UNIVERSITY OF HAWAII BULLETIN
GRADUATE DIVISION CATALOG
1972-1973
### 1972-73 UNIVERSITY CALENDAR

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<tr>
<th></th>
<th>First Semester</th>
<th>Second Semester</th>
<th>Summer Session</th>
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<tbody>
<tr>
<td>Last day to file applications and renewals of application for graduate admission</td>
<td>Mar. 1</td>
<td>Sep. 1</td>
<td>(Applications accepted for Fall and Spring semesters only)</td>
</tr>
<tr>
<td>Last day to apply for change in field of study</td>
<td>Apr. 1</td>
<td>Nov. 15</td>
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<tr>
<td>Last day to file returnee forms for students returning after an absence</td>
<td>Apr. 1</td>
<td>Oct. 1</td>
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<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>Apr. 1</td>
<td>Oct. 1</td>
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<tr>
<td>Registration</td>
<td>Aug. 28</td>
<td>Jan. 15</td>
<td>Jun. 4</td>
</tr>
<tr>
<td>Instruction begins</td>
<td>Sep. 5</td>
<td>Jan. 22</td>
<td>Jun. 5</td>
</tr>
<tr>
<td>Last day to register for credit</td>
<td>Sep. 18</td>
<td>Feb. 2</td>
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<tr>
<td>Last day to change from audit to credit</td>
<td>Sep. 18</td>
<td>Feb. 2</td>
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<tr>
<td>Last day to add courses for credit</td>
<td>Sep. 18</td>
<td>Feb. 2</td>
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<tr>
<td>Last day to withdraw from courses</td>
<td>Sep. 22</td>
<td>Feb. 9</td>
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<tr>
<td>Last day to process Credit-No Credit option</td>
<td>Nov. 16</td>
<td>Apr. 3</td>
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<tr>
<td>Last day to change from credit to audit</td>
<td>Sep. 22</td>
<td>Feb. 9</td>
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<tr>
<td>Last day to file diploma applications</td>
<td>Sep. 25</td>
<td>Feb. 12</td>
<td>Jun. 19</td>
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<tr>
<td>Last day to remove incompletes from previous semester</td>
<td>Nov. 22</td>
<td>Apr. 13</td>
<td>Nov. 21</td>
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<tr>
<td>Last day of final examinations, Plan A and Ph.D.</td>
<td>Nov. 21</td>
<td>Apr. 23</td>
<td>Jul. 2</td>
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<td>Theses and dissertations due in Graduate Division</td>
<td>Nov. 28</td>
<td>Apr. 30</td>
<td>Jul. 5</td>
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<tr>
<td>Last day to submit Plan B final exam results</td>
<td>Dec. 5</td>
<td>May 7</td>
<td>Jul. 11</td>
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<td>Last day to file titles of theses and dissertations with Graduate Division</td>
<td>May 15</td>
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<tr>
<td>Last day of instruction</td>
<td>Dec. 14</td>
<td>May 8</td>
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<tr>
<td>Final examinations begin</td>
<td>Dec. 18</td>
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<td>Term ends</td>
<td>Dec. 23</td>
<td>May 20</td>
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<tr>
<td>Commencement</td>
<td>Dec. 23</td>
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#### CALENDAR

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| CAMPUS MAP | 100 |
GRADUATE DIVISION STAFF

Wytze Gorter, Ph.D., Dean
Howard P. McKaughan, Ph.D., Associate Dean, Programs and Personnel
Arthur N. L. Chiu, Ph.D., Associate Dean, Research and Fellowship
Sumie F. McCabe, M.A., Assistant Dean, Student Services

ADMINISTRATIVE OFFICERS

Harlan Cleveland, A.B., LL.D., D.C.L., Litt. D., President of the University
Stuart M. Brown, B.S., Ph.D., Vice-President for Academic Affairs
William W. Parsons, B.S., M.S., LL.D., Vice-President for Business Affairs
H. Brett Melendy, A.B., M.A., Ph.D., Vice-President for Community Colleges
Kenneth K. Lau, B.A., J.D., LL.M., Secretary of the University
Roy Y. Takeyama, B.S., M.S., LL.B., Secretary of Board of Regents
The University of Hawaii, the state-supported system of 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. Hawaii's physical characteristics 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 interrace relations.

The University offers course work leading to the bachelor's degree in 69 fields. The Graduate Division offers work leading toward the master's degree in 66 fields and the doctorate in 34.

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 Hawaii, Maui, and Kauai. A four-year campus and two more community colleges are planned for Oahu.

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. 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 twelve faculty members on a temporary
campus in downtown Honolulu. In 1912 the 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.

In 1964 the state legislature authorized the University 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 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's Manoa Campus is administered by seven colleges: Arts and Sciences, Business Administration, Continuing Education and Community Service, Education, Engineering, Health Sciences and Social Welfare, and Tropical Agriculture.

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, School of Social Work. The School of Library Studies is an additional professional school.

Experimental programs such as New College, Ethnic Studies, Liberal Studies and others are offered. 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 (see "University Calendar").

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 and an international relations advisory council. The Manoa Campus administration is headed by a chancellor. The chief administrative officers for other campuses are either chancellors or provosts. Various faculty senates are advisory to the chancellors, provosts, president and the board of regents.

Equal Opportunity Policy. The University of Hawaii subscribes to, and complies with, all state and federal statutes, rules and regulations and any amendments thereto, promulgated from time to time, which prohibit discrimination in its policies and practices applicable to its campuses, programs and activities.

Colors, Seal and Motto. The University of Hawaii colors are green and white. The rainbow, a frequent sight in Manoa Valley, is the 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 languages 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 on the Manoa Campus. Undergraduates: Office of Admissions and Records, Bachman Hall 125, 2444 Dole Street, Honolulu, Hawaii 96822. Graduate students: Graduate Division Office, 2540 Maile Way, Honolulu, Hawaii 96822. General studies: College of Continuing Education and Community Service, 2500 Dole Street, Honolulu, Hawaii 96822. Summer session: Summer Session Office, Room 101, 2500 Dole Street, Honolulu, Hawaii 96822.

RESEARCH AND SERVICE OPERATIONS

The Office of Research Administration was authorized by the board of regents to provide assistance to the faculty in the planning and processing of individual applications for extramural research grants and contracts; to maintain a record of all active and pending research projects; to serve as liaison for the University with the federal and private funding agencies; and to provide administrative services, general supervision, coordination and encouragement in support of individual faculty research. As the organized research centers, institutes and laboratories were authorized, many were placed for administrative purposes under the supervision of this office. Currently there are 12 organized research units coordinated by the director of research.
This office also administers extramurally sponsored fellowship and traineehip programs for graduate study; and reviews, processes and maintains current files on all extramurally supported institute and training programs.

Working closely with the University Research Council, this office supports and facilitates the research function of the University through intramural grants of state and federal funds to individual faculty members on all campuses. A program of faculty professional travel is also administered by this office in cooperation with the council.

In order to facilitate projects awarded to members of the faculty at Manoa, this office provides fiscal support by assigning a fiscal officer to assist the awardee in all fiscal and business affairs.

This office initiates and encourages interdisciplinary, university-wide application for grants such as the Sea Grant Program. Though not directly involved in the operation of cross-disciplinary activities, it often serves as a catalyst, bringing interested faculty together to discuss potential University-wide proposals for financial support.

This office serves as the liaison between the University and the Research Corporation of the University of Hawaii. The transfer of University projects to the corporation is effected through this office.

Some of the University's research and service operations are described below.

The 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.

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 University, the Center offers research training to advanced students.

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 of the center are directed at obtaining evidence to assist educators in reaching decisions on educational practices. Major programs focus upon understanding of achievement motivation, of conditions influencing educational attainment of different ethnic and socio-economic groups, of social/moral status and development, 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 are primary concerns of the center.

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 Environmental Center was established in 1970 to stimulate, expand, and coordinate education, research, and service efforts of the University related to ecological relationships, natural resources, and environmental quality, with special relation to human needs and social institutions, with particular regard to Hawaii. The center attempts to make most effective the contribution of the University to the problems of determining and maintaining optimum environmental quality. Its membership is composed of those members of the University community actively concerned with ecological and environmental problems.

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

The 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, physical oceanography, solid earth geophysics, geology, soils, geochemistry, underwater acoustics, and tsunami. The main laboratory of the institute is located at 2525 Correa Road on the campus. The institute also maintains two research vessels, a twin engine aircraft, a ship operations facility at Pier 18, Honolulu, and a seismographic observatory in upper Manoa Valley.

The Hawaii Institute of Marine Biology, established in 1948 with facilities on Coconut Island in Kaneohe Bay and at Kewalo Basin, has research programs in the marine biological sciences, including fisheries. In addition to the institute's research staff, it provides 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 aquaculture research under the Sea Grant Program.

The Industrial Relations Center, established in 1948, seeks to promote understanding of industrial relations and manpower development problems, techniques and policies. Organized to facilitate University instruction in the disciplines and professions related to industrial relations, it also serves labor, management and the community as the link in a continuing dialogue, reporting on changes in the field to enlarge understanding so that the public good is enhanced. In this endeavor the center functions through several channels, including a library containing the basic information services, as well as current publications; reference service; conferences, lectures and group discussions; and 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 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, the institute maintains an observatory for planetary and stellar studies, equipped with an 88-inch and two 24-inch telescopes. 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 office of the scientific staff, laboratories for data reduction and instrument development, and shops for instrument construction and maintenance, are located on the mauka Manoa Campus.

The Instructional Resources Service Center is staffed by instructional and media specialists. Upon request they provide assistance and consultation to faculty in examination of instructional objectives, overall strategy planning, organization of instructional media, evaluation of media 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. Services and facilities offered in support of faculty and staff are many and varied. They include the following: Twelve multi-media auditoriums on the Manoa campus and Varsity Theatre just off campus. A closed-circuit television (CCTV) system in Kuykendall Hall where videotaping can be done for instructional analysis, micro teaching and the recording of instructional demonstrations. Graphic Media Design prepares and develops a wide range of graphic materials such as transparencies for projection, scientific and technical graphs, charts and diagrams. A Media Lab has facilities for faculty media workshops, self-paced materials for learning AV equipment operation, and reference materials. The reference materials include film and other media catalogs, manufacturer's AV equipment brochures and source articles giving ideas on innovative uses of media in the instructional process. Faculty wishing to make their own transparencies and other instructional materials are invited to use the self-service facilities where equipment and materials are provided. The preview evaluation and selection of films to be added to the University's film collection is coordinated by the center which strongly encourages the cooperative involvement of faculty members.

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 at the state capitol, 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.

Thomas Hale Hamilton Library, located on the Mall near East-West Road, houses the main book, periodical and microform collections of the University of Hawaii Library. The open stacks contain approximately 730,000 volumes, including over 10,000 currently received periodicals. The library arrangement places humanities, social science and science-technology librarians near the reference materials and current period-
ics of these broad subject areas to encourage maximum use of library resources. The four-story building has space for 955 readers and an open reading lanai on the top floor. Some special research collections, listed below, will remain in the Sinclair Library building until a planned addition to Hamilton Library is completed.

**Gregg M. Sinclair Library**, located at University Avenue and Campus Road, houses the undergraduate collection of 80,000 books and periodicals. It includes the Reserve Book Room (for graduate and undergraduate courses), a browsing collection with lounge furniture, a collection of college catalogs, an "architecture alcove," a Clearinghouse for Innovative Developments in Higher Education and the Listening Center. There are seats for 2,000 readers and a 24-hour study area. Special research collections also in the Sinclair Library building are the Asia Collection, (formerly the East-West Center Library), with over 240,000 volumes and additional serials and microforms, Hawaiian and Pacific Collections, Government Documents, Rare Books and Archives.

The **Listening Center** located in room 128 on the first floor of Sinclair contains 70 carrels modified for dial-access retrieval of programmed audio-tapes, 26 carrels equipped for individual tape playback, and another 50 carrels for optional use. Additionally, within the center, students and faculty may use small-group facilities for previewing any of the media in the University Library's collection including films, filmstrips, slides, etc., as well as records and tapes.

On the ground floor of Sinclair in room 16 is the film and equipment section of **Audio-Visual Services**. Films for instructional purposes may be scheduled in advance and audio-visual equipment for classroom use may be reserved. Film showings may be arranged for classes of up to forty students in Sinclair, room 4. AV Services also maintains decentralized pools of such equipment conveniently located in eight classroom buildings on campus. This library unit will assist any department on campus in obtaining maintenance service for departmental audio-visual equipment.

The **Harold L. Lyon Arboretum** occupies 124 acres in Manoa Valley, about 2.5 miles from the Manoa Campus. The facilities include two greenhouses (5,000 square feet), office-laboratory buildings (3,400 square feet) and approximately 6,000 accessions inventoried and maintained for instruction and research in botany, biology, zoology, agriculture, phytochemistry, pharmacology and medicine. An herbarium, of approximately 2,000 specimens and reference library, is also maintained. The altitude of the arboretum ranges from 450 to 1,300 feet above sea level; the annual rainfall averages 160 inches. The Lyon Arboretum is, for the University and community, an unrivaled facility for research and instruction.

The **Pacific and Asian Linguistics Institute** plans and conducts research on the languages of Asia, the Pacific Basin and the Americas, with special attention given to previously undescribed languages. The scope of the research includes the compilation of bi-lingual dictionaries, grammatical descriptions and pedagogical materials. Computer aids are used extensively for lexical storage and retrieval and for comparative linguistic purposes.

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 guided 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 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 efforts throughout the University.

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 comparative studies, futuristic analysis, and quantitative methodology. The institute is developing new programs in Hawaii community studies, political leadership, automation and society, comparative legislative studies, and multi-disciplinary seminars. A program for the study of contemporary Korea is being assisted by the institute. 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 institute provides a variety of support services to social science faculty including computer consultation, manuscript typing, distribution of working papers and publications, information on social science research and grant assistance.

The **Social Welfare Development and Research Center**, located in the School of Social Work provides interdisciplinary continuing education, consultation, and research in social welfare, with special emphasis on problems of juvenile delinquency and youth development. It utilizes an educational model which treats planning, training and program evaluation as a part of a single interrelated process. The focus is primarily on new and innovative approaches and techniques.

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** is a laboratory which includes pan-Pacific educational communications via satellite, an audio-media communications workshop, and an interpersonal communication research facility. The center is used by faculty and students in communication and related areas for research, researcher training and instruction.

The **Survey Research Office** (formerly the Institutional Research Office) is responsible for providing survey technical facilities to campus researchers and for utilizing those facilities in generating and reporting data required for the planning, administration, and evaluation of the University system. Survey facilities include consultation on study design, questionnaire construction, sampling, data-collection, data-processing, analysis, and reporting. A data archive is maintained for purposes of secondary analysis. Faculty-course evaluations are offered to interested faculty members.

The **University Press of Hawaii** is a new publishing operation, the outcome of a merger of the lists and staffs of the University of Hawaii Press and the East-West Center Press. The new organization maintains the commitment of the two former presses to publish quality works in the areas of Pacific and Asian scholarship. All titles published carry the imprint "The University Press of Hawaii." Titles published for the East-West Center also carry the subimprint "An East-West Center Book."

The Press functions in much the same way as any other publishing house, although unlike commercial publishing firms, it operates on a nonprofit basis and the emphasis is on scholarly publication. It is a member of the Association of American University Presses and the Association of American Publishers. Books of general interest as well as scholarly monographs, and four scholarly journals, Asian Perspectives, Oceanic Linguistics, Pacific Science, and Philosophy East and West, are published.

Editorial control (final selection of manuscripts) is vested in a board made up of University of Hawaii faculty members appointed by the president. Faculty members are encouraged to submit book-length manuscripts to the director. Journal papers should be submitted to the respective editors.

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** plans and conducts research of both basic and practical nature related to Hawaii's water resources, assists and promotes instruction in water resources in several academic departments, and provides for training opportunities of engineers and scientists through research. Research is interdisciplinary with a broad base of physical sci-
ences, 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 operates research laboratories and field research facilities.

INTERNATIONAL PROGRAMS

The international relations of the University are coordinated by the president. The All-University Advisory Council on the International Relations of the University of Hawaii provides for information exchange, cooperation and coordination among the units of the University. As necessary the Advisory Council provides reports and policy advice to the University community.

Currently more than 200 of the University’s programs have an international dimension. The University of Hawaii ranks fourth nationally in number of foreign scholars and eleventh in foreign student enrollment.

The University also provides an academic house for the only nationally funded Center for Cultural and Technical Interchange Between East and West: the East-West Center, with institutes devoted to the study of communications, culture learning, food, population, and technology and development.

COOPERATING INSTITUTIONS

Through cooperative agreements with institutions listed below, the University has increased its research facilities and expanded its services to the state. 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 Experimental Farm near Hilo. The laboratory cooperates with the department of entomology, and other University and state agencies.

The Hawaiian Sugar Planters’ Association provided, jointly with the Pineapple Research Institute, funds for building the Agricultural Engineering Institute shop facilities for instruction and research. The association donated its Experiment Station arboretum—the renowned Lyon Arboretum—to the University. A dense botanical tree garden maintained by the HSPA since 1919, the arboretum is now used as an experimental laboratory by the UH botany department. HSPA has provided grants to the departments of agronomy and soils, and plant pathology. It has supported a graduate fellowship in entomology. HSPA Experiment Station staff scientists and engineers serve as members of the affiliate graduate faculty, supervise graduate students in research, and work on joint research projects with the University.

The Honolulu Academy of Arts features a world-renowned collection of Asian art treasures as well as outstanding Occidental holdings. The permanent collections are augmented by a diversified schedule of temporary exhibitions from world-wide sources and a research library for members, scholars and students. The Academy’s extension for Japanese decorative arts, Spalding House and gardens provide the setting for lectures, programs, demonstrations and a center for exhibition and study of Ukiyo-e woodblock prints.

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 staff of scientists on the affiliate graduate faculty of the University. Offices and laboratories are located on a 150-acre experimental farm near Wahiawa, Oahu.

The Honolulu Laboratory of the National Marine Fisheries Service, NOAA, U.S. Department of Commerce, 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, Honolulu Laboratory, National Marine Fisheries Service, P.O. Box 3830, Honolulu, Hawaii 96812.

The Hawaii Volcano Observatory, U.S. Geological Survey, located at Kilauea Crater on the island of Hawaii, conducts research relating to the volcanoes of the islands. 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, except for the application fee.

Application Fee*

All applicants pay a $10.00 application fee for each application filed.

This fee is applicable to the following categories of applicants as well:

Returnees. Students who leave the University of Hawaii and are out for at least two consecutive semesters (not counting summer session) pay the $10.00 fee when they apply for readmission. The following categories of students are exempt: (a) students who are out for one semester only, (b) any Ph.D. or master's degree candidate returning to register for Thesis 800 only, (c) EWC students returning from field study tours, (d) students returning from military leave, (e) school teachers with the State of Hawaii Department of Education who are degree candidates who attend summer sessions only.

Renewals. Newly admitted students who are no-shows or who completely withdraw from courses within that first semester of enrollment pay the $10.00 fee if they apply for readmission after a lapse of two or more consecutive semesters, not counting summer session. Students applying for readmission after a lapse of only one semester are exempt from this fee.

Students who apply for changes in fields of study. Students who apply for changes in fields of study pay $10.00 for each application filed.

Reconsiderations. Students who have been denied admission by the Graduate Division and/or the Graduate Field of Study pay the fee for each reconsideration requested.

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. Non-residents pay $30.00 per credit hour.

Students registered in the College of Continuing Education and Summer Session pay $20.00 per credit hour. Nonresidents pay $30.00 per credit hour.

Advance Partial Tuition Payment

New nonresident students pay $90.00; all other students, including continuing and returning nonresidents, $27.00. This deposit is nontransferable (applicable only for the semester for which the deposit is made) and nonrefundable (may not be refunded if the student fails to register for the semester for which the deposit is made).

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. One-half time graduate assistants who, with special permission from the Graduate Dean, are permitted to register for 12 credits, including audit, must pay the general fee.

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.

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.

Payment for all fees except the application fee 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 nonrefundable, 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.

*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 nonrefundable, and does not carry credit toward tuition in the University.
ASSISTANTSHIPS 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 part-time teaching or technical assistants and carry a program of study usually limited to a maximum of nine hours a semester. The initial remuneration is $3,708 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 be filed before February 1. Each application must be accompanied by three letters of recommendation from former professors or employers.

Research Assistantships. One-half time research assistantships are available in various 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. 18 for details.

Fellowships and Traineeships. The Graduate Student Programs Office of the Graduate Division has available general information on fellowship competitions open to graduate students which are administered by outside foundations or agencies. For application purposes, it is important to distinguish between (1) those awards made directly by the sponsoring agency to individual students, and (2) those awards made by the sponsoring agency to an institution to be awarded, in turn, to students for study at that specific institution.

Awards in the first category are generally awarded by national organizations and allow students to choose their institution of affiliation. Applications are submitted by students to the sponsor, usually in early fall preceding the year graduate study is to begin. Examples listed here with their addresses include:

- National Science Foundation
  National Research Council
  2101 Constitution Avenue
  Washington, D.C. 20418
- HUD Urban Studies Fellowships
  U.S. Department of Housing and Urban Development
  Washington, D.C. 20410

Awards in the second category, which vary in source from federal to local, include NDFL Fellowships in Asian Studies and EPDA, Part E Fellowships for Prospective Community College Teachers, as well as a large number of smaller programs. At the University of Hawaii nominations for these awards are made by the departments that are eligible. Students are urged to exercise their initiative to explore the various possibilities. In any case, the first place to inquire is your major department.

FINANCIAL AIDS

The University of Hawaii subscribes to the College Scholarship Service (CSS) system of financial need analysis and utilizes the CSS inventory of forms. Students who wish to be considered for any of the types of financial assistance outlined below should submit the appropriate CSS form to the nearest address indicated on the form itself. Acceptable CSS forms are the Parents’ Confidential Statement for students dependent upon their parents for educational costs; the Student’s Financial Statement for students completely independent of parental support. Applications should be submitted so as to arrive at the appropriate CSS office by March 1 in order to be considered for the following academic year. The CSS forms may be secured from most high schools and community colleges or from the Financial Aids Office, University of Hawaii, Manoa Campus.

The University participates in the National Defense Student Loan, the College Work-Study, the Health Profession Loan/Scholarship, the Nursing Student Loan/Scholarship, and the Federally Insured/Guaranteed Loan programs. Applicants for the latter program who are not residents of Hawaii should contact the State Guarantee Agency in the state of legal residence for details. In addition, the State Higher Education Loan program is available for residents of Hawaii who are full-time students.

Another form of financial aid available to students is employment. The financial aids office performs the functions of an employment agency for on-campus student jobs and serves as an information center for off-campus employment opportunities.

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 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.

Inquiries concerning student housing should be directed to the Student Housing Office, Johnson Hall A, 2555 Dole Street, Honolulu, Hawaii 96822.
Application-contracts must be accompanied by a $25.00 deposit before consideration for space reservation can be made. Room and board fee is $441.00 per semester.

Off-Campus Housing
The student who chooses not to live in University residence halls should be prepared to make temporary housing arrangements in hotels or other quarters, in advance if possible, and to keep in mind that rental rates can quickly use up personal funds. He must use all possible means to locate suitable housing, including newspapers, rental agencies, and personal or professional contacts in the community or other sources open to him. There is no place on campus to which luggage or mail may be forwarded ahead of arrival.

The housing office offers a free central listing service and maintains listings of rooms in private homes, a few apartments, houses and room-and-board situations. However, these listings are very limited and quickly exhausted. Moreover, contacts with these off-campus landlords must be made directly by the student. Because of the rapid turnover the names of landlords cannot be sent through the mail. The rush for housing usually starts about three weeks prior to the beginning of classes. The general housing picture is one of extreme shortage; this means expense and difficulty in locating suitable accommodations.

Food Services
Gateway House Cafeteria. Open to the general campus for lunch only.
Aloha Cafeteria. Primarily for residents of Hale Aloha; guests can be accommodated at special guest rates.
Hemenway Hall Cafeteria. Plate lunches, sandwiches and snacks are served.

East-West Center Cafeteria. A complete food service in Jefferson Hall, including a cafeteria, a snack bar and private dining rooms.
Snack Bar. Lunches and snacks.
Food vending machines, providing 24-hour service, are located throughout the campus.

Expenses
Minimum expenses per academic year are estimated to be approximately $2,365 for students living in off-campus housing; $1,970 for students living at a University residence hall; $1,493 for a student living at home. These estimates do not include the costs related to dependents, transportation for out-of-state students, extensive medical/dental care or the tuition differential for nonresident students. They do include costs for board, room, resident tuition, books, supplies, fees other than those related to curricula, clothing, recreation and personal/miscellaneous.

STUDENT SERVICES
Student Health Service
The Student Health Service is set up to assist the student in protecting his health. The Student Health Service building is located at 1710 East-West Road and include both an outpatient 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 is open from 8:00 a.m. to 4:30 p.m., Monday through Friday; and 9:00 a.m. to 11:00 a.m. on Saturday. Physicians are present at the clinic from 8:30 a.m. to 11:45 a.m. and 12:30
p.m. to 4:15 p.m., Monday through Friday; and 9:00 a.m. to 11:00 a.m. on Saturday. 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 of $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. The health service strongly endorses the ASUH sponsored health plan, the cost and benefits being far superior to most other commonly available health insurance plans open to student subscribers. Consult the Bureau of Student Activities or the health service for further information.

The University requires that all newly registered daytime students undergo a complete medical examination, and the results of this evaluation must be submitted to the 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 hazard for all students. All students must have a TB skin test or chest x-ray performed six months prior to enrollment. Positive reactors of the skin test must follow up with a chest x-ray taken immediately and annually thereafter.

All foreign students will be skin tested upon arrival on campus. Positive reactors will be required to have a chest x-ray taken in Hawaii. An annual chest x-ray is also required by the state of Hawaii of all students applying for visa renewals.

Residents of University housing must obtain a medical clearance from the 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, 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.

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 regula-

tions 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 attending the University 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.

Non-U.S. citizens who are university graduates should apply for admission to the University of Hawaii by writing to: Graduate Division Admissions Office, University of Hawaii, 2540 Maile Way, Honolulu, Hawaii 96822.

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 or 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, or New Zealand;
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. Such students may be eligible for H.E.L.P. (Hawaii English Language Program); for information about which, write to H.E.L.P., College of Continuing Education and Community Service, University of Hawaii, 2500 Dole Street, Honolulu, Hawaii 96822.

EAST-WEST CENTER

The East-West Center is an international educational institution established in Hawaii by the United States Congress in 1960. Formally known as the "Center for Cultural and Technical Interchange Between East and West," the institution brings men and women together from Asia, the Pacific area and the United States to exchange ideas in a variety of cooperative programs of study, training and research.

The federally-funded East-West Center is administered by the University of Hawaii board of regents to further the broad national goal of fostering better relations and mutual understanding among the peoples of the area. Each year nearly 2,000 degree students, midcareer professionals seeking further knowledge and skills in short-term projects, and research-oriented senior fellows and fellows study, work and confer together in East-West Center programs. They are supported by annual grant appropriations from the Congress, supplemented in some fields by cost-sharing contributions from Asian/Pacific governments, regional agencies and private foundations.

