and the United States through cooperative study, training and research.

In cooperation with Asian/Pacific countries and the University of Hawaii, the Center aims at the free interchange of information, ideas and beliefs in cultural and technological fields.

Each year about 1,000 students and Senior Specialists and technical training participants from more than 30 countries and territories come to the Center under federal scholarships and grants, supplemented in some fields by contributions from foreign governments and private foundations. Academic instruction is provided, and degrees are awarded to students in degree programs, by the University of Hawaii under a grant-in-aid agreement with the Department of State for operation of the Center. Nondegree programs and projects involving education, research and technological training are conducted by the Center in cooperation with the University, U.S. mainland and Asian/Pacific institutions, federal and state agencies, and private organizations.

Since 1968, the Center has moved to direct its resources into coordinated programs seeking solutions to problems of mutual concern to East and West.

**Problem-Oriented Programs**

**Population.** The East-West Population Institute, established within the Center in 1969, offers scholarships to qualified candidates for the M.A. or Ph.D.
degrees in anthropology, economics, geography, sociology and public health, with specialization in population studies. The objective of the degree program is to enable students to acquire a thorough understanding of demographic structures and processes — fertility, mortality and migration — and their causes and consequences. The program emphasizes the social and economic aspects of population trends and examines the rationale and the ways by which societies attempt to modify these trends. Special attention is paid to training in techniques of demographic analysis appropriate for deficient and erroneous data. The Institute’s geographic focus is the Asian and Pacific area, reflecting Hawaii’s unique position at the crossroads of the Pacific and utilizing the University’s extensive research and library facilities in Asian and Pacific studies. The Institute is active in population research with an emphasis on Asian and Pacific populations. Under the supervision of faculty members who hold joint appointments with the East-West Center while also offering population studies courses in various University units, and under the supervision of other Center staff in population, graduate students have opportunities to participate in research projects conducted at the Institute. For more advanced students, particularly at the Ph.D. level, field work outside Hawaii is arranged and supported by the Institute on a team or an individual basis. The Institute also conducts a variety of short-term, nondegree training programs, maintains a specialized collection of books and reference materials, and engages in various research- and service-related activities.

Communication. The Developmental and Cross-Cultural Communication Program focuses on two aspects of the broad field of human communication: (a) the use of communication for the sharing of knowledge aimed at human betterment in general, and economic and social development in particular; and (b) the use of communication to share knowledge between cultures and thus contribute to more complete understanding and peaceful interaction. A limited number of grants are offered for nondegree seminars and training programs to meet well-defined and urgent needs not readily served by formal academic programs. The program is building a resource collection of materials, research findings, case studies and visual, auditory and written records. Under grants from private sources, the Center offers Jefferson Fellowships to six or seven mid-career journalists and other professionals in the communication field each year. The Jefferson Fellowships provide for one semester’s study, on a noncredit basis, in University courses of the Fellow’s choice, specialized seminars and a two-week trip to the U.S. mainland for professional interviews.

Food. The Food Resources Program offers a variety of degree and nondegree scholarships and grants in projects of applied research, study and training. Emphasis is placed on a systems approach to maintaining and nurturing human life with quality. This approach requires the application not only of agricultural and ocean sciences but also the social sciences. Opportunities are provided for graduate student research. A considerable part of the Center’s resources in past years has been devoted to individual scholarships and grants for education, research and training on various aspects of the food problem and a coordinated program is being developed.
GENERAL INFORMATION

**Culture.** The Culture Learning Program is a newly-coordinated effort within the Center to find ways to help people cross cultural boundaries more easily and make culture less an obstacle to cross-cultural understanding. Grants are offered for research in building intercultural learning theory and in analyzing experiences of those in other cross-cultural programs and of students and alumni of the East-West Center from varied cultural, national and religious backgrounds. Degree and nondegree scholarships and grants will gradually be made available. In cooperation with University departments, an attempt is being made to develop teaching materials to be used in the classroom, mass media and training projects.

**Technological Development.** The Institute for Technical Interchange has been the major source of problem-oriented activity within the Center in the past, mainly on a nondegree, short-term training basis. The Pacific Island and Pacific Rim countries look to the Center as a major source of cross-cultural technical training opportunities, and this emphasis will be continued. By carefully planned changes, the Institute for Technical Interchange will link more closely its problem-oriented program with other Center programs and change its name to reflect these developments. The program is aimed at helping individuals take on new roles in the human infrastructures required for development, with emphasis on mid-management and trainers-of-trainers roles in such areas as health and social welfare, tourism, and specialized programs in educational systems. Increasingly, grants will be given to students at sub-professional and professional levels to participate in cooperative training projects. Grants are offered to Senior Specialists to participate in training projects and do research on training projects. Instruction, where practicable, is carried out by Center staff and University faculty, as well as by professional experts recruited from state and federal agencies and from private organizations. The Center, through this program, also administers training and job observation in Hawaii for Agency for International Development (AID) participants and participants from other private or government agencies.

**Special Projects and Study Opportunities**

The East-West Center also awards scholarships and grants embracing projects and study opportunities not directly associated with its problem-oriented programs. In general, academic scholarships in this category are awarded on the basis of their relationship to the needs of the individual applicant's country and the resources of the University of Hawaii (other criteria are listed below under “Scholarships and Grants”).

For continuity and responsiveness to mutual needs of East and West not covered by problem-oriented programs, the Center provides Senior Specialist and student grants for short-term research projects and university study.

Grants also will be awarded from time to time to teams of Senior Specialists invited to study and test new programs and projects designed by the Center in its continuing search for new educational and intercultural knowledge and methods as they relate to mutual problems of East and West.
Scholarships and Grants

Scholarships for study at the University of Hawaii, mainly at the graduate level, generally include round-trip air fare from the student's home, housing in the Center residence halls, tuition and books, medical insurance and a modest stipend for food and incidental expenses. If the student meets Center requirements, a grant may provide field education on the United States mainland for Asian/Pacific students and in Asia or the Pacific for American students.

Candidates for degrees must meet the academic standards of the University of Hawaii and at the same time must give evidence of interest and ability in contributing to intercultural communication. Scholarships are initially awarded for 17 or 19 months with provisions for extension to those who qualify. All degree program scholarships for Americans are at the graduate level. Some undergraduate scholarships are awarded to those students who come from countries where there are a limited number of higher educational institutions.

Senior Specialists. Grants, usually ranging from four to ten months in residence, are made to senior, professional level persons - such as professors, government administrators and authors - for participation in Center programs and seminars or for individual research and writing.

Training Grants. Housing, living expenses and training costs are provided, sometimes in cooperation with other cooperating agencies, on the same basis as provided in academic student grants. The cost of international transportation is usually paid by governments or agencies sponsoring participants. Training projects usually run from three to twelve months.

Language Requirements. Because the medium of instruction at the University of Hawaii is English, student grantees from Asia and the Pacific area 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 or Pacific language study before the end of their grants.

Intercultural Activities. To help promote cultural interchange, academic scholarships are awarded to approximately two Asian/Pacific students for each American at the Center. Center-wide activities embracing all participants - students, Senior Specialists and technical trainees - are designed to develop intercultural understanding recognized as one of the basic goals of the Center.

Supporting Services

The East-West Center Press issues new publications originating in the Center, at the University of Hawaii and other East-West institutions. It has developed an import and export book program to promote cultural and technical interchange.

The East-West Center Library is building an outstanding collection of materials, including books, periodicals and microfilm, emphasizing the problems with which the Center programs are concerned. It fosters cooperative Asian
library and bibliographic activities to assist in the growth of libraries and librarianship in the developing countries of Asia.

The Conferences and Seminars Office supports international meetings of senior-level experts dealing with problems of mutual concern to East and West, with emphasis on those involving Center programs.

Other support is provided by the Office of Participant Services, which deals with admissions, counseling and liaison with former participants; the Office of Public Affairs, which disseminates information on Center activities; and the Community Relations Office, which coordinates activities of the Center and its grantees with Hawaii's residents, primarily through the Friends of the East-West Center (an organization of volunteers).

GENERAL INFORMATION

The East-West Center complex on the Manoa campus of the University includes Thomas Jefferson Hall, the administration building which houses 50 offices, a lounge, food center, conference rooms and the exhibition gallery; Abraham Lincoln Hall, which houses Senior Specialists, the East-West Center Library and the East-West Center Press; John F. Kennedy Hall, a theater-auditorium; Hale Manoa and Hale Kuahine, residence halls for men and women participants. East-West Center funds were used for the construction of Edmondson Hall and a wing of Moore Hall, University classroom buildings. A Japanese garden is adjacent to the administration building and a traditionally-styled Thai pavilion, dedicated by King Bhumibol Adulyadej in 1967, lies between Jefferson and Lincoln halls.

The Chancellor of the East-West Center, through a grant-in-aid agreement which channels federal funds to the University, is responsible to the Board of Regents through the President of the University. The National Review Board, appointed by the U.S. Secretary of State and headed by the Governor of Hawaii, represents the national interest in the Center and advises the Secretary of State.

Further information concerning scholarships and grants may be obtained by writing to the Office of Admissions, East-West Center, 1777 East-West Road, Honolulu, Hawaii 96822.

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 prior to the start of 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, October 15 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. Application fee.
5. Residence information form.

*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.
ACADEMIC INFORMATION

**Unclassified students for summer session only:**
1. Self-certification of degree (form to be filled out at time of registration).

**Graduates of Foreign Universities** (non-Americans):

**Classified students:**
1. Application form.
2. Transcripts (two official copies) from each institution attended.
3. Application fee.
4. Records of examinations (GRE, MAT, ATGSB, etc.) as required by departments. (See special requirements under field listings.)
5. Results of Test of English as a Foreign Language.

Note: Foreign students are not accepted as unclassified students.

**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:

<table>
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<tr>
<th>For admission in:</th>
<th>Take the test the preceding:</th>
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<td>June</td>
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<td>September</td>
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<tr>
<td>January</td>
<td>March, June, or October</td>
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Completed registration forms to take TOEFL must be in the office of the Educational Testing Service (ETS) at least *one month* prior to the date of the examination. Information regarding the exact dates, locations, fees, etc., is available from: TOEFL, Educational Testing Service, Princeton, New Jersey 08540. Please *do not* write to the University of Hawaii for information on TOEFL.

**SUMMER SESSION**

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

*See p. 25 for information relating to the University's English Language Institute, and its role in testing and evaluating the English proficiency of foreign students.*

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ENTRANCE EXAMINATIONS

As a service to in-state students, application forms for the GRE, ATGSB, MAT, and MCAT are usually available at the Counseling and Testing Center, 1615 East-West Road. All out-of-state students must write to the address designated below.

Graduate Record Examination (GRE). The GRE is required for admission in a number of fields of study. In some fields it is recommended but not required. For requirements of the individual graduate fields of study, consult the relevant field of study descriptions in this catalog. Students taking the test must apply at least one month prior to the examination date. Applicants may write directly to Graduate Record Examinations, Educational Testing Service, 1947 Center Street, Berkeley, California 94704, or Box 955, Princeton, New Jersey 08540. Test dates, test fees and registration deadlines are posted on graduate school bulletin boards on all university campuses in the U.S. The GRE is administered six times a year: in January, February (U.S. only), April, July, October and December. ETS should be directed to forward the test results directly to the department to which you are applying for admission.

Admission Test for Graduate Study in Business (ATGSB). 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, at least one month prior to the date of examination. The ATGSB is usually administered in November, February, April, June and August of each year at a cost of $10.00.

Medical College Admission Test (MCAT). Students must apply to the Psychological Corporation by writing: Medical College Admission Test, The Psychological Corporation, 304 East 45th Street, New York, New York 10017. For Hawaii residents, information on test dates and deadlines is available at the Counseling and Testing Center. There is a fee of $25.00 for taking the test.

Miller Analogies Test (MAT). The test takes one hour. A fee of $3.00 is charged to University of Hawaii students, and $5.00 to non-students. In-state students who are required to take the MAT should contact the Counseling and Testing Center, 1615 East-West Road, for test dates, registration deadlines and test fees. Mainland U.S. students should contact a college or university in their area to arrange for the testing. Foreign students may write to The Psychological Corporation, 304 East 45th Street, New York, New York 10017.

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
ACADEMIC INFORMATION

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 sponsored nondegree training programs or certificate programs.

UNCLASSIFIED STUDENTS

Because of limited space and facilities, out-of-state graduate students are not accepted as unclassified graduates.

Students with baccalaureate degrees who have been denied admission to the Graduate Division and who are in unclassified status may be reconsidered for admission to the Graduate Division only after they have completed at least 12 more units of relevant non-lower-division work subsequent to the denial.

To be considered for admission as a classified graduate student, the applicant must have earned a B average (3.0 grade-point ratio) for all post-baccalaureate courses as well as for all graduate courses (courses numbered 600 and above) completed while in unclassified status at the University of Hawaii as well as at other institutions.

Computation of the grade-point average after admission to the Graduate Division (a B average is required for continued registration and graduation) will include grades in courses completed while in unclassified status which are applied toward fulfilling requirements for an advanced degree.

No more than 12 units of course credit earned while in unclassified status at the University of Hawaii may be applied toward fulfillment of advanced degree requirements by students who register as unclassified graduate students in the Division of Continuing Education for the first time in Fall 1969 or thereafter.

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.

Certification of Degree. Students whose bachelor’s and/or master’s degrees were incomplete at the time they filed applications for admission must submit to the Graduate Division two official copies of transcripts certifying completion of their degrees within 60 days upon registration in the first semester of enrollment. Those who fail to meet this requirement will not be permitted to register the following 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 (courses numbered 600 and above)
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 credit hours (including thesis research 800). Graduate assistants registering with special permission for twelve semester hours (including audit) must pay the general fee ($18.00).

Late Registration. With written approval from the dean of his college, a student may register for credit (initial or as a result of program changes) only during and not later than the first eight class days following regular registration. See Calendar, “Last day of registration for credit.” Similar restrictions apply to summer session.

Registration to audit courses is permitted at any time, but auditors may not change to credit status after the above late registration period.

Variable Credit Courses. The number of credits obtainable in most courses is stated in this catalog and in the schedule of courses available shortly before registration. However, certain courses, designated by “hours arranged,” offer variable credit. Students in these courses usually carry on individual work. The number of credits for which a student enrolls and will earn in such a course must be approved by the instructor at the time of registration. Students register for a definite number of credits and may earn no more or less than the stated number without the college dean’s approval.

Course Changes. Students wishing to change a course or courses must follow the procedures given for withdrawing from a course (see below) and for late registration (see above). Forms are available in self-service racks in the Graduate Division hallway.

Withdrawal from Courses. To withdraw from a course, a student must have the signature of the instructor on a form available in self-service racks in the Graduate Division hallway. The student must then obtain approval from his academic adviser and the Graduate Division and turn in the form, along with a $2 fee, to the Treasury Office in Bachman Hall.

A student may withdraw from a course up to the last four weeks of the semester; he will receive a grade of W (withdrawal, not failing). After the last date for withdrawals, a student may receive a grade of W if (and only if) he completely withdraws from the University with the approval of the Graduate Division.

If a student ceases to attend classes without officially withdrawing prior to the last four weeks of class, the instructor may award any one of the following final grades: A, B, C, D, F, P (pass), W, or I. An instructor will award an I or a W on the basis of the feasibility of the student’s making up the work within the
prescribed time limit. If an I (incomplete) is awarded, the instructor must also award an alternate grade to be recorded on the student’s record if he does not undertake the work necessary to remove the I. This alternate grade may be any one of the following: A, B, C, D, F, P, or W.

Refunds for withdrawals from courses are noted under “Tuition and Fees—Refunds.” Students seeking tuition refunds for withdrawals from courses should go to the Treasury Office in Bachman Hall immediately after the withdrawal form has been completed and signed, taking the form with them.

**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 300-499 with the approval of the program adviser or program committee, 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 applicable toward advanced degrees. These numbers are used to designate special institute, in-service training, study tour, and refresher courses.

**CREDITS, GRADES, AND EXAMINATIONS**

Work accomplished by students is usually recognized in terms of credits, grades, grade points, and grade-point ratios. Grade reports are given out at the end of each term.

**Credits.** A credit (also called a semester hour or a credit hour) is given to a student for work satisfactorily accomplished during three hours a week spent in the preparation and recitation of assignments in a course, or in the field or laboratory. The normal division of time in non-laboratory courses is one hour in the classroom and two hours in preparatory work. Thus, a three-credit course signifies that the class usually meets three hours a week and that the student is expected to spend six hours in preparation of assignments.

**Grades.** Grades given in all courses are $A, B, C, D, F, P, W,$ and $I$, except for 800 (thesis research) in which the grade of $S$ (satisfactory) is given upon acceptance of the thesis. Failure to make satisfactory progress on a thesis does not entitle a student to refund of tuition fees. The lowest passing grade is $D$.

An $I$ is given to a student who 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 the failure was caused by conditions beyond the student’s control and not by carelessness and procrastination. Each student
receiving an I should contact his professor to determine the steps to be taken to remove the I. The deadline for removing an I received in the first semester is the Easter recess of the following semester; for removing an I received in the second semester or the Summer Session, the deadline is the Thanksgiving recess of the next semester. When the instructor records a grade of I on the final grade card, he must also record the grade to which the I will revert if the work is not made up by the deadline; that grade should be computed on the basis of what grades or other evidence the instructor does have, averaged together with F’s for all the incompletely work (including the final examination, if it is not taken). If the work is completed prior to the deadline, the instructor will report a change of grade, taking the completed work into consideration.

Grade points are given for all courses in which grades of A, B, C, D, or F 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, 0 if F.

Grade-point ratios are determined by dividing the total number of grade points by the total number of credits for which a student has been registered. Courses for which grades of W, I, or Pass have been recorded are not included in the computation of ratios.

Grade Reports. Grade reports are sent to students through the mail at the end of each semester and summer session.

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.

A course taken on a P-F basis may not be retaken for an A, B, C, D, F grade nor may a course in which a student earns a grade on the A, B, C, D, F basis be retaken for a P-F grade.

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. a pass grade for all courses taken on the pass-fail basis will be the equivalent of at least a C–;
5. the course will not be used to fulfill the requirements for a master’s degree. Directed reading and research 699/799 courses, however, may be taken on Pass-Fail at the option of the graduate field of study and may be granted credit toward a master’s degree within the limits already prescribed by the Graduate Division (2 credits in Plan A thesis programs).
ACADEMIC INFORMATION

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 numbered 300-499 and 600-799 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. Grades for courses numbered 100-299 and 500-599 will not be computed in the grade-point ratio.

Credit-hour requirements for graduate degrees can only be fulfilled by grades of A, B, and C except for 699/799 courses taken under the Pass-Fail Option. Grades of P for 699/799 directed reading or research courses are counted in credit-hour requirements within stated rules, but are not computed for grade-point ratios. Grades of F under the Pass-Fail Option are computed. Grades of D and F 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, D, or F, all grades in that course will be included, as will the appropriate number of units for each time the course was repeated. For a C grade, however, the course will be counted only once for purposes of fulfilling the requirements for a graduate degree.

Intended candidates and candidates whose cumulative grade-point ratios fail to meet the minimum requirements after completing two or more semesters and upon completion of at least 12 credit hours, of course work 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 graduation 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.
DEGREE CHECKS

An appointment for a degree check must be made at the time the student registers for his final semester of work. At this time the student will be informed of missing grade labels, Student Progress Forms, etc.

The Graduate Division will automatically cross off the graduation list the name of any student whose final grade label contains either a grade of I (incomplete) or a missing grade, unless a certification is received beforehand from the chairman of his graduate field of study that the course is not a requirement for the degree.

CONFERRING OF DEGREES

Degrees are conferred and diplomas awarded four times annually, in December, May, August and September. Commencement exercises are held in December, May, 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. Though advisory services are provided to assist the students, the student alone is responsible for following the procedures and completing the steps required in his program. Requirements of the Graduate Division, both procedural and substantive, may be waived only by written request of the student and/or committee concerned and must have the written approval of the Dean. Petition forms are available in department offices and the Graduate Division office.

DEGREES, REQUIREMENTS, AND PROCEDURES

MASTER’S DEGREES

The Master of Arts is offered in:

American Studies • Anthropology • Art
Asian Studies • Asian Languages (Chinese, Japanese) • Classics
Drama and Theatre • Economics • English • French
Geography • German • History
Linguistics • Mathematics • Music • Pacific Islands
Studies • Philosophy • Political Science • Psychology
Sociology • Spanish • Speech-Communication
Teaching of English as a Second Language

The Master of Science is offered in:

Agricultural Economics • Agricultural Engineering • Agronomy • Anatomy
Animal Sciences • Astronomy • Biochemistry • Biophysics • Botany
Chemistry • Civil Engineering • Electrical Engineering • Entomology
Food Science • Genetics • Geosciences • Horticulture
Information Sciences • 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 • Educational Communications
Educational Foundations • Elementary Education
                • Educational Psychology
                • Secondary Education

The Master of Fine Arts is offered for creative production rather than research in: Architecture • Art • Drama and Theatre.

The Master of Music is offered for composition and performance in Music.

The Master of Library Studies 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 or the equivalent in credits. For the Master of Social Work and the Master of Fine Arts in visual arts, four semesters of full-time work are required.
ACADEMIC INFORMATION

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. Up to 6 credits of work completed at another accredited institution following admission to candidacy may be transferred to this University, providing such transfer does not exceed the maximum allowable. 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. All course credits and grades will be computed into the student's grade-point ratio. 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 30 credit hours are required, including a minimum of 18 credit hours of course work and between 6–12
credit hours of thesis research, depending on the requirements of the graduate field of study. A minimum of 12 credits, exclusive of research methods courses, must be earned in courses numbered 600-799, including at least one graduate seminar in the major field or in a related 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. Candidates who accumulate the maximum number of thesis research credits but fail to complete all degree requirements must be registered for a minimum of one credit of thesis research during the term in which the degree is awarded.

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 of the graduate field of study 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 May graduation, May 15 for December 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—12).

The thesis committee is made up of three members of the graduate faculty. 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, signed by all members of the committee, 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.** At the option of the faculty of the field of study, a general examination may be required before a student is advanced to candidacy for a master's degree. All students within a particular field of study must take
the examination if it is required at all. The examination is usually given during the first semester of residence. 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. The examination also enables the student's committee or adviser to assist in planning a program that will overcome any deficiencies in the student's background.

A student who passes the examination may be recommended for advancement to candidacy for the master's degree. A student who fails the general examination may repeat it once. However, he will not be considered for candidacy again should he fail the general examination the second time.

In fields of study not requiring a general examination, the student may be advanced to candidacy upon the recommendation of his adviser and/or the graduate faculty of the field of study concerned. It is assumed that in these cases the recommendation for advancement to candidacy will be based on some other form of evaluation of the student's potential performance rather than of his performance in the general examination.

**Final Examination.** A final oral examination, covering the thesis and related areas, may be required by individual graduate fields of study. All students within a particular field of study must take the examination if it is required at all. 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 graduate faculty members. As an alternative, the committee chairman may have the candidate present 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 only once. If the field of study does not require a final examination, the chairman of the graduate faculty concerned reports the completion of all degree requirements on Progress Report Form VI.

**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, if required, 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 diploma, payment of graduation and thesis binding fee.
7. Completed thesis submitted to committee.
8. Final oral examination, if required. (Form VI submitted; student notified of results.)
10. Granting of the degree.
PLAN B (NONTHESIS)

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

- Agricultural Economics • Agricultural Engineering
- American Studies • Anthropology • Art (Eastern Art History) • Asian Languages (Chinese, Japanese)
- Asian Studies • Astronomy • Biochemistry • Biophysics • Business Administration • 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 • Information Sciences • 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-Communication • 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 in the major field or in a related field.

When the student is advanced to candidacy, the chairman of the field of study appoints a program adviser or a program committee made up of three members of the graduate faculty. The program adviser/committee advises the candidate and approves a coherent program of courses for the candidate.

Examinations

General Examination. At the option of the faculty of the field of study a general examination may be required before a student is advanced to candidacy for a master's degree. All students within a particular field of study must take the examination if it is required at all. The examination is usually given during the first semester of residence. 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. The examination also enables the student's committee or adviser to assist in planning a program that will overcome any deficiencies in the student's background.

A student who passes the examination may be recommended for advancement to candidacy for the master's degree. A student who fails the general examination may repeat it once. However, he will not be considered for candidacy again should he fail the general examination the second time.

In fields of study not requiring a general examination, the student may be advanced to candidacy upon the recommendation of his adviser and/or the graduate faculty of the field of study concerned. It is assumed that in these cases the recommendation for advancement to candidacy will be based on some other
form of evaluation of the student's potential performance rather than on his performance in the general examination.

**Final Examination.** At the option of the faculty of the field of study, a final examination may be required of Plan B candidates for the master's degree. If required, it is designed to determine the candidate's achievement in his field of study at the master's level. This examination has several possible forms. It may be a seminar appearance, a written comprehensive examination, an oral examination, some equivalent, or a combination of these. If a final examination is required by the field of study, it must be given at least three weeks before the end of the term during which the degree is conferred.

Should the student fail the final examination, he may be permitted to repeat it only once. A student who fails the examination a second time is irrevocably dropped from the program.

**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, if required, admission to candidacy, and establishment of degree plan. (Form II submitted, with copy to student.)
4. Appointment of program committee/adviser. (Form III submitted, with copy to student.)
5. Diploma application, payment of graduation fee.
6. Final examination, if required.
7. Completion of course work.
8. Granting of the degree. (Form VI 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:
ACADEMIC INFORMATION

Agricultural Economics • American Studies • Anthropology
Asian Languages (Japanese) • Astronomy • Biochemistry • Biophysics
Botany • Chemistry • Drama and Theatre • Economics
Educational Psychology • Electrical Engineering • Entomology
Genetics • Geography • Geosciences • History • Horticulture • Linguistics
Microbiology • Oceanography • Pharmacology • Philosophy • Physics
Physiology • Political Science • Psychology • Sociology
Agronomy and Soil Science • Zoology

Residence

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

Credits

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

Language Requirements *

The intended candidate for the Ph.D. degree 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 agency to administer the examination is designated by the graduate faculty of the fields of study, but all students within a particular field of study must be examined by the same agency for examinations offered by that agency.

No limit has been placed on the number of times a student may take the examination. However, it must be passed before a student can be advanced to candidacy and before he may take the comprehensive examination.

Doctoral Committee

The doctoral committee may be selected at any time after a student becomes an intended candidate. The chairman of the graduate faculty of the

*At the time this Bulletin was being prepared, a modification of the language requirement was under consideration. The modification proposed is that the language requirement be left to individual fields of study. For up-to-date information, consult the chairman of the graduate field of study of your choice.
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:

Qualifying Examination (Optional to fields of study)

Some fields of study require a Ph.D. qualifying examination. The purpose of this examination is to determine whether to encourage a student to proceed in a doctoral program, and if encouraged, to enable his advisers to assist him in planning a program that will familiarize him with the requisite knowledge and techniques of his chosen field of study. Fields of study requiring this examination give it early in the intended candidate’s program (often coinciding with the master’s final examination). It may be oral and/or written, and is conducted either by a special examination committee appointed by the chairman of the graduate field of study or by the student’s doctoral committee.

Comprehensive Examination

The comprehensive examination is an important step in the sequence toward the Ph.D. degree. This examination covers the major field of study and work fundamental thereto and minor fields as may be required by the field of study. Its purpose is to ascertain the student’s comprehension of his field(s) of study.

The examination is given only after the student has completed his foreign language requirement, if required, and when, in the judgment of his doctoral committee, he has had sufficient preparation in his field of study either through course work or other individual study and research. The comprehensive examination may be either oral or oral and written. It is conducted by the student’s doctoral committee composed of five members of the graduate faculty, at least one being from outside the major field of study and outside the department responsible for the field of study.

Students who fail the comprehensive examination may repeat it once at the discretion of the graduate faculty concerned. A student who fails the second examination is irrevocably dropped from the program.

The student who passes the examination is eligible, at the option of the various fields of study, to receive a University certificate indicating that he has completed all requirements of the Ph.D. except for the dissertation.

Final Examination

A final examination in defense of the dissertation, which may also cover related subjects, is required of all candidates for the Ph.D. degree. The
examination is oral and is conducted by the candidate’s doctoral committee. It is never less than one hour in length. Arrangements for it must be made at least one month in advance, and it must occur at least six weeks before the end of the session in which the degree is granted. The examination is announced in the University Bulletin and is open to the public.

If the candidate 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. If the candidate fails the final oral examination twice, he is dropped from candidacy.

If the candidate passes the examination, all other requirements having been met, he will be awarded the Ph.D. degree at the end of the appropriate term.

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 instructions 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.

Candidates must be registered in the appropriate thesis research course (800) during the entire term in which the work for the degree is completed.
Candidates who accumulate the maximum number of thesis research credits but who fail to complete all degree requirements must be registered for a minimum of one credit of thesis research during the term in which the degree is awarded.

Candidates who complete all requirements for the degree during the six-week summer terms need not be registered during the subsequent fall semester.

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, payment of graduation and dissertation binding fee.
8. Abstract of dissertation filed with the Graduate Division.
9. Final examination. (Form VI submitted.)
10. Copies of dissertation filed in Graduate Division.
11. Granting of the degree.

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

**PROFESSIONAL TEACHING CERTIFICATE**

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

FACULTIES, REQUIREMENTS, AND COURSES

Courses listed here numbered 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

J. R. Davidson, Ph.D. (Chairman) – production economics
H. L. Baker, Ph.D. – resource economics
C. Gopalakrishnan, Ph.D. – resource economics and marine economics
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
B. M. Renaud, Ph.D. – econometrics and regional economics
F. S. Scott, Jr., Ph.D. – marketing
H. Spielmann, Ph.D. – marketing and agricultural policy
C. P. Wilson, Ph.D. – marketing and agricultural policy
H. Yamauchi, Ph.D. – resource economics

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 (nonthesis), 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 economics, 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**

410 Introduction to Quantitative Methods in Agricultural Economics (3)
424 Marketing of Tropical and Subtropical Agricultural Products (3)
425 Marketing of Livestock, Poultry and Dairy Products (3)
427 Management of Agri-Business Firms (3)
428 Production Economics (3)
429 Agricultural Policy and Planning (3)
430 Agricultural Finance (3)
432 Introduction to Natural Resource Economics (3)
433 Advanced Management and Plantation Economics (3)
434 Statistical Methods (3)
435 Economics of Food Distribution (3)
470 Regional Economic Analysis (3)
480 Computer Programming in Agricultural Economics Research (3)
624 Research Methodology (3)
625 Economics of Agriculture: Tropical Countries and Asia (3)
626 Collection of Economic Data in Agriculture (3)
629 Advanced Production Economics (3)
630 Market Development for Agricultural Products (3)
634 Quantitative Methods and Statistical Analysis (3)
635 Seminar: Agricultural Price Analysis and Statistics (3)
636 Seminar: Agricultural, Resources, and Ecological Policy (3)
637 Resource Economics (3)
638 Seminar: Land Use in Developing Countries (3)
639 Agricultural Development Economics and Development Planning (3)
680 Rural Sociology and the Agricultural Economy (3)
699 Directed Research (arr.)
701 Seminar in Agricultural Economics (arr.)

**Agricultural Engineering**

**Graduate Faculty**

J. K. Wang, Ph.D. (Chairman) – harvesting and processing equipment, soil dynamics
H. M. Gitlin, M.S. – agricultural process engineering
E. B. Hundtoft, Ph.D. – agricultural machinery design
D. M. Kinch, Ph.D. – power and machinery, farm processing
Tung Liang, Ph.D. – systems engineering
M. R. Smith, Ph. D. – power and machinery
I-pai Wu, Ph.D. – irrigation engineering

**Affiliate Faculty**

W. N. Reynolds, M.S. – irrigation

S4
Intended candidates for the M.S. must present a bachelor's degree in an accredited engineering program or the equivalent. Agricultural engineering courses available for the graduate program are listed below. Courses from related fields of engineering, agriculture and sciences may also be utilized to fulfill the course credit requirements. Candidates may specialize in fruit and nut harvesting equipment, fruit and nut processing equipment, machinery management, soil dynamics, precooling and storage of fresh product, surface hydrology, irrigation engineering, and physical properties of biological materials. Required courses are marked with an asterisk.

**AGRICULTURAL ENGINEERING**

- 331 Mechanizing Food Production I (3)
- 332 Engineering Application in Food Production (3)
- 342 Junior Project (1)
- 431 Agricultural Power (3)
- 432 Agricultural Implements (3)
- 435 Agricultural Irrigation (3)
- 442 Handling, Storage and Processing Equipment (3)
- 499 Directed Research (arr.)
- 631 Analysis of Implement Design (3)
- 635 Farm Irrigation System Design (3)
- 638 Optimization of Biological Production Systems (3)
- 647 Methods of Agricultural Engineering (3)
- 648 Post Harvest Process Engineering (3)
- 699 Directed Research (arr.)

*700 Seminar (1)*

*800 Thesis Research (arr.)*

**Agronomy and Soil Science**

*Graduate Faculty*

- W. G. Sanford, Ph.D. (Chairman) — plant nutrition
- D. P. Bartholomew, Ph.D. — crop physiology
- P. C. Ekern, Ph.D. — soil management, agricultural meteorology
- S. A. El-Swaify, Ph.D. — soil salinity, physical chemistry
- R. L. Fox, Ph.D. — soil fertility and chemistry, soil and crop management
- R. E. Green, Ph.D. — soil-pesticide interactions, soil physics
- H. Ikawa, Ph.D. — soil mineralogy, soil genesis and classification
- Y. Kanehiro, Ph.D. — soil chemistry, fertility
- D. L. Plucknett, Ph.D. — crop management, weed control, soil fertility
- P. P. Rotar, Ph.D. — plant breeding
- J. A. Silva, Ph.D. — soil fertility and soil chemistry, statistics
- L. D. Swindale, Ph.D. — soil genesis and classification, physical chemistry
- Y. N. Tamini, Ph.D. — forest soils, fertility
- J. R. Thompson, Ph.D. — crop production, pasture management
- G. Uehara, Ph.D. — soil physics, mineralogy; soil management
- U. Urata, Ph.D. — cytogenetics, breeding of grasses and sugar cane
- A. S. Whitney, Ph.D. — pasture management, forage physiology
- H. Y. Young, M. S. — plant chemistry, nutrition, pesticide chemistry

*Affiliate Graduate Faculty*

- D. J. Heinz, Ph.D. — sugar cane breeding
- M. Isobe, Ph.D. — sugar cane agronomy
This graduate field of study offers two options, one in agronomy and the other in soil science. The first option is designed for candidates whose primary interests lie with crop science, and the second option is designed for students who wish to place greater emphasis on soils.

Intended candidates for the M.S. or Ph.D. degrees must present a minimum of 18 undergraduate credits either in agronomy or in soil science and subject matter related to one of these. Applicants must also submit to the department scores for the aptitude and advanced (biology) tests of the Graduate Record Examination. The soil science option also requires two years of college chemistry. Related fields for agronomy are animal science, botany, chemistry, climatology, genetics, horticulture, plant pathology, plant physiology, soil science, and zoology. Related subject matter fields for soil science are agricultural engineering, agronomy, botany, chemistry, geosciences, mathematics, microbiology, and physics.

A general examination will be required of all intended M.S. candidates during the first semester of enrollment. The examination will consist of two parts; a basic examination in the natural and physical sciences, and selected questions representing major agronomy and soil science disciplines.

The Plan A (thesis) program is required of all M.S. candidates. A minimum of 21 course credits is required, including a minimum of 12 credits, in courses numbered 600–799. No more than 2 credits in directed research (Agronomy 699, Soil Science 699) may be allowed toward the degree under this plan. All candidates must register for seminar in agronomy or soil science.

The agronomy option allows the use of Plan B only by students accepted as intended candidates for the Ph.D. directly from the B.S. degree. Upon completion of their course requirements, such students will be required to present a seminar at which time the program committee will decide (a) whether the student passes or fails, and (b) if he passes whether he will be allowed to continue for the Ph.D.

The degree of Ph.D. in agronomy and 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. For the soil science option, mathematical preparation at least to the level of differential and integral calculus is strongly recommended.

Ph.D. candidates will be required to take a predoctoral qualifying examination similar in nature to the general examination taken by all candidates for the M.S. degree. If the intended candidate receives his M.S. from this department, then his M.S. committee will decide whether or not he may be accepted as an intended Ph.D. candidate. The committee will further decide if such intended candidate will be required to take the pre-doctoral examination. Candidates must demonstrate proficiency by examination in either French, Spanish, German or Russian. Subsequently, they will be required to take written and oral comprehensive examinations and a final oral examination which will include a public defense of the dissertation.
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. Those in the agronomy option may specialize in tropical crop production, crop physiology, plant breeding, cytogenetics, pasture management, or plant-soil relationships. In the soil science option students may specialize in tropical soil genesis and characterization, soil chemistry, soil physics, soil mineralogy, soil fertility, soil salinity or soil 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)
- 651 Advanced Techniques in Plant and Soil Analysis (3)
- 699 Directed Research M.S. (arr.)
- 701 Seminar in Advanced Agronomy (1)
- 710 Mineral Nutrition of Tropical Crops (2)
- 799 Directed Research Ph.D. (arr.)
- 800 Thesis Research (arr.)

**SOIL SCIENCE**
- 440 Soil Salinity and Irrigation Water Quality (3)
- 460 Soil Physics (3)
- 461 Soil Erosion: Causes and Controls (3)
- 470 Tropical Soil Survey and Interpretation (3)
- 640 Advanced Soil Chemistry (3)
- 650 Advanced Soil Fertility (3)
- 661 Meteorology in Agriculture (3)
- 670 Soil Formation and Classification (4)
- 671 Soil and Clay Mineralogy (3)
- 699 Directed Research M.S. (arr.)
- 704 Seminar in Advanced Soil Science (1)
- 799 Directed Research Ph.D. (arr.)
- 800 Thesis Research (arr.)

**American Studies**

**Graduate Faculty**
- S. Lutzky, Ph.D. (Chairman)—history and social backgrounds
- S. Brown, Ph.D.—politics and history of ideas
- R. Denney, B.A.—literature and sociology
- J. Gurian, Ph.D.—literature and social problems
- H. Kato, Ph.D.—comparative cultures
- F. Matson, Ph.D.—politics and social science
- J. McCutcheon, Ph.D.—social and cultural history
- J. Neil, Ph.D.—cultural history and art

**Cooperating Faculty**
- J.T. Araki, Ph.D.—Japanese language
- B.O. Campbell, Ph.D.—economics
- R.H. Canary, Ph.D.—American literature
- A.M. Keppel, Ph.D.—education
The American studies department offers a graduate program designed as a multidisciplinary and cross-cultural approach to the study of problems in American life. Taking advantage of the location of the University, library resources and faculty interests, the department places a special emphasis on the problems shared by the U.S. with Asian nations and cultures.

Recognizing the unique nature of the program and the difficulties of adequate undergraduate preparation, especially for students from Asian countries, 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 courses or readings in those fields before acceptance as degree candidates. The G.R.E. aptitude scores are required before requests for admission to either the M.A. or Ph.D. programs are considered by the department. No general examination is required.

Intended candidates for the M.A. degree may select either the Plan A (thesis) or the Plan B (nonthesis) programs. For either program candidates are required to take 15 semester credits in American studies courses, including American Studies 701-702. In addition, candidates should undertake a balanced program of courses in the fields of the humanities and the social sciences. Candidates under Plan A should include a minimum of 12 semester hours and under Plan B, 18 semester hours of courses in the fields of the humanities and the social sciences. An oral examination covering the thesis only is required of Plan A candidates. Plan A candidates will receive 6 credit hours for their thesis work. The mandatory requirement for American Studies 701-702 is in place of the final examination requirement for both Plan A and B.

Intended candidates for the Ph.D. degree are expected to possess the M.A. degree in American studies or its equivalent. An applicant should have a scholarly attainment of an unusually high order to work within a multidisciplinary program and both written and oral preliminary examinations will be required. The program of study will not require a specific group of courses other than four seminars, American Studies 711-714. The seminars will cover four fields in American civilization and the examinations given at their conclusion will be considered as a part of the preliminary examinations. Candidates will be admitted into the seminars only after the advisory committees have agreed that candidates have completed their individually planned prerequisites of other courses and readings. The language requirements for admission to candidacy will be the minimum requirements set by the Graduate Division unless the candidate’s advisory committee sets additional requirements.

American candidates having a special career interest in Asia may obtain the certificate offered by the Overseas Career Program in conjunction with the degree in American Studies.
ANATOMY

AMERICAN STUDIES

370  Music in Modern America (3)
435  Radical Tradition in America (3)
460  Myths in American Development (3)
465  Popular Culture in America (3)
475  American Taste (3)
485-486  Contemporary American Civilization (3)
490  Special Topics (3)
495  Black Americans and American National Character (3)
615  Leaders and Movements in American Thought (3)
621  The West in the American Consciousness (3)
631  Mass Media in American Society (3)
635  Perspectives in Comparative Literature (3)
641  Asian Influences in American Civilization (3)
650  American Civilization and the Overseas American (3)
665  Seminar: Presidential Leadership & American Civilization (3)
670  Seminar: Sociability in the United States (3)
672  Environmental Design in Hawaii (3)
685-686  Seminar: Nature of American Society (3-3)
690  Introduction to Contemporary America (3)
701-702  Proseminar—M.A. (3-3)
711  American Representative Institutions (3)
712  American Beliefs (3)
713  American Technology and Society (3)
714  American Arts and Society (3)
750  Seminar in the Interaction of Asia and America (3)
799  Directed Research (arr.)
800  Thesis Research

Anatomy

Graduate Faculty

V. J. DeFeo, Ph.D. (Chairman)—embryo-uterine relationships, endocrinology and physiology of reproduction, electron microscopy
R. W. Noyes, M.D.—obstetrics and gynecology, sperm transport, fertility and infertility
M. Diamond, Ph.D.—sex behavior, human sexuality, endocrinology of reproduction
R. Kleinfeld, Ph.D.—cellular and developmental biology, cytochemistry, electron microscopy
R. Yanagimachi, Ph.D.—sperm capacitation, ovum fertilization
R. Teichman, Ph.D.—comparative sperm morphology, biological membranes, electron histochemistry

Only the M.S. degree is offered at present. It is hoped that the Ph.D. program may become available in a few years. The thesis research in which students would participate relates to the subject of reproductive biology in mammals, including humans (the department of anatomy has a close working relationship with the department of obstetrics and gynecology). All research programs are multidisciplinary and involve not only the biological structures relating to reproduction but also their biochemical and physiological aspects. This approach will also be reflected in the planning of a student's curriculum by the faculty. The department also maintains a strong interest in sex behavior and
human sexuality. Excellent, well-equipped facilities exist for both the teaching and research programs including two modern electron microscopes. The courses which are available are listed below and a description of their contents can be found in the *Medical School Bulletin*.

**ANATOMY**

- 601 Functional Microscopic Anatomy (4)
- 602 Functional Human Anatomy (5)
- 604 Neuroanatomy (2)
- 630 Reproductive Biology (3)
- 632 Reproduction and Sexuality (2)
- 634 Experimental Methods in the Study of Reproductive Behavior (arr.)
- 636 Seminar, Current Readings in Reproductive Behavior (2)
- 691 Seminar (1)
- 699 Directed Research (arr.)

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**Animal Sciences**

**Graduate Faculty**

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

Thesis research is required for animal sciences graduate students and carries 12 credits.

**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

Anthropology

Graduate Faculty
G. Bateson, M.A.—Melanesia, Indonesia; culture and personality, communicational aspects of culture
S.T. Boggs, Ph.D.—culture and personality, education and anthropology, methods
A.G. Dewey, Ph.D.—Indonesia, Polynesia, Melanesia; social anthropology, culture change
P.B. Griffin, Ph.D.—North America, Polynesia; archaeological theory, ecological anthropology
W.P. Lebra, Ph.D.—East Asia; social anthropology, religion
H.T. Lewis, Ph.D.—Southeast Asia, Philippines; economics and religion
K.L. Luomala, Ph.D.—Polynesia and Micronesia; ethnology and folklore
F.J. Mahony, Ph.D.—Micronesia; applied anthropology, medical anthropology
T.W. Marettzi, Ph.D.—East Asia; psychological and applied anthropology, culture change
D.L. Oliver, Ph.D.—Oceania; social anthropology
R.J. Pearson, Ph.D.—Southeast Asia, East Asia, Hawaii; archaeology
M. Pietrusewsky, Ph.D.—Physical anthropology
W.G. Solheim II, Ph.D.—Southeast Asia; archaeology

Affiliate Faculty
K.E. Emory, Ph.D.—Polynesia; archaeology, 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; archaeology
D. Yen—Oceania, Southeast Asia; ethnobotany

Intended candidates for the M.A. or Ph.D. need not have an undergraduate background in anthropology. All applicants must submit to the department Graduate Record Examination aptitude scores and three letters of recommendation at the time of application. Lack of previous training in anthropology may result, however, in study to fill gaps in knowledge. Such decisions will be taken by course instructors, who may set up appropriate admission requirements for their courses. The goal of the Ph.D. program is to allow early and intensive specialization within the field of anthropology and adequate comprehension of one field of specialization and related knowledge as a preparation for undertaking dissertation research. The specializations offered by the department are social and psychological anthropology, and archaeology. Cross-disciplinary specializations are welcomed, especially in such related fields as linguistics and human biology. Graduate programs are flexible and tailored to the interests of the individual student. Evaluation of the student’s capacity to do graduate work will normally be carried out by the end of the first year. Students favorably evaluated will be admitted to candidacy for the M.A. or Ph.D.

M.A.

The M.A. candidate has a choice of a thesis (Plan A) or a nonthesis (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. The course requirements should be met in a way which provides a broad knowledge of one sub-field of anthropology and an acquaintance with a second sub-field within anthropology or another discipline. The M.A. candidate who selects Plan A must pass a final oral examination. For candidates who select Plan B the final exercise
ANTHROPOLOGY

will consist of an oral examination (or critical analysis) given by the committee, a presentation to a graduate seminar, and/or directed research papers written by the student after his admission to candidacy for the degree. The oral examination or other final exercise will assess the candidate’s knowledge of one topic, possession of relevant information about one ethnographic area, and his understanding of the principles of research methods.

Attention is called to the fact that the M.A. program at present is modelled closely upon the Ph.D. program. Consideration is being given to M.A. programs designed for students in such applied fields as education, international programs, public health, and medicine. Students with interests in these fields are invited to discuss with the graduate program coordinator M.A. programs specifically designed for their needs.

Ph.D.

The Ph.D. program has no unit requirements apart from the Graduate Division requirement of three semesters of full-time work. No specific course is required. The student will work out with his advisory committee a program to accomplish the following goals: A broad knowledge of one sub-field of anthropology (biological anthropology, archaeology, linguistics, and social-cultural anthropology, the latter including psychological anthropology); an acquaintance with a second sub-field within anthropology or another discipline; deep and critical knowledge of the topic which is most relevant to the research which the student plans to carry out for the dissertation; pertinent information about one ethnographic area; knowledge of appropriate methods of analysis; and an acceptable dissertation proposal.

In order to develop a broad knowledge of one sub-field a student will take a regular graduate course or seminar from at least 4 different members of the department, and also some work in a second sub-field within anthropology or another discipline. Equivalent graduate study at another university can be substituted for these requirements with the approval of the student’s advisory committee. Students will be encouraged to undertake faculty supervised research prior to submitting a dissertation proposal. Students who intend to teach introductory anthropology later in their careers will be encouraged to develop a broad acquaintance with the entire field of anthropology and to develop teaching abilities through practice.

Before undertaking dissertation research a student will submit a detailed proposal to his doctoral advisory committee. The committee may amend the proposal and suggest further ethnographic theoretical, or methodological areas which the candidate should investigate. When the student and his committee are satisfied that he is fully prepared for his dissertation research the student will be given a comprehensive oral examination, which will ascertain the student’s comprehension of the topics and areas defined as program goals above. This examination will be conducted by the student’s doctoral advisory committee. All members of the department faculty are invited to attend. Upon submission of the final draft of his dissertation a candidate will, under present Graduate Division requirements, present an oral defense of the dissertation.
ANTHROPOLOGY

300  Study of Contemporary Problems (3)
305  History of Anthropology (3)
306  Foundations of Anthropological Method (3)
310  Human Evolution (3)
320  Archaeological Theory and Interpretation (3)
330  Social Organization (3)
340  World Ethnography (3)
350  Oceania (3)
355-356  Asia (3-3)
370  Ethnographic Field Techniques (3)
380  Archaeological Field Techniques
381  Archaeological Laboratory Techniques (3)
400  Anthropological Statistics (3)
415  Ecological Anthropology (3)
416  Economic Anthropology (3)
417  Political Anthropology (3)
418  Culture and the Individual (3)
419  Oral Art (3)
422  Comparative Religion (3)
423  Social and Cultural Change (3)
445  Regional Ethnology (3)
   (1) Continental East Asia  (5) Polynesia
   (2) Mainland Southeast Asia  (6) Melanesia
   (3) Island Southeast Asia  (7) Other to be announced
   (4) Micronesia
460  Regional Archaeology (3)
   (1) Asia  (3) North and South America
   (2) Europe, Africa, and Near East
   (3) North and South America
   (4) Other to be announced
480  Anthropological Applications (3)
   (1) Development  (3) Education
   (2) Health
481  Applied Anthropology (3)
483-484  Japanese Culture and Behavior (3-3)
485-486  Peoples of Hawaii (3-3)
620  Theory in Social and Cultural Anthropology (3)
   (1) Kinship  (5) Law and Social Control
   (2) Cognitive Systems  (6) Economics
   (3) Religion  (7) Ecology
   (4) Political Institutions  (8) Other to be announced
630  Theory in Physical Anthropology (3)
635  Culture History (3)
640  Method and Theory in Archaeology (3)
   (1) Prehistory  (3) Other to be announced
   (2) Environmental Archaeology
699  Directed Reading or Research (arr.)
710  Seminar in Research Methods (3)
712  Data Processing in Archaeology (3)
750  Research Seminar (3)
   (1) Archaeology  (4) Social Anthropology
   (2) Linguistics  (5) Psychological Anthropology
   (3) Ethnography  (6) Biological Anthropology
800  Thesis Research (arr.)
ARCHITECTURE

Architecture

Graduate Faculty
A. Bruce Etherington, B. Arch., (Chairman)—architecture
T. D. Terazaki, M.E.—architectural engineering
J. H. Burgess, M.S. Arch.—architecture
C. Mahoney, Dip. AA—tropical architecture
L. Minerbi, D. Arch., MUP—urban design and planning

Affiliate Faculty
F. Haines, M. Arch.—professional practice
W. Grant, B. Arch.—urban design and planning
T. Creighton, B.A.—architectural history and theory

The professional degree of M.F.A. in architecture is designed to provide intensive professional study and to meet the criteria of professional licensing boards. At the same time an opportunity to elect courses from other departments and colleges within the University encourages integration of architecture with other disciplines and provides a broad social and technical curriculum. Requirements for graduation are completion of 30 credit hours of course work and 6 credit hours of thesis research. See department bulletin for detailed requirements.

Candidates for the M.F.A. in architecture are accepted from three categories.

1. Holders of bachelor’s degrees in a major other than architecture. Such students are required to complete 63 credits of undergraduate architectural preparatory work and 28 credits of post-graduate architectural preparatory work before becoming candidates.

2. Holders of the B.F.A. in environmental design or an equivalent pre-professional degree. These students are required to complete 28 credits of post-graduate architectural preparatory work before becoming candidates.

3. Holders of a five-year B. Arch. degree or equivalent. These students are admitted immediately to candidacy.

Applicants under categories 2 and 3 noted above must when applying to the Graduate Division, simultaneously submit to the department a brochure of work completed in architecture of student and/or projects completed in practice.

In addition to meeting departmental and graduate division academic requirements and prior to admission to candidacy, applicants are required to submit documented evidence of completion of 600 hours of supervised work in the offices of practicing engineers, architects, landscape architects, urban designers and/or planners.

Because of Hawaii’s climate and geographical position, the department offers training on the tropical aspects of architecture, recognizing, however, that the underlying principles of architecture are universal. Students from areas bordering or within the Pacific Basin, as well as from other tropical countries, will be able to obtain specialized training with regard to the problems of building in tropical climates and developing countries.
ARCHITECTURE

400 Special Projects in Architecture (V)
401 Architectural Structures “D” (4)
402 Architectural Structures “E” (4)
411 Building Construction “C” (3)
412 Building Construction “D” (3)
421 Environmental Control (3)
431 Architecture “D” (4)
432 Architecture “E” (4)
438 Architecture “F” (5)
441 Strategy in Urban & Regional Design (4)
442 Methods of Urban & Regional Design (4)
472 Japanese Architecture and Landscaping (3)
496 Field Studies (V)
601 Architectural Kinetics (4)
621 Seminar on Tropical Architecture (2)
640 Architecture and Planning in Tropical Areas (4)
641 Studio in Urban & Regional Design (4)
672 Environmental Design in Hawaii (3)
699 Directed Work (arr.)

Art

Graduate Faculty
C. W. Anderson, M.A.—painting, design
K. Bushnell, M.F.A.—painting
J. H. Cox, M.A.—painting, oceanic art
B. Ecke, M.A.—Chinese art
M. Havaas, M.F.A.—weaving, textile design
C. F. Horan, M.A.—ceramics
S. Kimura, M.F.A.—painting
K.G. Kingrey, M.A.—design
R. Kowalke, M.F.A.—printmaking
G. Lenox, B.A.—design
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
M. Turnbull, M.A.—painting
J. Wisnosky, M.F.A.—painting

Visiting Artists in residence arranged

The M.A. is given in the fields of Asian and Pacific 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 history of art as well as the studio programs are concerned with the creative, the experiential and the developmental aspects of art.
The M.F.A. (Plan A only) is a terminal degree in creative studio work in the visual arts. As such, it is closer to the Ph.D in character than to the M.A. Forty-eight credit hours are required. Students accepted to candidacy before September 1970 may elect to transfer to the extended program or may continue under the old requirements.

Studio specialization is required in a selected area. Course work includes a minimum of 18 credits in studio and 6 credits in thesis which includes an exhibition of original work in the chosen medium. Intended candidates must present the equivalent of an undergraduate major in art including 18 credits in art history and theory. Evidence of ability to do creative work of superior quality must be presented by means of a portfolio or slides.

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

An otherwise deficient or incompatible undergraduate program will require at the discretion of the graduate faculty, additional course work for either degree. The M.F.A. will require a minimum of two years of study for a well-qualified candidate.

Courses available for the graduate program are listed below. For the M.A. a maximum of 9 hours may be earned in appropriate advanced courses in other departments as approved by the graduate adviser. For the M.F.A. degree elective courses may be in any art department program or any academic department of the University approved by the graduate adviser.

Art courses which qualify for a graduate degree may be taken in any areas of specialization for which adequate preparation is demonstrable, subject to consent of instructor and graduate adviser.