Academic instruction is provided for degree students, predominantly at the graduate level, by the University of Hawaii. Degrees are awarded by the University. Some East-West Center program staff members hold joint faculty appointments with the University. Professional study and training programs and research are directed by Center staff members. Fundamental to Center goals is the interchange of information, ideas and beliefs in an atmosphere of academic freedom. The Center's multinational staff, in association with the University of Hawaii, provides the basis for growing cooperative arrangements with universities and other institutions in Asia, the Pacific area and the United States mainland. Center programs combine theory and practice in providing present and future leaders the opportunity for dealing with mutual problems. The Center offers other opportunities, including field education, which extend beyond formal course work. Academic degree study, research and professional study and training are integrated in problem-oriented institutes whose programs foster deeper intercultural understanding.

Problem-Oriented Programs

The East-West Communication Institute provides graduate students, scholars and professionals in various fields of communication with the opportunity to work together in programs of education, research and training. Broadly seeking insights into the processes of sharing knowledge across cultural frontiers, the institute is directly concerned with helping build and strengthen mass media and other communication systems essential to social and economic change and development in the United States, Asia and the Pacific area. In addition to those with prime interest in communication studies, more generalized students and scholars in the social sciences and humanities can find appropriate areas for study and research emphasizing cross-cultural communication. Scholarships for M.A.
and Ph.D. studies are awarded through the institute in such disciplines as Asian studies, American studies, anthropology, design, educational communications, educational psychology, library studies, Pacific islands studies, political science, psychology, sociology, speech communication and related fields. In addition to their degree work, students are expected to become knowledgeable in communication research and theory, and to develop media skills in the use of communication in development programs. Students also participate with senior scholars and professional practitioners in institute-directed research, seminars, workshops and training projects. Jefferson Fellowships are awarded annually to mid-career Asian/Pacific and American journalists in print and broadcast media for a semester of non-credit study at the University of Hawaii in fields relating to developmental communication. They also participate in a wide range of professionally-related activities, including an observation tour of the U.S. mainland. The institute, under a grant from the Agency for International Development, is carrying out a three-year inventory/analysis study of information, education and communication support for family and population planning programs, as well as training and research in these fields. Other communication resource material is collected for use of students and scholars, as well as for dissemination to other institutions through such means as a newsletter, microfiche, bibliographies, abstracts, summary translations, etc.

The East-West Culture Learning Institute seeks deeper insight into cultural interchange by systematic study and analysis of characteristic features shared by people in various societies. The institute’s scholarly and practical training interests range from a society’s humanistic and artistic achievements to material things such as styles of clothing; from patterns of behavior such as the way men talk and act to their religious and philosophical beliefs. Graduate students seeking the M.A. and Ph.D. degrees work with staff, senior fellows and professional study participants on research projects relevant to culture and language learning. In degree study, heaviest concentrations are in such areas as psychology, Asian studies, linguistics and English as a second language. Other disciplines represented include American studies, anthropology, art, drama and theater, East Asian languages, educational administration, educational foundations, educational psychology, English, geography, history, music, Pacific islands studies, philosophy, political science, public health, social work, sociology and speech communications.

The East-West Food Institute deals with an integrated interpretation of the human, technical and economic concerns with food. Research, education and training programs are related to the efficient and profitable production of commodities from land and sea resources; the evaluation and improvement of nutritional quality; techniques of processing, preservation and distribution; and preparation for effective utilization. Programs also deal with economic, social and political policies, cultural values, institutions, and population characteristics related to food from production to consumption. Scholarships for post-graduate study at the master’s and doctoral degree levels are awarded through the institute for students in the fields of agriculture, fisheries, nutrition, food technology and economic analysis, as well as the humanities and other natural and social sciences that touch on food-related problems. Institute students, in addition to their primary course requirements, are expected to take at least one course in the tropical application of a food-related discipline; take a course in “Agriculture and Rural Development Administration”; and participate in at least one semester of the institute’s seminar “The Food Systems of Asia and the Pacific,” a four-semester cycle focusing, in turn, on Southeast Asia, East Asia, South Asia and the Pacific. Students also have the opportunity to join with staff, fellows and professional study participants in “task force” groups dealing with specific problems, insofar as is appropriate to their degree program and career objectives. Research areas given priority include agricultural diversification and multiple cropping, systems of crop protection, food quality, planning and implementation of food-related programs and policies, and application of the “systems” concepts to modernization problems in fields related to food.

The East-West Population Institute, in aiming to contribute to the understanding and solution of population problems, conducts a broad research program, promotes graduate study in its field, organizes a variety of professional study and training projects, and engages in technical cooperation with sister institutions in Asia, the Pacific area and the U.S. mainland. The institute awards East-West Center scholarships to students seeking advanced degrees from the University of Hawaii in various disciplines closely related to population studies. M.A. and Ph.D. degree awards are offered in the College of Arts and Sciences for an interdisciplinary Population Studies Program, involving cooperation of several departments. The aim is to provide opportunities for graduate students to acquire an understanding of demographic structures and processes, and a competence in aspects of population related to their particular discipline and professional orientation. Course offerings include demographic analysis, ecological anthropology, communication, manpower economics, economics of population growth, population geography and rural and urban sociology. M.P.H. and M.S. degree study awards are offered in the School of Public Health involving population and family planning studies, biostatistics, maternal and child health, world population problems, fertility and reproduction, vital and health statistics, techniques of demographic analysis. The institute complements formal graduate training in three ways: by providing more intensive advisory and technical services to students, by involving them in research seminars, and guiding them in field education. 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 individual basis. As faculty members teaching University courses in population often hold joint
appointments with the institute, a close day-to-day contact is maintained. 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 library and research facilities in Asian and Pacific studies. Research directed by institute staff focuses on two main areas: analyses of the causes and consequences of population change, and on the field of demography proper, with emphasis on studies of population change and composition in Asia and the Pacific. The institute maintains a specialized collection of books and reference materials, and engages in certain service-related activities.

East-West Technology and Development Institute programs seek to increase understanding of development as a whole, with special emphasis on the interaction and respective roles of men, institutions and technology as economic growth and national development proceeds in both East and West. An added dimension to conventional university education and technical training is provided by involving graduate students, senior scholars, technologists and administrators in integrated development planning on a multinational, multidisciplinary level. Special interest is given to fostering the entrepreneurial role in development by working on problems of organization and management of private and public enterprises. The institute is concerned not only with engineering research to adapt existing technologies and to create new technologies more appropriate to the requirements of both East and West, but also with economic, political, cultural and psychological factors which affect the adoption of new ideas, and with the impact of rapid technical change on the development process as a whole. Advanced degree scholarships are awarded not only in technically-oriented engineering studies, but also in such development-oriented fields as economics, business administration, sociology, political science, urban and rural planning, and the ocean and geosciences. Graduate students are offered the opportunity to become involved in various aspects of training programs. In an effort to increase the sensitivity of technologists to economic and cultural factors, engineering students are encouraged to enroll in at least one social science course in development or development planning. The institute sponsors a research seminar which—because of the multidisciplinary, multinational composition of its staff, senior fellows and students—exposes all participants to a wide variety of approaches and perspectives relating to the problems of technology and development.

Open Grants

A limited number of grants are offered each year for degree study, as well as awards for senior fellows and fellows, in academic fields not directly related to the problem-oriented programs. The Open Grants provide the East-West Center with flexibility for accomplishing its goals and meeting requirements for equitable geographic distribution of participants. Students are selected in a wide range of disciplines, primarily at the graduate level. A few grants are made for undergraduates from countries in Asia and the Pacific to meet specific objectives. Open Grants students meet the high standards required of all Center participants, including a demonstrated interest in cross-cultural study. While formal coursework and degrees are taken at the University of Hawaii, students are provided the opportunity for participation in various Center activities and informal seminars with senior fellows on open grants. Study themes are selected from year to year for these informal seminars designed to involve fellows and students more deeply in the search for mutual understanding than is normally afforded in formal course work. One theme for 1972-73 is "Alternative Futures," in which students and fellows may explore the perplexing problems brought about by rapidly changing societies and the alternatives which may be available to us.

Scholarships and Grants

Degree scholarships for study at the University of Hawaii and participation in Center-sponsored programs generally include round-trip air fare from the student's home, housing in Center residence halls, tuition and books, medical insurance and a modest stipend for food and incidental expenses. The Center is not able to provide transportation or support for dependents. If the student meets Center requirements, a grant may provide for field education in Asia, the Pacific area or the United States mainland for periods ranging up to eight months for M.A. students and fifteen months for Ph.D. students. Candidates for degrees must provide evidence of professional interest in the Center program of their choice, meet the high academic standards of the University of Hawaii, and at the same time demonstrate interest and potential for contributing to intercultural communication. The Center grantee assumes an obligation to help advance the broader cultural aims of the Center, not only in its academic aspects but also in its day-to-day programs of interchange, both formal and informal. Scholarships for study at the master's degree level are generally awarded for 17 months, if the student begins in September, and for 19 months for those beginning in June. A small number of doctoral study grants are made for 36 months to highly promising individuals who normally must hold an M.A. degree. All degree programs for Americans are at the graduate level. Some undergraduate scholarships are awarded for students from some areas in Asia and the Pacific to meet specific objectives.

Senior Fellows and Fellows are scholars and authorities in fields relevant to institute programs and Center goals who are invited to the Center for participation in research and intercultural activities. Grants are usually awarded for periods ranging from four to twelve months. Senior fellows are scholars and officials who are distinguished and recognized for past professional contributions in their fields. Fellows are outstanding individuals still in early phases of their careers.
Professional Study and Training grants are made for nondegree participants in a wide variety of projects directed by the institutes, usually on a cost-sharing basis with cooperating institutions or agencies. Ordinarily participants are nominated by the cosponsoring agency and selections made by the East-West Center. Project periods generally vary in length from one month to one year. Housing, living expenses and training costs are provided on the same general basis as provided for academic student grants. Transportation to and from Hawaii is usually provided by the cosponsoring organization or the Center, depending upon the terms of the project.

Language Requirements. Competence in English is essential because Center program activities and University instruction are conducted in English. Applicants whose first language is not English must take the Test of English as a Foreign Language (TOEFL) as part of the selection requirement. On arrival, students may be assigned special course work at the University's English Language Institute. In some cases, foreign students may spend their entire first summer session or first semester exclusively on the study of English so that they may attain the proficiency needed to pursue their chosen fields of study. Foreign applicants who are exempt from the TOEFL examination are: (a) native speakers of English from Australia, Britain, Canada or New Zealand; (b) students who have received a bachelor's degree from an accredited American, Australian, British, Canadian or New Zealand university/college. All native speakers of English are required to take an Asian or Pacific language appropriate to their areas of interest and must maintain a 3.0 or "B" level of performance throughout the grant period.

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 fellows and fellows and technical trainees—are designed to develop intercultural understanding recognized as one of the basic goals of the Center.

Supporting Services. Supporting services fall into three categories: Administration, Public Affairs and Participant Services. The Office of Administration deals with all financial support for Center participants and programs, while the Office of Public Affairs disseminates information on Center programs and activities.

The Office of Participant Services administers international meetings of senior level experts, through the Conference and Seminars Office, dealing with problems of mutual concern to East and West, with emphasis on those involving Center programs.

It also coordinates intercultural activities and deals with admissions, counseling and liaison with former participants. It is responsible for Community Relations, primarily through the Friends of the East-West Center, a voluntary organization of Hawaii residents which helps Center participants join in community activities.

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, cafeteria, conference rooms and the exhibition gallery; Abraham Lincoln Hall, which houses the problem-oriented institutes; 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.
(The following regulations and procedures governing admission to the Graduate Division at the University of Hawaii are subject to change without prior notice. Prospective students should always consult the most current catalog before applying for admission.)

ADMISSION

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 a U.S. 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 a decision is reached on 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.

Application.* Applications for admission may be obtained in person or by mail from the Graduate Division Admissions Office, Spalding 352-A, University of Hawaii, 2540 Maile Way, Honolulu, Hawaii 96822, or from departmental offices. All applicants should write to the department in which they wish to study for a graduate program brochure.

Unless he has a distinguished overall academic record at the conclusion of his junior (third) year, an undergraduate applicant should apply after completion of at least the first semester or first quarter of his senior (last and final) year. Such students are advised to heed the early deadlines for the various examinations required for admission. Arrangements for taking the TOEFL, GRE, ATGSB, etc., should be made well in advance of the application deadlines.

If yearly examination results or grade reports are not available, and where the student's performance is rated only after he passes the final examination (i.e., first class honours, second class honours, upper division, etc.), the student should apply after he completes his degree. This applies to applicants from British universities, some Australian universities, the University of Hong Kong, Nanyang University, University of Singapore, to name a few. Students from the University of Malaya should apply after completion of their bachelor's degree even though they are able to present grades prior to the final examination.

Admission for classified graduate status is limited to the fall and spring semesters. In-state teachers who plan to work toward their M.Ed. degrees by attending summer sessions only should consult the Graduate Division Admissions Office for information about application procedures.

Deadlines. Applications for admission to the Graduate Division are accepted from November 1 to March 1 for the fall semester, from May 1 to September 1 for the spring semester. The application, transcripts, test scores (if required), and other supporting documents should be sent to the Graduate Division Admissions Office and postmarked no later than March 1 for the fall semester, September 1 for the spring semester.

Academic Information

*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.
Application Requirements. Students applying for admission to the Graduate Division must submit the following:

Graduates of U.S. Universities:
1. Application form.
2. Transcripts (two official copies) from each institution attended.
3. $10 application fee.
4. Application fee form.
5. Residence information form (for tuition purposes).
6. Records of examinations (GRE, MAT, etc.) as required by certain fields (see special requirements under field listings).
7. Letters of recommendation as required by certain fields.

Nontraditional grading
If all or more than 25% of a student’s undergraduate course work has been graded under a nontraditional grading system (i.e., pass/fail, credit/no credit, S/U, etc.):
1. the transcripts must be accompanied by official course performance reports (2 copies each of transcripts and performance reports).
2. the applicant must take the aptitude test of the Graduate Record Examination and submit the results to the department to which he is applying.

Graduates of Foreign Universities (non-U.S.):
1. Application form.
2. Transcripts (two official copies) from each institution attended.
3. $10 application fee.
4. Application fee form.
5. Residence Information form (for tuition purposes).
6. Records of examinations (GRE, MAT, ATGSB, etc.) as required by departments (see special requirements under field listings).
7. Letters of recommendation as required by certain fields.
8. 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 scores over two years old are not acceptable. TOEFL is administered only four times each year. Applicants should plan to take TOEFL at the following times:

For admission in: The test must be taken on:

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. Students who wish to take TOEFL in Hong Kong, India, Nepal, or Taiwan should obtain the appropriate editions of the TOEFL Bulletin of Information at the addresses given below:

In Hong Kong:
Education Department
Examinations Section
Canton Road Government Offices
393, Canton Road, 11th Floor
Kowloon, Hong Kong

In India and Nepal:
Test of English as a Foreign Language
Bureau of Educational Research
Ewing Christian College
Allahabad 3, U.P., India

In Taiwan:
Language Center
2-1, Hsu-chow Road
Taipei, Taiwan (100)
Republic of China

Students who wish to take TOEFL in any country except Hong Kong, India, Nepal, or Taiwan should obtain the TOEFL Bulletin of Information for Candidates, International Edition. Copies of this Bulletin and the Registration Form may be obtained in a number of cities outside the United States. They are generally available at American embassies and consulates, the United States Information Service (USIS), United States educational commissions and foundations abroad, and binational centers. In addition, several private organizations distribute TOEFL Bulletins, among them (1) the Institute of International Education (IIE) in Nairobi, Kenya; Paris, France; and Lima, Peru; (2) the African-American Institute (AAI) in Dar es Salaam, Tanzania; and Lagos, Nigeria; (3) the American Friends of the Middle East (AFME) in Tehran, Iran; Amman, Jordan; Beirut, Lebanon; Tangier, Morocco; and Cairo, Egypt; and (4) the American-Korean Foundation in Seoul, Korea.

*See p. 16 for information relating to the University’s English Language Institute, and its role in testing and evaluating the English proficiency of foreign students.
Students who cannot obtain locally a TOEFL Bulletin of Information for Candidates, International Edition and Registration Form should write for them well in advance to:

Test of English as a Foreign Language
Box 899
Princeton, New Jersey, U.S.A. 08540

Please do not write to the University of Hawaii for information on TOEFL.

ENTRANCE EXAMINATIONS

As a service to in-state students, application forms for the GRE and ATGSB are usually available at the Counseling and Testing Center. University of Hawaii, 1615 East-West Road (subject to relocation), Honolulu, Hawaii 96822. 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. The Graduate Division requires the aptitude test of the GRE of all students who have done their undergraduate work under a nontraditional grading system. For requirements of the individual graduate fields of study, consult the relevant field-of-study descriptions in this catalog. Students taking the test must submit completed registration forms and test fees to the Educational Testing Service at least one month prior to the examination date. Applicants may request forms directly by writing to Graduate Record Examinations, Educational Testing Service, Box 1502, Berkeley, California 94701; 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 will be administered in January, February (U.S. only), April, June, October, and December. ETS should be directed to forward the test results directly to the department to which the student is applying for admission. GRE scores over five years old are not acceptable.

The Educational Testing Service offers special administrations of the GRE in a few major cities in the U.S. for students who are unable to take the examinations on the regular testing dates. The student should check with the testing center at his university or in his city for information about this. The GRE may be taken twice in one year under this special program—once during the period from October through March and once from April through September. Although repeating a test is restricted in the Specials, a student may register again at any time for a regular GRE administration. There is an additional charge of $5.00 above the regular test fees for registering at a Special center.

In-state students taking the test at the University of Hawaii should submit the registration forms and test fees directly to the Counseling and Testing Center, University of Hawaii, 1615 East-West Road, Honolulu, Hawaii 96822, in advance of the test date. Forms are available at the Counseling and Testing Center. In Hawaii, the tests will be administered on November 7 and 8, 1972; March 6 and 7, 1973; August 7 and 8, 1973; and September 11 and 12, 1973, during the afternoons.

The following testing deadlines must be observed if the GRE is required for admission:

For Spring 1973: Test must be taken
No later than June 1972.

For Fall 1973: Test must be taken
No later than January 1973 (outside of U.S.);
February 1973 (U.S. only).

The Advanced Test of the GRE is not given in February.

Admission Test for Graduate Study in Business (ATGSB). The ATGSB is required of every applicant for admission to the MBA program in business administration. The test is given five times a year—in November, February, April, June, and August—in the United States, Canada, the West Indies, and the Canal Zone. In foreign centers, the test is administered in November, February, and April.

In-state students may obtain the Bulletin of Information and registration forms from the MBA Office, College of Business Administration, or the Counseling and Testing Center, University of Hawaii, 1615 East-West Road, Honolulu, Hawaii 96822. Out-of-state students should write directly to ATGSB, Educational Testing Service, Box 966, Princeton, New Jersey 08540, for registration forms. The completed registration forms and test fees must be submitted to the Educational Testing Service at least one month prior to the examination date. Results of the test should be sent, at the applicant's request, to the MBA Office, College of Business Administration.

Since applications are not processed if the ATGSB is not taken on time, the following testing deadlines should be strictly adhered to:

For Spring 1973: Test must be taken
No later than August 1972
(Applicants from U.S., Canada, West Indies, and the Canal Zone).
No later than April 1972
(All others taking the test at foreign centers).

For Fall 1973: Test must be taken
No later than February 1973.

Miller Analogies Test (MAT). In-state students who are required to take the MAT should contact the Counseling and Testing Center for specific test dates. The MAT is usually administered once a month. There is no need for preregistration. A fee of $5.00 is charged to University of Hawaii students, and $7.00 to non-students. Actual testing time is 50 minutes. 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.
CHANGE IN FIELD OF STUDY

A newly admitted student who wishes to change his field of study may apply for a change for the following semester but he may do so no earlier than six weeks after he registers. All students applying for a change in field must file the necessary form with a $10 application fee no later than April 1 for the fall semester, November 15 for the spring semester. The form is available at the Graduate Division Admissions Office, Spalding 352-A.

The new field will review the student's application for a change along with new applications for the semester in question. Previous acceptance by a field of study does not guarantee acceptance by another field.

CLASSIFICATION OF STUDENTS

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

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

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

Special students are those who have been admitted to special sponsored nondegree training programs or certificate programs.

SUMMER SESSION

Students applying for admission to the summer session should apply to: Director of Admissions and Records, University of Hawaii, 2444 Dole St., Honolulu, Hawaii 96822. Applications for advanced degree programs are accepted for the fall and spring semesters only. Admission to summer session courses does not imply or guarantee eventual admission to the Graduate Division. However, appropriate credits from summer session courses are countable toward an advanced degree at the recommendation of the fields of study involved.

UNCLASSIFIED STUDENTS

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

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 postbachelor 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.

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. Registration will be cancelled for those who fail to meet this requirement.

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 two weeks following regular registration. See Calendar, "Last day to register for credit."

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 "v" 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.

To withdraw from all courses, a student must obtain a complete withdrawal form from the office of admissions and records, Bachman 125, obtain the necessary signatures as indicated on the form, and turn in the completed form to the treasury office, Bachman 110.

A student wishing to withdraw from a course must do so by the deadlines specified in the calendar (Friday, September 22, for the fall semester; Friday, February 9, for the spring 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 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, the instructor may award any one of the following final grades: A, B, C, D, or F.

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 of 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.

Credit... 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 nonlaboratory 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, CR, NC, 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 but only grades of A, B, and C, may be used to fulfill requirements for advanced degrees.

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. (See calendar for specific dates.) When the instructor records a grade of I on the final grade card, he must also record the grade which will replace the I 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). This alternate grade may be any one of the following: A, B, C, D, F, or, if the course was taken under Credit-No Credit, CR or NC. 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, NC or CR have been recorded are not included in the computation of ratios.

Grade Reports. Grade reports are sent to students through the mail by the Admissions and Records Office, Bachman 125, at the end of each semester and summer session.

CREDIT—NO CREDIT OPTION (formerly Pass-Fail Option)

The major purpose of the Credit-No Credit 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 CR (Credit) or NC (No Credit). These do not carry grade points, therefore are not computed in the student’s grade-point ratio.

The Credit-No Credit Option must be exercised by November 16 for the fall semester and April 3 for the spring semester, and only under the following conditions:

1. Except as noted, courses taken under the CR/NC option may not be applied toward the requirements for the master’s degree. Only 699/799 directed reading/research courses may be taken on CR/NC 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 (two credits in Plan A thesis programs).
2. A course for which a grade of NC is received may be retaken under the CR/NC option, or under the regular letter-grade system.
3. The CR designation in the non-letter grade system denotes D-caliber work or better (at the graduate level, C or better).
4. The NC designation and the course in which it is received will appear in official records as part of the student’s academic history.

5. The NC designation affects neither the credit hours total nor the grade-point total of the student.
6. The CR designation assumes all functions and meanings of the former P (Pass) designation.

REQUIREMENTS FOR CONTINUED REGISTRATION

To remain eligible for further graduate work and to be awarded a graduate degree, a student must have a B average (3.0 grade-point ratio) for all courses numbered 300-499 and 600-799 (300-799 for MBA candidates). Furthermore, he must also have a B average for all graduate courses (i.e., courses numbered 600 and above).

The Graduate Division will disregard grades for courses numbered 100-299 and 500-599 (except for 500-599 courses in Business Administration) in arriving at these grade-point ratios.

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 Credit-No Credit Option. Grades of CR 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 NC taken under the Credit-No Credit Option are not 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 a 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.

A student whose cumulative grade-point ratio fails to meet the minimum requirements after completing at least 12 credits and two or more semesters of course work will be placed on academic probation for the following semester for the duration of that semester.

All grades for courses taken during the probationary semester, as well as for all previous semesters, will be included in calculating the grade-point ratio at the end of the probationary semester. No extensions of the probationary semester may be granted due to Incompletes (I).

A student on probation who fails to attain the minimum standards at the end of the probationary semester will be denied further registration in the Graduate Division.

A student whose academic record falls below the required minimum at any time following one academic probationary semester is not eligible for an additional probationary semester.

A student not working for a graduate degree, certificate, or diploma must have a minimum grade-point ratio of 2.5 upon completion of 12 credits or more.
A student 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.

In special cases, two grades below B in undergraduate (300-499) courses taken during the first semester as a graduate student at the University of Hawaii may be excluded when the Graduate Division computes the grade-point ratio if a petition, filed by the student and recommended for approval by the chairman of the graduate faculty, is approved by the dean. If these grades are so excluded, the concomitant course credits may not be counted toward fulfillment of requirements for graduate degrees. Any such waiver will not alter the official University record of student grades and grade-point ratios.

**DIPLOMAS**

An application for a diploma must be filed at the beginning of the semester in which the student expects to complete his degree requirements. Application forms should be obtained at the Graduate Division from self-service racks outside Spalding 354, and fees paid at the treasury office, Bachman 110.

**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, Progress Report Forms, etc.

The Graduate Division will automatically delete from the graduation list the name of any student whose final grade label contains either a grade of I (incomplete) or a missing grade, unless 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. (Commencement exercises for September graduates are held in December.) 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, Bachman 125.

**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
- English as a Second Language
- French
- Geography
- German
- History
- Linguistics
- Mathematics
- Music
- Pacific Islands Studies
- Philosophy
- Political Science
- Psychology
- Russian
- Sociology
- Spanish
- Speech-Communication

The Master of Science is offered in:
- Agricultural Economics
- Agricultural Engineering
- Agronomy and Soil Science
- Anatomy
- Animal Sciences
- Astronomy
- Biochemistry
- Biophysics
- Botanical Sciences
- Chemistry
- Civil Engineering
- Electrical Engineering
- Entomology
- Food Science
- Genetics
- Geology and Geophysics
- Horticulture
- Information Sciences
- Mechanical Engineering
- Meteorology
- Microbiology
- Nursing
- Nutrition
- Ocean Engineering
- Oceanography
- Pharmacology
- Physics
- Physiology
- Public Health
- Speech Pathology and Audiology
- Zoology

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

The Master of Architecture is designed to provide intensive professional study and to meet the criteria of professional licensing boards.

The Master of Fine Arts is offered for creative production rather than research in: 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.

Language Requirements

At the option of the graduate field of study, the intended candidate for the master's degree may be required to demonstrate comprehension of one or more foreign languages. For specific language requirements in particular fields of study, see the appropriate section listed alphabetically under "Graduate Fields of Study" in this bulletin.

Foreign language reading proficiency examinations in East Asian languages, European languages, and Indo-Pacific languages administered by the respective departments are held three times a year coinciding with the Educational Testing Service test dates (except the summer administration). Announcements regarding these tests are circulated by the Graduate Division to the graduate fields of study for posting on bulletin boards three times a year, usually in September, January, and March.

Students in the following fields of study planning to take the French, German, Russian, or Spanish examinations must take the ETS Graduate School Foreign Language Tests administered by the Counseling and Testing Center on campus four times a year: Chemistry, Educational Psychology, English, Geography, Geology & Geophysics (Ph.D. only), History, Horticulture, Linguistics, Meteorology (Ph.D. only), Microbiology, Music, Oceanography, Philosophy, Sociology, and Zoology.