ART

400  Special Projects in Art (arr.)
401  Glass Blowing (3)
402  Glass Blowing (3)
407  Advanced Photography (3)
463-464  Visual Communication (3-3)
470  Renaissance Art (3)
471  Baroque and Rococo Art (3)
473  Contemporary Art (3)
475  Arts of the Pacific (3)
476  Primitive Art (3)
477  Primitive Art of the Pacific Rim (3)
483  Applied Arts of Japan (3)
485  Applied Arts of China (3)
491  Art of Islam (3)
495  Art of Southeast Asia (3)
496  Art and Architectural Field Studies (arr.)
617  Printmaking (3)
624  Painting (3)
630  Textile Design (3)
638-639  Weaving (3-3)
Asian Languages

Graduate Faculty

J. DeFrancis, Ph.D. (Chairman)—Chinese; applied linguistics, civilization
J. T. Araki, Ph.D.—Japanese: literature
R.M. Baumer, Ph.D.—Indic languages
S. Dardjowidjojo, Ph.D.—Indonesian: linguistics
N. Fujioka, M.A.—Japanese: classical and modern grammar
T.W. Gething, Ph.D.—Thai: linguistics
B. Hoffer, Ph.D.—Japanese: linguistics
H. Ikeda, Ph.D.—folklore: Japanese bibliography and literature
P. H. Lee, Ph.D.—East Asian comparative literature
Fang Kuei Li, Ph.D.—Chinese and Thai: linguistics
Nguyen-Dang-Liem, Ph.D.—Vietnamese: linguistics
C. T. Lo, Ph.D.—Chinese: folklore and traditional literature
W. H. Maurer, Ph.D.—Sanskrit: literature
Y. Uyehara, M.A.—Japanese: poetry and modern literature
V. H. Viglielmo, Ph.D.—Japanese: modern literature and thought
L.P.H.C. Winters, M.A.—Chinese: classical poetry and modern literature
Hsin-Nung Yao, B.A.—Chinese: literature
John Young, Ph.D.—Japanese and Chinese: applied linguistics, civilization

Intended candidates for the M.A. or Ph.D. in Asian languages must present a minimum background equivalent to a strong undergraduate major in the language. Those not fulfilling this requirement may be admitted to candidacy only under the condition that they make up their deficiencies as early as possible.

M.A.

The department of Asian and Pacific languages offers the M.A. in Chinese and Japanese. Both Plan A (thesis) and Plan B (nonthesis) programs in each of the following major concentrations are available: Chinese (1) language, (2) literature, and (3) teaching Chinese as a second language (CHISL); Japanese (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, Chinese or Japanese 750.

Under Plan B (nonthesis), a minimum of 30 hours of course work, including at least 21 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 or Japanese 750.

Intended candidates must have a B.A. in Chinese or 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.

**Ph.D.**

The department of Asian and Pacific languages offers a Ph.D. degree in Asian languages with emphasis on Japanese. There are four major areas in which candidates for the Ph.D. may work: Classical-Medieval Japanese, Edo Japanese, Modern Japanese, and History of the Japanese Language. The doctoral candidate is expected also to have two minor fields of study to be selected in consultation with his advisers. Suggested fields include Japanese art, Japanese or East Asian philosophy, Asian drama and theater, general linguistics, history of China, Korean language and literature, and Western literature.

Prospective candidates will be formally advanced to candidacy upon passing qualifying examinations. They must pass a comprehensive examination and a final oral examination in defense of the dissertation. Apart from having a command of English and Japanese, candidates must be proficient in a foreign language—normally French or German—in which there is considerable literature pertinent to their areas of concentration, and must also acquire a basic competence in classical Chinese.

**CHINESE**

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<td>401-402</td>
<td>Fourth-Level Chinese (4-4)</td>
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<td>404</td>
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<td>421-422</td>
<td>Advanced Chinese Conversation (3-3)</td>
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<td>Chinese for Reading Knowledge (3-3)</td>
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<td>433-434</td>
<td>Selected Readings in Chinese (3-3)</td>
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<td>435-436</td>
<td>Introductory Classical Chinese (3-3)</td>
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<td>437-438</td>
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<td>461-462</td>
<td>Introduction to Modern Chinese Literature (3-3)</td>
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<td>613-614</td>
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<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>Chinese Phonology (3)</td>
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### ASIAN LANGUAGES

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<td>641-642</td>
<td>Contrastive Analysis of Mandarin and English Structure (3-3)</td>
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<td>643-644</td>
<td>Methodology in Teaching Chinese as a Second Language (3-3)</td>
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<td>651-652</td>
<td>Historical and Philosophical Texts (3-3)</td>
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<tr>
<td>693-694</td>
<td>Methods in Chinese Studies (3-3)</td>
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<td>750</td>
<td>Research Seminar in Chinese (3)</td>
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<td>800</td>
<td>Thesis Research (arr.)</td>
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<tr>
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<td>Directed Reading (arr.)</td>
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<td>AP699</td>
<td>Directed Research (arr.)</td>
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<tr>
<td>AP761-762</td>
<td>Seminar in East Asian Comparative Literature (3-3)</td>
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### JAPANESE

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<td>431-432</td>
<td>Selected Readings in Japanese (3-3)</td>
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<td>435-436</td>
<td>Introduction to Japanese Documentary and Epistolary Styles (3-3)</td>
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<td>Advanced Japanese Composition (2)</td>
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<td>451-452</td>
<td>Structure of Japanese (3-3)</td>
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<td>455-456</td>
<td>Topics in Japanese Grammar (3-3)</td>
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<td>457-458</td>
<td>Japanese Grammar: Classical (3-3)</td>
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<td>Introduction to Modern Japanese Literature (3)</td>
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<td>491-492</td>
<td>Japanese Interpretation (3-3)</td>
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<td>495-496</td>
<td>Japanese Translation (3-3)</td>
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<td>609-610</td>
<td>Japanese Poetry (3-3)</td>
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<td>Classical Japanese Literature (3)</td>
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<td>621-622</td>
<td>History of Japanese Literary Criticism (3-3)</td>
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<td>Japanese Folklore (3)</td>
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<td>631-632</td>
<td>History of Japanese Language (3-3)</td>
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</tbody>
</table>
Asian Studies

Graduate Faculty

East Asia
D. W. Y. Kwok, Ph.D. (Director)—history
F. C. Hung, Ph.D. (Chairman)—economics

Southeast Asia
W. F. Vella, Ph.D. (Chairman)—history

South Asia
B. Stein, Ph.D. (Chairman)—history

The graduate program in Asian studies is designed primarily for students who have taken their B.A. in a discipline and who wish to study a particular geographical and cultural region of Asia at the M.A. level. Such an approach entails studying the region through at least two disciplinary viewpoints. The program is open also to Asian nationals provided they concentrate 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 nonthesis program.

Graduate work in Asian studies is supervised and coordinated by three respective area studies committees for East Asia, Southeast Asia, and South Asia.

Students not having sufficient academic background for the study of Asia 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. Graduate Record Examination scores for aptitudes are also required for admission to the program, but advanced test scores are not required.

Requirements for the M.A. in Asian studies include:

1. A concentration and completion of 15 hours of courses approved by the area adviser in consultation with the pertinent department in one of the following disciplines: anthropology, economics, geography, history, political science, 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, to be taken towards the end of the candidate's degree program;

4. A minimum of 6 hours of credit in an Asian language at the fourth-level or higher; entering students who have achieved this level and can demonstrate this proficiency through examination, may select alternate courses equaling 6 credits with the consent of their area committee adviser;

5. Submission of a major seminar paper to the appropriate area committee for consideration as partial fulfillment of the M.A. degree.

ASIAN STUDIES

601 Contemporary Chinese Studies Seminar (3)
798 Seminar in Asian Studies (3)
    (1) East Asian Studies
    (2) Southeast Asian Studies
    (3) South Asian Studies
799 Directed Research (arr.)
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
T.K. Menon, Ph.D.—radio astronomy and galactic structure
F.Q. Orrall, Ph.D.—solar physics
W.M. Sinton, Ph.D.—planetary and infra-red astronomy
R.D. Wolstencroft, Ph.D.—interplanetary and interstellar matter
J.B. Zirker, Ph.D.—solar physics

Undergraduate preparation for admission to the graduate program in astronomy includes a minimum of 35 semester hours of undergraduate credits in physics or astronomy, some of which must be in atomic and nuclear physics, electro-magnetism, mechanics, optics, and thermodynamics. An undergraduate course in introductory astronomy is recommended. Courses in mathematics through differential equations are also required. Applicants for admission must submit to the department aptitude and advanced (physics) scores 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. While no additional courses are required for the Ph.D., the student's adviser may recommend additional courses to ensure adequate background.

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. (Chairman)—mechanisms of organic and biological reactions, electron paramagnetic resonance
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
J.A. Mann, Ph.D.—biomembrane dynamics, structure and function; surface physics and chemistry; theoretical chemistry (joint appointment with Chemistry)
J.D. McConn, Ph.D.—enzyme kinetics and the catalytic function of metals
The M.S. (Plans A and B) and Ph.D. degrees are offered in both biochemistry and biophysics. The following information supplements the general requirements and procedures listed by the Graduate Division. Acceptance for graduate work by the department will admit the student to candidacy for the M.S. degree. A final written examination for the M.S. degree is required for both Plan A (thesis) and Plan B (nonthesis) students. For the M.S. degree, Plan A, the thesis will be examined by a thesis committee but no oral examination will be given. The number of units of course work are those required by the University — Plan A — 30 credit hours — a minimum of 18 credit hours of course work and 12 credit hours of thesis research. For the M.S. degree, Plan B, nonthesis, the number of credits of course work are those required by the University, 30 graduate credit hours.

For the Ph.D. degree the foreign language (one) requirement will be met by a written or oral examination given by departmental faculty or other agency where appropriate. A written qualifying examination covering courses 601, 602 and 611 in general biochemistry and 601, 602 and 603 in biophysics is required before the student may continue to the comprehensive examination and then to enrollment in Thesis Research 800.

The qualifying examination is normally offered at the end of the second semester. Students joining the department with an M.S. degree may, on request, take the qualifying examination at time of entrance. Success in the biochemistry and/or biophysics section will credit the students with the relevant courses.

The comprehensive examination will take the form of an oral examination by the candidate’s doctoral committee based on two original research propositions and a thesis outline submitted by the candidate. The final oral examination in defense of the dissertation follows University regulations. To facilitate matters for the candidate the doctoral committee will be kept informed as to the progress of the thesis research.

Further details may be obtained from the Prospectus for Graduate Training and Guide for Incoming Ph.D. Candidates issued by the department.

Intended candidates 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**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>441</td>
<td>Basic Biochemistry (3)</td>
<td></td>
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<tr>
<td>442</td>
<td>Basic Biochemistry Laboratory (1)</td>
<td></td>
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<tr>
<td>601-602</td>
<td>General Biochemistry (3-3)</td>
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<tr>
<td>611</td>
<td>General Biochemistry Laboratory (2)</td>
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<td>605-606</td>
<td>Medical Biochemistry (2-2)</td>
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<tr>
<td>705</td>
<td>Special Topics in Biochemistry (2)</td>
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<tr>
<td>710</td>
<td>Special Topics in Enzymology (2)</td>
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<tr>
<td>713</td>
<td>Advanced Enzyme Kinetics (2)</td>
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<tr>
<td>720</td>
<td>Bioenergetics (2)</td>
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<tr>
<td>730</td>
<td>Nucleic Acids and Viruses (2)</td>
<td></td>
</tr>
<tr>
<td>740</td>
<td>Advanced Protein Chemistry (2)</td>
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</tr>
<tr>
<td>671</td>
<td>Seminar (1)</td>
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<tr>
<td>799</td>
<td>Directed Research (arr.)</td>
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<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
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**BIOPHYSICS**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>601-602</td>
<td>Survey of Biophysics (3-3)</td>
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<tr>
<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>
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<tr>
<td>703</td>
<td>Conformational Analysis of Biopolymers (2)</td>
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</tr>
<tr>
<td>704</td>
<td>The Role of Free Radicals in Biological Systems (2)</td>
<td></td>
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<tr>
<td>705</td>
<td>Special Topics in Biophysics (2)</td>
<td></td>
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<tr>
<td>706</td>
<td>Molecular Structure and Function of Cell Organelles (2)</td>
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<tr>
<td>799</td>
<td>Directed Research (arr.)</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
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**Botany**

*Graduate Faculty*

- N.P. Kefford, 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
- H.F. Clements, Ph.D.—sugar cane physiology, crop-logging
- B.J. Cooil, Ph.D.—mineral nutrition, salt uptake
- M.S. Doty, Ph.D.—marine ecology
- R.O. Fournier, Ph.D.—phytoplankton systematics and ecology
- D.J.C. Friend, Ph.D.—quantitative growth, radiation effects
- R.D. Goos, Ph.D.—tropical fungi, their systematics and distribution
- C.H. Lamoureux, Ph.D.—developmental morphology of ferns
- R.M. Lloyd, Ph.D.—fern systematics and biology
- 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
- C.W. Smith, Ph.D.—morphogenetic processes, environmental effects
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.

For the M.S. degree, Plan A only is offered, and, of the 30 credits required, 12 shall be for thesis and a minimum of 18 shall be approved course credits.

BOTANY
410 Plant Anatomy (3)
412 Microtechnique (3)
430 Mycology (3)
435 Experimental Mycology (3)
436 Medical Mycology (3)
440 Environmental and Space Biology I (2)
450 Natural History of the Hawaiian Islands (2)
453 Physiological Ecology (4)
454 Vegetation Ecology (4)
461 Systematics of Vascular Plants (4)
470 Principles of Plant Physiology (4)
480 Phycology (3)
610 Botanical Seminar (1)
612 Advanced Botanical Problems (arr.)
615 Morphology Seminar (2)
618 Cytology (3)
620 Origin, Evolution and Distribution of Flowering Plants (4)
631 Marine Phytoplankton (3)
640 Environmental and Space Biology II (arr.)
650 Environmental Phytogeography (2)
651 Dynamics of Marine Productivity (3)
662 Advanced Taxonomy (4)
665 Nomenclature Seminar (2)
670 Plant Nutrition 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) 684 Phycology—Rhodophyta (2)
681 Phycology—Chlorophyta (2) 699 Directed Research (arr.)
682 Phycology—Phytoplankton (2) 799 Directed Research (arr.)
683 Phycology—Myxophyta and Phaeophyta (2) 800 Thesis Research (arr.)
Business Administration

Graduate Faculty
E. Richman, D.Eng.Sc. (Chairman)—management
J. Adler, Ph.D.—accounting, finance
L.W. Ascher, Ph.D.—finance
J.K. Bailey, Ph.D.—management
R.E. Baird, Ph.D.—management, travel industry 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
L.J. Crampon, M.B.A.—travel industry management
E. Currie, Ph.D.—accounting
E.W.J. Faison, Ph.D.—marketing
J.B. Ferguson, Ph.D.—personnel management, industrial relations
L.P. Freitas, Ph.D.—finance
C. Gee, M.A.—travel industry management
T.Q. Gilson, Ph.D.—management, industrial relations
H.W. Grayson, Ph.D.—business economics
R.C. Hook, Ph.D.—marketing
M.E. Hopkins, Ph.D.—personnel management, industrial relations
T. Ige, Ph.D.—business economics
L.W. Jacobs, Ph.D.—management, marketing, industrial relations
L.E. Jacobsen, Ph.D.—accounting, finance
S. Kim, Ph.D.—business economics
A.L. Kirkpatrick, M.A.—business economics, money and banking
H.E. Kramer, Ph.D.—marketing
S.S.O. Lee, Ph.D.—accounting
H.D. Lowe, D.B.A.—accounting
J.V. Miccio, Ed.D.—management
J.R. Omphs, Ph.D.—accounting
E.C. Pendleton, Ph.D.—labor economics, industrial relations
H.C. Reeser, D.B.A.—management
K.K. Seo, Ph.D.—business economics, money and banking
C.H. Spencer, Ph.D.—accounting
H.B. Stellmacher, M.B.A.—marketing
A.M. Whitehill, Ph.D.—international management

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 organization). 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 prerequisites to the program; students are admitted on the basis of undergraduate grade averages and the results of the ATGSB examination.

There are two programs leading to the M.B.A., both requiring a minimum of 33 hours of work. One is a thesis program offered under Plan A of the Graduate Division, the other is a nonthesis program offered under Plan B of the Graduate Division. The College of Business Administration does not require the General Examination (as defined in this Bulletin) for either M.B.A. program nor does it require the final examination for the M.B.A. Plan B. The college does require a final oral examination for the M.B.A. Plan A.

**Program Requirements – MBA Plan A**

**Group I, Foundation Courses** — required only of students not possessing an undergraduate background in business administration. Do not count towards the 33 required credit hours up to 15 hours

**Group II, Advanced Disciplines & Functions**

**Group III, Electives**

**Thesis**

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**33 hours**

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**Program Requirements – MBA Plan B**

**Group I, Foundation Courses** — required only of students not possessing an undergraduate background in business administration. Do not count towards the 33 credit hours up to 15 hours

**Group II, Advanced Discipline & Functions**

**Group III, Electives**

**Group IV, Integrative**

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**33 hours**

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**BUSINESS ADMINISTRATION**

**Group I**

Bus 501 Accounting (3)
Bus 502 Economic Analysis (3)
Bus 503 Introduction to Quantitative Methods (3)
Bus 504 The Management Process (3)
Bus 505 Marketing and Operations Management (3)

**Group II**

Bus 601 Managerial Accounting (3)
Bus 611 Statistical Methods of Business Analysis (3)
Bus 621 Managerial Economics (3)
Bus 631 Finance (3)
Bus 641 Management: A Systems Analysis (3)
Bus 642 Behavioral Science for Business (3)
Bus 651 Marketing (3)
BUSINESS ADMINISTRATION

Group III

Accounting
- Acc 437 Advanced Tax Problems (3)
- Acc 445 Advanced Cost Accounting (3)
- Acc 703 Advanced Auditing (3)
- Acc 704 Computers and Accounting in Business Systems (3)
- Acc 705 Advanced Accounting Problems (3)
- Acc 706 Accounting History and Theory (3)
- Acc 707 Accounting for Management Planning and Control (3)
- Acc 708 Seminar in Advanced Accounting (3)

Business Analysis & Statistics
- BAS 713 Statistical Decision Theory (3)
- BAS 714 Operations Research (3)
- BAS 715 Quantitative Methods of Business and Economic Forecasting (3)
- BAS 783 Data Management Systems (3)
- BAS 784 Management Information Systems (3)
- BAS 785 Systems Analysis—A Computer Approach to Decision Models (3)

Business Economics
- BEc 723 Operations Economics (3)
- BEc 724 Current Economic Problems (3)
- BEc 725 Capital Markets and International Finance (3)

Finance
- Fin 733 Problems in Business Finance (3)
- Fin 734 Investment Analysis and Management (3)
- Fin 735 The Financial System (3)

Law
- Law 786 Environment of Business (3)

Management
- Mgt 743 Selected Topics in Organization Theory and Practice (3)
- Mgt 744 Comparative Management (3)
- Mgt 746 Production and Operations Management (3)

Marketing
- Mkt 753 International Marketing Management (3)
- Mkt 754 Marketing Communication and Promotional Strategy (3)
- Mkt 755 Marketing Research Methodology (3)

Personnel and Industrial Relations
- PIR 763 Personnel Administration (3)
- PIR 764 Advanced Personnel Administration (3)
- PIR 765 Labor Relations (3)
- PIR 766 Problems of Collective Bargaining (3)

Real Estate
- RE 773 Advanced Real Estate (3)
- RE 774 Land Resource Development (3)

Travel Industry Management
- TIM 775 Advanced Travel Industry Management (3)

Group IV

Bus 796 Business Policy
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.W. Buddemeier, Ph.D. — inorganic and environmental chemistry, radiocarbon dating, distribution of natural carbon isotopes, geochronology
R.E. Cramer, Ph.D. — inorganic chemistry, nuclear magnetic resonance contact shifts, EPR of sigma radicals, molecular orbital calculations
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. Self, 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
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.

The candidate for a M.S. in chemistry is granted 12 course credits for an acceptable thesis. The remaining 18 credits must 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 M.S. and Ph.D. research and study opportunities in analytical, inorganic, organic and...
physical chemistry with special programs offered in environmental and marine related chemistry. Additional details of programs may be found in a departmental brochure.

CHEMISTRY

445  Modern Synthetic Methods (4)
621  Introductory Quantum Chemistry (3)
622  Advanced Inorganic Chemistry I (3)
623  Advanced Inorganic Chemistry II (3)
631  Instrumental Methods of Analysis (4)
632  Electroanalytical Chemistry (3)
633  Introduction to Spectroscopy (3)
641  Advanced Organic Chemistry: Structure and Stereochemistry (3)
642  Advanced Organic Chemistry: Mechanisms (3)
651-652  Intermediate Physical Chemistry (3-3)
655  Radiochemistry and Nuclear Reactions (3)
656  Radiochemical Techniques (1)
*691-692  Seminar (1-1)
721-722  Special Topics in Inorganic Chemistry (arr.)
731-732  Special Topics in Analytical Chemistry (arr.)
741-742  Special Topics in Organic Chemistry (arr.)
744  Organic Applications of Spectroscopy (3)
751-752  Special Topics in Physical Chemistry (arr.)
753  Quantum Chemistry (3)
756  Statistical Mechanics (3)
758  Crystallography (3)
799  Directed Research (arr.)
*800  Thesis Research (arr.)

Civil Engineering

Graduate Faculty

M.L.P. Go, Ph.D. (Chairman)—structures
G.K. Anderson, Ph.D.—environmental and sanitary engineering
C.L. Bretschneider, Ph.D.—ocean engineering
N.C. Burbank, Sc.D.—environmental and sanitary engineering
A.N.L. Chiu, Ph.D.—structures
J.R. Evans, M.S.—soil mechanics
R.A. Grace, Ph.D.—hydrology, hydraulics
H.S. Hamada, Ph.D.—structures, applied mechanics
H.P. Harrenstien, Ph.D.—applied mechanics
R.W. Haselwood, M.S.—transportation and soil mechanics
H.W. Klemmer, Ph.D.—sanitary microbiology (PBRC)
L.S. Lau, Ph.D.—hydrology, environmental and sanitary engineering
T. Mitsuda, Ph.D.—applied mechanics
N.N. Nielsen, Ph.D.—structures
R.S. Szillard, Ph.D.—structures, applied mechanics
G.T. Taoka, Ph.D.—applied mechanics
J.A. Williams, Ph.D.—hydromechanics
R.H.F. Young, Sc.D.—environmental and sanitary engineering
S.S. Zundelevich, Ph.D.—structures, applied mechanics

Affiliate Faculty

A.Q.Y. Tom, Sc.D.—environmental and sanitary engineering
The master's degree is offered in structures, soil mechanics, environmental and sanitary engineering, applied mechanics and hydrosciences. Options to be added soon include transportation, urban planning, and water resources. Close cooperation is maintained with the other engineering departments, the School of Public Health, the mathematics department, the University Computing Center and the Water Resources Research Center. Details and requirements of each program may be obtained from the department office.

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.

Plan A requires 9 credits of thesis work and 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)
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)
631 Environmental and Sanitary Engineering Theory I (3)
632 Environmental and Sanitary Engineering Theory II (3)
633 Environmental and Sanitary Engineering Design I (3)
634 Environmental and Sanitary Engineering Design II (3)
635 Environmental and Sanitary Engineering Chemistry (4)
636 Environmental and Sanitary Engineering Microbiology (4)
637 Environmental and Sanitary Engineering Lab (3)
638 Environmental and Sanitary Engineering Public Health (3)
651 Soil Mechanics (3)
655 Applied Soil Mechanics I (3)
656 Applied Soil Mechanics II (3)
671 Theory of Elasticity I (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.)
Classics

Graduate Faculty
A. Burns, Ph.D. (Chairman)—Roman Republic, Greek philosophy
J. Tyler, Ph.D.—Roman and Greek poetry, drama
S. Temple, Ph.D.—New Testament and Greek philosophy

Two plans are offered, Plan A (thesis) is intended primarily for students planning to continue to a doctorate in Classics. Plan B (nonthesis), leading to the M.A. in Classics—Latin, is intended primarily for students who wish to emphasize course work in Latin with a view to teaching in secondary schools.

Requirements for admission are those of the Graduate Division and a B.A. degree in Greek, Latin or Classics with a minimum grade-point average of 3.0 in the major field. Students with a slightly lower grade-point average may be admitted on a provisional basis.

Under Plan A, degree requirements include 30 semester hours of work in Latin or Greek. The distribution of work between Latin and Greek will depend on the student's main interest and the results of the preliminary conference and examination. Of the 30 hours, 6 will be allowed for thesis, and 12 must be in courses numbered 600-799. Candidates must demonstrate a reading knowledge of German or French. Oral defense of the thesis will complete the program.

Under Plan B, 30 semester hours are required, of these at least 18 must be in courses numbered 600-799. Concentration of course work will be in Latin. The student will be expected to demonstrate a knowledge of Greek civilization which may be acquired through graduate or undergraduate course work in Greek, ancient history, Greek philosophy, literature in translation, or through independent study. Candidates must show a reading knowledge of German or French. A comprehensive examination completes the degree requirements.

LATIN
409 Lyric Poets (3)
420 Vergil (3)
427 Satire (3)
428 Drama (3)
433 Roman Philosophy (3)
434 Lucretius (3)
440 Oratory (3)
490 Seminar (3)
601 Advanced Latin Composition (3)
610 Literature of the Republic (3)
611 Augustan Literature (3)
612 Literature of the Empire (3)
651 Seminar in Roman Literature (3)
699 Directed Research (arr.)
800 Thesis Research (6)

GREEK
409 Plato (3)
410 Historians (3)
421 Homer (3)
422 Lyric Poetry (3)
431 Introduction to Drama (3)
432 Drama (3)
441 Pre-Socratics (3)
442 Aristotle (3)
601 Advanced Latin Composition (3)
610 Literature of the Republic (3)
611 Augustan Literature (3)
612 Literature of the Empire (3)
651 Seminar in Roman Literature (3)
699 Directed Research (arr.)
800 Thesis Research (6)

EUROPEAN LANGUAGES
630 Seminar in Research Methods (1)
Drama and Theatre

Graduate Faculty

E. Ernst, Ph.D. (Chairman)—Oriental theatre, aesthetics
J. Brandon, Ph.D.—Oriental theatre
G. Cannon, A.B.—acting, directing
D. Carroll, Ph.D.—playwriting, theory
T. Knapp—acting, directing
E. Langhans, Ph.D.—theatre history
R. Mason, M.F.A.—design
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. Candidates in Plan B are required to write a final essay on an approved subject. For the M.A. thesis the candidate does research in theatre history, criticism, or theory. The M.F.A. thesis consists of an essay and a record of creative work in play production, playwriting, design, or dance.

Intended candidates must present an adequate undergraduate background in the humanities, submit three letters of recommendation, submit official scores for the Graduate Record Examination aptitude tests, pass a foreign language examination and a general examination in drama and theatre before admission to candidacy. East-West Center grantees from the United States must attain proficiency in an Asian language.

All candidates must take 461-462, 610, 660, and 6 credits from 620, 631 or 632, 640, or 650. Those with sufficient undergraduate preparation may take approved related graduate courses in other departments. Besides work in course, candidates must participate in the production of at least three plays.

Final oral and written comprehensive examinations are required of all candidates.

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.

The degree is not conferred for the acquisition of academic credits. It is granted only to candidates who demonstrate outstanding ability to do imaginative research and who present the results in a cogent dissertation.

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 Graduate Record Examination aptitude tests.