The GSFLT will be administered on the following dates during 1972-73:

**DEADLINE DATES**

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Penalty Date*</th>
<th>Final Closing Date†</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 14, 1972</td>
<td>Sept. 20, 1972</td>
<td>Sept. 27, 1972</td>
</tr>
</tbody>
</table>

*Last day for receipt of Registration Form without $3.00 penalty fee.
†Last day for guaranteed registration or for change in registration.
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.

Candidates for the doctoral degree will normally be expected to complete all requirements within six years after admission into the doctoral program.

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 register for a minimum of one credit of thesis research at the beginning of the term in which the degree is awarded.

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 must register for Thesis 800 during the announced registration period. Students given special permission by the Graduate Division to register 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 credits 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 candi-
dates 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 • Botanical Sciences
Business Administration • Civil Engineering
Drama and Theatre • Economics
Educational Administration • Educational Foundations
Educational Psychology • Electrical Engineering
Elementary Education • English • English as a Second Language • Entomology
Food Science • Genetics • Geography
Geology and Geophysics
German • History • Horticulture • Information Sciences • Library Studies • Linguistics
Mathematics • Mechanical Engineering
Meteorology
Microbiology • Music Education • Music Performance
Nursing • Ocean Engineering • Pharmacology
Philosophy • Physics • Physiology • Plant Pathology
Political Science • Public Health • Russian
Secondary Education • Social Work
Sociology • Spanish • Speech-Communication
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; student notified of results.)

**PLAN C (EXAMINATIONS)**

Plan C is available on a two-year experimental basis in Agronomy and Soil Science, Economics, English, English as a Second Language, Linguistics, Mathematics and Public Health. Neither a thesis nor a certain number of course credits is required by this plan. Rather, the student is asked to demonstrate competence by examination.

A preliminary conference will be held to discuss with the student his objectives and how to meet them, and to determine the general program the student will follow in order to prepare himself for the required examinations. The conference will be conducted by the chairman of the graduate field of study or by a member of the graduate faculty designated by him. The plan of study developed at this conference may include course work and/or independent study and research. Each field of study specifies its own requirements in addition to the following.

**Examinations**

**General Examination** (oral and/or written). A general exploratory examination will be given to determine if the intended candidate should be admitted to candidacy for the master's degree under Plan C, and to ascertain weaknesses in the student’s academic preparation and how to overcome them. This examination 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
will be conducted by the student's interim adviser and the graduate faculty of the field of study or a committee thereof consisting of at least three members of the faculty. It is given during the first semester of residence, and is from one to two hours in length. A student who fails the general examination may repeat it after three months only if a petition, recommended for approval by the graduate faculty of the major field of study, is approved by the dean of the Graduate Division. The student will not be considered for candidacy again should he fail the general examination twice.

**Final Examination (written and oral).** A final examination or series of examinations, written and oral, will be given to determine the candidate's comprehension of his field of study at the master's level. Since there are no course requirements for this plan, the final examinations will be designed to give the student opportunity to demonstrate a level of achievement consonant with the level of achievement required by Plans A and B. It is assumed that many students will prepare themselves for the examinations by taking courses recommended by advisers.

Specifications for the number of written examinations required, what they cover, and the amount of time required for each (two or three hours or more for written examinations and one or more for the oral portion) are set forth in the statement of requirements in each field of study. The written examinations may be given by the candidate's committee or by an examination committee of graduate faculty members constituted for that purpose.

The oral portion of the final examination follows the written portions and must be held at least three weeks before the end of the term during which the degree is conferred. It is conducted by the candidate's committee and is open to all members of the graduate faculty.

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. Should the student fail the final examination a second time, he is irrevocably dropped from candidacy.

**Summary of Procedure**

1. Application for admission to the Graduate Division.
2. Preliminary conference; appointment of interim adviser (Progress Form I submitted to Graduate Division, with copy to student).
3. General examination and admission to candidacy (Form II submitted, with copy to student).
4. Appointment of program committee (Chairman and at least two other members; Form III submitted, with copy to student).
5. Application for diploma.
6. Final examinations (Form VI submitted, student notified of results).
7. Payment of graduation fees.
8. Granting of degree.

**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.

No faculty or staff member of CI-3, R-3, or higher rank may be awarded either a master's or doctoral degree by the University of Hawaii in the graduate field of study administered by the department in which he is employed.

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

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

**Residence**

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

**Time Allowed**

A candidate for the doctoral degree will normally be expected to complete all requirements within six years after admission into the doctoral program.

**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

At the option of the graduate field of study, the intended candidate for the Ph.D. degree may be required to 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.

For information on language test administrations, see "Language Requirements" in previous section.

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 field of study recommends to the dean of the Graduate Division appointment of a doctoral committee consisting of at least five members of the graduate faculty, 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 Manoa Campus 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

A minimum of three members of the doctoral committee of five must read the dissertation. The committee will make the decision with the student on which three will read the dissertation and affix their signatures to the title page. This policy does not preclude all five members from reading the 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 dis-
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.

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.
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

F. S. Scott, Jr., Ph.D. (Chairman)—market development
R. N. Anderson, Ph.D.—resource economics
H. L. Baker, Ph.D.—resource economics
J. R. Davidson, Ph.D.—production and marine economics
C. Gopalakrishnan, Ph.D.—resource and marine economics
J. T. Ishida, Ph.D.—marketing
J. T. Keeler, M.S.—farm management
A. B. Larson, Ph.D.—price analysis
N. G. M. Luykx II, Ph.D.—agricultural policy
P. F. Phillip, Ph.D.—production and international economics
B. M. Renaud, Ph.D.—econometrics and regional economics
H. Spielmann, Ph.D.—marketing and agricultural policy
W. J. Staub, Ph.D.—international economic development
C. P. Wilson, Ph.D.—marketing and agricultural policy
H. Yamauchi, Ph.D.—resource economics

Affiliate Faculty

W. L. Collier, Ph.D.—production economics
H. C. Hogg, 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. If the master's degree is expected to be a terminal degree, the student is encouraged to pursue Plan A.

Students may in some instances be admitted to the master's program in agricultural economics although undergraduate training was in a different but related field providing that deficiencies in preparation are satisfied either by examination or by completion of the appropriate courses.

The Ph.D. program may include a major in production economics, marketing, resource economics, agricultural economic development, agricultural finance, price analysis, or a related area upon the approval of the student's Ph.D. committee. The student may also select one or more minors in related fields.

In addition to the oral comprehensive examination required by the Graduate Division, the Ph.D. candidate is required to pass written comprehensive examinations in three fields:

1. Economic theory, emphasizing micro-economics, macro-economics and history of economic thought.
2. Quantitative methods, including research tools, statistics, and econometrics.
3. Specialized field in agricultural or resource economics.

The department requires a minimum core requirement for both the M.S. and Ph.D. programs. For further information, request departmental brochure on procedures and requirements from the chairman of the graduate field in agricultural economics.

AGRICULTURAL ECONOMICS (AgEc)

410 Introduction to Quantitative Methods in Agricultural Economics (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)
434 Statistical Methods (3)
480 Computer Programming in Agricultural Economics Research (3)
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.—experimental design, agricultural machinery
D. M. Kinch, Ph.D.—agricultural machinery, environment control
Tung Liang, Ph.D.—systems engineering
M. R. Smith, Ph.D.—agricultural machinery
I-pai Wu, Ph.D.—irrigation engineering

Affiliate Faculty

A. L. Myers, M.S.—harvesting equipment

A. L. Myers, M.S.—harvesting equipment

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 products, surface hydrology, irrigation engineering, environment control engineering, and physical properties of biological materials. Required courses are marked with an asterisk.

Agricultural Engineering (AgEng)

333 Computer Programming for Bio-science (3)
351 Mechanization Principles & Practices (3)
352 Mechanization Laboratory (2)
431 Agricultural Power (3)
432 Agricultural Implements (3)
435 Irrigation Principles and Practices (3)
499 Directed Research (v)
622 Experimental Methods in Cause-Effect Modeling (3)
631 Analysis of Implement Design (3)
635 Farm Irrigation System Design (3)
638 Systems Analysis in Bio-sciences (3)
647 Methods of Agricultural Engineering (3)
699 Directed Research (v)
*700 Seminar (1)
*800 Thesis Research (v)

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 management
R. E. Green, Ph.D.—soil-pesticide interactions, soil physics
H. Ikawa, Ph.D.—soil mineralogy, soil genesis and classification
H. Jones, Ph.D.—clay mineralogy, electron microscopy
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. Swindle, Ph.D.—soil genesis and classification, physical chemistry
Y. N. Tamimi, 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
Tung Ming Lai, Ph.D.—soil chemistry, fertility, sugar cane agronomy
D. D. Williams, Ph.D.—pineapple 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 interest 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 test 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. All M.S. candidates must register for seminar in agronomy or soil science.

The Plan A (thesis) program is for 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.

The Plan B (nonthesis) program is intended only for 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 thesis program committee will decide (a) whether the student passes or fails, and (b) if he passes whether or not he will be allowed to continue for the Ph.D.

The Plan C option is limited to superior students. Selection of candidates will be based upon their previous academic records, an interview, and level of performance in the general examination. The student will be required to take courses, present reports and to take examinations as outlined by the program committee. Upon completion of program requirements the student will be required to take a written and oral final examination. The thesis program committee will then decide (a) if the student passes or fails and (b) if he passes whether or not he will be allowed to continue for the Ph.D. in agronomy and soil science.

The degree of Ph.D. in agronomy and soil science is awarded only for scholarly achievement. The dissertation, which is a significant original contribution of basic knowledge in the candidate's field, is required. Only students with excellent 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 composed of four subject matter areas, the areas to be designated by the graduate program committee and the adviser on the basis of the candidates' stated area of interest. 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 he will be required to take the qualifying examination.

Language Requirement: One of the requirements for Ph.D. degree candidates in the field of agronomy and soil science will be knowledge of two or more languages, one of which must be English. When the additional language is not the student's native tongue, the language requirement may be fulfilled by either:

(1) Completion with a passing grade of two semesters of a foreign language as taught by the University of Hawaii language department (either European or Asian and Pacific languages) or
(2) Transfer of credits equivalent to (1) above from another institution, or
(3) Demonstration of competence equivalent to completion of the first two semesters of foreign language at the University of Hawaii as determined by the language department credit-by-examination procedures.

Subsequently, candidates will be required to take written and oral comprehensive examinations and a final oral examination which will include a public defense of the dissertation. All Ph.D. candidates must register for seminar in agronomy or soil science.

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, weed science, 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 salinity, soil management, soil conservation, soil fertility, and soil biology.

**AGRONOMY (Agron)**

- 310 Tropical Crop Production (3)
- 402 Tissue Culture (3)
- 410 Field Course in Tropical Crop Production (6)
- 411 Sugar Cane Agronomy (3)
- 412 Pineapple Culture (2)
- 413 Pasture Management (3)
- 410 Physiology of Crop Production (3)
- 651 Advanced Techniques in Plant and Soil Analysis (3)
- 699 Directed Research M.S. (v)
- 701 Seminar in Advanced Agronomy (1)
- 710 Mineral Nutrition of Tropical Crops (2)
- 799 Directed Research Ph.D. (v)
- 800 Thesis Research (v)

**SOIL SCIENCES (Soils)**

- 404 Soil Microbiology (3)
- 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 (2)
- 640 Advanced Soil Chemistry (3)
- 650 Advanced Soil Fertility (4)
- 661 Meteorology in Agriculture (3)
- 670 Soil Formation and Classification (4)
- 671 Soil and Clay Mineralogy (3)
- 699 Directed Research M.S. (v)
- 704 Seminar in Advanced Soil Science (1)
- 799 Directed Research Ph.D. (v)
- 800 Thesis Research (v)
American Studies

Graduate Faculty
S. Lutzky, Ph.D. (Chairman)—history and social backgrounds
D. Bertelson, Ph.D.—literature and social thought
S. Brown, Ph.D.—politics and history of ideas
R. Denney, B.A.—literature and sociology
J. Gurian, Ph.D.—literature and social problems
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
A. M. Keppel, Ph.D.—education
H. F. Margulies, Ph.D.—history
G. D. Paige, Ph.D.—political science
R. L. Rapson, Ph.D.—history
F. W. Riggs, Ph.D.—political science
R. K. Sakai, Ph.D.—history
W. F. Veil, Ph.D.—history
A. M. Whitehill, Ph.D.—international management

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 GRE 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 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.

AMERICAN STUDIES (AmSt)
370 Music in Modern America (3)
390 Introduction to Contemporary America (3)
421 The West in the American Consciousness (3)
435 The Radical Tradition in America (3)
460 Myths in American Development (3)
465 Popular Culture in America (3)
475 American Taste (3)
479-480 Foreign Policy and the American Personality (3)
485-486 Contemporary American Civilization (3)
490 Special Topics (3)
495 Black Americans and American National Character (3)
499 Readings in American Studies (v)
615 Leaders and Movements in American Thought (3)
631 Mass Media in American Society (3)
635 Perspectives in Comparative Literature (3)
641 Asian Influences in American Civilization (3)
651 Seminar in the Interaction of Asia and America (3)
665 Seminar: Presidential Leadership and American Civilization (3)
670 Seminar: Comparative Social Structures (3)
690 Seminar: Special Topics (v)
701-702 Seminar in American Studies (v)
711 American Representative Institutions (3)
712 American Beliefs (3)
713 American Technology and Society (3)
714 American Arts and Society (3)
799 Directed Research (v)
800 Thesis Research

Anatomy

Graduate Faculty
V. J. DeFeo, Ph.D. (Chairman)—embryo-uterine relationships, endocrinology and physiology of reproduction, electron microscopy, human sexuality
G. D. Bryant, Ph.D.—endocrinology of reproduction, radioimmunoassay
M. Diamond, Ph.D.—sex behavior, human sexuality, endocrinology of reproduction
J. C. Hoffmann, Ph.D.—control of reproductive cycles, endocrinology of reproduction, neuroendocrinology
V. L. Jacobs, Ph.D.—neural aspects of reproduction
R. G. Kleinfeld, Ph.D.—cellular and developmental biology, cytochemistry, electron microscopy
R. J. Teichman, Ph.D.—comparative sperm morphology, biological membranes, electron histochemistry
R. Yanagimachi, Ph.D.—sperm capacitation, ovum fertilization
Only the M.S. degree is offered at present. The thesis research in which students participate relates to the subject of reproductive biology in mammals, including humans (the department 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 (Anat)

602 Functional Human Anatomy (6)
628 Mechanisms of Gamete Interaction (2)
632 Reproduction and Sexuality (2)
634 Experimental Methods in the Study of Reproductive Behavior (v)
699 Directed Research (v)
800 Thesis Research (v)

In addition to the specific courses above, the department of anatomy is strongly involved in the following interdisciplinary biomedical courses at the graduate level.

BIOMEDICAL SCIENCE (Biomd)

601 Cell Structure and Function (2)
602 Endocrinology and Reproduction (2)
603 Organ Structure and Function (5)
604 Neuroscience (4)
605 Microanatomy Laboratory (2)
606 Endocrinology and Reproduction Laboratory (1)
607 Physiology Laboratory (1)

Animal Sciences

Graduate Faculty

R. W. Stanley, Ph.D. (Chairman)—ruminant nutrition
C. C. Brooks, Ph.D.—non-ruminant nutrition
C. M. Campbell, Ph.D.—ruminant nutrition
R. B. Herrick, Ph.D.—poultry physiology
J. H. Koshi, Ph.D.—dairy management
R. M. Nakamura, Ph.D.—veterinary microbiology
A. L. Palafox, Ph.D.—poultry nutrition
D. Reimer, Ph.D.—genetics
E. Ross, Ph.D.—poultry nutrition
D. W. Vogt, Ph.D.—genetics
O. Wayman, Ph.D.—reproductive physiology

Strong training 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 9 credits.

ANIMAL SCIENCES (AnSc)

444 Animal Nutrition (4)
445 Animal Breeding (3)
451-452 Physiology of Domestic Animals (4-4)
453 Animal Diseases and Their Control (3)
641 Seminar in Animal Sciences (1)
642 Ruminant Nutrition (2)
643 Physiology of Reproduction (3)
652 Quantitative Genetics (3)
699 Directed Research (v)
800 Thesis Research (v)

Anthropology

Graduate Faculty

M. H. Agar, Ph.D.—language and culture, cognitive systems, quantitative methods; urban U.S., India
S. T. Boggs, Ph.D.—culture and personality, education and anthropology, methods
A. G. Dewey, Ph.D.—social anthropology, culture change; Indonesia, Polynesia, Melanesia
B. R. Finney, Ph.D.—social and cultural change; Pacific
R. A. Gould, Ph.D.—archaeology, ethnarchaeology; Australia, North America
P. B. Griffin, Ph.D.—archaeological theory, ecological anthropology; North America, Polynesia
J. M. Hanna, Ph.D.—physical anthropology
S. A. Howard, Ph.D.—social and psychological anthropology, ethnoscience; Polynesia
T. Lebra, Ph.D.—behavior and social systems, religion; Japan
W. P. Lebra, Ph.D.—social anthropology, religion; East Asia
R. W. Lieban, Ph.D.—social anthropology, medical anthropology; Philippines, Southeast Asia
K. L. Luomala, Ph.D.—ethnology and folklore; Polynesia and Micronesia
T. W. Maretzki, Ph.D.—psychological and applied anthropology, culture change; East Asia
D. L. Oliver, Ph.D.—social anthropology; Oceania
M. Pietrusewsky, Ph.D.—physical anthropology
W. G. Solheim, Ph.D.—archaeology; Southeast Asia
H. D. Tuggle, Ph.D.—archaeology, theory, ecology, animal biosocial evolution; New World, Pacific Basin

Affiliate Faculty

G. Bateson, M.A.—culture and personality, communicational aspects of culture; Melanesia, Indonesia
K. E. Emory, Ph.D.—archaeology, ethnology; Polynesia
R. W. Force, Ph.D.—culture change; Oceania
Y. Sinoto, D.Sc.—archaeology; Polynesia and Japan
D. Yen—ethnobotany; Oceania, Southeast Asia

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 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 (Anth)

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 (3)
381 Archaeological Laboratory Techniques (3)
384 Human Osteology (3)
400 Anthropological Statistics (3)
414 Introduction to Linguistic Anthropology (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)
425 Medical Anthropology (3)
445 Regional Ethnology (3)

(1) Continental East Asia
(2) Mainland Southeast Asia
(3) Island Southeast Asia
(4) Micronesia
(5) Polynesia
(6) Melanesia
(7) Other to be announced
The professional degree of M. Arch. in architecture is designed to provide intensive professional study. 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. Emphasis areas are: architectural design, architectural engineering and technology, urban/regional design, and tropical and development studies. 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 master's degree 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 undergraduate architectural preparatory work before becoming candidates.

2. Holders of a bachelor's degree in pre-architecture or an equivalent pre-professional degree. These students are required to complete 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 of architecture: (a) indication of major area of study: architectural design, architectural and environmental engineering, urban/regional design, or tropical and development studies. (b) Samples of work done in intended major; e.g., colored transparencies, or black and white photographs in brochure form. Brochures should not exceed 12 by 18 inches. Brochures will be returned by mail only if sufficient postage is included.

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 architects, architectural engineers, landscape architects, urban/regional designers and/or planners.

ARCHITECTURE (Arch)
400 Special Projects in Architecture (2-4 v)
401 Architectural Structures "D" (4)
402 Architectural Structures "E" (4)
411 Building and Zoning Codes (3)
412 Working Drawings, Estimating and Specifications (3)
413 Construction Technology and Management (3)
421 Environmental Control (3)
431 Architectural Design "D" (4)
432 Architectural Design "E" (4)
441 Strategy in Urban and Regional Design (4)
442 Methods of Urban and Regional Design (4)
451 Planning Problems (3)
452 Planning Processes (3)
453 Urban and Regional Design (3)
471 Environmental Psychology (3)
472 Environmental Psychology (3)
474 Advanced Computer Applications (3)
476 Architectural Archetypes (3)
477 Research Seminar (v)
481 Design Internship (v)
496 Field Studies (v)
501 Architectural Kinetics (4)
505 Professional Practice (3)
561 Seminar on Architecture in Developing Countries (3)
630 Housing and Planning in Tropical Areas (4)
640 Housing and Planning in Tropical Areas (4)
645-646 Development Planning I, II (3-3)
671 Advanced Environmental Psychology (3)
672 Environmental Design in Hawaii (3)
699 Directed Work (v)
800 Thesis Research (v)
Art

Graduate Faculty

C. W. Anderson, M.A.—painting, design
K. Bushnell, M.F.A.—painting
B. Ecke, Ph.D.—Chinese art
M. Everson, M.F.A.—textile design
C. F. Horan, M.A.—ceramics
S. Kimura, M.F.A.—painting
K. G. Kingrey, M.A.—design
R. Kowalske, M.F.A.—printmaking
H. O. McVay, M.A.—ceramics
P. Neogy, M.A.—Asian art
B. Norris, B.A.—painting
H. A. Robinson—weaving
M. Sato, M.F.A.—sculpture
E. Stasack, M.F.A.—painting, printmaking
M. Turnbull, M.A.—painting
D. Waite, Ph.D.—Pacific art
J. Wisnosky, M.F.A.—painting

Visiting Artists in residence arranged

Two masters' degrees are offered: The M.A. in history of art (Plan A. thesis or Plan B. nonthesis) and the M.F.A. in studio practice (Plan A. thesis only). The history of art as well as the studio programs are concerned with the creative, the experiential and the developmental aspects of art. An otherwise deficient or incompatible undergraduate program will require at the discretion of the graduate faculty, additional course work for either degree.

M.A.

The M.A. is given in the fields of Asian and Pacific history of art. A minimum of 30 semester hours are required for Plan A or B. The more suitable plan will be determined by the faculty at the preliminary conference. Plan A includes a minimum of 18 semester hours of course work and 6 semester hours of thesis. A maximum of 2 semester hours may be allowed in Art 699 Directed Work.

Plan B consists of 30 semester hours of course work, which may include Art 699 with variable credits.

For either plan, a maximum of 9 semester hours may be earned in appropriate advanced courses in other academic departments of the University as approved by the graduate adviser.

Intended candidates must present the equivalent of an undergraduate major in the history of art including 24 semester hours in the history of art and related courses, and, in addition to English a reading knowledge of one language in which a considerable body of relevant literature is published. Art 384, 385, 391 or the equivalent may be required of students as prerequisites to work towards the M.A.

M.F.A.

The M.F.A (Plan A, thesis only) is a terminal degree in creative studio work in the visual arts. It will take a minimum of two years for a well qualified student to complete the 48 semester hours required. (As such, it is closer to the Ph.D. in character than to the M.A.) Studio specialization is required in a selected area. Course work includes a minimum of 18 semester hours in studio and 6 semester hours of thesis which includes an exhibition of original work in the chosen medium. Elective courses may be in any art department program or any academic department of the University for which adequate preparation is demonstrable, subject to consent of instructor and graduate adviser.

For the M.F.A. Art 699 Directed Work, normally 3 semester hours per semester, may be taken for a total of 12 semester hours maximum of the 48 required.

Intended candidates must present the equivalent of a B.F.A. 63 semester hours in the field of art, including a basic preparation in studio area of specialization and 18 semester hours in the history of art, and be ready to present for evaluation, a portfolio or slides as evidence of ability to do creative work of superior quality. Such material will be requested by the department only after application has been received.

In view of the intensive character 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 the master of fine arts degree. Ordinarily this will not exceed two semesters of study.

Courses available for the graduate program are listed below.

ART (Art)

384 Art of Japan and Korea (3)
385 Early Chinese Sculpture (3)
391 Art of South Asia (3)
400 Special Projects in Art (V)
402 Glass Blowing (3)
407 Advanced Photography (3)
463-464 Visual Communication (3-3)
470 Renaissance Art (3)
471 Baroque and Rococo Art (3)
472 American Art (3)
473 Contemporary Art (3)
474 Arts of the 20th Century (3)
475 Arts of the Pacific (3)
476 Primitive Art (3)
477 Primitive Art of the Pacific Rim (3)
478 Arts of Melanesia (3)
483 Applied Arts of Japan (3)
485 Applied Arts of China (3)
492 Comparative Aspects of Art (3)
495 Art of Southeast Asia (3)
496 Art and Architectural Field Studies (3)
617 Painting (3)
630 Textile Design (3)
638-639 Weaving (3-3)
646 Ceramics (3)
647 Ceramics (v)
648 Ceramic Glazes and Clay Bodies (3)
649 Ceramics (3)
653 Graduate Sculpture (v)
665 Advanced Typography (3)
675 Arts of Hawaii (3)
677 Tribal Arts of Indonesia and South Asia (3)
685 Early Chinese Painting (3) (Alt. yrs., offered 1972-73)
686 Later Chinese Painting (3) (Alt. yrs., offered 1973-74)
699 Directed Work (v)
773-774 Visual Design Research (v)
780 Japanese Sculpture (3)
781 Japanese Painting (3)
791 Buddhist Art of South Asia (3)
792 Hindu Art of South Asia (3)
Asian Languages

Graduate Faculty

R. M. Baumer, Ph.D. (Chairman, Graduate Field of Study)—Bengali language and literature
J. T. Araki, Ph.D. (Chairman, Department of East Asian Literature)—Japanese literature
J. DeFrancis, Ph.D. (Chairman, Department of East Asian Languages)—Chinese language
W. H. Maurer, Ph.D. (Chairman, Department of Indo-Pacific Languages)—Sanskrit and Pali
R. L. Cheng, Ph.D.—Chinese and Japanese language
S. Dardjowidjono, Ph.D.—Indonesian language
N. Fujioka, M.A.—Japanese language
T. W. Gething, Ph.D.—Thai language
H. Ikeda, Ph.D.—Japanese literature
P. N. Jenner, Ph.D.—Cambodian language
Y. Kusanagi, Ph.D.—Japanese literature
J. S. M. Lau, Ph.D.—Chinese: modern drama and comparative literature
P. H. Lee, Ph.D.—Korean literature
F. K. Li, Ph.D.—Chinese and Thai; linguistics
Y. C. Lit Ph.D.—Chinese language
M. M. Tahara, Ph.D.—Japanese language
M. M. Tahara, Ph.D.—Japanese: classical literature
H. Taylor, Ph.D.—Japanese language
V. H. Viglielmo, Ph.D.—Japanese literature
L. P. H. C. Winters, M.A.—Chinese literature
J. Young, Ph.D.—Japanese language

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 M.A. degree is offered 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 B (nonthesis), a minimum of 30 hours 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.

A Ph.D. degree is offered 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.

ASIAN LANGUAGES

CHINESE

Language (Chnse):

401-402 Fourth-Level Chinese (4-4)
404 Accelerated Fourth-Level Chinese (8)
421-422 Advanced Chinese Conversation (3-3)
433-434 Selected Readings in Chinese (3-3)
435-436 Introductory Classical Chinese (3-3)
437-438 Advanced Classical Chinese (3-3)
440 Chinese Composition (2)
451-452 Structure of Chinese (3-3)
453-454 Study of Chinese Characters (3)
470 Language and Culture of China (3)
631 Chinese Phonology (3)
632 Chinese Dialects (3)
641-642 Contrastive Analysis of Mandarin and English Structure (3-3)
643-644 Methodology in Teaching Chinese as a Second Language (3-3)
693-694 Methods in Chinese Studies (3-3)
730.1 Research Seminar in Chinese—Teaching Methods (3)
730.2 Research Seminar in Chinese—Structure (3)
730.3 Research Seminar in Chinese—Classical Grammar (3)
730.4 Research Seminar in Chinese—Other topics (3)

Literature (ChLit):

341-342 Readings in Contemporary Chinese Literature (3-3)
441-442 Readings in Modern Chinese Literature (3-3)
451 Readings in Traditional Chinese Literature (3)
490 Reference Materials for Chinese Literary Studies (3)
609-610 Chinese Poetry (3-3)
611 Contemporary Chinese Literature (3)
615 Traditional Chinese Fiction (3)
619 Traditional Chinese Drama—Northern (3)
620 Traditional Chinese Drama—Southern (3)
621 History of Chinese Literary Criticism (3)
693 Advanced Chinese Bibliography (3)
730 Research Seminar in Chinese Literature (3)
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 non-thesis 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, Asian arts, Asian literature, 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 equalling 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.
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. Jeffries, D.Sc.—solar physics, radiation transfer  
F. Q. Orrall, Ph.D.—solar physics  
W. M. Sinton, Ph.D.—planetary and infra-red astronomy  
R. D. Wolsencroft, Ph.D.—interplanetary and interstellar matter  
J. B. Zirkel, 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, mechanism, 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. M.S. must be completed before Ph.D. is attempted.

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 one course selected from Physics 610, 650, or 770 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 (Astr)**

*621 Stellar Atmospheres I (3)  
623 Stellar Interiors and Evolution (3)  
*627 Galactic Structure I (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. Picket, Ph.D. (Chairman)—mechanisms of organic and biological reactions, electron paramagnetic resonance  
N. V. Bhagavan, Ph.D.—clinical biochemistry  
I. R. Gibbons, Ph.D.—cytology, electron microscopy  
F. C. Greenwood, Ph.D.—biochemical endocrinology; metabolism of protein hormones  
R. J. Gillory, Ph.D.—bioenergetics  
T. D. Humphreys, Ph.D.—cell surface molecules, contact inhibition, RNA synthesis and growth regulation  
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  
B. McConnell, Ph.D.—structure of nucleic acids

R. H. McKay, Ph.D.—physical biochemistry, biological oxidation  
B. E. Morton, Ph.D.—ribosomal structure and function  
H. F. Mower, Ph.D.—biological nitrogen fixation; hydrogenase enzymes; energy transfer mechanisms  
K. T. Yasunobu, Ph.D.—relationship of enzyme structure to function

**Affiliate Faculty**

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

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.

The department requires all candidates to submit results of the Graduate Record Examination. 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.

A written qualifying examination covering courses 601, 602 and 611 in general biochemistry and 601, 602 and 603 in biophysics is required for the Ph.D. degree 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.

All candidates for advanced degrees are required to participate in the department’s teaching program.

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 (Bioch)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>341</td>
<td>Elements of Biochemistry (3)</td>
</tr>
<tr>
<td>441</td>
<td>Basic Biochemistry (v)</td>
</tr>
<tr>
<td>442</td>
<td>Basic Biochemistry Laboratory (1)</td>
</tr>
<tr>
<td>601-602</td>
<td>General Biochemistry (3-3)</td>
</tr>
<tr>
<td>605-606</td>
<td>Medical Biochemistry (2-2)</td>
</tr>
<tr>
<td>611-612</td>
<td>Medical Biochemistry Laboratory (1-1)</td>
</tr>
<tr>
<td>613</td>
<td>General Biochemistry Laboratory (2)</td>
</tr>
<tr>
<td>620</td>
<td>Advanced Topics in Clinical Biochemistry (2)</td>
</tr>
<tr>
<td>671</td>
<td>Seminar (1)</td>
</tr>
<tr>
<td>705</td>
<td>Special Topics in Biochemistry (2)</td>
</tr>
<tr>
<td>710</td>
<td>Special Topics in Enzymology (2)</td>
</tr>
<tr>
<td>720</td>
<td>Bioenergetics (2)</td>
</tr>
<tr>
<td>730</td>
<td>Nucleic Acids and Viruses (2)</td>
</tr>
<tr>
<td>740</td>
<td>Advanced Protein Chemistry (2)</td>
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<tr>
<td>799</td>
<td>Directed Research (v)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (v)</td>
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</tbody>
</table>

**BIOPHYSICS (Bioph)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>601-602</td>
<td>Survey of Biophysics (3-3)</td>
</tr>
<tr>
<td>603</td>
<td>Biophysics Laboratory (3)</td>
</tr>
<tr>
<td>701</td>
<td>Molecular Structure and Function of Chromosomes (2)</td>
</tr>
<tr>
<td>704</td>
<td>The Role of Free Radicals in Biological Systems (2)</td>
</tr>
<tr>
<td>705</td>
<td>Special Topics in Biophysics (2)</td>
</tr>
<tr>
<td>706</td>
<td>Molecular Structure and Function of Cell Organelles (2)</td>
</tr>
<tr>
<td>799</td>
<td>Directed Research (v)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (v)</td>
</tr>
</tbody>
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**Botanical Sciences**

**Graduate Faculty**

- E. K. Akamine—post harvest physiology, tropical fruits
- M. Aragaki—fungus physiology, disease control
- G. E. Baker—mycology, fungal ecology, medical mycology
- L. W. Buddenhagen—phytobacteriology, ultrastructure
- H. F. Clements—environmental physiology, crop logging
- B. J. Cool—mineral nutrition, salt uptake, tree nutrition
- M. S. Doty—marine ecology, productivity, algal systematics
- D. J. C. Friend—quantitative growth, environmental physiology
- J. E. Hunter—virology, general plant pathology
- O. V. Holtzmann—nematology, general pathology
- M. Ishii—virology
- N. P. Kefford—hormonal regulation of development
- W. Ko—soil microbiology
- C. H. Lamoureux—comparative and developmental morphology, conservation
- D. S. Meredith—epidemiology, aerobiology
- D. Mueller-Dombois—tropical and pioneer ecology
- S. Nakata—developmental physiology of tree crops
- S. S. Patil—host pathogen physiology, post harvest pathology, fungus physiology
- E. W. Putman—carbohydrate biochemistry, soil chemistry
- Y. Sagawa—cytology, cyto genetics, orchid genetics
- S. M. Siegel—exobiology, stress physiology and biochemistry
- C. W. Smith—morphogenetic processes, environmental effects
- W. L. Theobald—systematics of angiosperms
- E. E. Trujillo—soil-borne diseases

**Affiliate Faculty**

- W. J. Apt—nematology, pineapple diseases
- R. S. Byther—soil-borne diseases
- F. R. Fosberg—tropical ecology and systematics
- B. Krauss—anatomy, ethnobotany
- L. G. Nickell—physiology of sugar cane, tissue culture
- K. G. Rohrbach—pineapple disease
- P. van Royen—systematics of tropical species
- G. W. Steiner—host parasite physiology
- W. H. Wagner—systematics, ferns
- C. A. Wismer—diseases of sugar cane

M.S. (Plans A and B) and Ph.D. degrees in botanical sciences are offered. At the discretion of a candidate and his committee the degree may have the subtitle: Botanical Sciences (Plant Pathology).

Intended candidates must present a minimum of 18 hours of undergraduate credit in botanical sciences or in related biological or agricultural sciences. In addition, a basic preparation in the physical sciences and in expository writing in English are required. Applications for admission must include scores of the Graduate Record Examination for aptitudes. A study program to remedy deficiencies and to meet degree requirements will be determined by each candidate's committee through examination and continuing counsel.

Plan A (thesis) and Plan B (nonthesis) are separate M.S. programs with distinct purposes. Before admission to candidacy, the plan a candidate intends to follow must be declared and approved. Plan A is the usual program to be taken by candidates. Plan B is offered at the discretion of the graduate faculty for students who do not intend to make research in botanical sciences their profession. Plan B programs emphasize the technological aspects of the botanical sciences. For the M.S. degree—Plan A. 12 credits shall be for thesis and a minimum of an additional 18 credits for courses approved by a candidate's committee are required. For the M.S. degree—Plan B, of the minimum of 30 credits required. 15 credits shall be earned in the major field, or an approved related field, in courses numbered 600-799. Of these credits, 6 must be for directed research in aspects of botanical sciences chosen by the candidate in consultation with his committee.

All students take a qualifying examination within their first two semesters in a degree program. A requirement of all degrees is the presentation of a seminar on the research undertaken as part of the degree program.

Within one year of declaring his intention to enter the Ph.D. program, a student takes a reading examination in a foreign language significant to his area of specialty. On passing this examination, the student is admitted to candidacy and completes a program of instruction specified by his committee, including the demonstration of a working knowledge of either a second foreign language or another tool subject, and a dissertation. The dissertation is expected to be an original contribution based on independent research. It is initiated by the preparation of a critical review of the literature which becomes the basis for a dissertation proposal. Dissertation research for the Ph.D. degree is done in an aspect of botanical sciences for which
a member of the graduate faculty of the field will accept responsibility as committee chairman. The comprehensive examination is oral or oral and written and is conducted by the candidate's committee plus any members of the graduate faculty who wish to attend. In addition to general botanical sciences, the candidate is examined in depth in areas of botanical sciences or related disciplines selected by the committee and approved by the graduate faculty. The final oral examination in defense of the dissertation consists of a public seminar and examination by the graduate faculty and dissertation committee. Available courses are listed below.

**BOTANICAL SCIENCES**

*Botany (Bot)*

410 Plant Anatomy (3)
412 Microtechnique (3)
421 Developmental Biology (3)
430 Mycology (3)
436 Medical Mycology (3)
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 (I)
612 Advanced Botanical Problems (v)
615 Morphology Seminar (2)
618 Cytology (3)
619 Seminar in Biology Teaching (1)
620 Origin, Evolution and Distribution of Flowering Plants (4)
631 Marine Phytoplankton (3)
637 Physiology of Fungi (4)
640 Environmental and Space Biology II (v)
650 Ecology Seminar (1)
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)
681 Phycology-Chlorophyta (2)
682 Phycology-Phytoplankton (2)
683 Phycology-Myxophyta and Phaeophyta (2)
684 Phycology-Rhodophyta (2)
699 Directed Research (v)
799 Directed Research (v)
800 Thesis Research (v)

**Plant Pathology (PPath)**

411 Principles of Plant Pathology (4)
420 Biology and Ecology of Soil-Borne Plant Pathogens (3)
601 Tropical Plant Pathology (3)
605 Clinical Plant Pathology (2)
612 Principles of Plant Disease Control (3)
616 Plant Nematology (3)
621 Plant Pathology Techniques (3)
625 Advanced Plant Pathology (2)
630 Plant Virology (3)
635 Epidemiology of Plant Diseases (3)
637 Physiology of Fungi (4)
660 Plant Pathology Seminar (1)
699 Directed Research (v)
705 Host-Parasite Physiology (3)
799 Directed Research (v)
800 Thesis Research (v)

**Biology (Biol)**

440 Environmental and Space Biology (2)

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**Business Administration**

**Graduate Faculty**

H. D. Lowe, D.B.A. (Chairman)—accounting, finance
J. Adler, Ph.D.—accounting, 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
H. D. Bess, Ph.D.—transportation
D. Bonbright, J. D.—business law
R. B. Buchele, Ph.D.—management
N. H. P. Chung, Ph.D.—quantitative methods
C. F. Congdon, M.B.A.—statistics
D. A. Corbin, Ph.D.—accounting, finance
M. Cotlar, Ph.D.—management
L. J. Crampon, M.B.A.—accounting, finance
E. M. Currie, Ph.D.—accounting
S. Dawson, Ph.D.—finance
D. S. Ellis, Ph.D.—management
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
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
E. Jacobson, Ph.D.—accounting, finance
E. Johnston, Ph.D.—travel industry management
R. Kesner, Ed.D.—management
S. Kim, Ph.D.—business economics and quantitative methods
H. E. Kramer, Ph.D.—marketing
E. E. Laitila, Ph.D.—real estate
S. O. Lee, Ph.D.—accounting
K. H. Lie, Ph.D.—business economics and quantitative methods
C. J. Metelka, M.A.—travel industry management
J. V. Miccio, Ed.D.—management
S. Moscove, Ph.D.—accounting
J. R. Omps, Ph.D.—accounting
E. C. Pendleton, Ph.D.—labor economics, industrial relations
H. C. Reeser, Ph.D.—management
E. Richman, D.Eng.Sci.—management
K. K. Seo, Ph.D.—business economics, money and banking
C. H. Spencer, D.B.A.—management
R. H. Sprague, D.B.A.—computer and systems analysis
H. B. Stellmacher, M.B.A.—marketing
R. A. Taussig, Ph.D.—accounting
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 incor-
corporate studies of an international nature. The M.B.A. program is presently being offered on the Manoa campus in Honolulu and overseas in Japan and Okinawa.

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

For graduate students not having backgrounds in business administration, a group of 500-level courses is offered for the purpose of achieving an orientation to the graduate level courses.

All of the 500 courses will be required unless specifically exempted on the basis of academic records or proficiency demonstrated to the department chairman involved.

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 18 hours

Group III, Electives 9 hours

Group IV, Thesis 6 hours

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 required credit hours up to 15 hours

Group II, Advanced Disciplines & Functions 21 hours

Group III, Electives 9 hours

Group IV, Integrative 3 hours

Students desiring advanced work beyond the MBA degree are advised to enroll in the Ph.D. program offered by the economics department. One of the graduate fields in this program and the research may be in business administration.
Personnel and Industrial Relations (PIR)
763 Personnel Administration (3)
764 Advanced Personnel Administration (3)
765 Labor Relations (3)
766 Problems of Collective Bargaining (3)

Real Estate (RE)
441 Land Economics
773 Real Estate (3)
774 Land Resource Development (3)

Management Information System (BAS)
783 Data Management Systems (3)
784 Management Information Systems (3)
785 Systems Analysis-A Computer Approach to Decision Models (3)
786 Computer Simulation-Business and Economics (3)

Transportation (Trans)
453 Air Travel Management

Travel Industry Management (TIM)
771 Lodging Industry Administration
775 International Travel and Transportation
776 Socio-Political Factors in Tourism

Research (Bus)
799 Directed Research

Group IV

796 Business Policy
799 Directed Research
800 Thesis (6)

Chemistry

Graduate Faculty

R. L. McDonald, Ph.D.—physical chemistry, ionic behavior in nonaqueous media, spectroscopic studies of weak interactions
R. E. Moore, Ph.D.—organic chemistry, structure determination and biosynthesis of natural products from marine organisms
D. W. Muenow, Ph.D.—high temperature mass spectrometry, volatile components of materials of geochemical interest
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. Seft, 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

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 specialized research opportunities offered in environmental and marine related chemistry. Additional details may be found in a departmental brochure.

CHEMISTRY (Chem)

445 Modern Synthetic Methods (3)
622 Advanced Inorganic Chemistry I (3)
623 Advanced Inorganic Chemistry II (3)
631 Instrumental Methods of Analysis (3)
632 Electroanalytical Chemistry (3)
633 Introduction to Molecular Spectroscopy (3)
641 Advanced Organic Chemistry: Structure and Stereochemistry (3)
642 Advanced Organic Chemistry: Mechanisms (3)
651-652 Intermediate Physical Chemistry (3-3)
653 Introductory Quantum Chemistry (3)
655 Radiochemistry and Nuclear Reactions (3)
656 Radiochemical Techniques (1)
*691-692 Seminar (1-1)
721-722 Special Topics in Inorganic Chemistry (v)
731-732 Special Topics in Analytical Chemistry (v)
741-742 Special Topics in Organic Chemistry (v)
744 Organic Applications of Spectroscopy (3)
751-752 Special Topics in Physical Chemistry (v)
753 Quantum Chemistry (3)
756 Statistical Mechanics (3)
758 Crystallography (3)
761-762 Special Topics in Environmental Chemistry (v)
799 Directed Research (v)
*800 Thesis Research (v)
Civil Engineering

Graduate Faculty

M. L. P. Go, Ph.D. (Chairman)—structures
R. D. Bauman, Ph.D.—transportation engineering
C. L. Bretschneider, Ph.D.—ocean engineering
N. C. Burbank, Sc.D.—environmental and sanitary engineering
E. D. H. Cheng, Ph.D.—hydrology, hydraulics
A. N. L. Chiu, Ph.D.—structures
G. L. Dugan, Ph.D.—environmental and sanitary engineering
J. R. Evans, M.S.—soil mechanics
Y. S. Fok, Ph.D.—hydrology, water resources system analysis
R. A. Grace, Ph.D.—hydrology, hydraulics
H. S. Hamada, Ph.D.—structures, applied 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. Sziland, 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

Applicants for admission to the M.S. program in civil engineering must present a B.S. in civil engineering or the equivalent. A general examination will be required. For either Plan A (thesis) or Plan B (non-thesis), a minimum of 30 credits including two graduate seminars, approved by the student's committee, is required. Plan A will include 9 credits of thesis research. For either plan, a minimum of 12 credits is required in graduate civil engineering courses (numbered 600 and above) exclusive of thesis, seminar and directed reading or research. Additional information regarding course details and degree requirements may be obtained from the department office.

CIVIL ENGINEERING (CE)

623 Hydraulic Transients (3)
624 Flow in Porous Media (3)
626 Surface-Water Hydrology (3)
627 Ground-Water Hydrology (3)
628 Water Resources Planning and Development (3)
629 Water Resources System Analysis (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)
639 Biology of Environmental Engineering Systems (3)
640 Industrial Waste Treatment (3)
641 Marine Disposal of Wastes (3)
645 Development Planning I (3)
646 Development Planning II (3)
651 Soil Mechanics (3)
664 Analysis and Design of Urban Transportation Systems (3)
665 Simulation and Modeling of Urban Systems (3)
671 Theory of Elasticity I (3)
673 Theory of Plasticity (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)
686 Numerical Methods in Continuum Mechanics (3)
687 Design of Structural Systems (3)
691 Seminar in Civil Engineering I (1)
692 Seminar in Civil Engineering II (1)
696 Selected Topics in Civil Engineering (3)
699 Directed Reading or Research (v)
800 Thesis Research (v)

Classics

Graduate Faculty

A. Burns, Ph.D. (Chairman)—Roman republic, Greek philosophy
R. Ball, Ph.D.—Roman and Greek poetry
R. Littman, Ph.D.—Greek history

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 (Latin)

401 Historians (3)
409 Lyric Poets (3)
420 Vergil (3)
427 Satire (3)
428 Drama (3)
433 Roman Philosophy (3)
434 Lucretius (3)
440 Oratory (3)
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 detailed statement of the research they propose, 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.

M.A. and M.F.A.

Two master's degrees are offered: the master of arts (both Plan A and Plan B) and the master of fine arts. For the M.A. thesis the candidate does research in theatre history, criticism, or theory. The M.F.A. thesis 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.

DRAMA AND THEATRE
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 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 or under the Plan C program of the M.A. degree.

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 Plan A, Plan B, and Plan C 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.

A limited number of M.A. candidates can be admitted to Plan C by a general (oral or written) exploratory examination in the beginning of each semester. Plan C candidates must pass the comprehensive examination of Plan B(a) and a final oral examination and submit a research paper. No specific course credits are required under this plan.

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 this University 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 (Econ)

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)
415 Asian Economic Development (3)
420 Mathematical Economics (3)
424 Introduction to the Theory of Statistics (3)
425 Econometrics I (3)
426 Econometrics II (3)
430 Economics of Human Resources (3)
440 Monetary Theory and Policy (3)
450 Public Finance (3)
452 State and Local Finance (3)
458 Public Resource Allocation (3)
460 International Trade and Welfare (3)
461 International Monetary Economics (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)
495 Urban Economics (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)
610 Economic Development I (3)
611 Economic Development II (3)
613 Advanced Economic Development of the U.S. (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)
651 Theory of Public Finance-Revenue (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)
694 Economics of Marine Resources (3)
699 Directed Research (v)
700 Seminar: Macroeconomic Theory

701 Seminar: Microeconomic Theory (3)
710 Seminar in Economic Development (3)
730 Research Seminar (3)
760 Seminar in International Economics (3)
780 Selected Topics in Economic Analysis (3)
800 Thesis Research (v)

Educational Administration

Graduate Faculty

R. R. Dunwell, Ed.D. (Chairman)—administrative theory; foundations of educational administration
C. T. Araki, Ed.D.—public relations, supervision, program evaluation
H. V. Everly, Ph.D.—general school administration
J. A. Thompson, Ph.D.—school law, school finance, collective negotiations
S. S. Varney, Ed.D.—systems planning, systems management

Admission to study is open to any student admitted to graduate studies at the University of Hawaii. Department offerings include upper-division and graduate courses for majors and non-majors.

Students who seek the M.Ed. degree in educational administration must present a minimum of 9 semester hours of professional education course work.

Admission to candidacy is based on (1) written evidence of two years of full-time teaching or equivalent professional experience, (2) the quality of the student’s academic record, and (3) successful completion of a minimum of 9 semester hours of department course offerings, including EA 601.

Plan A requires a minimum of 30 semester hours,
Graduate Faculty

G. Z. Kucera, Ph.D. (Chairman)—communications and sociology
L. A. Butler, Jr., Ph.D.—educational communications and curriculum development
L. A. Lum, M.Ed.—curriculum and educational technology
R. A. Sanderson, Ph.D.—educational communications
R. J. Sparks, Ph.D.—communications and educational technology
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 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;
7. have developed a positive professional attitude, through an active involvement in appropriate professional organizations and community services.

Applicants for admission must possess a bachelor’s degree from an accredited institution, have at least one year of successful teaching experience or equivalent, and submit one copy of the scores on the Graduate Record Examination (aptitude, both verbal and quantitative, and advanced test in education, code 34).

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 scores.

Thesis and nonthesis programs are based on 30 credits beyond the bachelor’s degree. At least 24 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.

It is recommended that students formally apply for fall semester admission but begin their study during
the preceding summer session. All students are required to take the required courses in their proper sequence which begins in the fall semester. The courses with an asterisk are required for the M.Ed. degree in educational communications. Ed EC 404 or its equivalent is a prerequisite required of all students as the first course.

EDUCATIONAL COMMUNICATIONS (Ed EC)

314 Audio Visual Techniques (2)
404 Survey of Educational Communications Media (3)
599 Workshop in Educational Media (1)
*605 Seminar in Media Research Foundations (3)
*620 Production of Instructional Materials (3)
623 Survey and Production of Asian and Pacific Study Materials (3)
625 Educational Still Photography (3)
626 Educational Motion Pictures (3)
*630 Television in Education (3)
635 ETV Systems and Programs (3)
639 Mass Communication and Education (3)
640 Programmed Learning (3)
650 Media Service Administration (3)
670 Educational Communications Systems (3)
*690 Seminar and Internship in Media Leadership (3)
699 Directed Reading and/or Research (v)
750 Seminar in Administration and Management of Media Programs (3)
800 Thesis Research (v)

Educational Foundations

Graduate Faculty

R. Stueber, Ph.D. (Chairman)—history
S. Amioka, Ph.D.—philosophy, Japanese education (on leave)
R. Anderson, Ph.D.—comparative education
W. Boyer, Ed.D.—philosophy, social foundations
M. Ezer, Ed.D.—social foundations
G. Frazier, Ph.D.—philosophy, social foundations
R. Fruehling, Ed.D.—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, 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 theory and practice, and the humanistic and scientific components of education are avoided.

Intended candidates for the M.Ed. degree 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 before admission to candidacy.

Advancement to candidacy is based on the quality of the student's work during the first semester in the program.

Both Plan A (thesis) and Plan B (nonthesis) are available. In both programs, requirements include at least 30 semester credits, two of the Ed EF courses marked with an asterisk, and at least one seminar in the department. Courses in fields of study other than educational foundations will normally be concentrated in one or two of the following: American studies, anthropology, Asian studies, economics, history, philosophy, political science, religion, sociology, or other graduate fields in education. When offered, graduate courses in educational foundations not listed below may be included in degree programs.

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. The thesis carries 6 credit hours. No more than 2 credits of directed research (Ed EF 699) may be included in Plan A. An oral examination on the thesis constitutes the final examination.

Plan B: The program normally includes 18 semester hours of education of which at least 12 credits are in the department of educational foundations. 9 to 12 credits in a planned and approved sequence of courses in other fields are also normal requirements. No more than 6 credits of 699 may be included in Plan B. A final seminar appearance is required at which time the student presents his Plan B project.† This presentation constitutes the final examination in Plan B.

EDUCATIONAL FOUNDATIONS (Ed EF)

409 Culturally and Economically Disadvantaged Pupil (3)
*445 Educational Sociology (3)
*480 Anthropology and Education (3)
490 Zen and Education (3)
*650 Historical Foundations of Western Education (3)
*651 History of American Education (3)
652 History of Education in Hawaii (3)
657 Community College (3)
*660 Philosophy of Education (3)
664 Seminar in Problems in Education (2)
665 Comparative Ideologies and Education (3)
*669 Foundations of Comparative Education (3)
*670 Comparative Education: Europe and America (3)
*671 Comparative Education: Asia (3)
*683 Social Foundations of Education (3)
*684 Education and World Order (3)
685 Education in America (3) (for foreign students only)
*686 Environmental Education (3)
699 Directed Reading and/or Research (v)
725 Education and Social Change (3)
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
767 Seminar in Special Problems in Educational Foundations (2)
770 Seminar in Comparative Education (2)
800 Thesis Research (v)

†See department brochure on Plan B.
Educational Psychology

Graduate Faculty

I. E. Reid, Ph.D. (Chairman)—learning, measurement
D. C. Adkins, Ph.D.—statistics and measurement
J. A. Apfel, Ed.D.—special education
H. I. Ayabe, Ph.D.—cognition and measurement
F. T. Bail, Ph.D.—cognitive development, statistics
A. Blumberg, Ed.D.—special education
T. M. C. Chang, Ph.D.—education of culturally disadvantaged
D. R. Collins, Ed.D.—school counseling
P. Dunn-Rankin, Ed.D.—statistics, computer application
H. J. Dupont, Ph.D.—special education
G. Fargo, Ph.D.—special education
G. Y. Fujita, Ph.D.—statistics
D. W. Fullmer, Ph.D.—counseling: group and individual
T. Gust, Ph.D.—counseling psychology
F. P. Haehnlen, Ph.D.—college student personnel
A. Leton, Ph.D.—school psychology
D. K. McIntosh, Ed.D.—special education
J. Michel, Ph.D.—counseling
W. Nunokawa, Ph.D.—counseling: organization and management
J. M. O'Malley, Ph.D.—early childhood education
T. A. Ryan, Ph.D.—learning, measurement
D. G. Ryans, Ph.D.—measurement
J. L. Shapiro, Ph.D.—counseling and psycho-therapy, encounter groups
D. Sharrill, Ph.D.—research methods, socio-psychology
A. W. Staats, Ph.D.—learning, language development
D. Whittaker, Ph.D.—socio-psychology, higher education

Applicants for the M.Ed. and Ph.D. programs in educational psychology must present a minimum of 12 semester hours in psychology and educational psychology which includes courses in developmental psychology, tests and measurements, and psychological foundations of education.