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

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

DRAMA AND THEATRE

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>340</td>
<td>Advanced Stagecraft</td>
<td>3</td>
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<tr>
<td>353-354</td>
<td>Design in the Theatre</td>
<td>3-3</td>
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<tr>
<td>356</td>
<td>Costume for the Stage</td>
<td>3</td>
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<tr>
<td>370</td>
<td>Creative Dramatics</td>
<td>3</td>
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<tr>
<td>372</td>
<td>Drama in Performance</td>
<td>3</td>
</tr>
<tr>
<td>381-382</td>
<td>Intermediate Modern Dance</td>
<td>3-3</td>
</tr>
<tr>
<td>383-384</td>
<td>Intermediate Ballet</td>
<td>3-3</td>
</tr>
<tr>
<td>388</td>
<td>Dance Composition</td>
<td>3</td>
</tr>
<tr>
<td>410</td>
<td>Theatre Management</td>
<td>3</td>
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<tr>
<td>421-422</td>
<td>Advanced Acting</td>
<td>3-3</td>
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<tr>
<td>440</td>
<td>Advanced Stage Lighting</td>
<td>3</td>
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<tr>
<td>461-462</td>
<td>History of the Theatre</td>
<td>3-3</td>
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<tr>
<td>464</td>
<td>Oriental Drama and Theatre: India and Southeast Asia</td>
<td>3</td>
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<td>465</td>
<td>Oriental Drama and Theatre: China and Japan</td>
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<td>468</td>
<td>Dance History</td>
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<td>474</td>
<td>Children's Theatre</td>
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<td>476</td>
<td>Puppetry</td>
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<td>481-482</td>
<td>Advanced Modern Dance</td>
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<tr>
<td>483-484</td>
<td>Advanced Ballet</td>
<td>3-3</td>
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<tr>
<td>490</td>
<td>Playwriting</td>
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<td>492</td>
<td>Advanced Playwriting</td>
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<td>610</td>
<td>Seminar in Theatre Research</td>
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<td>620</td>
<td>Advanced Acting Techniques</td>
<td>3</td>
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<td>631-632</td>
<td>Seminar in Direction</td>
<td>3-3</td>
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<tr>
<td>640</td>
<td>Problems in Stagecraft and Stage Lighting</td>
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<tr>
<td>650</td>
<td>Advanced Design</td>
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<td>660</td>
<td>Theories of the Theatre</td>
<td>3</td>
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<tr>
<td>662</td>
<td>Seminar in Drama and Theatre</td>
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<tr>
<td>664</td>
<td>Seminar in Oriental Theatre</td>
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<td>(1) India and Southeast Asia</td>
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<td>(2) China and Japan</td>
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<td>699</td>
<td>Advanced Theatre Practice</td>
<td>3</td>
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<td>730</td>
<td>Seminar in Direction</td>
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<tr>
<td>750</td>
<td>Seminar in Design</td>
<td>3</td>
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<tr>
<td>760</td>
<td>Seminar in Aesthetics of the Theatre</td>
<td>3</td>
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<tr>
<td>799</td>
<td>Directed Work</td>
<td>3</td>
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<tr>
<td>800</td>
<td>Thesis Research</td>
<td>arr.</td>
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</tbody>
</table>
Economics

Graduate Faculty

B. Campbell, Ph.D. (Chairman)—macroeconomic theory, monetary theory
A. Alchian, Ph.D.—economic theory*
S. Comitini, Ph.D.—marine resource economics, international economics
P. Demeny, Ph.D.—economic demography, microeconomics
W. Gorter, Ph.D.—international economics
R. Heller, Ph.D.—international economics, monetary theory*
F. Hung, Ph.D.—microeconomics, economic development
R. Kamins, Ph.D.—public finance
Y. Lim, Ph.D.—economic development, monetary theory
M. McManus, Ph.D.—mathematical economics, welfare economics
W. Miklius, Ph.D.—industrial organization, regional economics
L. Miller, Ph.D.—monetary theory, microeconomics
S. Naya, Ph.D.—international economics, economic development
H. Oshima, Ph.D.—economic development, income accounting
R. Pollock, Ph.D.—public finance, macroeconomics
G. Walton, Ph.D.—economic history, microeconomics
Y. Yeh, Ph.D.—international economics


The department offers programs leading to the M.A. and Ph.D. in economics. These programs are designed to prepare students for careers as research economists in government and business and for careers in the academic profession.

All students are expected to acquire a strong background in economic theory. In addition, specialization is possible in the following fields: economic development, international economics, urban and regional economics, public finance, monetary economics, economic history, econometrics, mathematical economics, economic demography, human resource economics, and marine resource economics.

Faculty research interests and the supporting programs of the University make a regional emphasis focusing on Asia and the Pacific possible in many of the fields listed.

Departmental Requirements

Entering graduate students are expected to have completed courses in intermediate micro and macroeconomic theory, in money and banking, and in elementary statistics. Students not having these courses will be expected to complete them before being admitted to candidacy. Although not required for all fields, mathematics through calculus is necessary for some fields of specialization and will prove useful for anyone planning to work for a Ph.D. in economics.

All degree candidates must pass Economics 600 and 601 with a B or better in each course and must take and pass Economics 425. These requirements may be waived if a candidate can demonstrate that he has met their equivalent elsewhere.

Official scores of the Aptitude and Advanced Economics sections of the Graduate Record Examinations and two letters of recommendation must be submitted by applicants for graduate status in economics.
M.A.

The department offers both Plan A and Plan B programs leading to the M.A. degree.

Plan A candidates may count 6 units taken outside the department and 9 units of thesis research toward the 30 credit hours they are required to complete.

Plan B candidates must pass a written comprehensive examination covering micro and macroeconomic theory and either (a) pass a written examination in one additional field or (b) submit acceptable term papers in graduate courses in two additional fields. Plan B candidates may count 9 units taken outside the department toward the 30 units required for the M.A. degree.

Ph.D.

Ph.D. students must pass a qualifying examination, a comprehensive examination, and a final oral examination in defense of their dissertation.

They must also demonstrate, either through course work at the University of Hawaii or elsewhere or by passing an examination, competence in econometrics at the Econ 426 level and in history of economic thought at the Econ 404 level.

The qualifying examination, which is the same as the M.A. comprehensive examination in micro and macroeconomic theory, will normally be taken soon after the student has completed the courses required of all degree candidates.

In addition to the oral examination required by the Graduate Division, the comprehensive examination will include written examinations covering micro and macroeconomic theory and either (a) two additional fields in economics or (b) one additional field in economics and one outside field (approved by the department).

ECONOMICS

400 Growth and Fluctuations (3)
404 History of Economic Thought (3)
405 Comparative Economic Systems (3)
410 Economic Development (3)  
411 Economic Development of Europe (3)
412 Economic Development of U.S. (3)
414 Economic Development of Japan (3)
430 Economics of Human Resources (3)
440 Monetary Theory and Policy (3)
450 Public Finance (3)
452 State and Local Finance (3)
460 International Trade Theory (3)
461 International Finance (3)
470 Industrial Organization and Public Control of Business (3)
480 Transportation and Public Utilities (3)
490 Location Theory and Regional Analysis (3)
492 Regional Economic Development (3)
496 Selected Topics in Contemporary Economic Problems (3)
600 Macroeconomic Theory (3)
601 Microeconomic Theory (3)
602 Economic Growth and Fluctuations (3)
603 Advanced Microeconomic Theory (3)
604 History of Economic Thought (3)
605 Mathematical Economics (3)
606 National Income Accounts (3)
610 Economic Development I (3)
611 Economic Development II (3)
613 Economic Development of the West (3)
614 Economic Development of Japan (3)
616 Economic Development of China and Korea (3)
618 Economic Development of Southeast Asia (3)
624 Advanced Econometrics I (3)
626 Advanced Econometrics II (3)
627 Economic Programming (3)
640 Monetary Theory (3)
650 Theory of Public Finance (3)
660 International Trade Theory (3)
662 International Finance (3)
670 Human Resources and Manpower Economics (3)
672 The Economics of Population Growth (3)
690 Regional Economic Analysis (3)
698 Seminar in Marine Economics (3)
699 Directed Research (arr.)
700 Seminar: Macroeconomic Theory (3)
701 Seminar: Microeconomic Theory (3)
710 Seminar in Economic Development (3)
730 Research Seminar (3)
745 Workshop: Financial and Monetary Aspects of Economic Development (arr.)
760 Seminar in International Economics (3)
780 Selected Topics in Economic Analysis (3)
800 Thesis Research (arr.)

Educational Administration

Graduate Faculty

J.B. Crossley, Ed.D. (Chairman) – administration of intermediate, secondary, community college, and administrative leadership
R.R. Dunwell, Ed.D. – school plant, educational administration
H.V. Everly, Ph.D. – general school administration
C.R. Ingils, Ed.D. – supervision, educational administration
L.D. Jackson, Ed.D. – school law, school finance, general administration (on leave 1970-71)

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 Advanced Test in Education of the Graduate Record Examination and the Miller Analogies Test (a minimum score at the 50th percentile is considered satisfactory on each test); (3) successful
completion of EA 685; and (4) an oral interview by the Department of Educational Administration.+

Plan A requires 30 semester hours, 6 of which are earned through the thesis. In addition to EA 685, course credit hours must include 3 in educational foundations, 3 in educational psychology, 3 in research methods, and at least 2 seminars in educational administration or supervision.

Plan B, the nonthesis plan, requires 36 semester hours. Required are EA 685, 3 semester hours in educational psychology, 3 semester hours in educational foundations, 1 seminar in educational administration or supervision, and EA 700, Research Seminar in Educational Administration. Nine to 15 of the 36 required hours must be in fields other than educational administration and supervision.

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 candidates.

The department of educational administration will accept a maximum of 9 semester hours toward the master's in educational administration when such work is taken as a regular graduate student.

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)
640 Systems Analysis in Educational Administration (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.)
770 Seminar in School Supervision (3)
780 Seminar in Educational Administration (3)
(1) Elementary (5) Technical and Vocational
(2) Intermediate (6) Community College
(3) Secondary (7) Higher Education
(4) Adult
§800 Thesis Research (arr.)

*Master's candidates, Plan A and B.
+EA 685 shall be taken as early as possible in the program for those students working toward a M.Ed. in Educational Administration. The required oral interview shall be conducted in the second quarter of the course.
‡EA 700 shall be taken during the last semester of work for M.Ed. of Educational Administration candidates—Plan B.
§Required of Plan A candidates.
Educational Communications

Graduate Faculty
G.Z. Kucera, Ph.D. (Chairman)—communications and sociology
L. A. Butler, Jr., Ph.D.—educational communications and curriculum development
R. A. Sanderson, Ph.D.—educational communications
W. A. Wittich, Ph.D.—educational communications and public administration

Educational communications is a field of study concentrating on the application of new technological advancements to the general areas of education. After determination of learner needs and curricular objectives, the task of educational communications is to identify and plan the most expedient and the most efficient teaching strategies and learning experiences through various media channels. Drawing many of its major premises from the disciplines of psychology and other behavioral sciences, and operating within the general framework of the theories of curriculum development, educational communications emphasizes thoughtful application of media for the improvement of teaching and learning, and seeks the formulation of proper administrative procedures necessary for a systematic and meaningful integration of mediated experiences into the teaching-learning process.

The department of educational communications has set the following objectives for its graduate students who, at the conclusion of their study and training period should:

1. be conversant with and communicative in learning aspects of educational media and methods;
2. have knowledge of the existing body of media research, its meaning and influence on practical applications of new media techniques in the teaching-learning process;
3. be well acquainted with the principles and processes of systems analysis as applied to teaching-learning situations;
4. be able to plan, design and execute meaningful applications of instruction with systematic use of media;
5. be proficient in techniques involved in origination of instructional materials for use in classroom and other learning situations;
6. be capable of engaging in planning and creating new media learning facilities, in modifying existing ones, and in administering them as curriculum support programs for the benefit of learners as well as teachers.

Applicants for admission must possess a bachelor's degree from an accredited institution and have had at least one year of successful teaching experience, or equivalent.
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) at least a 3.0 (B) average in his graduate work; (5) the Graduate Record Examination: Aptitude test (verbal and quantitative), and advanced test in education (code 34).
Thesis and nonthesis programs are based on 30 credits beyond the bachelor's degree. At least 18 hours must be in the field of educational communications as such. Thesis Plan A requires 24 credits plus 6 thesis credits. Nonthesis Plan B requires 30 credits and in addition, the completion of a seminar report.

The courses with an asterisk are required for the M. Ed. degree in educational communications.

**EDUCATIONAL COMMUNICATIONS**

- 314 Audio Visual Techniques (2)
- *404 Survey of Educational Communications Media (3)
- 599 Workshop in Educational Media (1)
- 614 Audio Visual Media Systems (3)
- *620 Production of Instructional Materials (3)
- 625 Educational Still Photography (3)
- 626 Educational Motion Pictures (3)
- *630 Television in Education (3)
- 635 Advanced Educational Television (3)
- 639 Mass Media and Education (3)
- 640 Programmed Learning (3)
- 650 Media Services Administration (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
- S. Amioka, Ph.D.—philosophy, Japanese education
- R. Anderson, Ph.D.—comparative education
- W. Boyer, Ed.D.—philosophy, social foundations
- G. Frazier, Ph.D.—philosophy, social foundations
- S. Jaeckel, Ed.D.—history, social foundations
- A. Keppel, Ph.D.—history
- V. Kobayashi, Ph.D.—comparative education, philosophy
- R. Potter, Ed.D.—history, social foundations

The purpose of the master's degree program in educational foundations is to develop educators capable of critical analysis of alternatives in educational policy and practice related to the social and moral problems faced by the state, the nation, and the world. The candidate studies educational theory using the fields of history, philosophy, and the social sciences as well as other areas in professional education. Sharp distinctions between the scholar and practitioner, theory and practice, and the humanistic and scientific components of education are avoided.

Intended candidates for the M.Ed. normally present credit hours in undergraduate professional education equivalent to the requirements for the B.Ed. at the University of Hawaii. B.A. holders without supervised student teaching may be accepted provided they make a commitment to education, have
equivalent experience (such as Peace Corps or Vista), or provided they make up such experience prior to admission to candidacy.

Admission to candidacy is based upon a combination of such factors as the quality of the student’s undergraduate record, his graduate record, and a general interview of the student by a faculty committee.

Both Plan A (thesis) and Plan B (nonthesis) are available. Plan A: The program may include a maximum of 10 semester credits in approved courses other than educational foundations if related to the candidate’s announced goals. Only 2 credits of 699 may be included in Plan A. Six credits are awarded for the thesis. An oral examination on the thesis constitutes the final examination 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. Twelve semester hours in a planned and approved sequence of courses which carry graduate credit in other fields are also normal requirements in Plan B. No more than 6 credits of 699 may be included in Plan B. A final seminar appearance is required as well as an oral or written examination. Together these constitute the final examination in Plan B.

In both Plan A and Plan B, requirements include at least two of the listed Ed EF courses marked with asterisks and at least one seminar in the department. Plan B requirements normally include an additional seminar in the department, Ed EF 768, which is taken in the last semester of candidacy.

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, religion, sociology, anthropology, Asian studies, American studies, or other graduate fields in education. Graduate courses in educational foundations not listed may be included in degree programs with the approval of the chairman.

EDUCATIONAL FOUNDATIONS

445 Educational Sociology (3)
480 Anthropology and Education (3)
*650 Historical Foundations of Western Education (3)
*651 History of American Education (3)
652 History of Education in Hawaii (3)
660 Philosophy of Education (3)
665 Comparative Ideologies and Education (3)
*669 Foundations of Comparative Education (3)
*670 Comparative Education: Europe and America (3)
*671 Comparative Education: Asia (3)
681 The Church and the School (2)
*683 Social Foundations of Education (3)
685 Education in America (3) (for foreign students only)
699 Directed Research (arr.)
751 Recent History of American Education (3)
757 Educational Utopias (2)
761 History of American Higher Education (3)
763 Seminar in Educational Theory (2)

(1) Educational Issues
(2) John Dewey
(3) Contemporary Educational Philosophers
(4) Japanese Educational Philosophy
(5) History of Education
Educational Psychology

Graduate Faculty
I. E. Reid, Ph.D. (Chairman)—learning, measurement
D. C. Adkins, Ph.D.—statistics and measurement
T. M. C. Chang, Ph.D.—education of culturally disadvantaged, school psychology
D. R. Collins, Ed.D.—school counseling
P. Dunn-Rankin, Ed.D.—statistics, computer application
H. J. Dupont, Ph.D.—education of emotionally disturbed
G. Y. Fujita, Ph.D.—statistics
D. W. Fullmer, Ph.D.—counseling; group and individual
T. Gust, Ph.D.—counseling
F. P. Haehnlen, Ph.D.—student personnel
D. K. McIntosh, Ed.D.—education of mentally retarded
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, special education, student personnel, learning, measurement, and research methods. The curricula in counseling and guidance and special education meet certification requirements of the Hawaii State Department of Education.

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.
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 (1) one semester's work in the program, (2) satisfactory completion of departmental qualifying examinations, (3) passing the examination in the required foreign language. 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.

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.

EDUCATIONAL PSYCHOLOGY

404 Education of Exceptional Children (3)
405 The Mentally Retarded (3)
406 Curriculum Development for Mentally Retarded Children (3)
408 The Emotionally Disturbed Child (3)
409 Culturally and Economically Disadvantaged Pupil (3)
410 Curriculum Development for the Emotionally Disturbed (3)
414 Education of Gifted Children (3)
416 Tests and Measurements (3)
429 Introductory Statistics (3)
450 Practicum Experience with the Mentally Retarded (9)
451 Practicum for Teachers of Emotionally Disturbed Children (9)
497 Introduction to Learning Disabilities (3)
601 Guidance in the School (3)
602 Elementary School Guidance (3)
604 Occupational Information in Guidance (3)
605 Problems of School Adjustment (3)
606 Student Personnel Services in Higher Education (3)
608 Introduction to Educational Research (3)
609 Tests and Inventories in Guidance (3)
610 Counseling: Theory and Practice (3)
614 Theory and Assessment of Intelligence (3)

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

615 Clinical Assessment of Exceptional Children (3)
616 Seminar in the Education of Exceptional Children (3)
   (1) Mentally Retarded, (2) Emotionally Disturbed,
   (3) Learning Disabled
629 Educational Statistics (3)
640 Programmed Learning (3)
645 American College Student (3)
655 Learning Language and Intellectual Function (3)
672 Advanced Educational Psychology: Learning (3)
673 Advanced Educational Psychology: Psycho-Social Development (3)
685 Child Learning Laboratory (3)
699 Directed Research (arr.)
701 Seminar in Guidance (3)
   (1) School Psychology, (2) Testing, (3) Counseling,
   (4) Vocational, (5) Elementary School, (6) Administration,
   (7) Group Procedures, (8) Philosophical and Social Issues in Guidance
702 Group Guidance (3)
703 Guidance Practicum (3)
708 Educational Research Methods (3)
709 Advanced Problems of Educational Measurement and Evaluation (3)
710 Counseling: Group Theory and Practice (3)
729 Scaling Qualitative Data (3)
768 Seminar in Educational Psychology (3)
   (1) General, (2) Learning, (3) Measurement,
   (4) Research and Statistics, (5) Psycho-Social Development
800 Thesis Research (arr.)

Electrical Engineering

Graduate Faculty
B. Kinariwala, Ph.D. (Chairman)—system theory; computing algorithms
N. Abramson, Ph.D.—information theory and coding; computer nets
A. Barna, Ph.D.—instrumentation
R. Chattopadhyay, Ph.D.—mathematical programming and computation
G. Fang, Ph.D.—plasma dynamics; atmospheric and ocean waves
B. S. M. Granborg, Ph.D.—automatic control systems
H. H. H. Hwang, Ph.D.—power system analysis; energy conversion
F. Koide, Ph.D.—biomedical engineering
F. F. Kuo, Ph.D.—system theory; computer applications
S. Lin, Ph.D.—information theory; error-correcting codes
K. Najita, Ph.D.—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

Visiting Faculty
T. Kasami, Ph.D.—coding theory; automata theory

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. At least one graduate seminar is required of all students.

**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 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.

The intended candidate for the Ph.D. degree must take a qualifying 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 qualifying 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.

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 an oral examination covering primarily his dissertation.

**ELECTRICAL ENGINEERING**

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<th>Course</th>
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<th>Credits</th>
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<td>411</td>
<td>Introduction to System Analysis</td>
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<td>422</td>
<td>Electronic Instrumentation</td>
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<td>423</td>
<td>Instrumentation Laboratory</td>
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<td>425</td>
<td>Electronics III</td>
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<td>427</td>
<td>Topics in Physical Electronics</td>
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<td>435</td>
<td>Power System Analysis</td>
<td>(3)</td>
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<td>441</td>
<td>Principles of Communications</td>
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<td>446</td>
<td>Information Theory and Coding</td>
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</table>
Elementary Education

Graduate Faculty

E.C. Jenkins, Ph.D. (Chairman)—elementary curriculum, supervision, language arts
M.C. Austin, Ed.D.—reading and 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
M. Lang, Ed.D.—social studies, elementary curriculum
A.J. Picard, Ph.D.—mathematics education
A.L. Pickens, Ed.D.—art education
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)
*622 Elementary School Curriculum (3)
623 The Elementary Science Curriculum (3)
624 The Elementary Mathematics Curriculum (3)
625 The Elementary Social Studies Curriculum (3)
626 Art in Elementary Education (3)
629 Curriculum Development in Creative Expression (3)
640 Seminar in Teaching Fields
646 Reading Difficulties
647 Clinical Procedures in Reading
†667 Curriculum Trends in Early Childhood Education (3)
699 Directed Research (arr.)
*722 Seminar in Elementary Curriculum Foundation (3)—Limited to master’s candidates
800 Thesis Research (arr.)

*Graduate Record Examination (Aptitude test) to be taken before completing 12 graduate credits but preferably prior to application.
†For those who wish to concentrate on Early Childhood Education CI 667 may be substituted for CI 622.

English

Graduate Faculty

J.M. Backus, Ph.D. (Chairman)—American literature
G.L. Anderson, Ph.D.—18th century literature, Asian and comparative literature
C.S. Bouslog, Ph.D.—English romanticism, 20th-century British and American literature
R.H. Canary, Ph.D.—American literature
R. Crymes, Ph.D.—modern English grammar
A.G. Day, Ph.D. (retired)—consultant in Pacific literature
A. Friedson, Ph.D.—20th-century literature
Intended candidates for the M.A. in English are expected to present, in addition to the customary freshman and sophomore composition and literature survey courses, 27 semester hours of undergraduate credit in English or closely related subjects. They are also expected to demonstrate a reading knowledge of an ancient or modern language. Courses for the M.A. are selected mainly from the following list, although a number of advanced courses in other disciplines may be approved. Required courses are: English 401 or 402 (or equivalent); English 630; one seminar in English or American literature.

Since no general examination is required, a student is advanced to candidacy at the satisfactory completion of his first semester of graduate study, after a conference with his adviser. A six-hour written comprehensive examination on English and American literature is taken near the end of the program by students in both Plans A and B. Plan A requires 18 credits in courses and 12 for the thesis.

In addition to the regular concentration in literature, the department offers a concentration in the English language. Further details about its M.A. programs are available from the chairman of the graduate faculty, department of English. At present, the department does not offer a Ph.D.
English as a Second Language

Graduate Faculty
M.P. Lester, Ph.D. (Chairman)—English language
B.W. Bender, Ph.D. —linguistics
R.H. Crymes, Ph.D. —practicum and English language
G. Dykstra, Ph.D.—practicum
M. Higa, Ed.D.—language acquisition
K. Jackson, Ed.D.—practicum
C.W. Mason, Ph.D.—practicum
T.H. Plaister, M.A.—practicum
T.S. Rodgers, Ph.D.—language acquisition
D. Steinberg, Ph.D.—language acquisition

The M.A. program in teaching English as a second language is designed to prepare specialists in this field.

Undergraduate Preparation: Since there is no undergraduate program in teaching English as a second language in most schools, American students come into the program from a wide variety of backgrounds. Students whose native language is not English are expected to have majored in English (language and/or literature). American students who have had no literature courses are admitted with an undergraduate deficiency and must take 6 units of work in literature in
addition to the required 30 units. Students who have not had a course in the formal study of language (e.g. an introductory course in linguistics or the English language) are admitted with an undergraduate deficiency and must take either Linguistics 320 or 615 during the first semester.

The GRE Aptitude Test (the "morning" part) is recommended for all American students. However, for those American students who apply for graduate assistantships and/or East-West Center grants, the GRE Aptitude Test is required.

**Curriculum:** This is a 30-credit, nonthesis program, the completion of which normally requires two semesters and a summer of full-time study. The program is divided into three areas: practicum, English language and linguistics, and language acquisition. The first area, the practicum, deals with methods and materials of teaching English as a second language. Included in this area are all courses of an applied or pedagogical nature. The second area, English language and linguistics, deals with the phonology and grammar of modern English as well as linguistic theory. The third area, language acquisition, deals with the psychological and social factors that are relevant to an understanding of how a second language is learned. The emphasis placed on theory & research in language acquisition is a distinctive characteristic of this program.

**Courses** (all courses carry 3 units of credit)

**Area I Practicum (9 units required)**

*Required*

- ESL 610 Teaching English as a Second Language
- ESL 710 Materials Selection and Adaptation
- ESL 711 New Materials Development
- ESL 730 Seminar in Teaching English as a Second Language

*Elective*

- ESL 613 Experimentation in Language Acquisition and Modification
- ESL 625 Reading
- ESL 640 Contrastive Analysis and Linguistic Universals
- ESL 720 Second Language Testing
- ESL 799 Directed Research

**Area II English Language and Linguistics (6 units required)**

*Required*

- Eng 401 Modern English Grammar
- Eng 404 English Phonology
- Speech 412 Phonetics and Phonemics of American English

*Elective*

- Eng 735 Seminar in English Language
- Eng 402 History of the English Language
- ESL 630 (Pro)Seminar in Hawaiian English

**Area III Language Acquisition (6 units required)**

*Required*

- ESL 650 Survey of Psycholinguistics with Reference to 2nd Language Acquisition
Examinations: The program requires two examinations; a general examination given at the end of the first semester or beginning of the second semester to determine advancement to candidacy and a comprehensive examination given during the last semester.

Language Requirements: Non-native speakers of English (foreign students) are expected to have a score of 550 or higher on the Test of English as a Foreign Language (TOEFL). Foreign students are expected to compete with American students without the benefit of double standards.

Native speakers of English (American students) are required to have two semesters of college level study of an Asian or Pacific language or the equivalent; or to have had two years residency in an Asian or Pacific country; or to have successfully completed the Peace Corps Language Training Program in an Asian or Pacific language. If the student has not already satisfied this requirement upon entrance into the program, he should plan to take an intensive language course during the summer. Foreign languages other than Asian and Pacific languages may meet the requirement, but the student must be able to justify the substitution.

Additional information relating to the matters discussed above, and to further program requirements, is contained in a program brochure. Those considering entry into the 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. Entrance into the program is permitted in the Fall, Spring, and Summer.

Entomology

Graduate Faculty
T. Nishida, Ph.D. (Acting Chairman)–ecology and biological control
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
M.D. Delfinado, Ph.D.–systematics
F.H. Haramoto, Ph.D.–acarology
D.E. Hardy, Ph.D.–taxonomy, medical entomology
A.A. LaPlante, Ph.D.–extension entomology
W.C. Mitchell, Ph.D. (Acting Associate Director)–economic entomology
R. Namba, Ph.D.–insect transmission of plant pathogens
M. Sherman, Ph.D.–toxicology
M. Tamashiro, Ph.D.–insect pathology

Affiliate Faculty
D.L. Chambers, Ph.D.–insect behavior and physiology–fruit flies
V.C.S. Chang, Ph.D.–insect behavior and insect transmission of plant pathogens
C.I. Davis, B.S.–biological control
J.L. Gressitt, Ph.D.–taxonomy
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, horticulture, plant pathology, chemistry, botany, microbiology, genetics, and related sciences, may be allowed in the degree program.

**ENTOMOLOGY**

- 661 Medical and Veterinary Entomology (3)
- 662 Advanced Systematic Entomology (3)
- 641 Insect Physiology (3)
- 664 Immature Insects (3)
- 671 Insect Ecology (3)
- 672 Acarology (3)
- 673 Insect Pathology (3)
- 675 Biological Control of Pests (3)  
  676 Insect Transmission of Plant Pathogens (3)
- 680 Insect Toxicology (4)
- 697 Entomology Seminar (1)
- 699 Directed Research (arr.)
- 800 Thesis Research (arr.)

**Food Science**

**Graduate Faculty**

- H.Y. Yamamoto, Ph.D. (Chairman)—food and plant biochemistry
- A. Bevenue, B.S.—pesticide residues
- H.A. Frank, Ph.D.—food microbiology
- F.S. Hing, Ph.D.—food technology and engineering
- J.W. Hylin, Ph.D.—pesticide metabolism
- H. Matsumoto, Ph.D.—food toxicology
- J.H. Moy, Ph.D.—food engineering, food irradiation, processing technology
Affiliate Faculty
J.E. Brekke, M.S.—fruit chemistry and processing technology
H.T. Chan, Jr., Ph.D.—food biochemistry
A.M. Dollar, Ph.D.—food biochemistry
G.E. Felton, Ph.D.—food technology, carbohydrate chemistry

The department offers a master's degree program under either Plan A (thesis) or Plan B (nonthesis). Intended candidates must present a minimum undergraduate preparation of two and a half years of chemistry (including analytical and organic chemistry), one year of physics, credits in biological sciences (including general microbiology), and college algebra and trigonometry. All students must pass an oral General Examination before being advanced to candidacy.