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, college student personnel, learning, measurement, and research methods. A program in special education is also administered by the department at this time. The curriculum in counseling and guidance meets 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 and 6 hours of thesis research.

Plan B requires a minimum of 30 hours in a planned and approved sequence of courses.

Ph.D.*

The Ph.D. program in educational psychology requires a minimum of three years (six semesters) of graduate study. The master's degree is not ordinarily required as a prerequisite for the Ph.D.; however, the graduate faculty may request potential candidates to complete the master's degree before entering the doctoral program. Two semesters of resident credit may be granted for the master's degree in educational psychology.

The program in educational psychology offers individual programming to students interested in pursuing theoretical work in areas applicable to education. 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) demonstrating proficiency in computer use.

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.

EDUCATIONAL PSYCHOLOGY (Ed EP)

416 Tests and Measurements (3)
429 Introductory Statistics (3)
601 Guidance in the School (3)
602 Elementary School Guidance (3)
603 Introduction to Practicum (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)
615 Clinical Assessment of Exceptional Children (3)
616 Seminar in the Education of Exceptional Children (3)
(1) Mentally Retarded
(2) Emotionally Disabled
(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 (v)
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 (v)

SPECIAL EDUCATION (Ed SE)
404 Introduction to Special Education (3)
405 Curriculum and Instruction in Special Education (3)
406 Learning Characteristics of the Mentally Retarded (3)
407 Learning Characteristics of the Child with Learning and Behavior Disorders (3)
408 Methods and Materials in Teaching the Trainable Mentally Retarded (3)
409 Culturally and Economically Disadvantaged Pupil (3)
410 Methods and Materials in Teaching the Child with Learning and Behavior Disorders (3)
411-412 Identification and Remediation of Learning Difficulties (3-3)
414 Education of Gifted Children (3)
418 Methods and Materials in Teaching the Educable Mentally Retarded (3)
422 Introduction to Learning Disabilities (3)
485 Behavior Modification of Handicapped Children (3)
611 Advanced Curriculum and Instruction in Special Education (3)
615 Clinical Assessment of Exceptional Children (3)
616 Seminar in the Education of Exceptional Children (3)
619 Theory and Practice of Clinical Teaching (3)
627 Advanced Practicum (3)

Electrical Engineering

Graduate Faculty

N. Abramson, Ph.D.—information theory; coding theory
R. Chattopadhyay, Ph.D.—optimization
G. Fang, Ph.D.—acoustics; physical electronics
N. T. Gaarder, Ph.D.—communication theory; information theory
B. S. M. Granborg, Ph.D.—automatic control systems; computer applications
H. H. H. Hwang, Ph.D.—power system analysis; control systems
B. Kinariwala, Ph.D.—system theory; computing algorithms
F. Koide, Ph.D.—biomedical engineering
F. F. Kuo, Ph.D.—system theory; computer applications
W. W. Lichtenberger, Ph.D.—computer systems
S. Lin, Ph.D.—information theory; error-correcting codes
K. Najita, Ph.D.—electromagnetic theory
I. Naqvi, Ph.D.—solid state electronics
W. W. Peterson, Ph.D.—computers; error-correcting codes; information theory
T. H. Roelofs, Ph.D.—radio science; ionospheric physics
D. Slepian, Ph.D.—communication theory
P. F. Weaver, Ph.D.—radio science; ionospheric physics
E. J. Weldon, Jr., Ph.D.—error-correcting codes, computer applications
A. Yen, Ph.D.—control and system optimization
P. C. Yuen, Ph.D.—radio science, satellite communications

M.S.

Intended candidates for the M.S. degree in electrical engineering must present the B.S. degree in electrical engineering or the equivalent. Both Plan A and Plan B require 30 credits in approved technical courses numbered 400 or above of which at least 18 credits must be in electrical engineering. Furthermore, both plans also require 18 credits in courses numbered 600 or above, including at least one graduate seminar in electrical engineering or a related field.

Plan A requires 12 credits in EE 800, Thesis Research, and a minimum of 12 credits in courses numbered 600-799 with a maximum of 2 credits in 699. Plan B requires 18 credits in courses numbered 600-799 with a maximum of 6 credits in 699. All students must be in residence here during the semester in which they receive their degree.

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. All Ph.D. students must also participate in a teaching project.

The intended candidate for the Ph.D. degree must take a written qualifying examination covering the electrical engineering fundamentals and must demonstrate a superior understanding of these fundamentals. This examination will be offered about one week before registration every semester and must be taken by all intended Ph.D. candidates before they begin their third semester. A student who does not pass it, with at most one repetition, will be dropped from the Ph.D. program.

After passing the qualifying examination, the student is advanced to candidacy and should have a thesis committee appointed within two semesters. The committee should consist 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 proceeds with his dissertation research.

At the conclusion of his research, the student writes a dissertation which must be approved by a majority of the thesis committee. Finally, the student must pass an oral examination covering primarily his dissertation.
The fundamental purpose of the master’s program in elementary education is to promote the continued development of professional competency of each candidate in both general and special areas of elementary education so that he may effectively serve in whatever position he holds or hopes to secure.

More specifically, the program is aimed towards producing individuals who are (1) knowledgeable about the developmental and educational needs of children from various types of communities, (2) skillful in diagnostic and evaluation procedures and in developing educational programs to meet individual and group needs, (3) versatile in their employment of teaching strategies, (4) capable of providing leadership in a team situation in a classroom, school, or school system, (5) knowledgeable about issues, trends and research in their fields, and (6) objective in their assessment of trends and innovations.

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, and (2) 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, 3-6 in foundations of education, 9-18 in elementary education, and 9-18 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.

Elementary Education

Graduate Faculty

E. C. Jenkins, Ph.D. (Chairman)—elementary curriculum, supervision, language arts
M. C. Austin, Ed.D.—reading and language arts
A. Becker, Ed.D.—art education
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

ELECTRICAL ENGINEERING (EE)

411 Introduction to System Analysis (3)
422 Electronic Instrumentation (3)
423 Instrumentation Laboratory (1)
424 Integrated Circuit Fabrication Techniques (3)
425 Integrated Circuits (3)
427 Physical Electronics (3)
428 Digital Electronics (3)
435 Power System Analysis (3)
441 Communication Systems (3)
442 Statistical Communication Theory (3)
446 Information Theory and Coding (3)
451 Feedback Control Systems (3)
452 Feedback Control Systems Laboratory (1)
453 Modern Control Theory (3)
456 Switching Circuit Theory (3)
461 Digital Systems and Computer Design (3)
462 Digital Techniques Laboratory (1)
463 Analog Computers (3)
466 Computer Organization and Programming Techniques (3)
467 Algorithmic Languages (3)
473 Microwave Theory and Techniques (3)
475 Radio-wave Propagation (3)
477 Fundamentals of Radar, Sonar and Navigational System (3)
481 Bioelectricity (3)
486 Basic Biomedical Electronics (3)
487 Basic Biomedical Electronics Laboratory (1)
491-492 Special Topics in Electrical Engineering (3-3)
499 Project (1 to 6)
613 Linear System Analysis (3)
614 Analysis of Nonlinear Systems (3)
616 System Theory (3)
617 Computer-Aided Circuit Design (3)
618 System Optimization (3)
623 Advanced Electronic Instrumentation (3)
627 Advanced Topics in Physical Electronics (3)
646 Signal and Noise Theory (3)
647 Applied Statistical Decision Theory (3)
648 Error-Correcting Codes (3)
651 Non-linear Control Systems (3)
652 Optimal Control Systems (3)
654 Concepts of Digital System Control (3)
655 Sampled-Data Control Systems (3)
657 Hybrid Automatic Control Systems (3)
660 Computer Organization (3)
661 Theory and Design of Digital Machines (3)
671-672 Electromagnetic Theory and Applications (3-3)
673 Magneto-Ionic Theory (3)
677 Antenna Theory (3)
691-692 Seminar in Electrical Engineering (1-1)
693 Special Topics in Electrical Engineering (3)
699 Directed Reading or Research (v)
800 Thesis Research (v)

CURRICULUM AND INSTRUCTION (Ed CI)

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 (v)
*722 Seminar in Elementary Curriculum Foundation (3)—Limited to master’s candidates
800 Thesis Research (v)

*For those who wish to concentrate on Early Childhood Education, C1667 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
A. G. Day, Ph.D. (retired)—consultant in Pacific literature
L. Edel, Ph.D.—comparative literature, fiction, theory, literary psychology, theory of biography, American literature
A. Friedson, Ph.D.—20th-century literature
T. H. Fujimura, Ph.D.—Restoration literature, drama
J. M. Gray, Ph.D.—literary theory
W. E. Huntsberry, M.A.—writing
J. Kau, Ph.D.—Renaissance
R. L. Larson, Ph.D.—rhetoric and composition, Restoration literature
A. P. Leib, Ph.D.—American literature, medieval literature, Pacific literature
A. J. Levy, Ph.D.—American literature
J. K. Lowers, Ph.D.—Elizabethan literature
J. Maltby, Ph.D.—modern drama, 18th-century literature
E. McCutcheon, Ph.D.—Renaissance and 17th-century literature
B. Menikoff, Ph.D.—American literature
T. Pak, Ph.D.—language and linguistics
Y. Shen, Ed.D.—English language
M. C. Solomon, Ph.D.—20th-century literature
D. Stempel, Ph.D.—19th-century literature, linguistics, criticism
B. M. Stillians, Ph.D.—English romanticism, American literature
T. L. Summersgill, Ph.D.—Elizabethan literature, Chaucer
T. F. Teevan, Ph.D.—modern English and Irish literature
P. R. Thompson, Ph.D.—modern poetry, creative writing
L. E. Winters, Ph.D.—comparative literature, Chinese and American literature

Intended candidates for the M.A. in English are expected to have acquired 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 foreign language. Courses for the M.A. are selected mainly from the following list, although 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 from medieval times to the present is taken near the end of the program by students in Plan B. Students in Plan A are tested on the same material at a two-hour oral examination following completion of the thesis. Plan A requires 18 credits in courses and 12 for the thesis.

The department also offers Plan C, which allows for a demonstration of competence through examination rather than through course work or thesis. For further information, see the description of Plan C in this bulletin and in the English department’s supplementary mimeographed description of its programs.

At present, the department does not offer a Ph.D.

ENGLISH (Eng)

401  Modern English Grammar (3)
402  History of the English Language (3)

English as a Second Language

Graduate Faculty

R. Crymes, Ph.D. (Chairman)—practicum and English language
E. Afendras, Ph.D.—language acquisition
V. Bickley, Ph.D.—practicum and language acquisition
C. Blatchford, Ph.D.—practicum and English language
G. Dykstra, Ph.D.—practicum
M. Higa, Ed.D.—language acquisition
K. Jackson, Ed.D.—practicum
R. Krohn, Ph.D.—practicum and English language
M. Lester, Ph.D.—English language
C. Mason, Ph.D.—practicum
T. Plaister, M.A.—practicum
T. Rodgers, Ph.D.—language acquisition
D. Steinberg, Ph.D.—language acquisition
R. Whitman, Ph.D.—practicum and English language

The M.A. program in teaching English as a second language is designed to prepare specialists in this field. The department offers Plan A (thesis), Plan B (nonthesis) and Plan C (see below).

Curriculum: 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 through current 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 and research in language acquisition is a distinctive characteristic of this program.

Undergraduate Preparation for Plans A and B: 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.

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.

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).

Native speakers of English 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.

Advancement to Candidacy: There is no general examination required. A student is advanced to candidacy upon recommendation of the graduate faculty at the end of that semester, normally his first, in which he has completed a minimum of 6 credit hours in ESL courses, has a minimum grade of B in all ESL courses taken, and has an overall cumulative GPR of 3.0. Comprehensive and final examination requirements vary according to the program plan selected (see below).

Plan A

Plan A is a 30-credit program of which 6 credit hours are allotted to thesis research and 24 credit hours to course work. In his course work the student must complete the program requirements for one of the three programs outlined under Plan B: (1) the general program; (2) the specialization in English language; or (3) the specialization in language acquisition. See Plan B below. Plan A requires two one-hour oral exams, the first at the time that the thesis proposal is presented and the second at the time the thesis is completed.

Plan B

Students following Plan B may elect the general course or an area of specialization in either English language or in language acquisition. (All courses carry 3 units of credit.)

General Course

<table>
<thead>
<tr>
<th>Area I Practicum (9 units required)</th>
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<tbody>
<tr>
<td>Required</td>
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<tr>
<td>ESL 610 Teaching English as a Second Language</td>
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<tr>
<td>ESL 710 Materials Selection and Adaptation</td>
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<tr>
<td>or</td>
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<td>ESL 711 New Materials Development</td>
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<tr>
<td>ESL 730 Seminar in Teaching English as a Second Language</td>
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</tbody>
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<tr>
<th>Electives</th>
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<tbody>
<tr>
<td>ESL 425 Linguistics and Reading</td>
</tr>
<tr>
<td>ESL 720 Second Language Testing</td>
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<table>
<thead>
<tr>
<th>Area II English Language and Linguistics (6 units required)</th>
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</thead>
<tbody>
<tr>
<td>Required</td>
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<tr>
<td>ESL 450 English Syntax</td>
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<tr>
<td>ESL 460 English Phonology</td>
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<tr>
<th>Electives</th>
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<tbody>
<tr>
<td>ESL 360 The English Language in Hawaii</td>
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<tr>
<td>ESL 451 Advanced English Syntax</td>
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<tr>
<th>Area III Language Acquisition (6 units required)</th>
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</thead>
<tbody>
<tr>
<td>Required</td>
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<tr>
<td>ESL 650 Psycholinguistics in Second Language Learning</td>
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<tr>
<td>ESL 660 Culture in 2nd Language Learning</td>
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<tr>
<td>or</td>
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<tr>
<td>ESL 670 Comparison of 1st and 2nd Language Acquisition</td>
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</tbody>
</table>

Comprehensive Examination: The Comprehensive consists of two parts: written examinations covering Areas II and III, and the presentation and defense of a project undertaken as part of ESL 730, Seminar in Teaching English as a Second Language.

Specialization in English Language

<table>
<thead>
<tr>
<th>Area I Practicum (3 units required)</th>
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<tbody>
<tr>
<td>Required</td>
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<tr>
<td>ESL 610 Teaching English as a Second Language</td>
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</tbody>
</table>

(This may be substituted for by another course in the practicum area, if the student has had teaching experience.)

<table>
<thead>
<tr>
<th>Area II English Language and Linguistics (15 units required)</th>
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<tbody>
<tr>
<td>Required</td>
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<tr>
<td>ESL 450 English Syntax</td>
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<tr>
<td>ESL 460 English Phonology</td>
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<tr>
<td>ESL 730 Seminar in Teaching English as a Second Language</td>
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<tr>
<th>Electives (Choose two courses)</th>
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<tbody>
<tr>
<td>ESL 360 The English Language in Hawaii</td>
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<tr>
<td>ESL 451 Advanced English Syntax</td>
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<tr>
<td>Eng 401 Modern English Grammar</td>
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<tr>
<td>Eng 402 History of the English Language</td>
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<td>Eng 403 American English</td>
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<td>Eng 404 English Phonology</td>
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<tr>
<td>Ling 410 Articulatory Phonetics</td>
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<tr>
<td>Ling 421 Introduction to Phonological Analysis</td>
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<tr>
<td>Ling 422 Introduction to Grammatical Analysis</td>
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<tr>
<td>Ling 611 Acoustic Phonetics</td>
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<td>Ling 615 The Nature of Language</td>
</tr>
</tbody>
</table>
Ling 621 Phonology
Ling 622 Grammar
Ling 635 Language Variation

Area III Language Acquisition (3 units required)

Required
ESL 650 Psycholinguistics in Second Language Learning

Electives (9 units required)
Three courses related to the program are to be selected.

Comprehensive Examination: Two written comprehensive examinations will be given: a three-hour examination in the area of specialization and a one-hour examination in either practicum or language acquisition.

Specialization in Language Acquisition

Area I Practicum (3 units required)

Required
ESL 610 Teaching English as a Second Language
(This may be substituted for by another course in the practicum area, if the student has had teaching experience.)

Area II English Language and Linguistics (6 units required)

Required
ESL 450 English Syntax
ESL 460 English Phonology

Area III Language Acquisition (12 units required)

Required
ESL 650 Psycholinguistics in Second Language Learning
ESL 660 Culture in Second Language Learning
ESL 670 Comparison of 1st and 2nd Language Acquisition
EdEP 429 Introductory Statistics

Electives (9 units required)
Three courses related to the program are to be selected.

Comprehensive Examination: Two written comprehensive examinations will be given: a three-hour examination in the area of specialization and a one-hour examination in English language and linguistics.

Plan C

Plan C is available to applicants who meet the following additional qualifications:

a) They must be fluent speakers of English.
b) They must have had a minimum of five years full-time experience working in the field of teaching English as a second language.
c) During the five years they must have had at least two years of administrative, teacher training, or materials development responsibility.
d) They must have had an outstanding academic record and a high performance on the Graduate Record Examination.

Students enrolled under Plan C are exempted from the 30-credit requirement and from the specific course requirements of Plan B (but not from the residency requirement). The exact nature of the student's program will be determined after his arrival. Students in Plan C must take a final oral examination in addition to the comprehensive examination described in Plan B—General Course.

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 and spring.

Entomology

Graduate Faculty

W. C. Mitchell, Ph.D. (Chairman)—economic entomology
J. W. Beardsley, Jr., Ph.D.—biological control, systematics
H. A. Bess, Ph.D.—biological control and ecology
W. Carter, Ph.D. (Professor Emeritus)—insect transmission of plant pathogens
F. Chang, Ph.D.—insect physiology
M. D. Definado, Ph.D.—systematics
F. H. Haramoto, Ph.D.—acarology
D. E. Hardy, Ph.D.—taxonomy, medical entomology
A. A. LaPlante, Ph.D.—extension entomology
R. Namba, Ph.D.—insect transmission of plant pathogens
T. Nishida, Ph.D.—ecology and biological control
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. J. Davis, B.S.—biological control
J. L. Gressitt, Ph.D.—taxonomy
C. R. Joyce, Ph.D.—medical entomology
A. K. Ota, Ph.D.—applied entomology and ecology
F. J. Radovsky, Ph.D.—acarology
K. Sakimura, B.S.—pineapple insects
W. A. Steffan, 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.

Graduate programs in entomology encompass independent study, course work and research. The thesis based on original research is the major part of the master's (Plan A) and doctoral programs. All candidates must take a general examination, diagnostic in nature, early in their program.

The department offers a master's degree program under either Plan A (thesis) or Plan B (nonthesis).
The department offers a master of science degree program under either Plan A (thesis) or Plan B (nonthesis). Intended candidates should have undergraduate preparation in chemistry through quantitative and organic, physics, mathematics through college algebra and trigonometry, and biology (including general microbiology as well as some other biological science).

Students are advanced to candidacy on the recommendation of their adviser after taking written general examinations which are diagnostic in nature. A committee consisting of three faculty members will set course requirements, guide thesis work, and conduct
the final examination. Courses are selected from those offered in the major field of food science and in related fields such as chemistry, biochemistry, microbiology, nutrition, public health, and agriculture.

Under Plan A, a minimum of 18 semester hours of course work and 12 semester hours of thesis research are required. Thesis work in food science may be carried out in one of the following areas: food technology (including tropical fruit and seafood processing), biochemistry, chemistry, microbiology, engineering, sensory evaluation, irradiation, safety (including detection and metabolism of pesticides and natural toxins), fermentation, and waste product utilization. Under Plan B, a minimum of 30 semester hours of course work is required. All candidates (Plans A and B) must take Food Science 620 and 701. A final seminar presentation and an oral examination on the thesis (Plan A) or on a selected topic (Plan B) are required for all students.

FOOD SCIENCE (FdSc)

401 Food Processing (3)
403 Microbiology of Foods (3)
411 Food Engineering (3)
430 Food Chemistry (3)
604 Special Topics in Food Microbiology (v)
610 Advanced Food Processing-I (3)
613 Advanced Food Processing-II (3)
620 Seminar (1)
630 Food Fermentation (3)
640 Food Safety (2)
699 Directed Research (v)
701 Recent Advances in Food Research (1)
730 Biochemical and Chemical Aspects of Foods (3)
800 Thesis Research (v)

French

Graduate Faculty

D. B. Aspinwall, Ph.D. (Chairman)—poetry, 20th-century literature
L. Forno, Ph.D.—18th-century literature
E. Jackson, Ph.D.—novel, criticism, 19th-century prose
H. Niedzielski, Ph.D.—medieval language and literature, phonetics
R. Baciu, Doct. de l'Univ.—theatre of absurd, surrealism
R. Ignatius, Ph.D.—medieval, 20th-century literature
E. Zants, Ph.D.—19th, 20th-century literature

Candidates may emphasize either French literature or linguistics and the methodology of language teaching, and in each case may select a thesis program (Plan A), or a nontesis program (Plan B). 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; (4) an acceptable score on the advanced French Literature section of the Graduate Record Examinations.

Under Plan A degree requirements include 30 credit hours: a minimum of 24 hours of course work and a minimum 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) which carries 1 credit only in French, 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 and a thesis. Up to 8 credits in related fields may be elected.

Under Plan B degree requirements include 30 hours of course work of which a minimum of 12 credits 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. Up to 8 credits in related fields may be elected.

FRENCH (Fr)

407 Introduction to Medieval Language and Civilization (3)
408 Masterpieces of Medieval Literature (3)
410 Masterpieces of 16th-Century Literature (3)
411-412 Masterpieces of 17th-Century Literature (3-3)
413 Masterpieces of 18th-Century Literature (3)
415-416 Masterpieces of 19th-Century Literature (3-3)
420 20th-Century French Novel (3)
421 20th-Century French Theatre (3)
422 20th-Century French Poetry (3)
425 Current French Literature (3)
491 Seminar in French Literature (3)
601 Seminar in 20th-Century French Literature (3)
602 Seminar in French Poetry (3)
605 French Prose Literature of the Last 30 Years (3)
609 French Renaissance (3)
620 Masterpieces of the 17th Century (3)
651 Philosophic Currents of the 18th Century (3)
661 Stylistics (3)
666 Seminar in History of French Literary Criticism (2)
671 History of the Language (4)
672 Medieval Literature (3)
677 Seminar in French Language (3)
681 The Novel in France (3)
685 Seminar in Realism in French Literature (3)
690 The Theatre in France (3)
699 Directed Research (v)
735 Seminar in French Literature (3)
800 Thesis Research (v)
Both M.S. and Ph.D. degrees in genetics are offered. The M.S. Plan B is based on course and laboratory work and available to students who feel they would benefit from a knowledge of genetics and genetic techniques in their chosen careers; for example, medical students, medical technologists, paramedical personnel, psychologists and social scientists. The courses are mainly oriented to human genetics and a typical program consists of Genet 480, 611, 618, 702, 712, 3 credits of 699 and two semesters of 654, plus clinical biochemistry (MT 471-472) or basic biochemistry and lab (Bioch 441-2). Additionally, Genet 671-2, or Psyty 607 may be used to complete the requirement of 30 credit hours. Other combinations of courses and credit hours are possible, depending on individual preference.

The Plan A M.S. is also offered and the required course work consists of Genet 480, 618, 650, four semesters of 654 and Bioch 441, plus other courses from the department’s graduate offerings to bring the total to at least 20 credit hours. The M.S. thesis counts as 10 units of credit.

The Ph.D. has the same formal course requirements as the Plan A M.S. A written and oral comprehensive examination is given following completion of formal course requirements, and the degree is completed by submission and defense of an acceptable dissertation.

Candidates with an M.S. in an appropriate discipline may register for the Ph.D. program. Individuals who pass the department’s qualifying examination may register for the Ph.D. without first obtaining the M.S. degree, with the concurrence of the department faculty.

Ph.D. candidates are expected to indicate their main areas 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 professor concerned agree.

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 and statistical genetics an adequate mathematical background is desirable. For molecular genetics, organic and biochemistry backgrounds are desirable. The Graduate Record Examination (aptitude and advanced test in biology) and two letters of recommendation are required of all applicants.
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: agricultural climatology, air pollution 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.

Field, quantitative and computer methods; model building; cartography and remote sensing.

Students are encouraged to decide early upon their fields of specialization. They must expect to cross disciplinary lines and incorporate within their programs considerable work in related fields.

M.A.

Applicants for admission to the M.A. program in geography must provide the following information: (1) two transcripts; (2) Graduate Record Examination scores (aptitude tests only); (3) completed application forms (available from the department and the Graduate Division); (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. Any subject area weakness of incoming students must be remedied by course work.

The department offers both Plan A (thesis) and Plan B (nonthesis) programs. The appropriate program is determined on the basis of the student’s professional and vocational goals. 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.

In consultation with the advisory committee, the candidate will plan a coherent study program of departmental offerings and pertinent courses from other departments. The student must develop a primary field of systematic specialization consisting of at least 9 credit hours and a secondary area of interest, regional or systematic, that normally will consist of at least 6 credit hours. 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 candidates 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.

The Ph.D. program will consist of advanced courses and research seminars in the department, independent reading and research, and work in related disciplines. 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) a minimum of 12 credit hours each in a primary field of systematic specialization and a second field of interest, regional or systematic. In total, a Ph.D. program shall consist of no less than 39 credit hours, not including audit, pass/fail or credit/no credit options; (2) adequate work in supporting discipline(s) to be decided by the advisory committee in consultation with the student; (3) familiarity with the general development of geographic thought (Geog 691 or the equivalent).

Ph.D. candidates are expected to develop research skills beyond those required of M.A. students. All Ph.D. candidates must demonstrate competence in:

1) Two languages (except that Chinese or Japanese alone will fulfill this requirement);
   or
2) One language and quantitative methods;
   or
3) One language and field/laboratory techniques.
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

GEOGRAPHY (Geog)
300 Introduction to Climatology (3)
310 Modification of the Biosphere (3)
314 Geography of the Tropics (3)
400 Advanced Climatology (3)
405 Water Resources Management (3)
406 Applied Climatology (3)
407 Air Pollution Meteorology-Climatology I (3)
408 Air Pollution Meteorology-Climatology II (3)
415 Medical Geography (3)
600 Seminar in Climatology (3)

Systematic Human Geography

326 Conservation and Resource Management (3)
328 Perspectives on Environment and Culture (3)
330 Population Geography (3)
335 Political Geography (3)
339 Geography of Exploration (3)
351 Elements of Regional Science (3)
420 Location Theory and Regional Analysis (3)
421 Urban Geography (3)
423 Urbanization and Urban Problems in Asia (3)
425 Spatial Analysis of Social Behavior (3)
612 Ecological Concepts and Planning (3)
620 Regional Economic Analysis (3)
621 Urban Systems and Analysis (3)
632 Field Study of Population (3)

Area Courses

340 Geography of the United States and Canada (3)
345 Geography of the Soviet Union (3)
350 Geography of Asia (3)
352 Geography of Japan (3)
353 Geography of China (3)
355 Geography of South Asia (3)
356 Geography of Southeast Asia (3)
361 Australia and New Zealand (3)
365 Geography of the Pacific (3)
368 Geography of Hawaii (3)
650 Seminar in Geography of Asia (3)
(1) Asia
(2) China
(3) Japan
(4) Southeast Asia
(5) South Asia
665 Seminar in Geography of the Pacific (3)

Techniques and Methodology

375 Introduction to Cartography and Airphoto Methods (3)
380 Quantitative Methods in Geography (3)
470 Remote Sensing (3)
475 Cartographic Production (3)
476 Advanced Cartography (3)
680 Advanced Quantitative Methods in Geography (3)
685 Computer Applications in Geography (3)

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 Geophysics (3)
750 Research Seminar (3)
(1) applied urban climatology
(2) biogeography
(3) medical geography
(4) resource management
(5) population geography
(6) economic geography
(7) urban geography
(8) geographic aspects of economic development
(9) cultural geography
(10) conservation
(11) quantitative models and methods
791 Field Camp (1)
799 Directed Research (v)
800 Thesis Research (v)

Geology and Geophysics

Graduate Faculty

S. H. Laurila, Ph.D. (Department Chairman)—geodesy, electronic surveying
A. T. Abbott, Ph.D.—geomorphology, economic geology
W. M. Adams, Ph.D.—seismology, applied geophysics
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
A. S. Furumoto, Ph.D.—seismology, geophysics
R. H. Johnson, Ph.D.—geophysics
M. A. Khan, Ph.D.—satellite geodesy, gravity, geophysics
G. A. Macdonald, Ph.D.—volcanology, igneous petrology
A. Mahaffy, Ph.D.—geomagnetism, gravity
M. H. Manghani, Ph.D.—high pressure geophysics and geochemistry
R. Moberly, Ph.D.—marine geology, sedimentology
J. J. Naughton, Ph.D.—geochemistry
K. A. Pankiwskyj, Ph.D.—metamorphic geology, silicate phase petrology
F. L. Peterson, Ph.D.—hydrogeology, engineering geology
J. M. Resig, Dr. rer. nat.—micropaleontology
J. C. Rose, Ph.D.—gravity, marine geophysics
G. H. Sutton, Ph.D.—seismology, exploration geophysics
H. H. Veeh, Ph.D.—marine geology
G. P. Woolard, 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

For Cooperative Faculty, see under Hawaii Institute of Geophysics or Water Resources Research Center in the General Catalog.

Degree Requirements

M.S. The faculty will determine the suitability of Plan A or B at the preliminary conference. For Plan A a minimum of 24 credit hours of course work and
6 hours of thesis research, as well as general and thesis examinations, are required. For Plan B 30 credit hours of course work and final examination are required.

**Ph.D.** A candidate must pass a comprehensive examination which can be either oral or oral and written, depending on the particular area and a final examination in defense of his dissertation. A reading comprehension of one foreign language with useful scientific literature in the field of the candidate is required. The language must be approved by the department.

**Intended candidates** will be accepted from undergraduate majors in the natural sciences, mathematics, and engineering, and normally would be expected to have completed at least one year each of college mathematics, geology, physics, and chemistry. Adequacy of each applicant's additional preparation will depend on the particular branch of geology and geophysics to be pursued. At the time of his application, the student should state the area or areas in which he intends to study. Those in the following list are active fields of research in the department. For each, the normal undergraduate preparation is listed.

Students entering the area of **general geology**, must have had at least one semester each of mineralogy, petrology, structural geology, and geological field methods. For **general geophysics**, the student must have a good foundation in physics or engineering, and in mathematics. Students entering **geodesy** should be familiar with the principles of surveying and photogrammetry, and as a minimum, have taken general physics and mathematics through calculus. Background for **hydrology and engineering geology** will require courses in all of geology, physics, chemistry, and mathematics. For **marine geology and geophysics**, the undergraduate background should be such that the student can commence formal work in sedimentology, exploration geophysics, tectonics, and physical oceanography. Students entering **seismology** must have a strong background in physics or engineering and in mathematics. For **volcanology and petrology**, students must have a background that includes mineralogy and optical mineralogy, petrology, structural geology, and geological field methods.

Undergraduate deficiencies, which must be made up, will be listed on the basis of the applicant's transcripts, and from the results of an entrance placement examination as part of the preliminary conference with the departmental graduate work committee during the time of registration.

Information on the course of study and research opportunities in each of the fields of interest listed above, and on financial aid, can be obtained from the department.

**Progress**

Space and financial assistance are at a premium, and each student's progress will be reviewed annually.

### GEOLOGY AND GEOPHYSICS (GG)

- **301** Mineralogy (3)
- **302** Petrology (3)
- **303** Structural Geology (3)
- **305** Geological Field Methods (2)
- **306** Work of Water (4)
- **316** Geomorphology (3)
- **319** Seismology (3)
- **320** Principles of Geophysics (3)
- **411** Paleontology (3)
- **412** Micropaleontology (3)
- **415** Regional Geology (2)
- **424** Advanced Mineralogy (5)
- **425** Geochemistry (3)
- **426** Advanced Petrology (3)
- **430** Geology of Asia (2)
- **440** Economic Geology (2-2)
- **454** Engineering Geology (3)
- **455** Ground-water Geology (4)
- **457** Introduction to Geodetic Science (3)
- **463** Physical Properties of Earth Matter (3)
- **465-466** Geophysical Exploration (4-4)
- **481** Potential Theory (4)
- **482** Elements of Space Science (3)
- **601** Seminar in Volcanology (2)
- **602** Seminar in Petrology (2)
- **605** Seminar in Engineering and Ground-water Geology (3)
- **607** Seminar in Ore Deposits (2)
- **609** Seminar in Geomorphology (2)
- **614** Advanced Field Study (v)
- **619** Sedimentology (3)
- **620** Stratigraphy (3)
- **623** Marine Geology (3)
- **625** Seminar in Current Research Topics (v)
- **655** Seismic Source Mechanisms (3)
- **656** Seismic Propagation Phenomena (3)
- **657** Analysis and Synthesis of Seismograms (3)
- **658** Seismometry and Seismological Model Study (3)
- **659** Physics of the Earth's Interior (3)
- **660** Seminar in Solid Earth Geophysics (v)
- **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)
- **672** Seminar in Geotectonics I (3)
- **673** Seminar in Geotectonics II (3)
- **674** Rock Magnetism and Paleomagnetism (3)
- **675** Seminar in Geomagnetism (v)
- **680** Seminar in Geodesy (v)
- **681** Physical Geodesy (4)
- **683** Satellite Geodesy (3)
- **685** Adjustment Computation (3)
- **799** Directed Research (v)
- **800** Thesis Research (v)

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**German**

**Graduate Faculty**

- R. Seymour, Ph.D. (Chairman)—Germanic linguistics
- J. Crean, Ph.D.—methodology
- D. Dauer, Ph.D.—18th-and 19th-century German literature and philosophy
- A. Moore, M.A.—linguistics and stylistics
- J. Sang, Ph.D.—19th-and 20th-century literature
- W. Scherer, Ph.D.—Medieval, Reformation and Baroque literature
- N. Schweizer, Ph.D.—18th-century literature, Classicism, and comparative 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 experience of writing a thesis. Plan B is intended primarily
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GERMAN (Ger)

409 Enlightenment-Strum Drang (3)
410 Classicism (3)
411 Romanticism (3)
413-414 German Literature from 1880 to the Present (3-3)
415 Contemporary German Literary Activity (3)
428 Survey of German Lyric Poetry (3)
432 Stylistics (3)
451 Introduction to History of German Language (3)
452 Introduction to Middle High German (3)
609-610 Middle High German (3-3)
615 History of the German Language (3)
616 History of the German Language (3)
632 German Stylistics (3)
650 Seminar: The German Essay (3)
651 Seminar: The German Novel (3)
652 Seminar: The German Drama (3)
653 Seminar: Lyric Poetry (3)
654 Seminar: The German Novel (3)
655 Faust I (3)
690 Directed Research (v)
735 Seminar (3)
800 Thesis Research (6)

EUROPEAN LANGUAGES (EL)

630 Seminar in Research Methods (v)

CURRICULUM AND INSTRUCTION (Ed CI)

640 Seminar in Teaching Fields (3)

History

Graduate Faculty

S. Uhalley, Ph.D. (Department Chairman)—modern China, Chinese Communism
G. Akita, Ph.D.—Far East, modern Japan
E. D. Beecher, Ph.D.—United States economic
J. J. Connors, Ph.D.—European intellectual
C. B. Cowing, Ph.D.—United States social and economic
R. E. Cubberly, Ph.D.—early modern Europe, France
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
H. H. Kang, Ph.D.—Far East, Korea
D. W. Y. Kwok, Ph.D.—modern China, Chinese thought
T. B. Lam, Ph.D.—Southeast Asia, Vietnam
H. J. Lamley, Ph.D.—modern China
H. F. Margulies, Ph.D.—United States political, the Progressive Era
W. H. Maurer, Ph.D.—ancient Near East, Greece and Rome
M. McCutcheon, Ph.D.—United States cultural and social
B. E. McKnight, Ph.D.—Sung China
H. B. Melendy, Ph.D.—Asian immigration, education
V. D. Morris, Ph.D.—pre-modern Japan
H. A. Newby, Ph.D.—19th century United States, Negro
G. R. Nunn, Ph.D.—Asia, research methods and resources
R. L. Rapson, Ph.D.—United States intellectual and cultural
R. K. Sakai, Ph.D.—Far East, modern Japan
A. W. Saville, Ph.D.—modern Europe, Germany
J. Sharma, Ph.D.—South Asia
M. Shinoda, Ph.D.—Far East, pre-modern Japan
M. P. Speidel, Ph.D.—ancient Europe, Roman Empire
J. Stalker, Ph.D.—recent United States social and economic
B. Stein, Ph.D.—India
J. J. Stephan, Ph.D.—modern Japan, Japanese foreign policy
R. Van Niel, Ph.D.—Southeast Asia, Indonesia
W. F. Vella, Ph.D.—Southeast Asia, Thailand
R. A. Wade, Ph.D.—Russian intellectual
J. A. White, Ph.D.—Russia, Russia in Asia

Intended candidates must present a minimum undergraduate preparation of 18 upper-division credits in history. Students who lack this preparation or who wish to undertake study in a new area of history must make up deficiencies either before or during graduate study. 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, covering a research paper originating in a graduate course and the two fields of history offered in the comprehensive examinations. 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 primarily 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 (Hist)

Asia

401-402 History of South Asia (3-3)
405-406 History of Southeast Asia (3-3)
407 National and Regional History in Southeast Asia (3)
   (1) Southeast Asia to 1300 A.D.
   (2) Southeast Asia 1300 to circa 1750
   (3) Modern Philippines
   (4) Modern Malaysia
   (5) Modern Indonesia
   (6) Modern Vietnam, Laos, and Cambodia
   (7) Modern Thailand
   (8) Modern Burma

409-410 History of China (3-3)
411-412 Local History of China (3-3)
413-414 History of Japan (3-3)
415-416 Imperial and Feudal Institutions of Traditional Japan (3-3)
417-418 History of Korea (3-3)
496 Senior Tutorial in History (Section on Japan)
654 Seminar in Mainland Southeast Asian History (3)
655 Seminar in Island Southeast Asian History (3)
661 Seminar in Chinese History (3)
663 Seminar in Indian History (3)
   (1) Ancient India
   (2) South India
   (3) Muslim India
   (4) Modern South Asia
665 Seminar in Japanese History (3)
   (1) Traditional
   (2) Early Modern
   (3) Modern
667 Seminar in Korean History (3)
701 Research Materials and Methods in Asian History (3)
709-710 Institutional History of Korea (3-3)
711 Korean Historical Literature (3)
713-714 Chinese Historical Literature (3-3)
717-718 Chinese Intellectual History (3-3)
721-722 China from Classical Antiquity to 750 (3-3)
722-724 China from 750 to 1700 (3-3)
725-726 Contemporary China Seminar (3-3)
727-728 Japanese Historical Materials and Sources (3-3)
730 Japan: The Bakumatsu Period (1830-1873)
731 Seminar in Political History of Modern Japan
733-734 Japanese Intellectual History (3)
735-736 Seminar on Pre-Modern Japan c. 850-1800 (3-3)

The Pacific

421 Australia and New Zealand (3)
422 History of Oceania (3)
424 History of the Hawaiian Islands (3)
425 The United States in the Pacific (3)
675 Seminar in Pacific History (3)

Americas

461 Colonial America to 1790 (3)
462 The Young Republic: U.S. History 1789-1841 (3)
463 Crisis of the Union: U.S. History 1841-1877 (3)
464 The Transformation of America: U.S. History 1877-1920 (3)
465 Troubled Peace: U.S. History 1920-1941 (3)
466 America and World Leadership: The U.S. Since 1941 (3)
471-472 Diplomatic History of the United States (3-3)
475 Constitutional History of the United States (3)
477-478 Economic History of the United States (3-3)
480 History of Black Americans (3)
481-482 American Thought and Culture (3-3)
483 The West in American History (3)
484 The South in American History (3)
485 The City in American History (3)
486 Representative Americans (3)
487-488 History of Latin America (3-3)
631 Advanced Problems and Reading in American History (3)
635 The Colonial Period in American History (3)
636 Seminar in Nineteenth-Century American History (3)
637 The Progressive Period in American History (3)
638 Seminar in Recent American History (3)
640 Seminar in American Social and Intellectual History (3)
641 Seminar in American Diplomatic History (3)

Europe

419 European Expansion (3)
426 The Ancient Near East (3)
427 Ancient Greek History (3)
428-429 Roman Civilizations (3-3)
431-432 Medieval Europe, 300-1300 (3-3)
435 Renaissance and Reformation, 1300-1600 (3)
437 Early Modern Europe, 1600-1800 (3)

HISTORY
HORTICULTURE

438 French Revolution, 1789-1815 (3)
439 Europe in the Nineteenth Century (3)
440 Europe since Versailles (3)
441-442 East Central Europe (3-3)
443-444 History of Germany (3-3)
445-446 History of France (3-3)
447-448 History of England (3-3)
449-450 History of Russia (3-3)
451-452 Modern Russian and Soviet Foreign Policy (3-3)
453-454 Intellectual History of Russia and the Soviet Union (3-3)
455-456 European Intellectual History (3-3)
459 Constitutional History of England (3)
473-474 History of Spain and Portugal (3-3)
611 Seminar in European History (3)

Historiography, Historical Method, and Directed Research

602 Seminar in Histoi rioty (3)
603 Colloquium in the Instruction of History (1)
799 Directed Research (v)
800 Thesis Research (v)

Horticulture

Graduate Faculty

H. Kamemoto, Ph.D. (Chairman)—cytogenetics and breeding of ornamentals
J. L. Brewbaker, Ph.D.—genetics, corn breeding, radiobiology
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
B. A. Kratky, Ph.D.— vegetable physiology and management
C. L. Murdoch, Ph.D.— turf management
H. Y. Nakasone, Ph.D.— tropical fruit breeding
R. K. Nishimoto, Ph.D.— weed control, vegetable physiology
P. E. Parvin, Ph.D.— ornamentals
F. D. Rauch, 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

Information and Computer Sciences

Graduate Faculty

R. H. Jones, Ph.D. (Chairman)— time series analysis; statistics
N. Abramson, Ph.D.— information theory and coding; computer nets
H. Akah, Ph.D.— time series analysis
R. T. Goar, Ph.D.— communication theory
W. Gersch, Ph.D.— time series analysis; bio-medical engineering
B. Kanatwala, Ph.D.— system theory; computing algorithms
F. K. Kuo, Ph.D.— computer aided design; computer graphics
M. Lester, Ph.D.— syntactic theory and natural language models
A. Lew, Ph.D.— software; computation; system theory
W. W. Lichtenberger, Ph.D.— computer systems
S. Lin, Ph.D.— error correcting codes
V. Nicholson, Ph.D.— software; interactive computer systems
D. Pager, Ph.D.— recursive function theory; automata theory; artifical intelligence
W. W. Peterson, Ph.D.— coding theory; machine languages
F. R. Pitts, Ph.D.— computer applications in the social sciences
B. Plaszch, Ph.D.— decision theory; mathematical programming; system analysis and design
T. Rodgers, Ph.D.— psycholinguistics; computer-aided instruction
D. Slepian, Ph.D.— communication theory; applied mathematics
R. Sprague, Ph.D.— data management systems; management information systems
L. Wallen, Ph.D.— mathematics of communication
S. Watanabe, Ph.D.— pattern recognition
E. J. Weldon, Ph.D.— data communications; logic design; error correcting codes

All M.S. candidates are required to pass a two-hour written general examination administered by the graduate faculty in horticulture during their first year in residence. Candidates must demonstrate proficiency by examination in either French, German, Spanish, Russian, or Japanese.

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 (Hort)

420 Plant Propagation and Seed Technology (3)
450 Tropical Horticultural Crop Production (4)
453 Plant Breeding (3)
460 Turfgrass Management (3)
461 Post-Harvest Handling (3)
481 Weed Science (3)
499 Directed Study (v)
603 Experimental Design (3)
611 Plant Improvement Systems (3)
615 Advanced Plant Breeding (3)
618 Plant Cytogenetics (3)
631 Advanced Vegetable Crops (2)
662 Advanced Tropical Fruit Science (3)
664 Orchidology (3)
665 Radiation Biology (3)
667 Horticulture Seminar (1)
668 Growth Regulators in Horticulture (2)
669 Laboratory in Plant Growth Regulators (1)
691 Crop Ecology (3)
699 Directed Research (v)
711 Special Topics in Experimental Horticulture (v)
800 Thesis Research (v)

All Ph.D. candidates are required to pass a three-hour written qualifying examination administered by the graduate faculty in horticulture during their first
The information and computer sciences M.S. program is intended to serve both the student who is interested in a career in information and computer sciences and the student who expects to use information and computer 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 Graduate Record Examination Aptitude Test is required for all U.S. applicants and recommended for foreign applicants. The minimum requirements for admission to the program follow:

1. A working knowledge of some general programming language such as FORTRAN, PL-1, or COBOL.
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 18 credits from the courses listed below must be included in the M.S. program. Of the 18 credits, at least 3 credits must be taken from each of the three areas.
2. At least 9 graduate credits (600-799) must be I.Sc. courses.
3. The remainder of the program shall ordinarily consist of other courses from this list or elective courses approved by the student’s program committee, which fit in with the student’s educational objectives.
4. All students must register at least once for I.Sc. 690, Seminar in Information and Computer Sciences, as an extra credit to be graded on a CR-NC basis.

Area Courses

INFORMATION PROCESSING MACHINES—AREA 1
I.Sc 410 or 610 Computer Project I or II (3)
EE 461-462 Digital Systems and Computer Design (3-1)
I.Sc 466 Computer Organization and Programming Techniques (4)
I.Sc 467 Algorithmic Languages (4)
I.Sc 622 The Theory and Construction of Compilers (3)
I.Sc 627 Information Structures (3)
EE 660 Computer Organization (3)
I.Sc 665 Systems Programming (3)
I.Sc 710 Seminar in Software Systems (1)

LOGICAL ANALYSIS—AREA 2
EE 360 Logic Design (3)
Math 412 Introduction to Abstract Algebra (3)
Math 445 or Phil 445 Logic (3)
EE 460 Digital Circuits (3)
I.Sc 621 Formal Linguistics (3)
I.Sc 625 or Ling 625 Mathematical Properties of Natural Languages (3)
I.Sc 630 Information Processing in the Nervous System (3)
I.Sc 661 The Theory of Automata (3)
I.Sc 663 The Theory of Computability (3)
I.Sc 671 Artificial Intelligence (3)
I.Sc 720 Seminar in Automata and Computability Theory (1)

PROBABILISTIC ANALYSIS—AREA 3
I.Sc 371, Math 371 or 471 Probability (3)
I.Sc 443, Math 373 or 472 Statistics (3)
I.Sc 445 Introduction to Random Processes (3)
I.Sc or EE 446 Information Theory and Coding (3)
Math 631 Theory of Functions of a Real Variable (3)
I.Sc 641 Discrete State Stochastic Processes (3)
I.Sc 644 Pattern Recognition (3)
I.Sc 646 Parametric Methods in Time Series Analysis (3)
EE 646 Signal and Noise Theory (3)
EE 647 Applied Statistical Decision Theory (3)
I.Sc 648 Theory of Inference (3)
I.Sc 650 Time Series Analysis (3)
I.Sc 655 Applied Regression Analysis (3)
Math 671 Advanced Probability (3)
Math 672 Stochastic Processes (3)
I.Sc 680 Statistical Decision Analysis (3)
I.Sc 730 Seminar in Time Series Analysis and Applications (1)
Library Studies

Faculty (General)

R. D. Stevens, Ph.D. (Dean)—government documents
I. W. Harris, Ph.D. (Assistant Dean)—reader services
J. B. Abrera, Ph.D.—cataloging, management
C. M. Adams, M.A.—social functions
M. W. Ayrault, M.S. in L.S.—cataloging, organization of non-book materials
R. W. DeAngelo, M.S. in L.S.—children’s literature and school services
A. J. Fristoe, M.L.S.—administration
J. H. Haas, Ph.D.—reader services, documentation
E. Hurd, M.S.—children and young adult literature
A. Kamida, M.L.S.—cataloging
R. Kane, M.L.S.—science and technology
G. R. Nunn, Ph.D.—Asian reference and administration
F. M. O’Halloran, M.L.S.—reference and bibliography
S. Saito, M.L.S.—reference and bibliography
E. T. Schofield, Ed.D.—audio-visual and school services
S. L. West, J.D.—social functions

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:

LIBRARY STUDIES CORE CURRICULUM (LS)

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

ELECTIVES

602 Advanced Reference Sources (3)
606 Advanced Cataloging and Classification (3)
607 Organization of Non-Book Materials
618 Government Documents (3)
642 Audio-Visual Services in Libraries (3)
660 Science and Technology (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)
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)
696 Field Seminar (during last term in the School) (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 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 inquiries in advance through the dean’s office.

Linguistics

Graduate Faculty

B. W. Bender, Ph.D. (Chairman)—phonology; general linguistics; Micronesian languages
D. Bickerton, M.A.—language variation; pidgins and creoles; language and literature
G. H. Fairbanks, Ph.D.—descriptive and comparative linguistics; Indo-European, especially Indo-Aryan, Slavic and Germanic
M. L. Forman, Ph.D.—general linguistics, linguistic anthropology, creoles and sociolinguistics, Philippine studies
G. W. Grace, Ph.D.—historical linguistics; Austronesian, especially Melanesian linguistics; ethnolinguistics
I. Howard, Ph.D.—theoretical linguistics, phonology; Japanese, Oceanic languages
R. W. Hsu, Ph.D.—phonology, computer techniques, programming languages; Micronesian languages
L. S. Josephs, Ph.D.—descriptive and theoretical linguistics; Japanese and Korean
C. W. Kim, Ph.D.—phonetics, phonology; Korean linguistics; Swahili
F.-K. Li, Ph.D.—Chinese and Tai linguistics; other Sino-Tibetan languages; North American Indian linguistics
P. G. Lee, Ph.D.—theoretical linguistics, phonology, syntax
A. V. Lyovin, Ph.D.—generative phonology; Chinese dialectology; Sino-Tibetan
H. P. McKaughan, Ph.D.—descriptive and theoretical linguistics; Philippine and Papuan languages
A. K. Pawley, Ph.D.—Fijian, Polynesian and New Guinea linguistics
L. A. Reid, Ph.D.—Philippine and Formosan linguistics; lexicography; tagmemics; discourse analysis
A. J. Schütz, Ph.D.—descriptive linguistics, field methods, lexicography; Fijian and other Melanesian languages; history of linguistics in the Pacific
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. Tsuaski, Ph.D.—descriptive and applied linguistics; languages in contact; Romance linguistics

Emeritus

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

Cooperating Faculty

M. Higa, Ed.D. (Sub-Chairman for Psycholinguistics)—psycholinguistics
E. Afendras, Ph.D.—language planning; bilingualism
L. A. Jakobovits, Ph.D.—psycholinguistics
R. C. Johnson, Ph.D.—social and developmental psychology
K. A. Minke, Ph.D.—psychology; language learning measurement
A. M. Niyekawa-Howard, Ph.D.—psycholinguistics
T. S. Rodgers, Ph.D.—psycholinguistics
A. W. Staats, Ph.D.—psychology; language learning and language function
D. Steinberg, Ph.D.—psycholinguistics

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 variation, ethnolinguistics, and psycholinguistics.

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.

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. (The only exceptions are those already holding an M.A. in educational psychology, ESL, psychology, or a related discipline who are applying for admission to the Ph.D. program with major concentration in psycholinguistics.) A core of courses (410, 421, 422, 621, 622, 630, 645 or their equivalents) is required of all advanced degree candidates. All students are also required to take at least one advanced seminar.

M.A.

The department offers Plan A, Plan B and Plan C programs. In addition to the University-wide residence requirement of a minimum of two semesters of full-time work, all three programs require that the student demonstrate competence in one language other than his native language.

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.

Plan C is open to students who have had some previous work in linguistics and who show both high potential for scholarly development and the motivation and discipline necessary for a more flexible and independent course of study. A general examination is given early in the first semester of graduate study to assess potential and diagnose strengths and weaknesses of all students in Plan C programs. Individual programs will be developed in consultation with the student's program committee, a committee of three, the chairman of which will serve as the student's chief adviser. Usually, in the interest of continuity, the same committee will administer both the general examination and the oral portion of the final examination.

Plan C requires a final examination with both written and oral portions. The written portion coincides with the written final examination of Plan B. The oral portion permits the student's program committee, after reviewing his performance on the written portion, to investigate his grasp of both weak and strong areas in greater depth and detail.

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 except those majoring in psycholinguistics (see below) are expected to demonstrate strength in phonology, grammar, historical linguistics, and two additional areas of specialization chosen from among the following: phonetics, semantics, psycholinguistics, sociolinguistics, ethnolinguistics, computational linguistics, language learning and teaching, or the linguistics of any of the following areal or genetic groupings: Indo-European, English, Tai, Austroasiatic, Chinese, Japanese, Korean, Philippine, Indonesian, Micronesian, Melanesian, Polynesian, Austronesian, or American Indian linguistics. Integration of the required areas with one or more of the latter areal or genetic specializations...
is encouraged, especially in the case of historical linguistics, where the student is expected to demonstrate—in addition to a grasp of the general principles of historical and comparative methodology—a detailed familiarity with the history of one or more languages or language families.

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. 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.

Psycholinguistics

In addition to the minor specialization in psycholinguistics referred to above, a major concentration in psycholinguistics is also available as an option under the Ph.D. in linguistics program. Highly qualified holders of the M.A. in educational psychology, English as a second language, linguistics, psychology, or other related disciplines may be admitted to the program. Concentrations are available in theoretical, developmental, social, and educational psycholinguistics. Required courses beyond those in the linguistics core listed above include Ed EP 429, 608, 629; ESL 630, 660, 670; Psy 401, 655; and at least one seminar in the student’s area of concentration within psycholinguistics. (Students admitted to this Ph.D. program with major concentration in psycholinguistics who hold the M.A. in some discipline other than linguistics may be exempted from the requirement of demonstrating special strength in historical linguistics on the comprehensive examination; phonology, grammar, and psycholinguistics are the areas emphasized on the comprehensive examination in this program.) Suggested elective courses for students majoring in psycholinguistics include Anth 418; Ed EP 708; ESL 425, 720; Ling 414, 440, 470, 625, 635, 640, 650-651; Phil 417, 604, 605; Psy 320, 322, 423, 430, 431, 643, 654, 665, 730; Soc 422, 442, 741.