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, food irradiation, food safety, processing of seafoods, tropical and Asian food products. A final oral examination, covering the thesis and related areas, is required for students under Plan A.

Under Plan B, a minimum of 30 semester hours of course work is required. A final oral examination, consisting of a seminar appearance, is required for students under Plan B.

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.

FOOD SCIENCE
401 Food Processing (3)
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)
640 Food Safety (2)
699 Directed Research (arr.)
*701 Recent Advances in Food Research (1)
730 Biochemical and Chemical Aspects of Foods (3)
800 Thesis Research (arr.)

French

Graduate Faculty
E. Jackson, Ph.D. (Chairman)—novel, criticism, 19th-century prose
D.B. Aspinwall, Ph.D.—poetry, 20th-century literature
J. Lusseyran, Lic. es lettres—18th-century literature, theatre
H. Niedzielski, Ph.D.—medieval language and literature, phonetics
M. Bacić, Doct. de l’Univ.—theatre of absurd, surrealism
Plan A (thesis) and Plan B (nonthesis), outlined below, are designed to meet the needs of two different types of students. Plan A is primarily intended for those who plan to work for a doctorate and for whom it is desirable to have the experience of writing a thesis. Plan B is primarily intended for those for whom additional course work in linguistics and methodology of language teaching may be more valuable than thesis research. Normally, all candidates in both plans are required to take 10-12 credits in French literary courses. Reading proficiency in a second foreign language is to be demonstrated by passing the examination stipulated by the Graduate Division. Some Latin is desirable. It is to be recognized that all specified requirements are minimal. A program for each individual will be worked out on the basis of the results of the preliminary conference and general examination.

Requirements for admission, in addition to those of the Graduate Division are: (1) 3.0 average in French although applicants with somewhat lower averages may be admitted provisionally; (2) 24 credits of French (or equivalent) 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 degree requirements include 30 credit hours: a minimum of 24 hours of course work and a maximum of 6 hours thesis research. Of these, a minimum of 12 hours, exclusive of research methods course, must be in French courses numbered 600-799, including at least one graduate seminar. 4 to 6 credits of European history if not taken as an undergraduate, are required as well as EL 630 (Research Methods), and Fr 661 (Stylistics). Graduate assistants are required to take Ed CI 640 (Methods of Teaching French). Additional requirements are written and oral comprehensive examinations, thesis, a superior score in the four language skill areas of the MLA Teacher Proficiency Examinations and up to 8 credits in related fields.

Under Plan B degree requirements include 30 hours of course work of which a minimum exclusive of research methods and Fr 661 (Stylistics) must be earned in French courses numbered 600-799 including at least one graduate seminar. 4 to 6 credits of European history if not taken as an undergraduate are required as well as EL 630 (Research Methods), Fr 661 (Stylistics), Ed CI 640 (Methods of Teaching French) and EP 416 (Tests and Measurements). Additional requirements are written and oral comprehensive examinations, presentation of a seminar paper, superior scores in seven areas of the MLA Teacher Proficiency Examinations. Up to 8 credits in related fields may be elected.

FRENCH

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<td>Introduction to Medieval Language and Literature</td>
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<td>408</td>
<td>Masterpieces of Medieval Literature</td>
<td>(3)</td>
</tr>
<tr>
<td>410</td>
<td>Masterpieces of 16th-Century Literature</td>
<td>(3)</td>
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<tr>
<td>411-412</td>
<td>Masterpieces of 17th-Century Literature</td>
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<tr>
<td>413</td>
<td>Masterpieces of 18th-Century Literature</td>
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<td>415-416</td>
<td>Masterpieces of 19th-Century Literature</td>
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<td>420</td>
<td>20th-Century French Novel</td>
<td>(3)</td>
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<td>421</td>
<td>20th-Century French Theatre</td>
<td>(3)</td>
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<tr>
<td>422</td>
<td>20th-Century French Poetry</td>
<td>(3)</td>
</tr>
<tr>
<td>491</td>
<td>Seminar in French Literature</td>
<td>(3)</td>
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</table>
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 480, 618, 650, 4 semesters of 654 and Biochemistry 605. The M.S. may be completed only under Plan A. The M.S. thesis counts as 10 units of credit. 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. Also, exceptional candidates may bypass the M.S. degree. A qualifying examination is required for the Ph.D. degree.
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. The Graduate Record Examination (aptitude and advanced test in biology) and two letters of recommendation are required of all applicants.

GENETICS

- 451 Principles of Genetics (3)
- 452 Genetics Laboratory (1)
- 480 Molecular Genetics (3)
- 611 Genetics for Medical Students (2)
- 618 Cytogenetics (3)
- 625 Advanced Topics in Genetics (2)
- 650 Population Genetics (3)
- 654 Seminar (1)
- 660 Statistical Methodology in Genetics (3)
- 699 Directed Research (arr.)
- 800 Thesis Research (arr.)

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 study of the following topics:

Physical Geography—Environmental Analysis: climatology, biogeography and soils geography, tropical environments.

Man-environment Systems: human and cultural ecology, resource perception and management, population and medical geography.

Social Geography: spatial analysis of social behavior, mobility systems, innovation diffusion.

Economic Geography and Development Problems: tropical agriculture, urban and regional systems, migration and development.

East, Southeast, South Asia and the Pacific.

Quantitative and computer methods, model building.

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.

Acceptable program specializations must be drawn from departmental specializations and may include:

1) a systematic field and an Asian or Pacific region

or

2) two systematic fields

or

3) a systematic field and mathematical-quantitative applications.

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); (4) three letters of reference.

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 diagnostic 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 adviser 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 (nonthesis) programs. Plan A is the usual program but Plan B may be permitted at the discretion of the department. Plan A requires 21 semester hours and a thesis worth an additional 9 hours. Plan B requires 30 semester hours and the submission of three research papers of thesis quality, but not thesis length. The research papers must have been previously prepared in research seminars.

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) a beginning specialization in two subfields of geography. In consultation with the adviser, the candidate will plan a coherent study program of departmental offerings and pertinent courses from other departments. All students are required to take Geography 695-6 and 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 general 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. Students who have completed M.A. degrees in fields other than geography may be considered for admission to the Ph.D. program. If admitted however, they must undertake any remedial course work recommended by the department. In their second semester of residence these students shall take an oral qualifying examination covering general physical, cultural, economic and regional geography and geographic methods. A candidate who fails the qualifying examination is irrevocably dropped from candidacy.

The Ph.D. 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 course units. 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 discipline(s); (3) advanced technique competency as may be required by the research topic; (4) a seminar in the development of geographic thought (Geog. 691 or the equivalent).

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 with competence demonstrated by examination.

Written comprehensive examinations are administered covering the fields of specialization. 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 Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tr>
<td>300</td>
<td>Introduction to Climatology</td>
<td>3</td>
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<tr>
<td>310</td>
<td>Physical Geography</td>
<td>3</td>
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<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>
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<tr>
<td>405</td>
<td>Water Resources Management</td>
<td>3</td>
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<td>406</td>
<td>Applied Climatology</td>
<td>3</td>
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<tr>
<td>407</td>
<td>Air Pollution Meteorology-Climatology I</td>
<td>3</td>
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<tr>
<td>408</td>
<td>Air Pollution Meteorology-Climatology II</td>
<td>3</td>
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<tr>
<td>415</td>
<td>Medical Geography</td>
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<tr>
<td>600</td>
<td>Seminar in Climatology</td>
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**Systematic Human Geography**

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<tr>
<td>326</td>
<td>Conservation and Resource Management</td>
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<tr>
<td>328</td>
<td>Cultural Geography</td>
<td>3</td>
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<tr>
<td>330</td>
<td>Population Geography</td>
<td>3</td>
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<tr>
<td>335</td>
<td>Political Geography</td>
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<td>339</td>
<td>Geography of Exploration</td>
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<td>351</td>
<td>Elements of Regional Science</td>
<td>3</td>
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<td>420</td>
<td>Location Theory and Regional Analysis</td>
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<td>421</td>
<td>Urban Geography</td>
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<tr>
<td>425</td>
<td>Spatial Analysis of Social Behavior</td>
<td>3</td>
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<tr>
<td>611</td>
<td>Information Systems and Planning</td>
<td>3</td>
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<td>612</td>
<td>Ecological Concepts and Planning</td>
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<td>620</td>
<td>Regional Economic Analysis</td>
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**Area Courses**

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<tr>
<td>340</td>
<td>Geography of the United States and Canada</td>
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<td>345</td>
<td>Geography of the Soviet Union</td>
<td>3</td>
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<tr>
<td>350</td>
<td>Geography of Asia</td>
<td>3</td>
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<tr>
<td>352</td>
<td>Geography of Japan</td>
<td>3</td>
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<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>
</tr>
<tr>
<td>361</td>
<td>Geography of Australia and New Zealand</td>
<td>2</td>
</tr>
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<td>365</td>
<td>Geography of the Pacific</td>
<td>3</td>
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<td>368</td>
<td>Geography of Hawaii</td>
<td>3</td>
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<td>650</td>
<td>Seminar in Geography of Asia</td>
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<td>665</td>
<td>Seminar in Geography of the Pacific</td>
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<td>(3) Japan</td>
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**Techniques and Methodology**

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<td>370</td>
<td>Airphoto and Image Interpretation</td>
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<tr>
<td>375</td>
<td>Cartography</td>
<td>3</td>
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<tr>
<td>380</td>
<td>Quantitative Methods in Geography</td>
<td>3</td>
</tr>
<tr>
<td>680</td>
<td>Advanced Quantitative Methods in Geography</td>
<td>3</td>
</tr>
<tr>
<td>685</td>
<td>Computer Applications in Geography</td>
<td>3</td>
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</table>
GEOSCIENCES

Reading, Research, General

691 History of Geographic Thought (3)
695 Pro-Seminar I—Models in Geography (3)
696 Pro-Seminar II—Research Design (2)
700 Seminar in Geography (3)
750 Research Seminar (3)
(1) applied urban climatology (6) economic geography
(2) biogeography (7) urban geography
(3) medical geography (8) geographic aspects of economic
development
(4) resource management
(5) population geography (9) cultural geography
(10) conservation
791 Field Camp (1)
799 Directed Research (arr.)
800 Thesis Research (arr.)

Geosciences

Graduate Faculty
S.H. Laurila, Ph.D. (Department Chairman and Sub-chairman for Geodesy)—geodesy
G.A. Macdonald, Ph.D. (Sub-chairman for Geology)—volcanology, igneous petrology
F.L. Peterson, Ph.D. (Sub-chairman for Hydrology)—hydrogeology
C.S. Ramage, Sc.D. (Sub-chairman for Meteorology)—tropical meteorology
G.H. Sutton, Ph.D. (Sub-chairman for Solid Earth Geophysics)—seismology, exploration
geosciences
A.T. Abbott, Ph.D.—ore deposits, geomorphology
C.W. Adams, M.S.—climatology, physical oceanography
W.M. Adams, Ph.D.—seismology, applied geophysics
W.C. Chiu, Ph.D.—atmospheric turbulence and oscillations
D.C. Cox, Ph.D.—hydrology, groundwater and engineering geology
K.I. Daugherty, M.S.—physical geodesy
P.F. Fan, Ph.D.—geochemistry and mineralogy of marine sediments, geology of Asia
C.M. Fullerton, Ph.D.—cloud physics
A.S. Furumoto, Ph.D.—seismology, geophysics
M.A. Khan, Ph.D.—satellite geodesy, gravity, geophysics
A. Malahoff, Ph.D.—geomagnetism, gravity
M. Manghnani, Ph.D.—geochemistry, geophysics
R.M. Moberly, Jr., Ph.D.—sedimentology, marine geology
T. Murakami, D.Sc.—general atmospheric circulation, numerical methods
J.J. Naughton, Ph.D.—geochemistry
K.A. Pankiwskyj, Ph.D.—metamorphic geology, silicate phase petrology
J.M. Resig, Dr.rer.nat.—micropaleontology
J.C. Rose, Ph.D.—gravity, marine geophysics
R.C. Taylor, Ph.D.—tropical meteorology
A.H. Woodcock, D.Sc.—cloud physics
G.P. Woollard, Ph.D.—gravity, seismology, geomagnetism

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

For Cooperative Faculty, see under Hawaii Institute of Geophysics or Water Resources
Research Center in the General Catalog.
Degree Requirements (Plan A only)

M.S. A minimum of 24 credit hours of course work and 6 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. General and thesis examinations are required.

Ph.D. A reading comprehension 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. Graduate courses in photogrammetry available at the University of Washington, Seattle, under a co-operative program.

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 agrohydrology, 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**

Intended candidates will be accepted from undergraduate majors in physical sciences, mathematics and engineering. Deficiencies in undergraduate preparation in mathematics, physics, chemistry or geology must be made up. The background required depends upon each candidate's choice of specialization. Besides geosciences courses, courses in physics, engineering, oceanography and mathematics may be included in the candidate's program.

**GEOSCIENCES**

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

**GEODESY**

- 457 Introduction to Geodetic Science (3)
- 481 Potential Theory (4)
- 482 Elements of Satellite Geodesy and Celestial Mechanics (3)
- 680 Seminar in Geodesy (arr.)
- 681 Physical Geodesy (4)
- 683 Satellite Geodesy (3)
- 684 Advanced Geodesy (3)
- 685 Adjustment Computation (3)

**GEOLOGY**

- 300 Rocks and Minerals (5)
- 301 Mineralogy (3)
- 302 Petrology (3)
- 303 Structural Geology (3)
- 305 Geological Field Methods (2)
- 316 Geomorphology (3)
- 410 Historical Geology (3)
- 411 Paleontology (3)
- 412 Micropaleontology (3)
- 415 Regional Geology (2)
- 424 Advanced Mineralogy (5)
- 425 Geochemistry (2)
- 426 Advanced Petrology (3)
- 430 Geology of Asia (2)
- 440 Economic Geology (2-2)
- 601 Seminar in Volcanology (2)
- 602 Seminar in Petrology (2)
- 607 Seminar in Ore Deposits (2)
- 609 Seminar in Geomorphology (2)
- 614 Advanced Field Study (arr.)
- 619 Sedimentology (3)
- 620 Stratigraphy (3)
- 623 Marine Geology (3)
- 625 Seminar in Current Research Topics (arr.)
- 672 Seminar in Geotectonics I (3)
- 673 Seminar in Geotectonics II (3)
HYDROLOGY
306 Work of Water (4)
455 Ground-water Geology (4)
605 Seminar in Engineering and Ground-water Geology (3)

METEOROLOGY
639 Meteorology of the Tropical Oceans (2)
640 Advanced Tropical Meteorology Laboratory (3)
641 Monsoon Meteorology (3)
643 Cloud Physics (3)
644 Physical Meteorology (3)
646 Statistical Meteorology (3)
650 Advanced Theoretical Meteorology I (3)
651 Advanced Theoretical Meteorology II (3)
742 Atmospheric Turbulence (3)
745 Numerical Analysis and Weather Prediction I (5)
746 Numerical Analysis and Weather Prediction II (5)
752 Special Topics in Meteorology (3)
765 Seminar in Meteorology (1)

SOLID EARTH GEOPHYSICS
351 Seismology (3)
360 Principles of Geophysics (3)
463 Physical Properties of Earth Matter (3)
465-466 Geophysical Exploration (4-4)
655 Seismic Source Mechanisms (3)
656 Seismic Propagation Phenomena (3)
657 Analysis and Synthesis of Seismograms (3)
658 Seismometry and Seismological Model Study (3)
660 Seminar in Solid Earth Geophysics (arr.)
661 Marine Geophysics (3)
662 Principles of Theoretical Geophysics (3)
665 Numerical Methods in Geophysical Data Analysis (3)
671 The Magnetic Field of the Earth (3)
674 Rock Magnetism and Palaeomagnetism (3)
675 Seminar in Geomagnetism (arr.)

German

Graduate Faculty
R. Seymour, Ph.D. (chairman)–Germanic linguistics
D. Deuer, Ph.D. – 18th-and 19th-century German literature and philosophy
G. Frohlich, Ph.D. – 19th-and 20th-century literature
A. Moore, M.A. – linguistics and stylistics
W. Scherer, Ph.D. – Medieval, Reformation and Baroque literature

Plan A (thesis) and Plan B (nonthesis) 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 general examination will be administered to determine the student's program and objectives. By September 30 the candidates 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 final oral examination 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. A final examination, together with a seminar appearance after presentation of a paper, completes the degree.

**GERMAN**

- 409 Enlightenment-Strum und Drang (3)
- 410 Classicism (3)
- 411 Romanticism (3)
- 413-414 German Literature from 1880 to the Present (3-3)
- 432 Stylistics (3)
- 609-610 Middle High German (3-3)
- 615 History of the German Language (3)
- 616 History of the German Language (3)
- 651 Seminar: The German Novelle (3)
- 652 Seminar: The German Drama (3)
- 653 Seminar: Lyric Poetry (3)
- 654 Seminar: The German Novel (3)
- 655 Faust I (3)
- 656 Faust II (3)
- 699 Directed Research (arr.)
- 735 Seminar in German Literature (3)
- 800 Thesis Research (6)

**History**

**Graduate Faculty**

H.F. Margulies, Ph.D. (Department Chairman)—United State political, the Progressive Era
G. Akita, Ph.D.—Far East, modern Japan
E.D. Beechert, Ph.D.—United States economic
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
D. Johnson, Ph.D.—United States diplomatic, Latin America, United States in the Pacific
W. Johnson, Ph.D.—recent United States
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. History also requires GRE aptitude, qualitative and quantitative, scores for admission to the M.A. and Ph.D. programs.

Intended candidates for the M.A. degree may select either the Plan A (thesis) or the Plan B (nonthesis) 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 602), 6 semester hours of thesis research and a final oral examination. Plan B requires a minimum of 30 hours of graduate course work (at least 18 in courses numbered 600 to 799, including History 602), comprehensive examinations in two fields of history and a final oral examination. 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 and a final oral examination. 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, and the aptitude test scores from the Graduate Record Examination (GRE).

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, (2) a sample of his research work, such as a seminar paper or master's thesis and (3) the aptitude test scores from the Graduate Record Examination (GRE).

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 602. Courses available for the graduate program are listed below.

### HISTORY

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<td>History of South Asia</td>
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<td>405-406</td>
<td>History of Southeast Asia</td>
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<td>407</td>
<td>National and Regional History in Southeast Asia</td>
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<td>(1) Southeast Asia to 1300 A.D.</td>
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<td>(2) Southeast Asia 1300 to circa 1750</td>
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<tr>
<td></td>
<td>(3) Modern Philippines</td>
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<td></td>
<td>(4) Modern Malaysia</td>
</tr>
<tr>
<td></td>
<td>(5) Modern Indonesia</td>
</tr>
<tr>
<td></td>
<td>(6) Modern Vietnam, Laos, and Cambodia</td>
</tr>
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<td>(7) Modern Thailand</td>
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<td>(8) Modern Burma</td>
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<td>409-410</td>
<td>History of China</td>
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<td>411-412</td>
<td>Local History of China</td>
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<tr>
<td>413-414</td>
<td>History of Japan</td>
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<td>415-416</td>
<td>Imperial and Feudal Institutions of Traditional Japan</td>
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<td>417-418</td>
<td>History of Korea</td>
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<td>497</td>
<td>Senior Tutorial in History (Section on Japan)</td>
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<td>Seminar in Mainland Southeast Asian History</td>
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<td>655</td>
<td>Seminar in Island Southeast Asian History</td>
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<td>Seminar in Chinese History</td>
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<td>Seminar in Indian History</td>
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<td>(1) Ancient India</td>
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<td>(3) Muslim India</td>
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<td>(4) Modern South Asia</td>
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HISTORY

665 Seminar in Japanese History
   (1) Traditional
   (2) Early Modern
   (3) Modern

667 Seminar in Korean History

701 Research Materials and Methods in Asian History

711 Korean Historical Sources

713-714 Chinese Historical Literature

717-718 Chinese Intellectual History

721-722 China from Classical Antiquity to 750

723-724 China from 750 to 1700

727-728 Japanese Historical Materials and Sources

730 Japan: The Bakumatsu Period (1830-1873)

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

427 Seminar in Pacific History

Americas

461 Colonial America to 1790

462 The Young Republic: U.S. History 1789-1841

463 Crisis of the Union: U.S. History 1841-1877

464 The Transformation of America: U.S. History 1877-1920

465 Troubled Peace: U.S. History 1920-1941

466 America and World Leadership: The U.S. Since 1941

471-472 Diplomatic History of the United States

475 Constitutional History of the United States

477-478 Economic History of the United States

480 History of Black Americans

481-482 American Thought and Culture

483 The West in American History

484 The South in American History

485 The City in American History

486 Representative Americans

487-488 History of Latin America

631 Advanced Problems and Reading in American History

635 The Colonial Period in American History

636 Seminar in Nineteenth-Century American History

637 The Progressive Period in American History

638 Seminar in Recent American History

640 Seminar in American Social and Intellectual History

641 Seminar in American Diplomatic History

Europe

419 European Expansion

426 The Ancient Near East

427 Ancient Greek History

428-429 Roman Civilizations

431-432 Medieval Europe, 300-1300

435 Renaissance and Reformation, 1300-1600
HORTICULTURE

437 Early Modern Europe, 1600-1800
438 French Revolution, 1789-1815
439 Europe in the Nineteenth Century
440 Europe since Versailles
441-442 East Central Europe
443-444 History of Germany
445-446 History of France
447-448 History of England
449-450 History of Russia
451-452 Modern Russia and Soviet Foreign Policy
453-454 Intellectual History of Russia and the Soviet Union
455-456 European Intellectual History
459 Constitutional History of England
611 Seminar in European History
   (1) Ancient
   (2) Medieval
   (3) Early Modern
   (4) Modern
   (5) England
618 British Empire and Commonwealth
619 Seminar in Russian History
620 Seminar in Russian Foreign Policy

Historiography, Historical Method, and Directed Research

602 Seminar in Historiography
799 Directed Research
800 Thesis Research

Horticulture

Graduate Faculty
H. Kamemoto, Ph.D. (Chairman)—cytogenetics and breeding of ornamentals
J.L. Brewbaker, Ph.D.—radiation genetics
R.A. Criley, Ph.D.—floriculture, ornamentals
E.T. Fukunaga, M.S.—tropical fruits
J.C. Gilbert, Ph.D.—vegetable breeding
R.A. Hamilton, Ph.D.—tropical fruit improvement
R.W. Hartmann, Ph.D.—plant breeding and genetics
P.J. Ito, Ph.D.—tropical fruit breeding
H.Y. Nakasone, Ph.D.—tropical fruit breeding
P.E. Parvin, Ph.D.—ornamentals
Y. Sagawa, Ph.D.—developmental morphology and cytogenetics
R.M. Warner, Ph.D.—tropical fruit ecology
D.P. Watson, Ph.D.—ornamentals

Affiliate Faculty
D.J. Heinz, Ph.D.—sugar cane cytogenetics
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.
All M.S. candidates are required to pass a two-hour written General Examination administered by the graduate faculty in horticulture during their first semester in residence. A final oral examination is also required. For Plan A a minimum of 24 credits of course work and 6 credits for thesis preparation are required.

All Ph.D. candidates are required to pass a three-hour written Qualifying Examination administered by the graduate faculty in horticulture during their first year in residence.

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)
450 Tropical Horticultural Crop Production (4)
471 Post-Harvest Handling (3)
481 Weed Science (3)
603 Experimental Design (3)
611 Plant Improvement Systems (3)
615 Advanced Plant Breeding (3)
618 Plant Cytogenetics (3)
650 Advanced Vegetable Crops (3)
662 Advanced Tropical Fruit Science (3)
664 Orchidology (3)
666 Radiation Biology (3)
668 Growth Regulators in Horticulture (2)
669 Laboratory in Plant Growth Regulators (1)
691 Crop Ecology (3)
699 Directed Research (arr.)
711 Special Topics in Experimental Horticulture (arr.)
800 Thesis Research (arr.)

Information Sciences

**Graduate Faculty**

R.H. Jones, Ph.D. (Chairman)—time series analysis; statistics
N. Abramson, Ph.D.—information theory and coding, computer nets
J.B. Ferguson, Ph.D.—business systems analysis
L. Freeman, Ph.D.—information processing in the social sciences
N.T. Gaarder, Ph.D.—communication theory
B. Kinariwala, Ph.D.—system theory; computing algorithms
F.F. Kuo, Ph.D.—computer aided design; computer graphics
M. Lester, Ph.D.—syntactic theory and natural language models
S. Lin, Ph.D.—error correcting codes
D. Pager, Ph.D.—recursive function theory; automata theory; artificial intelligence
W.W. Peterson, Ph.D.—coding theory; machine languages
F.R. Pitts, Ph.D.—computer applications in the social sciences
T. Rodgers, Ph.D.—psycholinguistics; computer-aided instruction
D. Slepian, Ph.D.—communication theory; applied mathematics
L. Wallen, Ph.D.—mathematics of communications
S. Watanabe, Ph.D.—pattern recognition
E. J. Weldon, Jr., Ph.D.—data communications; logic design, error-correcting codes.

The information sciences M.S. program is intended to serve both the student who is interested in a career in information sciences and the student who expects to use information sciences in another profession. Prospective students must present a baccalaureate degree, and although students from all fields will be accepted, students whose undergraduate field of study was not business, engineering, mathematics, or science should consult with the program chairman before applying for admission. The minimum requirements for admission to the program follow:

1. A working knowledge of some general programming language such as FORTRAN, PL/I, or ALGOL.
2. A year course in calculus, or a semester course in probability theory, or a semester course in logic.

Plan A and Plan B are both available. Besides the general requirements of the Graduate Division for the master's degree, the student's program for either plan must conform to the following:

1. At least five of the background courses listed below must either be included in the M.S. program or in the student's previous college work. Of the five, at least one must be taken from each of the three areas.
2. The remainder of the program shall ordinarily consist of other background courses or credits from the list of elective courses. The student's program committee may approve other courses which fit in with the student's educational objectives.
3. In any case, the program must be approved by the student's program committee.

If Plan A is chosen, the student must earn at least 12 credits in courses numbered 600 or above. The thesis receives 12 credits toward the degree. If Plan B is chosen, a minimum of 18 credits must be earned in courses numbered 600 and above. In either case, a total of 30 credits is required.