Courses

The courses (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 thorough introduction to traditional descriptive, comparative, and transformational-generative approaches.

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

LINGUISTICS (Ling)

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<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>320</td>
<td>General Linguistics</td>
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<tr>
<td>410</td>
<td>Articulatory Phonetics</td>
<td>3</td>
</tr>
<tr>
<td>414</td>
<td>Introduction to Linguistic Anthropology</td>
<td>3</td>
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<td>Introduction to Phonological Analysis</td>
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<td>Introduction to Grammatical Analysis</td>
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<td>440</td>
<td>Introduction to Linguistic Semantics</td>
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<tr>
<td>470</td>
<td>Introduction to the Study of Children’s Speech</td>
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<td>611</td>
<td>Acoustic Phonetics</td>
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<td>615</td>
<td>The Nature of Language</td>
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<td>621</td>
<td>Phonology</td>
<td>3</td>
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<tr>
<td>622</td>
<td>Grammar</td>
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<tr>
<td>625</td>
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<tr>
<td>630</td>
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<td>635</td>
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<td>640</td>
<td>Topics in Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>645</td>
<td>Language Variation</td>
<td>3</td>
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<tr>
<td>650-651</td>
<td>Advanced Linguistic Analysis</td>
<td>3-3</td>
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<tr>
<td>660</td>
<td>Historical Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>699</td>
<td>Directed Research</td>
<td>v</td>
</tr>
<tr>
<td>750</td>
<td>Seminar</td>
<td>3</td>
</tr>
<tr>
<td>760</td>
<td>Problems in Comparison and Pre-History</td>
<td>3</td>
</tr>
<tr>
<td>770</td>
<td>Areaal Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>800</td>
<td>Thesis or Dissertation Research</td>
<td>v</td>
</tr>
</tbody>
</table>

Mathematics

Graduate Faculty

H. S. Bear, Ph.D. (Chairman)—functional analysis
E. Bertram, Ph.D.—group theory and combinatorics
C. Brase, Ph.D.—ring theory
R. Brown, Ph.D.—algebra and number theory
R. Colby, Ph.D.—ring theory
G. Csordas, Ph.D.—complex function theory
S. Fakhruddin, Ph.D.—ring theory
F. Gilfeather, Ph.D.—functional analysis
C. Gregory, Ph.D.—applied mathematics
W. Hanf, Ph.D.—mathematical logic
H. Hilden, Ph.D.—complex function theory
R. Hirschfeld, Ph.D.—analysis
F. Iha, Ph.D.—differential equations
J. Johnson, Ph.D.—universal algebra
D. Kibler, Ph.D.—algebraic geometry
S. Kranzler, Ph.D.—differential equations
M. Lee, Ph.D.—functional analysis
A. Mader, Ph.D.—group theory
J. Martin, Ph.D.—topological dynamics
T. McDermott, Ph.D.—functional analysis
E. Mookini, Ph.D.—analysis
N. Nobusawa, Ph.D.—algebra
Prospective graduate students must present a minimum preparation of differential and integral calculus, linear algebra, advanced calculus, and abstract 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 incoming graduate students both for the master's and Ph.D. programs. Candidates for the M.A. degree (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. For the Ph.D. degree the department requires a reading knowledge of two foreign languages chosen from French, German and Russian.

The department of mathematics is offering the experimental Plan C for the M.A. degree. Students interested in this plan must demonstrate above average ability in the general examination, and are admitted to Plan C upon recommendation by the graduate chairman or his representative. The written part of the master's examination for Plan C is identical with the examination taken by students in Plans A and B. In addition the student will be examined orally.

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

**MATHMATICS (Math)**

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>402</td>
<td>Partial Differential Equations (3)</td>
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<tr>
<td>403-404</td>
<td>Methods of Applied Mathematics (3-3)</td>
</tr>
<tr>
<td>407</td>
<td>Introduction to Numerical Analysis (3)</td>
</tr>
<tr>
<td>408</td>
<td>Numerical Solution of Differential Equations (3)</td>
</tr>
<tr>
<td>412</td>
<td>Introduction to Abstract Algebra (3)</td>
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<tr>
<td>413</td>
<td>Abstract Algebra (3)</td>
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<tr>
<td>420</td>
<td>Introduction to the Theory of Numbers (3)</td>
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<tr>
<td>431-432</td>
<td>Advanced Calculus (3-3)</td>
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<tr>
<td>442</td>
<td>Vector Analysis (3)</td>
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<tr>
<td>444</td>
<td>Theory of Functions of a Complex Variable (3)</td>
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<tr>
<td>449</td>
<td>Topics in Undergraduate Mathematics (3)</td>
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<tr>
<td>451</td>
<td>Projective Geometry (3)</td>
</tr>
<tr>
<td>455</td>
<td>Mathematical Logic I (3)</td>
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<tr>
<td>456</td>
<td>Mathematical Logic II (3)</td>
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<tr>
<td>471</td>
<td>Probability (3)</td>
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<tr>
<td>472</td>
<td>Statistical Inference (3)</td>
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<tr>
<td>611-612</td>
<td>Modern Algebra (3-3)</td>
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<tr>
<td>613-614</td>
<td>Group Theory (3-3)</td>
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<tr>
<td>615</td>
<td>Ring Theory (3)</td>
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<tr>
<td>617</td>
<td>Linear Algebra (3)</td>
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<tr>
<td>621-622</td>
<td>Topology (3-3)</td>
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<tr>
<td>631-632</td>
<td>Theory of Functions of a Real Variable (3-3)</td>
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<tr>
<td>633-634</td>
<td>Functional Analysis (3-3)</td>
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<td>644-645</td>
<td>Analytic Function Theory (3-3)</td>
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<td>649</td>
<td>Topics in Mathematics (3)</td>
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<td>655</td>
<td>Set Theory (3)</td>
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<tr>
<td>671</td>
<td>Advanced Probability (3)</td>
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<tr>
<td>672</td>
<td>Stochastic Processes (3)</td>
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<tr>
<td>750</td>
<td>Seminar (v)</td>
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<tr>
<td>799</td>
<td>Directed Reading and Research (v)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (v)</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. A. Jones, Ph.D.—materials science; corrosion
- D. H. Kihara, Ph.D.—thermodynamics; fluid mechanics
- J. Larsen-Basse, Ph.D.—materials science; corrosion
- W. Stuiver, Ph.D.—mechanics; system dynamics

The department offers programs leading to the M.S. in mechanical engineering with areas of concentration in thermoscience (e.g., heat and mass transfer, thermodynamics, fluid mechanics, energy conversion, thermal environmental engineering), in materials science (e.g., mechanical properties, corrosion, phase transformations, processing, marine materials) and in mechanics (e.g., dynamics, acoustics, continuum mechanics). Within these three areas of concentration students may opt for programs emphasizing either engineering science or engineering design; this option is reflected in the choice of both courses and thesis topic. Students are required to follow the Plan A (thesis) programs except that under special circumstances a petition to follow Plan B (nonthesis) may be granted by the graduate faculty.

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 Aptitude and Advanced Engineering Tests of the Graduate Record Examination. 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. Prospective students may obtain additional information about the program by requesting a copy of the Mechanical Engineering Department Graduate Manual.

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

**MECHANICAL ENGINEERING (ME)**

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>402</td>
<td>Computer Methods in Engineering (3)</td>
</tr>
<tr>
<td>403</td>
<td>Advanced Mathematics for Engineers I (3)</td>
</tr>
<tr>
<td>404</td>
<td>Advanced Mathematics for Engineers II (3)</td>
</tr>
<tr>
<td>422</td>
<td>Heat Transfer (3)</td>
</tr>
<tr>
<td>424</td>
<td>Introduction to Gasdynamics (3)</td>
</tr>
<tr>
<td>431</td>
<td>Electronic Processes in Materials (3)</td>
</tr>
<tr>
<td>433</td>
<td>Failures in Materials</td>
</tr>
<tr>
<td>451</td>
<td>Automatic Control (3)</td>
</tr>
<tr>
<td>455</td>
<td>Nuclear Power Engineering (3)</td>
</tr>
<tr>
<td>473</td>
<td>Mechanical Vibration and Shock (3)</td>
</tr>
<tr>
<td>474</td>
<td>Fundamentals of Acoustics (3)</td>
</tr>
<tr>
<td>496</td>
<td>Mechanical Engineering Topics (v)</td>
</tr>
<tr>
<td>611</td>
<td>Classical Thermodynamics (3)</td>
</tr>
<tr>
<td>612</td>
<td>Statistical Thermodynamics (3)</td>
</tr>
<tr>
<td>617</td>
<td>Advanced Thermal Environmental Engineering (3)</td>
</tr>
</tbody>
</table>
Microbiology

Graduate Faculty

A. A. Benedict, Ph.D. (Chairman)—immunochemistry
B. G. Adams, Ph.D.—regulatory mechanisms of eucaryotic microorganisms
R. D. Allen, Ph.D.—ultrastructure and cell biology
P. Baumann, Ph.D.—taxonomy and physiology of marine bacteria
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 and ecology
J. B. Hall, Ph.D.—comparative biochemistry and evolution
M. Herzberg, Ph.D.—host-parasite relationships and immunology
P. C. Loh, Ph.D.—animal virology and animal cell culture
B. Z. Siegel, Ph.D.—comparative biochemistry and cell biology

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 immunohemistry; 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

Degree Requirements (Plan A Only)

M.S. A minimum of 24 credit hours of course work and 6 credit hours of thesis research. 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. At some time during his first year of residence, the Ph.D. candidate may be required to pass a screening examination prerequisite to proceeding toward a degree.

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 meteorology courses, courses may be allowed in the fields of oceanography, physics and mathematics.
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 (Micro)**

- 431 Microbial Biochemistry and Function (4)
- 441 Ultrastructure of Microorganisms (3)
- 451 Biology of Bacteria (4)
- 461 Immunology (3)
- 462 Immunology-Laboratory (1)
- 463 Microbiology of the Pathogens (4)
- 475 Microbial Genetics (4)
- 480 Microbial Ecology (4)
- 490 Virology (4)
- 625 Immunocomplexology (3)
- 652 Advanced Microbial Physiology (3)
- 642 Marine Microbiology (3)
- 655 Virology (3)
- 665 Electron Microscopy (2)
- 671 Microbial Genetics (3)
- 675 Exobiology (3)
- 681 Host-Parasite Relationships (3)
- *690 Seminar (1)
- *699 Directed Research (v)
- 795 Special Topics in Microbiology (v)
- 800 Thesis Research (v)

**Music**

*Graduate Faculty*

L. Rowell, Ph.D. (Chairman)—music theory
A. P. Brown, Ph.D.—musicology
C. Chadwick-Cullen, M.M.—music performance, voice
R. Hines, M.M.—musicology, choral music
R. N. McKay, Ph.D.—music composition
W. Pfeiffer, M.A.—music performance, voice
A. Russell, A.M.D.—music composition
B. B. Smith, M.M.—ethnomusicology
M. Tait, Ed.D.—music education
A. Trubitt, D.M.—music composition
R. Vaughn, Ph.D.—musicology
C. Wolz, M.A.—dance ethnology
N. Zumbro, M.S.—music performance, piano

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 a student declares 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 (Mus)**

- 401 Ensemble (1)
- 402 University Concert Choir (1)
- 404 Opera Workshop (3)
- 405 University Symphony Orchestra (1)
- 409 University Concert Band (1)
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; (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 (not offered during 1972-1973); and (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.
Ocean Engineering

Graduate Faculty

C. L. Bretschneider, Ph.D. (Chairman)—civil engineering, physical oceanography
W. M. Adams, Ph.D.—geophysics, geophysical engineering
W. J. Arnell, Ph.D.—man machine systems
K. H. Bathen, Ph.D.—physical oceanography
N. C. Burbank, Sc.D.—environmental engineering
J. C. Burgess, Ph.D.—engineering mechanics
J. P. Craven, Ph.D.—ocean sciences, law
F. Gerritsen, Ing. dipl.—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-Basse, Ph.D.—materials science
A. Parvulescu, Ph.D.—ocean acoustics, signal processing
L. Seidl, Ph.D.—naval architecture
M. St. Denis, D.Eng.—naval architecture, structures
W. Stuiver, Ph.D.—mechanics, space dynamics
R. Szillard, Ph.D.—structures, applied mechanics
G. Venezian, Ph.D.—hydrodynamics, applied mathematics
J. A. Williams, Ph.D.—civil and ocean engineering, hydromechanics
K. Wyrtki, Ph.D.—physical oceanography

Affiliates

E. Link—Ocean Systems
G. Miller—ESSA
A. Tom—Sunn, Low, Tom & Hara, Inc.

The graduate program in ocean engineering is intended to channel the previous engineering experience of the student to ocean-related work. Options are available in coastal and harbor engineering, marine structures, naval architecture and ocean acoustics. The department currently offers a master's and a doctoral program in ocean engineering.

M.S.

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 and advanced engineering 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 credits of graduate seminars in engineering or oceanography are required. A minimum of 18 credits must be in courses numbered 600-799.

Plan B (nonthesis) requires a minimum of 30 credit hours of course work. At least 6 credits must be outside the undergraduate field of specialization. Two credits of 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.

NUTRITIONAL SCIENCES

Nutritional Sciences

Graduate Faculty

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

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 (Nutr)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>676</td>
<td>Nutritional and Metabolic Diseases (2)</td>
</tr>
<tr>
<td>677</td>
<td>Nutrition in Reproduction, Growth, Development and Senescence (3)</td>
</tr>
<tr>
<td>679</td>
<td>Mineral Metabolism (2)</td>
</tr>
<tr>
<td>680</td>
<td>Research Methods in Nutrition (3)</td>
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<tr>
<td>681</td>
<td>Seminar (1)</td>
</tr>
<tr>
<td>682</td>
<td>Nutritional Status (3)</td>
</tr>
<tr>
<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>688</td>
<td>Vitamins in Health and Disease (2)</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>

Oceans and Atolls
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.

Ph.D.

Students seeking admission to the doctorate should normally 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.

A student pursuing the doctoral program is required to achieve a broad understanding of the principal areas of ocean engineering as well as a thorough understanding of a specific area. The student must perform research in this area, culminating in a dissertation, which must be an original contribution to the field. It must be a scholarly presentation, suitable for publication.

All intended candidates for the Ph.D. degree must take an oral qualifying examination. In addition to covering basic undergraduate fundamentals, this examination will test the student's understanding of selected subjects taken at the M.S. level. To be advanced to candidacy, the student must, in addition, demonstrate adequate comprehension of one foreign language.

Approximately one year after being advanced to candidacy, all students must take a comprehensive examination, which will cover the student's general preparation in his area of specialty, and pertinent minor fields. The results of the examination will determine whether the candidate will be allowed to pursue the dissertation. The comprehensive examination will be in two parts, a written examination followed by an oral one.

The examination topic must be approved by a doctoral committee. After the thesis is completed, it will be reviewed by the committee and a final oral examination will follow this review.

The qualifying and comprehensive examinations may be repeated only once. The final examination may not be repeated except with approval of the graduate faculty involved and the dean of the Graduate Division.

Students entering a graduate program in ocean engineering should develop, with the help of their adviser, a program of study suited to their intended area of specialty. The adviser will recommend a set of courses necessary to give the student competence in his chosen field, and the student may choose the remainder of his course work to broaden his knowledge into other areas of ocean engineering and oceanography.

Options

COASTAL AND HARBOR ENGINEERING

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 41</td>
<td>Applied Probability &amp; Statistics (3)</td>
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</tr>
<tr>
<td>CE 42</td>
<td>Hydraulics (3)</td>
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<tr>
<td>CE 487</td>
<td>Wave Dynamics (3)</td>
<td></td>
</tr>
<tr>
<td>CE 489</td>
<td>Nearshore Marine Survey Techniques (3)</td>
<td></td>
</tr>
<tr>
<td>CE 491</td>
<td>Coastal and Harbor Engineering (3)</td>
<td></td>
</tr>
<tr>
<td>CE 563</td>
<td>Design of Coastal Structures (3)</td>
<td></td>
</tr>
<tr>
<td>CE 614</td>
<td>Sediment Transport, Littoral Drift and Dredging Technology (3)</td>
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</tr>
<tr>
<td>ME 631</td>
<td>Ocean Engineering Laboratory (3)</td>
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<td>ME 632</td>
<td>Ocean Hydrodynamics Laboratory (2)</td>
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<td>ME 636</td>
<td>Ocean Engineering Environment (3)</td>
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<td>ME 637</td>
<td>Marine Disposal of Wastes (3)</td>
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<td>ME 638</td>
<td>Soil Mechanics (3)</td>
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<td>ME 640</td>
<td>Advanced Physical Oceanography (3)</td>
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<td>ME 642</td>
<td>Sedimentology II (3)</td>
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<tr>
<td>ME 664</td>
<td>Nearshore Physical Oceanography (3)</td>
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<tr>
<td>OCN 620</td>
<td>Physical Oceanography (3)</td>
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<td>OCN 640</td>
<td>Structural Design of Ocean Systems I (3),II (3-3)</td>
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<td>Structural Dynamics of Ocean Systems (3)</td>
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<td>OCN 666</td>
<td>Offshore Physical Oceanography (3)</td>
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<td>OCN 691</td>
<td>Special Topics in Ocean Engineering (v)</td>
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<td>OCN 696</td>
<td>Topics in Ocean Engineering (2)</td>
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MARINE STRUCTURES

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<tr>
<td>CE 411</td>
<td>Applied Probability &amp; Statistics (3)</td>
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<td>CE 412</td>
<td>Dynamic Probabilistic Analysis (3)</td>
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<td>CE 414</td>
<td>Matrix Engineering Analysis (3)</td>
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<td>CE 482</td>
<td>Structural Analysis II (3)</td>
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<td>ME 487</td>
<td>Structural Dynamics (3)</td>
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<td>ME 567</td>
<td>Energy Methods in Applied Mechanics (3)</td>
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<td>ME 579</td>
<td>Theory of Thin Shells (3)</td>
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<td>ME 683</td>
<td>Advanced Reinforced Concrete Design I (3)</td>
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<td>ME 686</td>
<td>Numerical Methods in Continuum Mechanics (3)</td>
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<td>Structural Design of Ocean Systems I &amp; II (3-3)</td>
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<td>Special Topics in Ocean Engineering (v)</td>
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NAVAL ARCHITECTURE

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<td>ME 457</td>
<td>Marine Engineering (3)</td>
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<tr>
<td>ME 411</td>
<td>Buoyancy and Stability (3)</td>
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<tr>
<td>ME 412</td>
<td>Resistance and Powering of Ships (3)</td>
<td></td>
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<tr>
<td>ME 601</td>
<td>Ocean Engineering Laboratory (3)</td>
<td></td>
</tr>
<tr>
<td>ME 604</td>
<td>Ocean Engineering Environment (3)</td>
<td></td>
</tr>
<tr>
<td>ME 607</td>
<td>Wave Dynamics (3)</td>
<td></td>
</tr>
<tr>
<td>ME 608</td>
<td>Statistical Dynamics of Ocean Systems (3)</td>
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<td>ME 609</td>
<td>Principles of Ocean Engineering (3)</td>
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<tr>
<td>ME 612</td>
<td>Seakeeping (3)</td>
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<td>ME 631</td>
<td>Structural Design of Ocean Systems I &amp; II (3-3)</td>
<td></td>
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<td>ME 681</td>
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<td>Design of Ocean Systems (3)</td>
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<tr>
<td>ME 691</td>
<td>Special Topics in Ocean Engineering (v)</td>
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<tr>
<td>ME 696</td>
<td>Topics in Ocean Engineering (2)</td>
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<tr>
<td>OCN 620</td>
<td>Physical Oceanography (3)</td>
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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 digital computing.

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

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.

Oceanography (Ocean)
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)
634 Techniques in Geological Oceanography (2)
636 Phytoplankton Ecology (3)
640 Advanced Physical Oceanography (3)
641 Major Element Cycles in the Environment (3)
642 Sedimentology II (3)
643 Marine Geochemistry (3)
644 Marine Geophysics (3)
646 Zooplankton Ecology (3)
650 Mathematical Techniques for Biologists (3)
660 Ocean Waves (3)
661 Tides (3)
662 Marine Hydrodynamics (3)
663 Measurements and Instrumentation (2)
664 Principles of Underwater Acoustics (3)
666 Nearshore Physical Oceanography (3)
672 Seminar in Geotectonics I (3)
673 Continental Shelves (3)
699 Directed Research (v)
702 Deep Sea Biology (3)
705 Ecology and Management of Marine Resources (2)
735 Seminar in Oceanography (2)
750 Topics in Biological Oceanography (2)
760 Topics in Physical Oceanography (2)
770 Seminar in Chemical Oceanography (1)
779 Seminar (1)
800 Thesis Research (v)

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 the 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.

Each student’s course of study is tailored to fit his individual needs in preparation for an overseas career. The requirements for the certificate include 15 hours of credit at the graduate level and competence in an Asian language:

- 6 hours—Asia-America: Men and Institutions, a two-semester inter-disciplinary seminar required of all candidates for the certificate.
- 6 hours—two courses in area studies in one Asian country or region and related elective courses; one or both may be included in the student’s regular degree program.
- 3 hours—Internship in an Asian country, field experience for approximately 6 months with governmental or private agencies in Asia; periodic and final reports are required.
- Asian language—proficiency at the intermediate level.

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

Faculty include:

- W. G. Hackler, M.A.—director
- A. D. Moscotti, Ph.D.—associate director

OVERSEAS CAREER PROGRAM (OCP)

631-632 Asia-America: Studies of Men and Institutions (3-3)
791 Internship in an Asian country (3)

Pacific Islands Studies

Graduate Faculty

N. Meller, Ph.D. (Director)—political science
D. Cox, Ph.D.—geology
D. Johnson, Ph.D.—history
C. Lamoureux, Ph.D.—botany
A. Leib, Ph.D.—literature
D. Oliver, Ph.D.—anthropology
P. Pirie, Ph.D.—geography
F. Tilton, 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 Pacific-related survey 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 must be in courses numbered 600-799, including at least 3 credits in a cross-disciplinary course concerned with the interrelationship of cultural and physical change in the Pacific.

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) and examination.

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 (PIP)

390 Change in the Pacific (3)
690 Advanced Seminar Pacific Islands Studies (3)
699 Directed Reading and Research (v)
800 Thesis Research (v)

Pacific Urban Studies and Planning Program

The Pacific Urban Studies and Planning Program is a multidisciplinary endeavor, located in the College of Arts and Sciences and guided 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 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.

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 the planning practicum, a two course series, 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 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, 2540 Maile Way, Spalding 354, Honolulu, Hawaii 96822.

PLANNING (Plan)
600 Contemporary Planning Theory (3)
601 Introduction to Planning Systems (3)
645-646 Development Planning (3-3)
695 Planning Practicum (3)
696 Planning Practicum (3)
780 Selected Topics in Planning (3)
799 Directed Reading and Research (v)
800 Thesis Research (v)

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
E. Furusawa, M.D.—virus chemotherapy
J. F. Lenney, Ph.D.—biochemical pharmacology
J. T. Miyahara, Ph.D.—neuropharmacology
T. R. Norton, Ph.D.—medicinal chemistry
D. D. Palmer, M.D.—dermatologic pharmacology
S. Ramanathan, Ph.D.—biochemical 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.

PHARMACOLOGY (Pharm)
201 Introduction to General Pharmacology (2)
600 Pharmacology: Actions and Uses of Drugs (7)
613-614 Seminar in Pharmacology (1)
615 Toxicology (4)
631 Medicinal Chemistry & Structure-Activity Relations (3)
634 Molecular Pharmacology (2)
635 Experimental Chemotherapy (1)
637 Autonomic Nervous System Pharmacology (2)
639 Advanced Cardiovascular Pharmacology (2)
640 Neuropharmacology (2)
641 Pharmacological Techniques (v)
699 Directed Research (v)
800 Thesis Research (v)

Philosophy

Graduate Faculty
B. T. Yamasaki, Ph.D. (Chairman)—rationalism, Buddhist philosophy, philosophy of religion
F. L. Bender, Ph.D. (Associate Chairman)—phenomenology, Marxism, existential philosophy
C. Y. Chang, Ph.D.—Taoism, Ch’an Buddhism, aesthetics
C. Y. Cheng, Ph.D.—philosophy of language, philosophy of mathematics, Confucian philosophy
J. M. Copi, Ph.D.—logic, metaphysics, analytical philosophy
E. Deutsch, Ph.D.—Indian philosophy, comparative philosophy, aesthetics
L. E. Goodman, D.Phil.—Islamic philosophy, metaphysics, ethics
H. E. McCarthy, Ph.D.—history of philosophy, philosophy of art, philosophy in literature
J. L. Mehta, Ph.D.—Indian philosophy, phenomenology, comparative philosophy
W. E. Nagley, Ph.D.—nineteenth century, philosophy of religion, existential philosophy
K. N. Upadhyaya, Ph.D.—Indian philosophy, Buddhist philosophy

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. In support of the application for admission, American students are encouraged to take the Graduate Record Examination (GRE)—both the Aptitude (Qualitative and Quantitative) and the Advanced Test (No. 74: Philosophy)—and have the results forwarded to the philos-
o department, prior to the application deadline. Three letters of recommendation are required and a sample of the applicant’s written work in philosophy may be requested in the case of an intended M.A. candidate but is required in the case of an intended Ph.D. candidate. The latter must also possess the M.A. degree in philosophy or its equivalent.

Degrees are offered in three specific areas of philosophy: (1) Western Philosophy. All graduate students in philosophy must acquire a thorough knowledge of the history and problems of Western philosophy whatever their field of specialization. On the basis of this foundation students may further specialize in Asian or Comparative Philosophy. (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 areas, Indian, Buddhist, or Chinese, with any area of Western philosophy.

M.A.

The department offers only the Plan B (nonthesis) program. The requirements for specialization in Western and in Asian or Comparative Philosophy are as follows:

Western: 30 credits of course work, including Symbolic Logic I (Phil 445), at least one course in Asian or Comparative Philosophy, and at least six courses at the 600 level or above, including at least one seminar.

Asian or Comparative: 30 credits of course work, including Symbolic Logic I (Phil 445), introductory courses in Indian, Buddhist, and Chinese Philosophy (Phil 450, 460, and 470) and six courses at the 600 level or above. Of these six courses, four must be in Western Philosophy and at least one must be a seminar.

Full-time students are required to take their final examination for their degree no later than their fourth semester in residence. The area of this examination will be selected by the student, with the approval of the departmental examination committee from the set of departmental examinations.

Ph.D.

Although there is no formal minimum course requirement for the Ph.D., the student is required to spend three semesters in residence or the equivalent as a full-time student. During this period the student, in consultation with his advisor, should take courses in any areas of philosophy in which he may be deficient, in areas preparatory to his taking the departmental examinations, and in areas relevant to his intended field of dissertation research.