Background Courses

INFORMATION PROCESSING MACHINES—AREA 1
EE 460 Digital Circuits (3)
EE 461 Digital Systems and Computer Design (3)
ISc 466 Computer Organization & Programming Techniques (3)
ISc 467 Algorithmic Languages (3)
ISc 665 System Programming (3)

LOGICAL ANALYSIS—AREA 2
Phil 445 Symbolic Logic I (3)
ISc 661 Theory of Automata (3)
ISc 663 The Theory of Computability (3)
Ling 625 Mathematical Properties of Natural Languages (3)
ISc 671 Artificial Intelligence (3)
### INFORMATION SCIENCES

#### PROBABILISTIC ANALYSIS—AREA 3
- ISc 371 or Math 471 Probability Theory (3)
- ISc 443 Statistical Data Analysis (3) or Math 472 Statistical Inference (3)
- ISc 445 Introduction to Random Processes (3)
- ISc 446 Information Theory (3)
- ISc 641 Discrete Stochastic Process (3)

#### Elective Courses

### AGROPECULIDAL ECONOMICS
- 634 Advanced Agricultural Prices and Statistical Analysis (3)
- 635 Seminar: Agricultural Price Analysis and Statistics (3)

### BUSINESS ANALYSIS AND STATISTICS
- 611 Statistical Methods of Business Management (3)
- 713 Statistical Decision Theory (3)
- 714 Operations Research (3)
- 715 Quantitative Methods of Business and Economic Forecasting (3)
- 783 Data Management Systems (3)

### ECONOMICS
- 621 Mathematical Economics (3)
- 624 Econometrics I (3)
- 626 Econometrics II (3)
- 627 Economic Programming (3)

### EDUCATIONAL COMMUNICATIONS
- 640 Programmed Learning (3)

### ELECTRICAL ENGINEERING
- 463 Analog Computers (3)
- 613 Linear Systems Analysis (3)
- 614 Analysis of Nonlinear Systems (3)
- 616 System Theory (3)
- 617 Computer-Aided Circuit Design (3)
- 618 System Optimization (3)
- 646 Signal and Noise Theory (3)
- 647 Applied Statistical Decision Theory (3)
- 648-649 Error-Correcting Codes (3-3)
- 655 Sampled-Data Control Systems (3)

### GENERAL ENGINEERING
- 451 Engineering Analysis (3)

### GENETICS
- 650 Population Genetics (3)
- 660 Statistical Methodology in Genetics (3)

### GEOGRAPHY
- 680 Advanced Quantitative Methods in Geography (3)
- 685 Computer Applications in Geography (3)

### GEODESY
- 683 Satellite Geodesy (3)
- 685 Adjustment Computation (3)

### HORTICULTURE
- 603 Experimental Design
INFORMATION SCIENCES

382 Elements of Pattern Recognition (3)
621 Theory of Computer Languages (3)
627 Information Structures (3)
648 Theory of Inference (3)
650 Time Series Analysis (3)
693 Special Topics in Information Sciences (3)
699 Directed Reading (arr.)
800 Thesis Research (12)

LIBRARY STUDIES

660 Science and Technology Literature (3)
662 Business and Economic Literature (3)
670 Literature Searching and Documentation (3)

LINGUISTICS

650-651 Advanced Linguistics Analysis (3-3)

MATHEMATICS

402 Partial Differential Equations (3)
406 Difference Methods for Differential Equations (3)
412 Introduction to Abstract Algebra (3)
413 Abstract Algebra (3)
441 Numerical Analysis (3)
611-612 Modern Algebra (3)
631-632 Theory of Functions of a Real Variable (3)

METEOROLOGY

646 Statistical Meteorology (3)
745 Numerical Analysis and Prediction (5)

OCEAN ENGINEERING

707-708 Statistical Dynamics of Ocean Systems (3-3)

OCEANOGRAPHY

660 Ocean Wave Theory

PHILOSOPHY

611 Symbolic Logic II (3)
715 Philosophy of Mathematics (3)

PSYCHOLOGY

602 Statistical Analysis (3)
606 Multivariate Methods (3)
607 Introduction to Mathematical Models (3)
635 Sensory Processes and Psychoanalysis (3)
644 Mathematical Models (3)

PUBLIC HEALTH

656 Biostatistics (3)
657 Statistical Analysis (3)
747 Statistical Methods in Epidemiological Research (3)

SOCIOLOGY

610-611 Methods and Statistics (3-3)
715 Seminar in Social Statistics (3)
716 Seminar in Theory Construction (3)

Students should check on the latest addition to this list with the program secretary.
Library Studies

Faculty
R.D. Stevens, Ph.D. (Dean)—administration, government documents
I.W. Harris, Ph.D. (Assistant Dean)—reference, reader services
C.M. Adams, M.A.—social functions
M.W. Ayrault, M.S. in L.S.—cataloging
R.W. DeAngelo, M.S. in L.S.—children’s literature, reference
A.J. Fristoe, M.L.S.—administration
J.H. Haas, M.L.S.—reader services, documentation
J.R. Hunt, M.A. in L.S.—administration
A. Kamida, M.L.S.—cataloging
R. Kane, M.L.S.—science and technology
E.E. Kanner, M.L.S.—reference and bibliography
D.C. McAlister, B.Ed., B.S. in L.S.—cataloging
R. Myers, M.L.S.—management
G.R. Nunn, Ph.D.—Asian reference and administration
S. Saito, M.L.S.—reference and bibliography
E.T. Schofield, Ed.D.—audio-visual, children’s literature
Y. Suzuki, M.L.S.—administration, Far Eastern collections
M.J. Tsui, M.L.S.—reference and bibliography
S. Vann, Ph.D.—social functions, management
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 CORE CURRICULUM
601 Bibliography and Reference Sources (3)
602 Advanced Reference Sources (3)
605 Basic Cataloging and Classification (3)
610 Social Functions of Libraries (3)
615 Building Library Collections (3)
647 Management of Library Operations (3)
650 Administration of Libraries (3)
678 Reader Services (3)

ELECTIVES
606 Advanced Cataloging and Classification (3)
618 Government Documents (3)
642 Audio-Visual Services in Libraries (3)
660 Science and Technology Literature (3)
662 Business and Economic Literature (3)
664 Abstracting and Indexing for Information Services (3)
665 Special Libraries (3)
670 Literature Searching and Documentation (3)
681 Reading Materials for Children (3)
School Librarians: The basic program for school library work is identical with the above—electives for school librarians are normally selected from the following courses:

- 642 Audio-Visual Services (3)
- 681 Reading Materials for Children (3)
- 682 Reading Materials for Youth (3)
- 683 Service for Children and Young People (3)
- 684 School Library-Media Center Problems (3)
- 685 Traditional Literature and Oral Narration (3)

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

- 696 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

B.W. Bender, Ph.D. (Chairman)—phonology; general linguistics; Micronesian languages
C.J.N. Bailey, Ph.D.—comparative linguistics, phonological theory, phonetics; Indo-European, especially Greek and Latin
S.H. Elbert, Ph.D.—comparative and historical linguistics; Hawaiian, other Polynesian, and Micronesian languages
G.H. Fairbanks, Ph.D.—descriptive and comparative linguistics; Indo-European, especially Indo-Aryan, Slavic and Germanic
G.W. Grace, Ph.D.—historical linguistics; Austronesian, especially Melanesian linguistics; ethnolinguistics
F.K. Li, Ph.D.—Chinese and Tai linguistics, other Sino-Tibetan languages; North American Indian linguistics
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
S. Starosta, Ph.D.—theoretical linguistics, Asian and Pacific languages
L.C. Thompson, Ph.D.—descriptive and comparative linguistics, field methods; North American Indian linguistics; 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

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

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. Students having no previous work in linguistics proper are required to take 320, General Linguistics. All applicants must submit to the department scores from the aptitude tests of the Graduate Record Examination.

Both the M.A. and Ph.D. degrees are offered. Students interested in the Ph.D. who do not already hold an M.A. in linguistics should apply initially for admission to the M.A. program. 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 Plan A and Plan B programs. Both require that the student demonstrate competence in one language other than his native language. A general examination is given early in the second semester of graduate study to assess potential and diagnose strengths and weaknesses.

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. A final oral examination, covering the thesis and related areas, is also required.

Plan B requires a minimum of 30 units approved by the student's adviser. 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. Students are admitted to candidacy after demonstrating competence in both languages and performing successfully on the comprehensive examination.

The comprehensive examination in linguistics is both written and oral. In addition to a comprehensive knowledge of the field of linguistics, all students are expected to demonstrate strength in phonology, syntax, historical linguistics, and two additional areas of specialization chosen from among the following: phonetics, semantics, psycholinguistics, sociolinguistics, ethnolinguistics, applied linguistics, or the linguistics of any of the following areal or genetic groupings: Indo-European, Tai, Austroasiatic, Chinese, Japanese, Philippine, Indonesian, Micronesian, Melanesian, Polynesian, Austronesian, or American Indian linguistics.

The foregoing is intended as a general guide to the coverage intended for the comprehensive examination; in practice every attempt is made to tailor programs to the individual student's background and interests—in some cases giving one of the optional areas greater emphasis, the other lesser. Integration of the required areas with one or more of the latter areal or genetic specializations is encouraged. Also, other areas of specialization (including ones which are outside the discipline and which will be examined by the committee member from outside the department) may be included where such seem called for by the student's total program and where adequate faculty supervision is available. Shortly after passing the qualifying examination, the student is expected to declare the optional areas he hopes to develop strength in. This information helps determine the composition of his program committee; details and relative emphases of the total program are then worked out in consultation with the committee.

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 structure 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>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
<td>General Linguistics (3)</td>
<td></td>
</tr>
<tr>
<td>410</td>
<td>Articulatory Phonetics (3)</td>
<td></td>
</tr>
<tr>
<td>421</td>
<td>Introduction to Phonological Analysis (3)</td>
<td></td>
</tr>
<tr>
<td>422</td>
<td>Introduction to Grammatical Analysis (3)</td>
<td></td>
</tr>
<tr>
<td>611</td>
<td>Acoustic Phonetics (3)</td>
<td></td>
</tr>
<tr>
<td>615</td>
<td>The Nature of Language (3)</td>
<td></td>
</tr>
<tr>
<td>621</td>
<td>Phonology (3)</td>
<td></td>
</tr>
</tbody>
</table>

125
Mathematics

Graduate Faculty
H.S. Bear, Ph.D. (Chairman) - functional analysis
R. Colby, Ph.D. - ring theory
S.M. Fakhruddin, Ph.D. - algebra
M. Fraser, Ph.D. - ring theory
C. Gregory, Ph.D. - applied mathematics
E. Groth, Ph.D. - applied mathematics
H.M. Hilden, Ph.D. - complex function theory
R. Hirschfeld, Ph.D. - analysis
J. Johnson, Ph.D. - universal algebra and mathematical logic
M.C.Y. Lee, Ph.D. - functional analysis
A. Mader, Ph.D. - group theory
E. Mookini, Ph.D. - analysis
N. Nohusawa, Ph.D. - algebra
R.S. Pierce, Ph.D. - algebra
T. Pitcher, Ph.D. - probability theory
D.J. Samuelson, Ph.D. - universal algebra
L. Wallen, Ph.D. - functional analysis
C. Weinbaum, Ph.D. - group theory
J. Williamson, Ph.D. - complex function theory
R.Z. Yeh, Ph.D. - probability theory

Prospective graduate students must present a minimum preparation of differential and integral calculus, linear algebra, advanced calculus, and modern algebra. Applicants must submit to the department scores for the aptitude and advanced (mathematics) tests of the Graduate Record Examination. The department requires the General Examination of all first year graduate students. Candidates for the M.A. (Plan A or B) must pass a written Master's Examination as part of the degree requirements. This examination covers abstract algebra, complex and real analysis.

It is expected that a Ph.D. program in mathematics will be initiated in the fall of 1970. For further information, please write the chairman of the department.

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>402</td>
<td>Partial Differential Equations (3)</td>
<td></td>
</tr>
<tr>
<td>403-404</td>
<td>Methods of Higher Analysis (3-3)</td>
<td></td>
</tr>
<tr>
<td>406</td>
<td>Difference Methods for Differential Equations (3)</td>
<td></td>
</tr>
<tr>
<td>413</td>
<td>Abstract Algebra (3)</td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>Introduction to the Theory of Numbers (3)</td>
<td></td>
</tr>
<tr>
<td>441</td>
<td>Numerical Analysis (3)</td>
<td></td>
</tr>
<tr>
<td>442</td>
<td>Vector Analysis (3)</td>
<td></td>
</tr>
<tr>
<td>444</td>
<td>Theory of Functions of a Complex Variable (3)</td>
<td></td>
</tr>
<tr>
<td>449</td>
<td>Topics in Undergraduate Mathematics (3)</td>
<td></td>
</tr>
<tr>
<td>471</td>
<td>Probability (3)</td>
<td></td>
</tr>
<tr>
<td>472</td>
<td>Statistical Inference (3)</td>
<td></td>
</tr>
<tr>
<td>611-612</td>
<td>Modern Algebra (3-3)</td>
<td></td>
</tr>
<tr>
<td>613-614</td>
<td>Group Theory (3-3)</td>
<td></td>
</tr>
<tr>
<td>617</td>
<td>Linear Algebra (3)</td>
<td></td>
</tr>
<tr>
<td>621-622</td>
<td>Topology (3-3)</td>
<td></td>
</tr>
<tr>
<td>631-632</td>
<td>Theory of Functions of a Real Variable (3-3)</td>
<td></td>
</tr>
<tr>
<td>633-634</td>
<td>Functional Analysis (3-3)</td>
<td></td>
</tr>
<tr>
<td>644-645</td>
<td>Analytic Function Theory (3-3)</td>
<td></td>
</tr>
<tr>
<td>649</td>
<td>Topics in Mathematics (3)</td>
<td></td>
</tr>
<tr>
<td>655</td>
<td>Set Theory (3)</td>
<td></td>
</tr>
<tr>
<td>750</td>
<td>Seminar (1)</td>
<td></td>
</tr>
<tr>
<td>799</td>
<td>Directed Research (arr.)</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (arr.)</td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical Engineering

#### Graduate Faculty

- J.C. Burgess, Ph.D. — mechanics; acoustics
- H.C. Chai, Ph.D. — heat transfer, nuclear engineering
- P. Cheng, Ph.D. — radiation; fluid mechanics
- J.C.S. Chou, Ph.D. — environmental engineering; energy conversion
- R.M. Fand, Ph.D. — heat transfer; fluid mechanics
- J.S. Fox, Ph.D. — thermodynamics; gas dynamics
- K.M. Htun, Ph.D. — properties of materials; materials processing
- G.L. Johnson, Ph.D. — continuum mechanics; vibrations
- D.H. Kihara, Ph.D. — thermodynamics; fluid mechanics
- J. Larsen-Badse, Ph.D. — materials science; corrosion
- W. Stuiver, Ph.D. — mechanics; analytical dynamics

The department offers programs leading to the M.S. in mechanical engineering with areas of specialization in the thermosciences (e.g., heat and mass transfer, thermodynamics, fluid mechanics, energy conversion) and in materials science (e.g., mechanical properties, corrosion, tribology). The areas of mechanics and design are currently being developed. The department offers both Plan A (thesis) and Plan B (nonthesis).

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, and it must meet the approval of the student's thesis/program committee. Each student is encouraged to include in his program courses from
outside the department 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. Before admission to candidacy the student must pass a general examination. This examination is given during the first semester. Applicants for graduate assistantships must submit the results of the Aptitude and Advanced Engineering Tests of the Graduate Record Examination.

Candidates 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

422 Heat Transfer (3)
424 Introduction to Gas Dynamics (3)
431 Electronic Processes in Materials (3)
433 Failures in Materials (2)
441 Thermal Material Processing (3)
451 Automatic Control (3)
455 Nuclear Power Engineering (3)
459 Introduction to Space Technology (3)
473 Mechanical Vibration and Shock (3)
474 Fundamentals of Acoustics (3)
496 Mechanical Engineering Topics (arr.)
611 Classical Thermodynamics (3)
612 Statistical Thermodynamics (3)
617 Advanced Thermal Environmental Engineering (3)
621 Conduction Heat Transfer (3)
622 Convection Heat Transfer (3)
623 Radiation Heat Transfer (3)
624 Gasdynamics (3)
626 Viscous and Turbulent Flows (3)
628 Theory and Measurement of Turbulence (3)
630 Materials Science Laboratory (2)
631 Advanced Materials Science (3)
635 Corrosion Theory (3)
636 Materials for the Ocean Environment (3)
641 Theory of Mechanical Properties of Solids (3)
642 Mechanical Behavior of Engineering Materials (3)
671 Mechanics of Continua I (3)
672 Mechanics of Continua II (3)
678 Advanced Dynamics (3)
696 Advanced Topics in Mechanical Engineering (arr.)
697 Seminar (1)
699 Directed Reading or Research (arr.)
800 Thesis (arr.)
Microbiology

Graduate Faculty

A.A. Benedict, Ph.D. (Chairman)—immunochemistry
B.G. Adams, Ph.D.—microbial genetics
R.D. Allen, Ph.D.—ultrastructure and cell biology
P. Baumann, Ph.D.—general microbiology
L.R. Berger, Ph.D.—general microbiology and microbial physiology
D.E. Contois, Ph.D.—general microbiology and microbial physiology
C.E. Folsome, Ph.D.—microbial genetics and exobiology
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
P.C. Loh, Ph.D.—animal virology
B.Z. Siegel, Ph.D.—comparative biochemistry

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; developmental and cell biology; and exobiology. Research programs in interdisciplinary fields are possible. Studies in microbiology emphasize fundamental cellular and molecular approaches rather than those primarily of an applied or diagnostic character.

Undergraduate preparation in both biological and physical sciences, including biology, genetics, microbiology, organic and physical chemistry, physics, and calculus is desirable, but deficiencies in some of these areas do not preclude admission. Qualified students with undergraduate majors in fields other than microbiology are welcomed. Ph.D. candidates are required to take an initial diagnostic examination and to demonstrate proficiency in one foreign language before graduation. Experience in teaching in a laboratory course is considered part of the training of the Ph.D. candidate. Official scores of the aptitude test and the advanced test in biology of the Graduate Record Examination and three 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, biology, biophysics, botany, chemistry, genetics, mathematics, oceanography, public health, and zoology. Required courses are marked with an asterisk.

MICROBIOLOGY

431 Microbial Biochemistry and Function (4)
451 Biology of Bacteria (4)
461 Immunology (4)
463 Microbiology of the Pathogens (4)
475 Microbial Genetics (4)
480 Microbial Ecology (4)
490 Virology (4)
625 Immunochemistry (3)
632 Advanced Microbial Physiology (3)
642 Marine Microbiology (3)
655 Virology (3)
Music

Graduate Faculty

A. Russell, A.M.D., (Chairman) - music composition
C. Chadwick-Cullen, M.M. - music performance, voice
M. Kerr, M.M. - music performance, piano
R.N. McKay, Ph.D. - music composition
L. Rowell, Ph.D. - music theory
J.R. Shoemaker, Ed.D. - music education
B.B. Smith, M.M. - ethnomusicology
A. Trubitt, D.M. - music composition
R. Vaught, Ph.D. - musicology
R.W. Vine, M.M. - music performance, voice
C. Wolz, M.A. - dance ethnology

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, in music education, and in music theory. The M.M. 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.

It is recommended that applicants 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 music theory some composition study is highly desirable. 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, musicology, and music theory follow the thesis plan only (Plan A). In composition the thesis consists of an original work in one of the larger forms plus a detailed essay on the background and problems involved or a detailed theoretical analysis. Concentration in performance follows the nonthesis program only (Plan B). Plan A requires 22 hours of course work and 8 hours of thesis. Plan B requires 30 hours of course work. For concentration in musicology a reading knowledge of French or German is required. Concentrations in music theory may fulfill their language requirement in either of the above languages or in Latin. For concentrations in ethnomusicology or dance ethnology, a reading or speaking knowledge of a foreign language (or equivalent technique in linguistics) is required. Candidates concentrating in music education may choose between the thesis program and the nonthesis program. Requirements for the Hawaii State Department of Education Professional Certificate may be met in the M.A. program in music education. A final oral examination is required in both the thesis and nonthesis programs.

Courses available for the graduate program are listed below.

MUSIC

401 Ensemble (1)
402 University Concert Choir (1)
404 Opera Workshop (3)
405 University Symphony Orchestra (1)
409 University Concert Band (1)
420 Music Literature Laboratory (2)

(11) Voice
(12) Piano

431 Advanced Applied Music (arr.)
451 Advanced String Methods (2)
452 Advanced Woodwind Methods (2)
453 Advanced Brass Methods (2)
455 Advanced Percussion Methods (2)
457 Pacific and Asian Music in Education (2)
458 Voice Methods (2)
459 Piano Methods (2)
+461 Symphonic Music (2)
+462 Choral Music (2)
+463 Opera (2)
+464 Twentieth Century Music (2)
+465 Chamber Music (2)
+466 Music of the United States (2)
469 Keyboard Music (2)
470 Art Music of Asia (2)
471 Music of Non-Literate Peoples (3)
477 Musical Cultures (2)
   (1) Japan
   (2) India
   (3) Vietnam

*481-*482 Advanced Orchestration (2-2)
*483-*484 Counterpoint (2-2)
*485-*486 Form and Analysis (2-2)
*487-*488 Composition (2-2)
*489-*490 Advanced Composition (2-2)
491-492 Movement Notation (2-2)
600 Seminar (3)
   (1) composition
   (2) ethnomusicology
   (3) musicology
   (4) performance repertory
   (5) music education
   (6) dance ethnology
   (7) music theory

601 Advanced Ensemble (1)
625-626 Advanced Conducting (2-2)
635 Graduate-Level Applied Music (arr.)
636 Graduate Recital (3)
651 Foundations in Music Education (2)
652 Problems in Music Education (2)
660 Studies in Music Literature (3)
661 Bibliography and Research Methods in Music (3)
670 Regional Musics (3)
   (1) Asia
   (2) Oceania

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

699 Directed Work (arr.)
783-784 History of Theory (3-3)
800 Thesis Research (arr.)

*Credit not available to candidates for a graduate degree in composition.
†Credit not available to candidates for a graduate degree in musicology.

Nursing

Graduate Faculty
E. Anderson, Ph.D. (Dean)—nursing research and curriculum
L. Bermosk, M. Litt. (Chairman)—mental health-psychiatric nursing
G. Felton, Ed.D.—medical-surgical nursing
Y. Gross, M.S.—community-health nursing

The program extends over four semesters and leads to a master of science degree. Under Plan B (nonthesis), a minimum of 48 semester hours must include: (1) one research course; (2) a seminar in nursing theory and practice; (3) courses in the area of specialization and related cognate fields; and (4) courses in a functional minor.

In addition to requirements for admission to the Graduate Division, the
applicant must complete evidence of: (1) a baccalaureate degree with a major in nursing from an NLN accredited program; (2) completion of a course in elementary statistics; (3) licensure in Hawaii for the practice of nursing; and (4) official scores on the Graduate Record Examination Aptitude Test.

Recommendations for admission to candidacy are determined at the end of the first semester after the student’s progress has been reviewed and his ability to undertake graduate study has been determined. Upon admission to candidacy, a program adviser is selected from the graduate faculty in the selected area of specialization.

The student is eligible for graduation upon successful completion of the course of study with a cumulative grade-point average of 3.0, as well as a grade-point average of 3.0 in the nursing major.

Areas of specialization are offered in the following fields: (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 prepares a community health nursing specialist who will deliver family-centered nursing care in a variety of community settings; (3) Medical-Surgical Nursing, which is designed to prepare clinical specialists in nursing practice with patients who have medical or surgical conditions requiring hospital care and associated institutional services.

In addition to an area of specialization, each student selects a functional area of concentration in either teaching or nursing service administration.

Additional details on the graduate programs in nursing are given in a School of Nursing Bulletin, which is available upon request.

NURSING

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
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<td>602</td>
<td>Orientation to Nursing Research (3)</td>
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<tr>
<td>607</td>
<td>Seminar in Issues in Nursing (3)</td>
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<tr>
<td>611</td>
<td>Socio-Cultural Influences on Health and Health Services (3)</td>
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<td>615</td>
<td>Interaction Processes (3)</td>
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<td>617</td>
<td>Concepts and Nursing Practice (3)</td>
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<td>622</td>
<td>Advanced Nursing Concepts I, Mental Health-Psychiatric Nursing (4)</td>
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<td>623</td>
<td>Advanced Nursing Concepts I, Community Health Nursing (4)</td>
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<td>624</td>
<td>Advanced Nursing Concepts I, Medical-Surgical Nursing (4)</td>
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<td>Advanced Nursing Concepts II, Mental Health-Psychiatric Nursing (4)</td>
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<td>Advanced Nursing Concepts II, Community Health Nursing (4)</td>
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<td>Advanced Nursing Concepts II, Medical-Surgical Nursing (4)</td>
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<td>Advanced Nursing Concepts III, Mental Health-Psychiatric Nursing (4)</td>
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<td>Advanced Nursing Concepts III, Medical-Surgical Nursing (4)</td>
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<td>633</td>
<td>Curriculum Development (3)</td>
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<td>635</td>
<td>Seminar and Practicum in Teaching (4)</td>
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<td>643</td>
<td>Concepts of Leadership in Nursing (3)</td>
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<tr>
<td>645</td>
<td>Seminar and Practicum in Nursing Service Administration</td>
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<tr>
<td>653-656</td>
<td>Advanced Psychiatric Concepts (3-3)</td>
</tr>
<tr>
<td>699</td>
<td>Directed Study or Research (arr.) I, II, SS</td>
</tr>
</tbody>
</table>
Nutritional Sciences

Graduate Faculty
R. Van Reen, Ph.D. (Chairman)—mineral metabolism, nutritional status
D.M. Hilker, Ph.D.—toxic factors in foods
I.J. Lichton, Ph.D.—fluids and electrolytes, endocrinology
B.R. Standal, Ph.D.—protein, lipid metabolism, nutritional status
F. Young, Ph.D.—lipid metabolism, atherosclerosis

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. Candidates are required to complete a minimum of 30 credit hours including 10 credit hours of Nutr 800. Required courses are marked with an asterisk.

Additional details on the graduate program in nutritional sciences are given in a departmental brochure which is available upon request.

NUTRITION

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<th>Course</th>
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<tr>
<td>676</td>
<td>Nutritional and Metabolic Diseases (2)</td>
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<td>677</td>
<td>Nutrition in Reproduction, Growth and Development (3)</td>
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<td>680</td>
<td>Research Methods in Nutrition (3)</td>
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<td>681</td>
<td>Seminar (1)</td>
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<td>682</td>
<td>Nutritional Status (3)</td>
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<td>684</td>
<td>Lipids in Health and Disease (2)</td>
</tr>
<tr>
<td>685-686</td>
<td>Advanced Human Nutrition (1-1)</td>
</tr>
<tr>
<td>699</td>
<td>Directed Readings and Research (2)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis (10)</td>
</tr>
</tbody>
</table>

Ocean Engineering

Graduate Faculty
C.L. Bretschneider, Ph.D. (Chairman)—civil engineering, physical oceanography
W.M. Adams, Ph.D.—geophysics, geophysical engineering
E.E. Allmendinger, M.S.—naval architecture
N.C. Burbank, Sc.D.—environmental engineering
J.C. Burgess, Ph.D.—engineering mechanics
F. Gerritsen, Ing. dip.—coastal and harbor engineering
R.A. Grace, Ph.D.—hydrodynamics and water resources
G.W. Groves, Ph.D.—oceanography
H.H. Hwang, Ph.D.—electrical engineering
J. Larsen-Badso, Ph.D.—materials science
A. Parvulescu, Ph.D.—mathematical science
L. Seidl, Ph.D.—naval architecture
M. St. Denis, D.Eng.—aeronautical engineering
W. Stuiver, Ph.D.—mechanics, space dynamics
R. Szilard, Ph.D.—structures, applied mechanics
The graduate program in ocean engineering is intended to channel the previous engineering experience of the student to ocean-related work. This work includes coastal and harbor engineering, marine structures, naval architecture, hydrodynamics and ocean acoustics. The department currently offers a master's and a doctoral program in ocean engineering.

An intended candidate for the master's program is expected to have a bachelor's degree in any of the classical engineering disciplines. Candidates with degrees other than in engineering will be considered for admission, but they may be required to make up deficiencies. Official scores in the GRE Aptitude tests must be submitted prior to admission.

The M.S. degree in ocean engineering can be earned by completing the requirements under one of two plans. Plan A (thesis program) requires a minimum of 30 credit hours, including 22 credit hours of course work and 8 of thesis research. 6 credit hours may be taken outside the College of Engineering and the department of oceanography. Two graduate seminars in engineering or oceanography are required. A minimum of 18 credits must be in courses numbered 600-799.

Plan B (non-thesis) requires a minimum of 30 credit hours of course work. At least 6 credits must be outside the undergraduate field of specialization. Two graduate seminars in engineering or oceanography are required. A minimum of 18 credits must be in courses numbered 600-799.

Students must make a choice of plan before 14 credits of graduate work applicable to the degree have been completed. A foreign language is not required.

All students will be required to take a general examination before they are advanced to candidacy. This examination is intended to reveal the quality of the student's preparation and his ability to pursue work at the master's level. The student may be required to make up any deficiencies before advancement to candidacy.

In addition to the credit hour requirements, students will be required to take a final oral examination. For Plan A this examination covers the thesis and related subjects. The examination is conducted by the thesis committee and is open to the graduate faculty. For Plan B the examination covers the presentation of a seminar, which must be submitted to the committee as a written paper. The student will be questioned on the paper and related subjects.

The general and final examinations can only be repeated once. Students failing any of these examinations a second time will be dropped from the program.

Students seeking admission to the doctorate should have an M.S. degree in engineering. If they have an M.S. degree in another field, they may apply for a
special examination to determine their qualifications. Exceptionally well-qualified students who meet the requirements for the M.S. program may be admitted to the Ph.D. program directly. Applicants must submit the official GRE Aptitude score prior to admission.

Students pursuing the doctoral program will be required to take an oral qualifying examination, an oral and written comprehensive examination and a final oral examination in defense of their dissertation. One foreign language is required. These examinations are described elsewhere in this bulletin.

The following courses are recommended for all students in ocean engineering.

OE 411 Naval Hydrostatics (3)
OE 601 Ocean Engineering Laboratory (3)
OE 603 Ocean Engineering Environment (3)
OE 609 Principles of Ocean Engineering (3)
OE 696 Topics in Ocean Engineering (2)
Ocn 620 Physical Oceanography (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

412 Naval Hydrodynamics I (3)
610 Viscous Fluid Dynamics (3)
611-612 Naval Hydrodynamics II & III (3-3)
614 Ocean Hydrodynamics Laboratory (2)
621 Introduction to Ocean Acoustics (3)
622 Sonar Systems Engineering (3)
623 Electro-acoustics (3)
631-632 Design of Ocean Structures I & II (3-3)
661-662 Coastal and Harbor Engineering (3-3)
663 Design of Coastal Structures (3)
664 Sediment Transport, Littoral Drift and Dredging Technology (3)
671 Submarine Vehicle Naval Architecture (3)
691 Special Topics in Ocean Engineering (Arr.)
697-698 Seminar in Ocean Engineering (1-1)
707-708 Statistical Dynamics of Ocean Systems I & II (3-3)

CIVIL ENGINEERING

411 Applied Probability and Statistics in Engineering (3)
621-622 Advanced Fluid Mechanics I & II (3-3)
635 Environmental and Sanitary Engineering Chemistry (4)
636 Environmental and Sanitary Engineering Microbiology (4)
655 Applied Soil Mechanics I (3)
671 Theory of Elasticity I (3)
674 Stability of Structures (3)
675 Theory of Vibrations (3)
676 Structural Dynamics (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)
686 Numerical Methods in Continuum Mechanics (3)
OCEANOGRAPHY

ECONOMICS
698  Marine Resources (3)

ELECTRICAL ENGINEERING
614  Analysis of Nonlinear Systems (3)
616  System Theory (3)
618  System Optimization (3)
623  Advanced Electronic Instrumentation (3)
646  Signal and Noise Theory (3)
652  Optimization Techniques in Control Systems (3)
655  Sampled-Data Control Systems (3)
656  Concepts of Systems Engineering (3)
661  Theory of Digital Machines (3)
671-672 Electromagnetic Theory and Applications (3-3)

INFORMATION SCIENCES
443  Statistical Data Analysis (3)
641  Discrete State Stochastic Processes (3)
648  Theory of Inference (3)
650  Time Series Analysis (3)

MECHANICAL ENGINEERING
457  Marine Engineering (3)
474  Fundamentals of Acoustics (3)
621  Conduction Heat Transfer (3)
622  Convection Heat Transfer (3)
628  Theory and Measurement of Turbulence (3)
635  Corrosion Theory (3)
636  Materials for the Ocean Environment (2)
641  Theory of Mechanical Properties of Solids (3)

OCEANOGRAPHY
622  Geological Oceanography (3)
623  Chemical Oceanography (2)
640  Advanced Physical Oceanography (3)
642  Sedimentology II (3)
660  Ocean Wave Theory (3)
661  Tides (3)

Oceanography

Graduate Faculty
G.I. Murphy, Ph.D. (Chairman)—biological
J.E. Andrews, Ph.D.—geological
V.E. Brock, M.A.—biological
J. Caperon, Ph.D.—biological
K.E. Chave, Ph.D.—chemical
T.A. Clarke, Ph.D.—biological
B.S. Gallagher, Ph.D.—physical
G.W. Groves, Ph.D.—physical
W.A. Hardy, Ph.D.—physical
A. Malahoff, Ph.D.—geological
E.D. Stroup, Ph.D.—physical
K. Wytki, Ph.D.—physical
R.E. Young, Ph.D.—biological

Affiliate Faculty
R. Barkley, Ph.D.—physical
C.R. Seckel, M.S.—physical
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. Graduate Record Examinations (Advanced and Aptitude) are required. Interested students should write to the department chairman for a brochure and further information.

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.

The M.S. program (Plan A) requires a minimum total of 30 credit hours; including 18 credits of course work and 12 credits of thesis research. The student is also required to take an oceanography seminar course and must show qualification in computer technology.

A candidate for the Ph.D. must pass a qualifying examination, a comprehensive examination and a final oral examination in defense of his dissertation. He must qualify in one foreign language and computer technology.

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

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

OCEANOGRAPHY

620 Physical Oceanography (3)
621 Biological Oceanography (3)
622 Geological Oceanography (3)
623 Chemical Oceanography (3)
630 Physical Oceanography Laboratory (1)
632 Littoral Geological Processes (3)
633 Chemical Oceanography Laboratory Methods (1)
636 Phytoplankton Ecology (3)
640 Advanced Physical Oceanography (3)
642 Sedimentology II (3)
643 Marine Geochemistry (3)
644 Marine Geophysics (3)
646 Zooplankton Ecology (2)
647 Zooplankton Ecology Laboratory (2)
650 Mathematical Techniques for Biologists (3)
660 Ocean Wave Theory (3)
661 Tides (3)
662 Marine Hydrodynamics (3)
663 Measurements and Instrumentation (2)
664 Principles of Underwater Acoustics (2)
672 Seminar in Geotectonics I (arr.)
OVERSEAS CAREER PROGRAM

673 Continental Shelves (3)
699 Directed Research (arr.)
701 Neekon Ecology (3)
702 Deep Sea Biology (3)
735 Seminar in Oceanography (2)
750 Topics in Biological Oceanography (2)
760 Topics in Physical Oceanography (2)
770 Seminar in Chemical Oceanography (1)
800 Thesis Research (arr.)

Overseas Career Program

The Overseas Career Program is a certificate program with 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 University 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.

Faculty include:

J.M. Allison, LL.D.—director
W.G. Hackler, M.A.—associate director

OVERSEAS CAREER PROGRAM
631-632 Overseas Career Training Seminar (3-3)
791 Internship in an Asian Country (3)

Pacific Islands Studies

Graduate Faculty

P. Pirie, Ph.D. (Director)—geography
E. Barnet, Ph.D.—travel industry management
J.H. Cox, M.A.—art
E.A. Kay, Ph.D.—general science
F. Mahony, Ph.D.—anthropology
D. Oliver, Ph.D.—anthropology
C. Ramage, D. Sc.—geosciences
M. Reddin, Ed.D.—education
E. Voulgaropoulos, M.Ph., M.D.—public health

Intended candidates for an M.A. in Pacific Islands studies must have an
undergraduate background of 18 hours of credit (or the equivalent) in courses related to the Pacific Islands. The region is defined as Micronesia, Melanesia and Polynesia including Hawaii and New Zealand in their Polynesian aspects. These credits should include a basic Pacific-related course in anthropology, geography or history. Candidates are urged to have a reading or field knowledge of a foreign language useful in thesis research. These would include French, German, Japanese, Spanish or any of the languages indigenous to the islands. Prerequisites may be satisfied by course work while enrolled at the University prior to admission to candidacy.

The graduate program in Pacific Islands studies is designed primarily for students who have taken a B.A. in a discipline and who wish to focus their work at the M.A. level regionally in the Pacific. Only the master's degree is offered and this should be considered terminal. The degree is offered only under Plan A which requires a thesis. Graduate Record Examination aptitude scores must be submitted when applying for admission.

Requirements:

a. At least 21 credit hours in graduate level courses of which at least 12 credits, exclusive of research methods courses, must be in courses numbered 600-799 including at least one graduate seminar. A maximum of 2 credit hours may be allowed for directed research courses (699 or 799).

b. A general examination designed to reveal the quality of the student's preparation prior to the advance to candidacy. The thesis proposal is also reviewed and accepted at this time.

c. A completed thesis (carrying 9 credit hours).

d. A final oral examination covering the thesis and related areas.

Courses should be selected to provide an integrated program bearing upon a particular concentration of interest. At least three disciplines must be represented. A list of courses bearing upon the Pacific to be offered in any one year is available from the director. These courses will usually be found in the offerings of the following fields: agricultural economics, anthropology, architecture, art, English, geography, history, linguistics, music, political science, psychology, public health, sociology, speech-communication, and zoology-botany. Courses in other areas will be allowed if they contribute to an approved program.

PACIFIC ISLANDS PROGRAM

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

Pacific Urban Studies and Planning Program

The Pacific Urban Studies and Planning Program is a certificate program and is a multidisciplinary endeavor directed by the participating academic departments and professional schools—architecture, economics, engineering, geography, political science, public health, social work and sociology. These units join with the program in offering graduate studies emphasizing planning and urban and regional development.
Study programs are individually arranged in consultation with advisers in the participating units. Common elements include an urban (or regional) and planning-focused master's program within one of the participating departments or schools, related course work in disciplines other than the major field and participation in a 6-credit, interdisciplinary seminar in which students engage in a cooperative planning project. Successful completion of the program leads to award of a master's degree in the student's chosen field and a certificate in planning and urban (or regional) studies. The minimum number of credit hours for the degree and certificate is 36.

For further information regarding the program, a student should write the chairman of the department or dean of the professional school in which he is interested or to the Director, Pacific Urban Studies and Planning Program, University of Hawaii, 2327 Dole Street, Honolulu, Hawaii 96822.

PLANNING
610 Urban Studies and Planning Seminar (6)
630 Internship in Planning (0)

Pharmacology

Graduate Faculty
B.K.B. Lum, Ph.D., M.D. (Chairman)—autonomic and cardiovascular pharmacology
L.J. Casarett, Ph.D.—toxicology
S.C. Chou, Ph.D.—molecular pharmacology
W.C. Cutting, M.D.—chemotherapy
E. Furusawa, M.D.—virus chemotherapy
J.F. Lenney, Ph.D.—biochemical pharmacology
T.R. Norton, Ph.D.—medicinal chemistry
D.D. Palmer, M.D.—dermatologic pharmacology
G.W. Read, Ph.D.—cardiovascular pharmacology
S. Shibata, M.D., Ph.D.—cardiovascular pharmacology

The department of pharmacology offers the requisite work for medical students, and for 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 courses adapted to the needs of the particular students as determined by the major professor and the thesis committee. Most students will be expected to take graduate courses in biochemistry, physiology and pharmacology. Elective courses in pathology, microbiology, anatomy, chemistry and clinical medicine will be recommended.

The departmental policies in regard to examinations which are optional to fields of study are as follows: (1) general examination for the M.S. degree: not required, (2) final examination for the M.S. degree: required (3) Ph.D. qualifying examination: not required. A minimum of 30 credits of course work is required for the Plan A M.S. degree program of the department with 6 credits being derived from the thesis research work.
PHILOSOPHY

PHARMACOLOGY

600 Pharmacology: Actions and Uses of Drugs (5)
610 Marine Pharmacology (1)
613-614 Seminar in Pharmacology (1)
615 Toxicology (4)
631-632 Med. Chem. and Structure-Activity Relationships (3-3)
634 Molecular Pharmacology (2)
635 Experimental Chemotherapy (1)
637 Autonomic Nervous System Pharmacology (2)
639 Advanced Cardiovascular Pharmacology (2)
699 Directed Research (arr.)
800 Thesis Research (arr.)

Philosophy

Graduate Faculty

W.E. Nagley, Ph.D. (Chairman) - philosophy of religion, existential philosophy
C.Y. Chang, Ph.D. - Chinese philosophy, Taoism and Ch'an Buddhism
C.Y. Cheng, Ph.D. - philosophy of language, Chinese logic and methodology, Confucian philosophy
I.M. Copi, Ph.D. - logic, metaphysics
E. Deutsch, Ph.D. - Indian and comparative philosophy
H.F. McCarthy, Ph.D. - history of philosophy, philosophy of art, philosophy and literature
B.T. Yamasaki, Ph.D. - rationalism, philosophy of religion, aesthetics

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 Western Ph.D. degree candidate. In the case of the Asian or Comparative Ph.D. candidate, reading competence in one Asian language in the special area of research is required.

142
Western

PHILOSOPHY

400 Political Philosophy (3)
401 Social Philosophy (3)
402 Philosophy of Law (3)
405 American Philosophy (3)
410 Philosophy of the Physical Sciences (3)
415 Philosophy of the Social Sciences (3)
417 Theory of Knowledge (3)
418 Metaphysics (3)
420 Philosophy of Art (3)
422 Philosophy and Psychoanalysis (3)
425 Philosophy in Literature (3)
427 Kafka (3)
428 Samuel Beckett (3)
430 Existential Philosophy (3)
435 Philosophy of Religion (3)
445 Symbolic Logic I (3)
600 Problems of Philosophy (3)
604 Metaphysics of Language (3)
605 Philosophy of Language (3)
611 Symbolic Logic II (3)
700 Individual Western Philosophers (3)
715 Philosophy of Mathematics (3)
720 Seminar in Ancient-Medieval Philosophy (3)
725 Seminar in Modern Classical Philosophy (3)
730 Seminar in Contemporary Philosophy (3)
740 Seminar in Philosophy of Science (3)

Asian and Comparative

450 Indian Philosophy (3)
460 Buddhist Philosophy (3)
470 Chinese Philosophy (3)
480 Philosophy, East and West (3)
485 Modern Japanese Philosophy (3)
650 Individual Asian Philosophers (3)
655 Vedanta (3)
656 Indian Social Philosophy (3)
660 Theravada Buddhist Philosophy (3)
661 Mahayana Buddhist Philosophy (3)
662 Ch'an (Zen) Philosophy (3)
670 Confucianism (3)
671 Neo-Confucianism (3)
672 Taoism (3)
750 Seminar in Indian Philosophy (3)
760 Seminar in Buddhist Philosophy (3)
770 Seminar in Chinese Philosophy (3)
780 Seminar in Comparative Philosophy (3)
799 Directed Research (Greek, Modern Classical, Contemporary Western, Indian, Buddhist, Chinese, and Comparative) (arr.)
800 Thesis Research (arr.)
Physics

Graduate Faculty

J.R. Holmes, Ph.D. (Chairman)—optics, spectroscopy
R.J. Cence, Ph.D.—elementary particles
P.N. Dobson, Ph.D.—theoretical physics
C. Hayes, Ph.D.—mathematical physics
B.L. Henke, Ph.D.—ultra-soft x-rays
H.C. McAllister, Ph.D.—optics, spectroscopy
S. Pakvasa, Ph.D.—theoretical physics
M.W. Peters, Ph.D.—high energy physics
V.Z. Peterson, Ph.D.—elementary particles
W. Pong, Ph.D.—solid state
W.M. Shyu, Ph.D.—theoretical solid state physics
W.R. Steiger, Ph.D.—optics, atmospheric and solar physics
V.J. Stenger, Ph.D.—elementary particles
S.F. Tuan, Ph.D.—theoretical physics
M.S. Watanabe, Ph.D.—theoretical physics
D. Yount, Ph.D.—elementary particles

Intended candidates for the M.S. or Ph.D. in physics must present a minimum of 35 semester hours of undergraduate credits in physics, including atomic and nuclear physics, electromagnetism, mechanics, optics, and thermodynamics. Courses in general chemistry and differential equations are also required. Official scores of the Aptitude test and the Advanced (Physics) test 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. arc 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.

Physics

440 Solid State Physics (3)
490 Quantum Electronics (3)
*600 Methods of Theoretical Physics I (3)
601 Methods of Theoretical Physics II (3)
*605 Modern Physics Laboratory I (1 or 2)
606 Modern Physics Laboratory II (1 or 2)
*610 Analytical Mechanics I (3)
611 Analytical Mechanics II (3)
620 Physics of the Upper Atmosphere
*650 Electrodynamics I (3)
651 Electrodynamics II (3)
660 Advanced Optics (3)
*690 Seminar (1)
695 Seminar on Atomic and Solid State Physics (1)
700 Seminar on Elementary Particle Physics (1)
711 Advanced Topics in Theoretical Physics (3)
730 Statistical Mechanics (3)
*770 Quantum Mechanics I (3)
771 Quantum Mechanics II (3)
772 Relativistic Quantum Mechanics (3)
777 Nuclear Physics I (3)
778 Nuclear Physics II (3)  
780 Atomic and Molecular Spectra (3)  
785 Solid State Theory (3)  
799 Directed Research (arr.)  
800 Thesis Research (arr.)

Physiology

Graduate Faculty
T.A. Rogers, Ph.D. (Chairman)—environmental physiology
S. Batkin, M.D.—neurophysiology
V.J. DeFeo, Ph.D.—reproductive physiology
K.D. Gardner, M.D.—renal physiology
H.L. Gillary, Ph.D.—physiology of sense organs
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
Y.C. Lin, Ph.D.—cardiovascular physiology
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, cardiovascular physiology
P.B. van Weel, Ph.D.—physiological ecology

Affiliate Faculty
R.L. Pepper, Ph.D.—psychology, marine mammal biology

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 (which may include biochemistry, pharmacology, biophysics, or nutrition), plus other course work adapted to the needs of the particular student as determined by the major professor and the thesis committee. Students will be expected to develop a thorough knowledge of human, mammalian and/or comparative physiology with particular emphasis on their special fields of interest. All students must have or obtain adequate knowledge of the design of experiments, statistical methods, including the use of computers, and, in many instances, bioengineering and the use of isotopes in physiological research.

PHYSIOLOGY
601-602 Medical Physiology (2-4)  
603-604 Seminar in Physiology (1-1)  
605 Physiology of Nerve and Muscle (3)  
606 Comparative Physiology of Thermoregulation (3)  
607 Physiological Adaptation to the Environment (2)  
608 Advanced Renal Physiology (2)  
699 Directed Research (arr.)  
800 Thesis Research (arr.)
PLANT PATHOLOGY

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. Holtzmann, Ph.D.—nematology, general plant pathology
J.E. Hunter, Ph.D.—virology, general plant pathology
M. Ishii, Ph.D.—virology
W.H. Ko, Ph.D.—soil-borne diseases
D.S. Meredith, Ph.D.—epidemiology of plant diseases
S. Patil, Ph.D.—host-parasite physiology
E.E. Trujillo, Ph.D.—soil-borne fungal diseases

Affiliate Faculty
W.J. Apt, Ph.D.—nematology, pineapple diseases
R.S. Byther—soil-borne diseases
K.G. Rohrbach, Ph.D.—pineapple diseases
G.W. Steiner—host-parasite physiology
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.

The department offers both Plan A (thesis) and Plan B (nonthesis) programs. Plan A is the usual program. Plan B, designed for those students who do not intend to make research in plant pathology their profession, will be permitted only at the discretion of the graduate faculty.

Plan A: Minimum of 30 credit hours of which 8 credit hours will be granted for thesis research.

Plan B: Minimum of 30 credit hours. In this program 15 credit hours shall be earned in the major field in courses numbered 600-799 of which six credit hours must be earned in directed research in the major field.

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.

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

PLANT PATHOLOGY

601 Tropical Plant Pathology (3)
605 Clinical Plant Pathology (2)
610 Principles of Plant Disease Control (3)
615 Plant Nematology (3)
620 Plant Pathology Techniques (3)
625 Advanced Plant Pathology (2)
630 Plant Virology (3) 699 Directed Research (arr.)
635 Epidemiology of Plant Diseases (3) 705 Host-Parasite Physiology (3)
660 Plant Pathology Seminar (1) 800 Thesis Research (arr.)
POLITICAL SCIENCE

Political Science

Graduate Faculty

M.J. Shapiro, Ph.D. (Chairman)—political theory, legislative behavior
L. Alschuler, Ph.D.—comparative politics, political development
T. Becker, Ph.D.—judicial process, political theory
R.S. Cahill, Ph.D.—politics, political theory
J. Dator, Ph.D.—Japanese politics, political futures
H.J. Friedman, Ph.D.—comparative administration, comparative politics
M.N. Goldstein, Ph.D.—political theory, politics
M. Haas, Ph.D.—international relations, political development
P.E. Jacob, Ph.D.—political development, international organization
H.S. Kariel, Ph.D.—political theory
Y. Kuroda, Ph.D.—comparative politics, political socialization
W. Levi, Ph.D.—international relations, comparative politics
N. Meller, Ph.D.—public administration, legislative behavior
C. Neff, Ph.D.—international relations, comparative politics
L. Nitz, Ph.D.—decision making, political theory
G.D. Paige, Ph.D.—political development, leadership
F.W. Riggs, Ph.D.—comparative administration, development administration
I.H. Rohter, Ph.D.—political psychology, racial ideologies
R.J. Rummel, Ph.D.—international relations, systems theory
R.B. Stauffer, Ph.D.—comparative politics, political development
D. Tabb, Ph.D.—politics, political theory
J. Wilson, Ph.D.—biopolitics, political theory

Applicants must submit to the department letters of recommendation, secure and fill out departmental application forms in addition to those of the Graduate Division, and submit to the department scores from the Graduate Record Examination. Interested students should write the department chairman for further information.

Intended candidates for the master’s degree will select a thesis or nonthesis 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.

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. A student will be advised that he can be admitted to candidacy only after successful approval of his proposed program and upon completion of the comprehensive examination and the oral hearing on his dissertation proposal.

All 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. The course content of all courses, except the 600-602 sequence may vary each semester or with each instructor.
### Systems of Political Thought

#### POLITICAL SCIENCE

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>600</td>
<td>Scope and Methods of Political Science</td>
<td>(3)</td>
</tr>
<tr>
<td>601</td>
<td>Political Analysis, Theory Building and Techniques</td>
<td>(3)</td>
</tr>
<tr>
<td>602</td>
<td>Research Practicum</td>
<td>(3)</td>
</tr>
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<td>610</td>
<td>Political Thought</td>
<td>(3)</td>
</tr>
<tr>
<td>*710</td>
<td>Seminar: Political Thought</td>
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#### Decision Making

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<tr>
<td>620</td>
<td>American Government</td>
<td>(3)</td>
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<tr>
<td>650</td>
<td>Public Administration Theory</td>
<td>(3)</td>
</tr>
<tr>
<td>651</td>
<td>Functional Aspects of Public Administration</td>
<td>(3)</td>
</tr>
<tr>
<td>660</td>
<td>Public Law and Judicial Systems</td>
<td>(3)</td>
</tr>
<tr>
<td>670</td>
<td>Politics</td>
<td>(3)</td>
</tr>
<tr>
<td>*720</td>
<td>Seminar: American Government</td>
<td>(3)</td>
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<tr>
<td>*750</td>
<td>Seminar: Public Administration</td>
<td>(3)</td>
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<tr>
<td>*760</td>
<td>Seminar: Judicial Systems</td>
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<td>Seminar: Politics</td>
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#### Political Development

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<td>640</td>
<td>Comparative Government and Politics</td>
<td>(3)</td>
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<tr>
<td>650</td>
<td>Public Administration Theory</td>
<td>(3)</td>
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<tr>
<td>660</td>
<td>Public Law and Judicial Systems</td>
<td>(3)</td>
</tr>
<tr>
<td>670</td>
<td>Politics</td>
<td>(3)</td>
</tr>
<tr>
<td>*740</td>
<td>Seminar: Comparative Government and Politics</td>
<td>(3)</td>
</tr>
<tr>
<td>*750</td>
<td>Seminar: Public Administration</td>
<td>(3)</td>
</tr>
<tr>
<td>*760</td>
<td>Seminar: Judicial Systems</td>
<td>(3)</td>
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<tr>
<td>*770</td>
<td>Seminar: Politics</td>
<td>(3)</td>
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</tbody>
</table>

#### International Relations

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<tr>
<td>630</td>
<td>International Relations</td>
<td>(3)</td>
</tr>
<tr>
<td>631</td>
<td>International Relations of Asia</td>
<td>(3)</td>
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<tr>
<td>*730</td>
<td>Seminar: International Relations</td>
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#### General

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<tr>
<td>699</td>
<td>Directed Reading and Research</td>
<td>(arr.)</td>
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<tr>
<td>800</td>
<td>Thesis Research</td>
<td>(arr.)</td>
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</tbody>
</table>

### Population Studies

Population Studies is a certificate program and is interdisciplinary involving the departments of anthropology, economics, geography, and sociology. The program is designed for students who are candidates for an advanced degree—M.A. or Ph.D.—in one of the cooperating departments and who wish to acquire an understanding of demographic structures and processes and to develop a special competence in the application of the concepts and tools of their primary discipline to the study of various aspects of the population problem. The program emphasizes the social and economic aspects of the causes and consequences of population trends and examines the rationale and the ways by which societies attempt to modify these trends with particular reference to
the Asian and Pacific area. Special attention is paid to training in techniques of demographic analysis appropriate for deficient and erroneous data.

Students successfully completing an approved sequence of at least three courses in the program obtain a certificate in Population Studies if they have also fulfilled the requirements for a master's degree in anthropology, economics, geography, or sociology.

Faculty for the courses listed below and especially responsible for the program include the following.

P. Demeny, Ph.D. (Director)—economics
L.J. Cho, Ph.D.—sociology
F.A. Palmore, Ph.D.—sociology
P.N.D. Pirie, Ph.D.—geography

**POPULATION STUDIES**

- 650 Introduction to Demography (3)
- 691 Methods of Demographic Analysis (3)
- 750 Interdisciplinary Seminar in Population Studies (3)

**Psychology**

*Graduate Faculty*

R.C. Johnson, Ph.D. (Chairman)—social-developmental
L.L. Ames, Ph.D.—experimental
A. Arkoff, Ph.D.—clinical
H.M. Bitner, Ph.D.—counseling
R.J. Blanchard, Ph.D.—experimental
J.G. Carlson, Ph.D.—learning theory and human behavior extensions
D.H. Crowell, Ph.D.—developmental
J.M. Denny, Ph.D.—counseling
A.L. Diamond, Ph.D.—experimental
J.M. Digman, Ph.D.—personality
R.A. Dubanoski, Ph.D.—developmental
R.G. Gallimore, Ph.D.—social
H. Groth, Ph.D.—experimental
L.M. Herman, Ph.D.—experimental
W.S. MacDonald, Ph.D.—clinical
H.H. Manssson, Ph.D.—social
A.J. Marsella, Ph.D.—clinical
J. Michel, Ph.D.—counseling
K.A. Minke, Ph.D.—learning theory and human behavior extensions
T.S. Rodgers, Ph.D.—psycholinguistics
S.I. Shapiro, Ph.D.—learning theory and human behavior extensions
A.W. Staats, Ph.D.—learning theory and human behavior extensions
G. Tanabe, Ph.D.—clinical-developmental
R.G. Tharp, Ph.D.—clinical
R.S. Wahler, Ph.D.—clinical
D.L. Watson, Ph.D.—personality
H.B. Weaver, Ph.D.—applied social

*Emeriti*

C.J. Herrick, Ph.D.—clinical
S.D. Porteus, Sc.D.—clinical

*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.

The M.A. degree may be pursued only by Plan A (required thesis). Programs leading to the Ph.D. are available in five fields of specialization: experimental; developmental; social-personality; clinical; learning theory and human behavior extensions. Applicants interested in further information should write to the chairman directly.

Intended candidates for the Ph.D. may, under special circumstances offer 30 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**

401 Experimental Analysis of Behavior (3)
423 History of Psychology (3)
424 Abnormal Psychology (3)
425 Psychological Testing (3)
426 Industrial Psychology (3)
427 The Exceptional Child (3)
428 Social Development of Children (3)
430 Complex Human Learning (3)
431 Verbal Learning and Memory (3)

**Methodology**

601 Introduction to Quantitative Methods (3)
602 Statistical Analysis (3)
603 Design and Analysis of Psychological Experiments (3)
604 Scaling Methods (3)
605 Problems of Measurement and Evaluation (3)
606 Multivariate Methods (3)
607 Introduction to Mathematical Models (3)
714 Survey Research Methods (3-3)

**Experimental Psychology**

630 Experimental Method (3)
631 Experimental Method in Social Psychology (3)
633 Comparative Psychology (3)
634 Physiological Psychology (3)
635 Sensory Processes and Psychophysics (3)
636-637 Learning and Motivation (3-3)
638 Perception (3)
640 Verbal Learning (3)
641 Skill Learning (3)
643 Cognitive Processes (3)
644 Mathematical Models (3)
Psychology

649 Instrumentation
730 Research in Experimental Psychology (3)

Developmental Psychology

653 Infant Development and Behavior (3)
654 Cognitive Development (3)
655 Learning, Language, and Intellectual Function (3)
656 Social Learning and Personality (3)
750 Research in Developmental Psychology (3)

Social-Personality

660 Personality: Theory and Research (3)
661 Personality and Social Interaction (3)
662 Social Psychology (3)
663 Behavior in Groups (3)
664 Attitude Development and Change (3)
665 Cross-Cultural Psychology (3)
666 Psychology and Social Issues (3)
670 Applied Social Psychology (3)
760 Research in Personality (3)
762 Research in Social Psychology (3)

Clinical Psychology

675-676 Behavior Assessment (2-2)
677-678 Behavior Assessment Laboratory (1-1)
681 Childhood Behavior Disorders and Intervention (3)
682 Adult Behavior Disorders and Intervention (3)
683 Social Behavior Disorders and Intervention (3)
685 Child Learning Laboratory (3-3)
687 Practicum in Behavior Change: Community Issues (3)
688 Practicum in Behavior Change in Children (3)
689 Practicum in Behavior Change in Adults (3)
690 Practicum in Clinical Psychology (arr.)
790 Research in Clinical Psychology (3)
795 Internship (0-0)

Learning Theory and Human Behavior Extensions

The general purpose of this concentration is to provide a common core of work for graduate students which will focus upon the principles and methods of the field of learning, and also include courses that extend the basic principles to various areas of human behavior. In addition, the graduate student in the concentration will be expected to select some area of specialization within which he wishes to major. This area could be anywhere along the continuum from the basic field to applications of the principles to clinical, child, or social psychology, educational psychology, or areas in the social sciences—or to fields such as child learning, behavior modification, social learning, language and verbal learning, basic animal learning.
The School of Public Health offers a wide range of programs designed to meet the needs of a varied student body. In addition to basic work in public health common to all students in the school, candidates are expected to pursue intensive work in a selected area of emphasis within the public health field. The
broad areas of program emphasis offered include: administration (including comprehensive health planning, health services administration and public health administration), biostatistics, environmental health (including sanitation and public health engineering), epidemiology (including public health laboratory), international health, maternal and child health (including mental retardation), mental health, population and family planning studies, public health education, and public health nutrition. Program content may combine more than one area of emphasis for eligible students. Such expanded programs will usually require an additional semester of study.

Master of Public Health Degree

The M.P.H. program 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 meet the minimum admission requirements of the Graduate Division and present a minimum of 18 semester credits in the physical and social sciences. Applicants must also submit Graduate Record Examination scores for the aptitude tests. Depending upon the area of emphasis selected, different undergraduate preparation may be required; in some cases, at least two years of health or related work experience is also required. A candidate's total curriculum is developed with the approval of his program committee. All candidates must complete 30 or more semester hours, including courses PH 609-610 and PH 791. A final examination or other final requirement as determined by the student's program committee must be completed before graduation. In some cases, degree requirements may involve up to two years of residence. (Refer to School of Public Health Bulletin.)

Master of Science Degree

The M.S. program is intended to provide preparation for individuals who require more concentrated work in a specific area of emphasis. The program may require up to 24 months; both Plan A and B are available. In Plan A the minimum course requirement is 30 semester hours, including PH 609-610 and 6 credits for thesis research. A final oral examination on the thesis and related subjects is required. In Plan B, 30 or more semester hours, including PH 609-610 and PH 791, are required; a final examination or other final requirement as determined by the student's program committee must be completed before graduation. (Refer to School of Public Health Bulletin.)

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

PUBLIC HEALTH

601 Medical Care Systems (3)
602 Supervision and Leadership in Health Services (1)
603 Legal Basis for Health Services (1)
604 Principles of Organization of Health Services (2)
605 Personnel Practices in Health Services (2)
606 Economics of Health Service (3)
607 Seminar in Health Services Administration (1)
609-610 Public Health Organization and Administration (3-3)
<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>611</td>
<td>Information Systems and Planning</td>
<td>3</td>
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<tr>
<td>612</td>
<td>Ecological Concepts and Planning</td>
<td>3</td>
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<tr>
<td>613</td>
<td>Seminar in Comprehensive Health Planning</td>
<td>3</td>
</tr>
<tr>
<td>616</td>
<td>Basic Concepts of International Health</td>
<td>3</td>
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<tr>
<td>617</td>
<td>Comparative Public Health Systems</td>
<td>3</td>
</tr>
<tr>
<td>618</td>
<td>Seminar in International Health</td>
<td>2</td>
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<tr>
<td>624</td>
<td>Community Mental Health</td>
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<tr>
<td>629</td>
<td>Dental Public Health</td>
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<tr>
<td>631-632</td>
<td>Public Health Nutrition</td>
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<td>633</td>
<td>Seminar in Public Health Nutrition</td>
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<td>634</td>
<td>Nutrition in Public Health Programs</td>
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<td>642</td>
<td>Maternal and Child Health I</td>
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<tr>
<td>643</td>
<td>Maternal and Child Health II</td>
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<tr>
<td>644</td>
<td>The Handicapped Child</td>
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<tr>
<td>645</td>
<td>Principles of Comprehensive Maternity Care</td>
<td>2</td>
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<tr>
<td>646</td>
<td>Health Services for the Mentally Retarded</td>
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<td>649</td>
<td>Family Planning in Theory and Practice</td>
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<td>650</td>
<td>Demography and World Population Problems</td>
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<td>651</td>
<td>Fertility and Reproduction</td>
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<td>Staff Seminar in Population Dynamics</td>
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<td>Public Health Statistics</td>
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<td>656</td>
<td>Biostatistics</td>
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<td>Statistical Analysis</td>
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<td>663</td>
<td>Principles of Epidemiology</td>
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<td>Public Health Aspects of Chronic Diseases</td>
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<td>Epidemiology of Infectious Diseases in the Pacific Area</td>
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<td>Laboratory Aspects of Infectious Diseases in the Pacific Area</td>
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<td>Socio-Cultural Aspects of Health and Illness</td>
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<td>Educational Approach to Public Health</td>
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<td>674</td>
<td>Community Health Education Laboratory I</td>
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<td>675</td>
<td>Group Methods in Public Health</td>
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<td>Health Information Processes in Public Health—Theory and Practice</td>
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<td>Educational Program Evaluation in Public Health</td>
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<td>In-Service Training and Staff Development in Public Health</td>
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<td>Environmental Health</td>
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<td>Vector Control in Environmental Health</td>
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<td>Occupational Health I</td>
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<td>685-686</td>
<td>Solid Waste Management and Control</td>
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<td>Sampling and Analysis of Solid Wastes</td>
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<td>688</td>
<td>Design of Solid Waste Disposal Facilities</td>
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<td>696</td>
<td>Community Health Problems</td>
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<td>700</td>
<td>Management of Health Services</td>
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<td>701</td>
<td>Seminar in Medical Care Organization</td>
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<td>702</td>
<td>Principles of Fiscal Management for Health Services</td>
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<td>703</td>
<td>Planning and Evaluation of Health Services</td>
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<td>704</td>
<td>Institutional Health Care Facilities</td>
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<td>705</td>
<td>Non-Institutional Health Care Facilities</td>
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<td>706</td>
<td>Case Studies in Health Service Administration</td>
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<td>736</td>
<td>Seminar on Health of the School-Age Child</td>
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<td>746</td>
<td>Techniques in Demographic Analysis</td>
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<td>747</td>
<td>Statistical Methods in Epidemiological Research</td>
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<tr>
<td>763</td>
<td>Advanced Community Health Education</td>
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<td>764</td>
<td>Advanced Community Health Education Laboratory</td>
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<tr>
<td>765</td>
<td>Advanced Seminar in Special Public Health Education Problems</td>
<td>2</td>
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<tr>
<td>771</td>
<td>Environmental Control of Disease Through Food Protection</td>
<td>2</td>
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<td>772</td>
<td>Environmental Factors in Health Problems</td>
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SECONDARY EDUCATION

773 Measurement of Environmental Factors (3)
786 Community Health Concepts and Methods (1)
791 Advanced Public Health Practice in (Area of Emphasis) (3)
792 Seminar in Public Health (1-5)
799 Directed Reading/Research (arr.)
800 Thesis Research (arr.)

Secondary Education

Graduate Faculty
R.S. Alm, Ph.D. (Chairman)—English education, reading
M.C. Austin, Ed.D.—reading
F.B. Brown, Ed.D.—secondary education, curriculum
E.F. Chui, Ph.D.—health and physical education
J.N. Fultz, Ed.D.—social studies education
A.W.S. In, Ph.D.—secondary education
J.R. Little, Ph.D.—health and physical education
R.M. Martin, Ph.D.—secondary education, supervision, curriculum
J.D. Morris, Ed.D.—business education
D.S. Noda, Ph.D.—secondary education, supervision, curriculum
A.J. Picard, Ph.D.—mathematics education
A.L. Pickens, Ed.D.—art education
M.F. Poyzer, Ed.D.—industrial education
D.H. Thompson, Ed.D.—health and 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, evaluation, 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 608, one of Ed EF 650, 651, 660 or 683, and Ed CI 800.

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

CURRICULUM AND INSTRUCTION
437 Curriculum Development, Industrial Education (2)
439 The Business Education Curriculum (3)
460 Distributive Education (3)
SOCIAL WORK

471 Special Problems in Home Economics Education (2)
634 Extraclass Activities in Secondary Schools (2)
635 Junior High School Curriculum (3)
636 Secondary School Curriculum (3)
637 Art in Secondary Education (3)
640 Seminar in Teaching Fields (3)
643 Public School Curriculum for Physical Education (3)
646 Reading Difficulties (3)
647 Clinical Procedures in Reading (3)
657 Community College (3)
699 Directed Reading and/or Research (arr.)
733 Seminar in Curriculum, Secondary (3)
737 Foundations in Art Education (3)

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

Social Work

Graduate Faculty
H.H. Aptekar, D.S.W. (Dean)
R. Fisher, M.S.S.A. - group work
N.M. Hartman, M.A. - casework, supervision
H.A. Jambor, D.S.W. - social welfare policy and services, community organization, research
J. Krisberg, M.A.S.A. - field instruction
K. Kumabe, M.S.W. - casework, research
F.C. Merritt, M.S.W. - social work practice, research
B. Polemis, Ph.D. - research
M. Sikkema, Ph.D. - Social Welfare policy and services, research
R. Takasaki, M.P.A. - administration
A.M. Takase, M.S. - field instruction
K.C. Tyson, M.S. - field instruction
H. Verdelen, M.S.W. - field instruction
W.A. Walsh, Ph.D. - casework, human behavior
C. Woodruff, M.S.W. - field instruction

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 6 credits (600 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 practice. 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:
SOCIOLOGY

Social Services

SOCIAL WORK
627-628 Policies and Services in World Social Welfare (2-2)
753 The Law and Social Welfare and Social Work (2)
777-778 Planning, Policy-Making and Administration in Social Welfare (2-2)

Human Behavior in the Social Environment
610-611 Human Development in Cross-Cultural Perspective (2-2)

Social Work Practice
(All methods courses require concurrent field practice)
603-604 General Social Work Practice (3-3)
605-606 Social Work Practice with Individuals & Groups (3-3)
607-608 Social Work Practice in Community Organization (3-3)
620-621 Integration Seminar with Director of Field Work and Advisors (1-1)
626 Prevention and Treatment of Juvenile Delinquency (2)
660-661 Practicum (3-3)
703-704 General Social Work Practice (2-2)
720-721 Integration Seminar with Director of Field Work and Advisors (1-1)
760-761 Practicum (3-3)
764 The Social Caseworker and the Use of Group in Treatment (2)
765 Advanced Social Casework (2)
766 Seminar in Social Casework (2)
767 Casework with Children (2)
770 Advanced Social Group Work (2)
771 Seminar in Social Group Work (2)
785 Methods of Supervision in Social Work (2)
796-797 Directed Individual Study in Substantive Field (3-3)

Research
651 Introduction to Scientific Method and Research Principles in Social Work (2)
652 Research Methodology in Social Welfare and Social Work (2)
794-795 Group Research Project (3-3)
800 Thesis Research (3)

Sociology

Graduate Faculty
C. Ackerman, Ph.D.—kinship, historical sociology
E. Babbie, Ph.D.—methodology, sociology of religion
H.V. Ball, Ph.D.—sociology of law, race relations
H.R. Barringer, Ph.D.—comparative sociology, logic of social inquiry
M. Bloombaum, Ph.D.—methodological integration, social interaction
C.K. Cheng, Ph.D.—social institutions, family
L.J. Cho, Ph.D.—demography
L. Freeman, Ph.D.—mathematical sociology, general theory
C.E. Glick, Ph.D.—race relations, collective behavior and social movements
B.L. Hormann, Ph.D.—changing folk and peasant societies, sociology of religion
G.G. Kassebaum, Ph.D.—criminology, comparative research
J.A. Palmore, Ph.D.—demography, methodology
R.E. Sakumoto, Ph.D.—urban sociology, social deviancy
D. Swift, Ph.D.—sociology of education, formal organizations
T. Wittermans, Ph.D.—social change, sociology of religion  
G. Won, Ph.D.—industrial sociology, urban sociology  
G.K. Yamamoto, M.A.—occupations and professions, comparative institutions—Japan  
D.S. Yamamura, Ph.D.—ecology and demography, methodology

M.A.

Intended candidates should present an adequate undergraduate preparation in sociology. Applicants with undergraduate majors other than sociology are welcome, but background deficiencies are to be overcome during the first year. Prior to admission, applicants must submit official Graduate Record Examination (GRE) scores on the General Aptitude Tests and Advanced Test in Sociology. Someone without a sociology degree may apply if he wishes by submitting in addition the GRE Advanced Test in his field of undergraduate major.

Each student must complete a set of four “core” courses (610-611, 612 and 613) with a grade of “B” or better in each course. These courses are normally taken in the first year of graduate work. An undergraduate course in elementary statistics is a prerequisite for entrance to Sociology 610-611. (A course in elementary statistics is offered during the second summer session at the University of Hawaii, for the benefit of those students who may wish to meet this requirement before the regular session begins.) The “core” courses provide common training in the classical traditions of sociology, current concepts and propositions, philosophy of science, theoretical methodology, research procedures and data analysis. Students with serious deficiencies in theory, methodology or statistics may be required to postpone these courses until the second semester or second year of graduate work.

Plan A (thesis): Students must earn a minimum of 30-credit hours distributed as follows: graduate core—12; sociology seminars at the 700 level in two separate fields exclusive of theory and methods—6; completion of thesis—6; electives (may be in another department)—6. A maximum of 2 credits toward the degree will be allowed in Directed Research or Directed Reading courses.

Plan B (nonthesis): Students must earn a minimum of 36 credit hours distributed as follows: graduate core—12; sociology seminars at the 700 level in two major fields exclusive of theory and methods—12; courses of seminars outside the field of sociology—6; electives (may be within or outside the field of sociology)—6. A seminar paper will be submitted in lieu of thesis.

All M.A. degree seeking students will be examined orally at least three weeks prior to the end of the term in which the degree is to be conferred. This examination, attended by all committee members and open to all faculty members, will cover the thesis or seminar paper and all other material considered pertinent by members of the committee.

Ph.D.

An M.A. is prerequisite to admission to the program of studies at the doctoral level. In addition applicants must submit official GRE scores on the
General Aptitude Tests and the Advanced Test in Sociology, letters of recommendation, and evidence of having completed sociological research.

Each Ph.D. candidate must take at least one advanced seminar in sociological methods or statistics (714 or 715), demonstrate proficiency in one foreign language through an examination administered by the Educational Testing Service, pass comprehensive examinations (three four-hour written examinations in theory and method, and two specialties, and an oral examination), make an original contribution to the field through his dissertation, and make an oral defense of the dissertation.

It is intended that no student be awarded the Ph.D. degree simply because he has successfully completed a program of course work; rather he must show himself to be an independent scholar. Each program of study will be tailored individually to meet the interests and needs of the student, and the requirements of his doctoral committee.

Courses available for credit in the graduate program are listed below.

**SOCIOLOGY**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>410</td>
<td>Population and Society (3)</td>
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<td>415</td>
<td>The Agrarian Community (3)</td>
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<td>416</td>
<td>The Urban Community (3)</td>
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<tr>
<td>425</td>
<td>People and Institutions of China (3)</td>
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<td>426</td>
<td>People and Institutions of Japan (3)</td>
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<td>427</td>
<td>People and Institutions of Korea (3)</td>
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<td>430</td>
<td>Race Relations in the Pacific (3)</td>
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<td>The Family (3)</td>
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<td>Sociology of Religion (3)</td>
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<td>Sociology of Education (3)</td>
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<td>Industrial Sociology (3)</td>
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<td>Social Stratification (3)</td>
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<td>Juvenile Delinquency (3)</td>
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<td>Sociology of Small Groups (3)</td>
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<td>470</td>
<td>Collective Behavior and Social Movements (3)</td>
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<td>Methods of Social Research (3)</td>
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<td>611</td>
<td>Methods and Statistics II (3)</td>
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<td>Classics of Sociological Theory (3)</td>
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<td>Concepts and propositions in Sociology (3)</td>
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<td>714</td>
<td>Seminar in Methods of Research (3)</td>
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<td>Seminar in Social Institutions (3)</td>
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<td>Seminar in Social Psychology (3)</td>
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<td>Seminar in Culture and Communication (3)</td>
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<td>750</td>
<td>Seminar in Demography and Human Ecology (3)</td>
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<td>751</td>
<td>Seminar in Urban and Rural Sociology (3)</td>
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Spanish

Graduate Faculty

E.C. Knowlton, Jr., Ph.D. (Chairman)—history of the language, Hispano-Philippine literature
S. Baciu, M.A.—Ibero-American literature, civilization, and history of ideas
R.L. Hadlich, Ph.D.—comparative, structural and Romance linguistics
J.S. Holton, Ph.D.—methods of teaching the language, grammar
M. Montes, Ph.D.—Spanish literature, stylistics, and creative writing

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

Both Plan A and Plan B are available. Under both plans a minimum of 6 and a maximum of 15 credits may be taken from courses in related fields. Some knowledge of Latin is desirable, and one year of a second modern language will be required of those whose basic command of Spanish was largely acquired in the home. Before admission to candidacy a student must present satisfactory scores on the Proficiency Examinations for Teachers and Advanced Students prepared by M.L.A. and E.T.S. Required courses are marked with an asterisk; those numbered between 400 and 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.

A final examination, written and oral, on relevant fields within Spanish must be successfully completed by all candidates.

SPANISH

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<tr>
<td>403-404</td>
<td>Advanced Oral Practice (3-3)</td>
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<tr>
<td>405</td>
<td>Spanish-English Translation (3)</td>
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<tr>
<td>*431</td>
<td>Structure of Spanish (3)</td>
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<tr>
<td>441</td>
<td>History of the Spanish Language (3)</td>
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<tr>
<td>444</td>
<td>Spanish Dialectology (3)</td>
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<tr>
<td>465-466</td>
<td>Modern and Contemporary Spanish Literature (3-3)</td>
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<tr>
<td>470</td>
<td>Social and Political Ideas of 20th Century Latin America (3)</td>
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<tr>
<td>485-486</td>
<td>Spanish American Prose (3-3)</td>
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<td>490</td>
<td>Hispano-Philippine Literature (2)</td>
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<td>*625-626</td>
<td>Stylistics and Advanced Composition (3-3)</td>
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<td>Seminar in Spanish Linguistics (3)</td>
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<td>665</td>
<td>Spanish Literature Prior to the Golden Age (3)</td>
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<td>Spanish Literature of the Golden Age (3)</td>
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<td>674</td>
<td>Spanish-American Lyric Poetry (3)</td>
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<td>681-682</td>
<td>Spanish-American Novel (3-3)</td>
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<td>697</td>
<td>Seminar in Hispanic Literature (3)</td>
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<td>Directed Research (arr.)</td>
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<td>Thesis Research (arr.)</td>
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HISTORY

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<td>History of Spain and Portugal (3-3)</td>
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<tr>
<td>487-488</td>
<td>History of Latin America (3-3)</td>
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</table>
SPEECH-COMMUNICATION

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)

CURRICULUM AND INSTRUCTION
335 Foreign Languages, Secondary (3)
640 Seminar in Teaching Fields: Foreign Language (3)

ENGLISH
735 Seminar in Comparative Literature (3)

Speech-Communication

Graduate Faculty
R.L. Rider, Ph.D. (Chairman)—radio and television, international communication
E.J. Bilsborrow, Ph.D.—public speaking, speech education, semantics
L.N. Breneman, M.A.—interpretation
B.H. Byers, Ed.D.—speech education
G. Dykstra, Ph.D.—language performance theory, first and second language development, theory and practice in learning programs
L.E. Ekroth, Ph.D.—intercultural communication, non-verbal communication, encounter groups
H.W. Ellingsworth, Ph.D.—interpersonal communication, communication and innovation, history of research
L.S. Harms, Ph.D.—intercultural speech-communication, communication systems
P.J. Heinberg, Ph.D.—speech-communication behavior modification, scientific methods
D.W. Klopf, Ph.D.—forensics, debate, small group communication
V.K. Larson, M.A.—speech education, speech improvement, choral speaking
J.L. Owen, Ph.D.—communication theory and research methodology, interpersonal communication
S.E. Sanderson, Ph.D.—contemporary rhetoric, interpretation, international speech education
D.D. Steinberg, Ph.D.—psycholinguistics
T.A. Welden, Ph.D.—interpersonal communication, speech education, philosophy of science
H.H. Wong, Ph.D.—phonology, linguistics

Intended candidates for the M.A. in speech-communication may present a baccalaureate degree from a recognized university with a major in a field which involves the systematic study of human communication, including speech, communications, psychology, sociology, business administration, linguistics, education. Applicants whose backgrounds are deficient for the successful pursuit of the M.A. degree may be required to strengthen certain areas. Both Plan A (thesis) and Plan B (non-thesis) are available. Both programs require the following: completion of Speech-Communication 601 and 602; 6 credit hours of graduate work in a related field outside the department; a written general
examination during the first semester of graduate work; an oral examination near the end of the program. Under Plan A, the thesis will count 6 semester hours. At least 12 semester hours, excluding S-C 602, must be in courses numbered above 600. Not more than 2 semester hours may be taken in directed research, S-C 799. Under Plan B, at least 18 semester hours must be in courses numbered above 600.

SPEECH-COMMUNICATION

304 Speech-Communication Characteristics of the Source (3)
305 Language in Speech-Communication Behavior (3)
384 Intercultural Communication (3)
406 Evaluation of Speech-Communication (3)
412 Phonetics and Phonemics of American English (3)
434 Advanced Interpretative Reading (3)
468 Broadcasting and the Public (3)
469 World Broadcasting (3)
499 Special Problems (var.)
601 History of Theory and Trends in Speech-Communication Research (3)
602 Methods of Scientific Research in Speech-Communication (3)
613 Experimentation in Language Acquisition and Modification (3)
631 Seminar in Interpretation (3)
651 Seminar in Rhetoric and Public Address (3)
671 Speech-Communication in Control of Cognition (3)
672 Speech-Communication in the Control of Behavior (3)
681 Speech-Communication Process Analysis (3)
682 Speech-Communication: Theories of Source-Receiver Behavior (3)
696 General Seminar (3)
784 Seminar in Intercultural Speech-Communication (3)
785 Seminar in Speech-Communication in Innovation (3)
799 Research (arr.)
800 Thesis Research (arr.)

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
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.

A preliminary conference will be held with each beginning graduate student prior to his initial enrollment in courses. This will include a thorough analysis of his previous academic program and a determination of his qualifications for admission to candidacy or the necessity for removal of undergraduate
deficiencies without graduate credit before such a recommendation is made. The student's adviser will determine when recommendation for admission to candidacy will be made. No general examination will be required.

Two programs are offered for graduate study: Plan A, thesis; and Plan B, nonthesis. 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 in course work plus a thesis (8 credits) and a final oral examination on the thesis subject are required. Plan B requires satisfactory completion of 44 semester credits of course work including SPA 799 and a seminar appearance in which the student will be examined upon the research study which he has completed in this course. 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 terms or three semesters plus one six-week summer term.

Specialized courses offered at the graduate level are:

SPEECH PATHOLOGY AND AUDIOLOGY (SPA)

  600 Research Methods (3)
  610 Organic Disorders of Speech (3)
  611 Auditory Training and Speech Reading (3)
  612 Functional Disorders of Speech (3)
  613 Language Development for Children with Hearing Deficiencies (3)
  701 Advanced Audiology (3)
  710 Advanced Practicum in Speech Pathology
      Section 1: General Clinical (3)
      Section 2: Public School (6)
  711 Advanced Practicum in Audiology
      Section 1: General Clinical (3)
      Section 2: Public School (6)
  720 Seminar in Speech Pathology
      Section 1: Diagnostic Procedures (3)
      Section 2: Functional Disorders (3)
      Section 3: Organic Disorders (3)
  721 Seminar in Audiology
      Section 1: Diagnostic Procedures (3)
      Section 2: Rehabilitation (3)
  799 Research (Required for Plan B Program)
      Section 1: Speech Pathology (1-4)
      Section 2: Audiology (1-4)
  800 Thesis Research (Required for Plan A Program)
      Section 1: Speech Pathology (8)
      Section 2: Audiology (8)
ZOOLOGY

Zoology

Graduate Faculty

A.J. Berger, Ph.D. (Chairman)—ornithology, human and avian anatomy
J.M. Arnold, Ph.D.—developmental biology
J.H. Bailey, Ph.D.—invertebrate zoology
A.H. Banner, Ph.D.—invertebrate zoology, systematics
J.M. Branham, Ph.D.—experimental embryology
V.E. Brock, M.A.—fishery biology, oceanography
W.A. Gosline, Ph.D.—ichthyology, zoogeography and evolution
M.G. Hadfield, Ph.D.—developmental biology of invertebrates
S.R. Haley, Ph.D.—invertebrate embryology
P. Helfrich, Ph.D.—ichthyology, ecology
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
J.E. Randall, Ph.D.—ichthyology
S.A. Reed, Ph.D.—coral physiology
I.S. Reese, Ph.D.—behavior, ecology, invertebrate zoology
E.D. Stevens, Ph.D.—physiology
A.L. Tester, Ph.D.—fishery biology, biometry
S.J. Townsley, Ph.D.—invertebrate zoology, ecology, radio-biology
P.B. van Weel, Ph.D.—physiology, physiological ecology

Affiliate Faculty

Y. Kondo, Ph.D.—malacology
Z.II. Shehach, Ph.D.—physiology of fishes
M. Takata, M.S.—fishery biology

Intended candidates for the M.S. or Ph.D. in zoology must present a minimum of 18 hours of undergraduate preparation in zoology, including courses in vertebrate zoology (including comparative anatomy), embryology, and physiology. M.S. and Ph.D. candidates should have completed two years of chemistry (inorganic and organic), and courses in 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 one foreign language.

ZOOLOGY

416 Histology (3)
417 Microtechnique (3)
420 Embryology (4)
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<td>622</td>
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<td>Seminar in Zoology (1)</td>
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<td>699</td>
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<td>Preparation of Scientific Manuscripts (1)</td>
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<td>Topics in Animal Behavior (arr.)</td>
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<td>Topics in Fish and Fisheries Biology (3)</td>
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