Reading competence in two Western foreign languages, selected to accord with the area of dissertation research, is required of each Western Ph.D. degree candidate; one Asian language for the Asian Ph.D. degree candidate; and one Asian and one Western foreign language for the Comparative Ph.D. degree candidate.

The Ph.D. candidate must demonstrate his general competence in philosophy by passing three written Departmental Examinations one of which is in the history of Western philosophy and an oral Comprehensive Examination. He must write and defend a dissertation which is an original contribution to knowledge, resulting from independent investigation, and of such quality as to be in principle publishable.

Additional details on the graduate programs 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 those listed in other related disciplines as approved by the candidate’s adviser. Graduate courses are numbered 600 or above; courses numbered 300-449 are upper-division undergraduate courses which may carry graduate credit.

PHILOSOPHY (Phil)

300 Greek Philosophy (3)
301 Philosophy of Late Antiquity (3)
302 Medieval Philosophy (3)
304 British Empiricism (3)
306 Continental Rationalism (3)
308 Nineteenth Century (3)
310 Twentieth Century (3)
315 Ethical Theory (3)
340 Islamic Philosophy (3)
400 Political Philosophy (3)
401 Social Philosophy (3)
402 Philosophy of Law (3)
403 Marxist Philosophy (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)
421 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)
440 Introduction to Phenomenology (3)
441 Introduction to Contemporary Analytic Philosophy (3)
445 Symbolic Logic I (3)
448 Comprehensive Philosophical Systems (3)
449 Philosophical Topics (3)
600 Problems of Philosophy (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)
795 Philosophical Texts (in original language) (3)
799 Directed Research (Greek, Modern Classical, Contemporary Western) (v)
800 Thesis Research (v)

Asian and Comparative

448 Comprehensive Philosophical Systems (3)
449 Philosophical Topics (3)
450 Indian Philosophy (3)
460 Buddhist Philosophy (3)
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. M.S. must be completed before Ph.D. is attempted.

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

**PHYSICS (Phys)**

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<tr>
<td>440</td>
<td>Solid State Physics</td>
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<tr>
<td>490</td>
<td>Quantum Electronics</td>
<td>3</td>
</tr>
<tr>
<td>*600</td>
<td>Methods of Theoretical Physics I</td>
<td>3</td>
</tr>
<tr>
<td>601</td>
<td>Methods of Theoretical Physics II</td>
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<td>*610</td>
<td>Analytical Mechanics I</td>
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<tr>
<td>611</td>
<td>Analytical Mechanics II</td>
<td>3</td>
</tr>
<tr>
<td>620</td>
<td>Physics of the Upper Atmosphere</td>
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<tr>
<td>*650</td>
<td>Electrodynamics I</td>
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<tr>
<td>651</td>
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<tr>
<td>660</td>
<td>Advanced Optics</td>
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<tr>
<td>*690</td>
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<tr>
<td>695</td>
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<td>700</td>
<td>Seminar on Elementary Particle Physics</td>
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<tr>
<td>711</td>
<td>Advanced Topics in Theoretical Physics</td>
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<tr>
<td>730</td>
<td>Statistical Mechanics</td>
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<tr>
<td>*770</td>
<td>Quantum Mechanics I</td>
<td>3</td>
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<tr>
<td>771</td>
<td>Quantum Mechanics II</td>
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<tr>
<td>772</td>
<td>Relativistic Quantum Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>777</td>
<td>Nuclear Physics I</td>
<td>3</td>
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<tr>
<td>778</td>
<td>Nuclear Physics II</td>
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<tr>
<td>785</td>
<td>Solid State Theory</td>
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<td>*799</td>
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<tr>
<td>800</td>
<td>Thesis Research (v)</td>
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Physiology

Graduate Faculty
S. K. Hong, M.D., Ph.D. (Chairman)—environmental and renal physiology
S. Batkin, M.D.—neurophysiology
K. D. Gardner, M.D.—renal physiology
H. L. Gillyard, Ph.D.—physiology of sense organs
F. T. Koide, Ph.D.—bioengineering
Y. C. Lin, Ph.D.—cardiovascular physiology
T. O. Moore, Ph.D.—environmental physiology, biorhythms
M. D. Rayner, Ph.D.—nerve–muscle physiology
T. A. Rogers, Ph.D.—environmental physiology
R. M. Smith, Ph.D.—environmental and comparative physiology
G. C. Whittow, Ph.D.—thermoregulation, physiological ecology

Affiliate Faculty
J. Pegg, M.D.—diving and hyperbaric physiology
R. L. Pepper, Ph.D.—psychology, marine mammal biology
J. F. Allen, V.M.D.—marine mammal physiology

The department of physiology offers undergraduate and graduate courses and provides a major input to those interdisciplinary courses (Biomd numbers) which are required for first year medical students. Intended candidates for the M.S. or Ph.D. must have or acquire adequate preparation in biology, chemistry, physics and mathematics. The course work required includes the graduate level Biomd courses and basic courses in related sciences, or demonstrated competence 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 (Phys)
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)
609 Cardiovascular and Respiratory Physiology (3)
610 Advanced Physiology Laboratory (2)
699 Directed Research (v)
701 Diving Physiology (3)
800 Thesis Research (v)

BIOMEDICAL SCIENCE (Biomd)
601 Cell Structure and Function (2)
602 Endocrinology and Reproduction (2)
603 Organ Structure and Function (5)
604 Neuroscience (4)
605 Microanatomy Lab (2)
606 Endocrinology and Reproduction Lab (1)
607 Physiology Lab (1)

Plant Pathology

See the Botanical Sciences field of study for M.S. and Ph.D. programs in the subdiscipline of plant pathology.

Political Science

Graduate Faculty
M. J. Shapiro, Ph.D. (Chairman)—political theory, decision-making
T. Becker, Ph.D.—judicial process
R. S. Cahill, Ph.D.—politics, political theory
R. Chadwick, Ph.D.—international relations
J. A. Dator, Ph.D.—Japanese politics, political futures
H. J. Friedman, Ph.D.—comparative politics, comparative administration
M. Haas, Ph.D.—international relations, political development
M. Henningsen, Ph.D.—political theory
P. E. Jacob, Ph.D.—international organization, political development
H. S. Kariel, Ph.D.—political theory
G. Kent, Ph.D.—international relations
Y. Kuroda, Ph.D.—comparative politics, political socialization
O. Lee, Ph.D.—international relations
W. Levi, Ph.D.—international relations
N. Meller, Ph.D.—public administration, legislative behavior
N. Milner, Ph.D.—judicial behavior
D. E. Neubauer, Ph.D.—political behavior
L. Nitz, Ph.D.—decision-making
G. D. Paige, Ph.D.—political leadership, development
F. W. Riggs, Ph.D.—comparative administration, development administration
I. H. Rohter, Ph.D.—political psychology
R. J. Rummel, Ph.D.—international relations, systems theory
G. Schubert, Ph.D.—judicial behavior
R. B. Stauffer, Ph.D.—comparative politics, development

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 aptitude tests of the Graduate Record Examination. Interested students should write the department chairman’s assistant for further information.

Information regarding the requirements for Plan A and Plan B master’s programs as well as requirements for the Ph.D. program in political science is available in other sections of this Catalog and in a brochure entitled Graduate Study in Political Science. The latter is available in the department office or by writing to the Chairman’s Assistant, Department of Political Science, University of Hawaii.

All courses with the exception of 600-601 may be repeated for credit with permission of the adviser. The course content of all courses other than 600-601 may vary each semester or with each instructor. The thesis is granted 6 units for the Plan A master’s candidates.

POLITICAL SCIENCE (PolSc)
600 Scope and Methods of Political Science (3)
601 Political Analysis, Theory Building and Techniques (3)
602 Research Practicum (3)
610 Political Thought (3)
710 Seminar: Political Thought (3)
Population Studies is an interdisciplinary certificate program, involving faculty from several University departments, under the supervision of a population studies committee composed of the director of the program, and the chairmen of the departments of anthropology, economics, geography and sociology. The program is designed primarily for students who are candidates for an advanced degree—M.A., M.S., M.P.H. or Ph.D.—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 various aspects of population study. 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 special reference to the Asian and Pacific area. Special attention is paid to training in techniques of demographic analysis appropriate to deficient or limited data.

Students who successfully complete 15 credits drawn from an approved list of courses, offered by the program and by several departments, and who pass a comprehensive examination, will be eligible to receive a Certificate in Population Studies.

Population Studies

**Decision Making**

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

**Political Development**

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

**International Relations**

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

**General**

- 699 Directed Reading and Research (v)
- 800 Thesis Research (v)

**Population Studies**

*Faculty*

- P. Pirie, Ph.D. (Director)—geography
- M. Chapman, Ph.D.—geography
- L. J. Cho, Ph.D.—sociology
- P. Demeny, Ph.D.—economics
- J. Fawcett, Ph.D.—psychology
- A. Howard, Ph.D.—anthropology
- H. Overbeek, Ph.D.—economics
- J. Palmore, Ph.D.—sociology
- F. Rosario, Ph.D.—communications

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 (Psy)

401 Experimental Analysis of Behavior (3)
423 History of Psychology (3)
424 Abnormal Psychology (3)
426 Industrial Psychology (3)
427 The Exceptional Child (3)
428 Social Development of Children (3)
430 Complex Human Learning (3)
432 Psychological Aspects of War and Peace (3)
434 Seminar on the Psychology of Knowledge (3)
471 Environmental Psychology (3)
485 Seminar on Humanistic Psychology (3)
493 Practicum in Psychology (3)

Methodology

601 Introduction to Quantitative Methods (3)
602 Statistical Analysis (3)
603 Design and Analysis of Psychological Experiments (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)
633 Comparative Psychology (3)
634 Physiological Psychology (3)
635 Sensory Processes and Psychophysics (3)
636-637 Learning and Motivation (3-3)
639 Selected Topics in Comparative Psychology (3)
640 Verbal Learning (3)
641 Skill Learning (3)
642 Behavior Processes of the Marine Mammal (3)
643 Cognitive Processes (3)
645 Current Issues in Learning and Motivation (3)
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)
671 Advanced Environmental 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)
684 Cognitive Approaches to Behavior Change (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 (v)
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.

Other

699 Directed Reading or Research (v)
700 Seminar (3):
   (1) General
   (2) History and Theory
   (3) Statistics and Measurement
   (4) Experimental
   (5) Physiological
   (6) Personality
   (7) Social
   (8) Developmental
   (9) Applied-Industrial
   (10) Clinical
   (11) Comparative
   (12) Learning
   (13) Perception
   (14) Psychopathology
   (15) Psychological Therapies
710 Seminar in Teaching Psychology (1)
800 Thesis, Dissertation Research (v)
Public Health

Graduate Faculty

E. O’Rourke, M.D., M.P.H. (Chairman)—public health administration
R. W. Armstrong, Ph.D., M.P.H.—comprehensive health planning
J. E. Banta, M.D., M.P.H.—international health
T. L. Bell, M.S.P.H., Ph.D.—public health laboratory
B. M. Bennett, Ph.D.—biostatistics
E. E. Bertellotti, M.P.H., M.S.—public health education and administration
N. C. Burbank, Jr., Sc.D.—environmental sanitation and public health engineering
C. S. Chung, Ph.D.—biostatistics
E. W. Clark, Dr.P.H.—public health education
R. H. Conway, Dr.P.H.—health services administration
H. D. Davenport, M.P.H., Ed.S.—public health education
L. E. Dickinson, M.D., Dr.P.H.—epidemiology
S. Furuno, M.S.P.H., Ph.D.—mental retardation
F. I. Gilbert, Jr., M.D.—community health
W. P. Golden, Jr., Ed.D.—public health education
J. Grossman, M.P.H., Ph.D.—public health administration
J. H. Hankin, M.S., Dr.P.H.—public health nutrition
J. M. Johnson, Ph.D.—environmental sanitation
E. R. Larkin, M.D., M.P.H.—comprehensive health planning
R. K. C. Lee, M.D., Ph.D. (Dean Emeritus)—public health administration
A. M. Lenzer, Ph.D.—gerontology
M. Lim, M.R.C.S., L.R.C.P., D.P.H.—population and family planning
Y. S. Matsumoto, Ph.D.—population and family planning
J. M. Michael, M.S., M.P.H.—public health administration and health planning
R. E. Mytinger, Dr.P.H.—health services administration
C. B. Park, M.D., Dr.P.H.—biostatistics
R. J. Pion, M.D.—population and family planning
A. D. Schwartz, M.D., M.P.H.—mental health
R. G. Smith, M.D., M.P.H.—maternal and child health
R. Y. Suehiro, M.A., M.P.H.—international health
F. H. Tilton, M.D.C.M., M.P.H.—international health
E. Vougaropoulos, M.D., M.P.H.—international health
N. B. Wiederholt, M.A.—comprehensive health planning
R. J. Wolff, Ph.D.—population and family planning
R. M. Worth, M.D., M.P.H., Ph.D.—epidemiology
R. H. F. Young, Sc.D.—environmental sanitation and public health engineering

Affiliate Faculty

E. W. Colby, M.D., M.P.H.—health services administration
A. Conner, M.D., M.P.H.—maternal and child health
K. McLaren, M.P.H.—public health nursing
W. B. Quisenberry, M.D., M.P.H.—public health administration
L. Rosen, M.D., Dr.P.H.—epidemiology

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 are: health services planning and administration (including comprehensive health planning, health services administration, public health administration); environmental health (including environmental management, environmental sanitation, public health engineering); international health and population studies; personal health services (including maternal and child health/mental retardation, mental health, gerontology); public health education; quantitative health sciences (including biostatistics, epidemiology, public health laboratory, 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. (Refer to School of Public Health Bulletin.)

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. 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 are 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.

Master of Science Degree

The M.S. program is intended to provide students with a research-oriented education in a specific area of emphasis. A degree candidate must have at least a bachelor’s degree from an accredited institution; his undergraduate record should show adequate preparation in the biological, physical, and social sciences. Additionally, at least two years’ work experience in a health or related field is desirable. 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 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. Students in fields other than public health, including unclassified, generally should obtain the instructor’s approval prior to registration.

PUBLIC HEALTH (PH)

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)
611 Information Systems and Planning (3)
612 Ecological Concepts and Planning (3)
613 Seminar in Comprehensive Health Planning (3)
and Child Health II

Maternal and Child Health I (2)

Maternal and Child Health II (2)

The Handicapped Child (2)

Principles of Comprehensive Maternity Care (2)

Health Services for the Mentally Retarded (2)

Family Planning in Theory and Practice (3)

Demography and World Population Problems (3)

Fertility and Reproduction (2)

Components of Population Control (2)

Vital and Health Statistics (3)

Biostatistics I (3)

Biostatistics II (3)

Seminar in Biostatistics (1)

Techniques in Demographic Analysis (3)

Principles of Epidemiology (v)

Epidemiological Management of Chronic Diseases (2)

Epidemiology of Infectious Diseases in the Pacific Area (3)

Laboratory Aspects of Infectious Diseases in the Pacific Area (2)

Socio-Cultural Aspects of Health and Illness (3)

Education and Community Health (3-3)

Group Methods in Public Health (3)

Communication Processes in Public Health (3)

In-Service Training of Health Workers (2)

Educational Approaches to Public Health Problems (3)

Environmental Health (3)

Vector Control in Environmental Health (3)

Occupational Health I (2)

Solid Waste Management and Control (3-3)

Sampling and Analysis of Solid Wastes (4)

Design of Solid Waste Disposal Facilities (4)

Community Health Problems (v)

Seminar in Medical Care Organization (2)

Principles of Fiscal Management for Health Services (2)

Planning and Evaluation of Health Services (3)

Institutional Health Care Facilities (3)

Non-Institutional Health Care Facilities (2)

Case Studies in Health Service Administration (2)

Health Program Planning and Evaluation (3)

Mental Abnormality and the Law (2)

Seminar on Health of the School-Age Child (2)

Statistical Techniques in Epidemiological Research (3)

Sampling Techniques in Public Health (3)

Evaluative and Action Research in Public Health (3)

Staff Development in Health Systems (3)

Environmental Control of Disease Through Food Protection (2)

Environmental Factors in Health Problems (3)

Measurement of Environmental Factors (3)

Community Health Concepts and Methods (2)

Advanced Public Health Practice (3)

Seminar in Public Health (v)

Directed Reading/Research (v)

Thesis Research (v)

Requirements for admission, in addition to those of the Graduate Division are:

1. B.A. from an accredited institution or the equivalent from a foreign university.
2. 3.0 average, on a 4.0 scale, in the undergraduate major for the last four undergraduate semesters (applicants with lower averages may be accepted provisionally; those with majors other than Russian will be required to make up deficiencies).
3. Acceptable accent and reasonable degree of fluency in Russian, as demonstrated in a personal interview or by tape recording. Applicants should send a five-minute single track tape of themselves speaking and reading Russian. The tape should not have been previously used.

The program provides the usual two plans of study. Plan A is the thesis plan, and Plan B nonthesis. Candidates following Plan A write a thesis and generally take 6 credits in one Slavic language other than Russian as part of the degree requirements. Candidates following Plan B normally emphasize courses in the Russian language. Candidates in both plans are urged to acquire a reading knowledge of a non-Slavic language.

For all degree candidates a conference will be arranged at the beginning of their first semester of study. The nature of the conference is mainly diagnostic, i.e., to assist the candidates and the program committee in preparing an individual program of study. Based on the results of the conference, the committee will prepare a reading list for the candidate.

All degree candidates must complete a minimum of 31 semester hours (including one credit in Research and Methods, EL 630). Candidates with appointments as graduate assistants will in addition take EdCI 640, Seminar in Teaching Russian.

All degree candidates will have to pass the MLA Teacher Proficiency Examination in the language skill areas.

Requirements in Plan A include:

A minimum of 12 credits in courses numbered 600-799, excluding EL 630 but including a minimum 3 credits in Graduate Seminar 735.

Six credits in thesis writing, Russian 800. Thesis must be completed and submitted at least three weeks in advance of the oral examination. The final oral examination will consist of two parts. The first part will be based on the thesis. Candidates must defend their points of view. The second part will be based on the minimum reading list.
Requirements in Plan B include:

Minimum of 18 credits in courses numbered 600-799, including either Russ 621 or Russ 650, and minimum 3 credits in Graduate Seminar, Russ 735, but excluding EL 630.

Maximum 6 credits of electives, including one appropriate course (3 credits) in linguistics and/or English as a second language.

Candidates must pass a comprehensive final examination, based on all fields of study of language and literature. The examination will be based on the minimum reading list.

RUSSIAN (Russ)

411-412 Literature of the 19th Century (3-3)
413-414 Literature of the 20th Century (3-3)
418 Advanced Composition and Stylistics (3)
419 Advanced Reading in Russian Daily Press (3)
495 Seminar in Russian Literature (3)
615 Russian Poetry (3)
617 Russian Drama (3)
618 Comparative Grammar of Russian and English (3)
619 Advanced Russian Syntax (3)
621 Historical Grammar of the Russian Language (3)
622 Reading in Old Russian Language (3)
641-642 Russian Literature X-XVIII Centuries (3-3)
645 History of the Russian Literary Language (3)
699 Directed Reading (1-6)
735 Seminar in Russian Literature (3)
800 Thesis (6)

POLISH (Polsh)

419-420 Topics in Polish Literature and Culture (3-3)

EUROPEAN LANGUAGES (EL)

630 Seminar in Research Methods (1)

CURRICULUM AND INSTRUCTION (Ed CI)

640 Seminar in Teaching Fields (3)

Secondary Education

Graduate Faculty

R. S. Alm, Ph.D. (Chairman)—English education, reading
M. C. Austin, Ed.D.—reading
A. Becker, Ed.D.—art education
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
G. S. Kahanbuh, Ed.D.—health and physical education
J. R. Little, Ph.D.—health and physical education
R. M. Martin, Ph.D.—secondary education, supervision, curriculum
S. L. Martin, Ph.D.—health and physical education
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
H. Thompson, Ed.D.—health and physical education
N. Whitman, Ph.D.—mathematics education
L. F. H. Zane, Ph.D.—trades and industries education

Intended candidates for the M.Ed. must present successful academic performance in the areas of secondary curriculum, psychological and societal foundations, and appropriate methods and supervised student teaching or teaching experience.

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

Both Plan A (thesis) and Plan B (nonthesis) are available.

Plan A. The program requires a minimum of 30 semester credits of course work with a minimum of 12 semester credits in education. Required courses are Ed CI 635, 636, or 657, 640*, Ed EP 608, and an elective in another area of education. At least one graduate seminar is required. A maximum of 12 semester credits is to be taken in a related field; usually this field will be the same as the student’s undergraduate major but it may be in reading or in one of the other departments in the College of Education. A maximum of 6 credits is allowed for the thesis (Ed CI 800). The program is primarily designed for those students with an interest in research.

Plan B. The program requires a minimum of 30 semester credits in course work, with a minimum of 12 credits in education. Required courses are Ed CI 635, 636, or 657, 640*, 733, and an elective in another area of education. A minimum of 12 credits is to be taken in a related field. The program is primarily designed to enable teachers to strengthen their teaching field majors. Thus, the related field is usually the same as the student’s undergraduate major. It may, however, be in reading or in one of the other departments of the College of Education. In Plan B, students write a Plan B paper.

CURRICULUM AND INSTRUCTION (Ed CI)

437 Curriculum Development, Industrial Education (2)
438 Foundations of Vocational Education (2)
439 Business Education Curriculum (3)
460 Distributive Education (3)
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)
639 The Business Education Curriculum (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)
649 Theory and Practice in Cooperative Business Education (3)
657 Community College (3)
699 Directed Reading and/or Research (v)
733 Seminar in Curriculum, Secondary (3)
737 Foundations in Art Education (3)
800 Thesis Research

*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)
J. Fischer, D.S.W.—human behavior
N. M. Hartman, M.A.—casework, research
J. Krisberg, M.A.S.A.—practicum
K. Kumabe, M.S.W.—casework, research
O. Kurren, Ph.D.—community organization
L. Lister, D.S.W.—human behavior
F. Merritt, D.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
W. A. Walsh, Ph.D.—casework

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) in 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 policy and social services, human behavior and 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:

Social Services

SOCIAL WORK (SW)

627-628 Policies and Services in World Social Welfare (2-2)
655-656 Selected Topics in Social Welfare (3-3)
753 The Law in Social Welfare and Social Work (2)
755-756 Advanced Seminar in Substantive Fields of Social Welfare (3-3)
777-778 Planning, Policy-Making and Administration in Social Welfare (2-2)

Human Behavior in the Social Environment

610-611 Human Development and Behavior in Cross-Cultural Perspective (2-2)
774-775 Studies in Individual and Social Behavior (3-3)
776 Social Work and Social Psychiatry (3)

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 (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 (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)
781-782 Seminar in Community Organization Process (2-2)
785 Methods of Supervision in Social Work (2)
796-797 Directed Individual Study in Substantive Field (v-v)

Research

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

Sociology

Graduate Faculty

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
D. B. Chandler. Ph.D.—family, theory
R. Cheng. Ph.D.—social change, sociology of revolutions
L. J. Cho. Ph.D.—demography
C. Endo. Ph.D.—social stratification, methodology
J. A. Palmore. Ph.D.—sociology of religion
L. Freeman. Ph.D.—mathematical sociology, general theory
J. Cho. Ph.D.—sociology of religion
M. Sunshine. Ph.D.—social stratification, community
R. E. Sakamoto. Ph.D.—urban sociology, social deviance
J. Seldin. Ph.D.—sociology of religion, youth and counter-culture
P. G. Steinhoff. Ph.D.—Japanese society, sociology of law
M. Sunshine. Ph.D.—social stratification, community
D. Swift. Ph.D.—sociology of education, formal organizations
E. Volkart. Ph.D.—sociology of education, formal organizations
E. Volkart. Ph.D.—sociology of education, formal organizations
M. G. Weinstein. Ph.D.—sociology of education, sociology of communities
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

Two programs of graduate study in sociology are offered: a Ph.D. program that is intended to provide the broadest scholarly basis for research and university teaching, and a M.A. program in applied sociology that affords particular relevance to one or more lines of professional work other than university scholarship. Applicants for graduate study in the department are required to specify which program they wish to enter.

Ph.D.

The Ph.D. program represents an attempt to provide a flexible, professionally oriented and student-centered curriculum. Its goal is the facilitation of interaction
among and between students and faculty in a setting that will enhance the opportunity for all to play professional roles.

Beginning graduate students will fulfill all requirements for their first year of study by producing a research paper that shows promise of professional quality work. It is intended that this paper be prepared on a subject and in a style that is chosen by the student with the advice of a committee consisting of two members of the graduate faculty (one of whom may be outside sociology) and one or more advanced graduate students. It may be prepared and submitted at any time after the end of the first academic term and before the end of the second academic term of the student’s residence. When this paper is submitted it is reviewed by the committee and all other interested students and faculty members. Their review will serve as a guide for the student’s further work.

After completion of the first paper and its review process each student must establish a new committee consisting of at least three members of the graduate faculty (two of whom must be from sociology and one of whom must be from outside sociology). With the help of this committee, the student must prepare a second, professional quality paper. This paper may be presented at any time between the end of the first term and the end of the third term following successful completion of the preliminary paper. This paper, like the earlier one, may mobilize any style of sociological work and cover any substantive area agreeable to a student and his committee. The student’s committee members will report to the departmental graduate committee, which will be responsible for certifying successful completion of the M.A. degree requirements to the Graduate Division when a minimum of 30 semester hours of course work and an acceptable paper have been completed.

After successful completion of the master’s level paper, students will, upon recommendation of the graduate committee, be admitted to formal candidacy for the Ph.D. degree. Each student will be expected to pass an oral comprehensive examination, conducted by his second paper committee plus two additional graduate faculty members. The departmental graduate committee must certify successful completion of this examination, after which the student will be expected to prepare a dissertation prospectus, a dissertation and an oral defense. Completion of these requirements to the satisfaction of the dissertation committee will result in the recommendation that a degree be awarded. For general requirements for the degree of doctor of philosophy see "Academic Information" section in this catalog.

Students who have completed some graduate work elsewhere (including the M.A.) may submit their earlier work in lieu of their first or second papers at the discretion of their committee. All transfer students must submit a second paper and take the oral comprehensive before proceeding to the dissertation prospectus. In such cases, the usual committee reviews will be conducted in order to certify progress.

M.A.

The M.A. program in applied sociology is designed to provide education in sociological methods and information of particular relevance to several areas of non-academic employment. This is a program for students who seek specific intellectual development to qualify them for a professional position or to upgrade a position already held. It is possible in this program to focus on the acquisition of the special skills needed to perform effectively as a sociologist in particular private or governmental agencies or organizations such as welfare agencies, corrections institutions, citizens groups, courts, mental hospitals, planning agencies and the like.

The following requirements must be met to receive the M.A. degree in applied sociology:

a) Each applicant must complete a specialized course studies designed by a faculty committee of the department with his particular needs and interests in mind.

b) Each student must complete 30 credit hours of course work, of which at least 18 are courses numbered 600 or above, in a manner acceptable to the student’s committee.

c) The committee will evaluate the performance and accomplishments of the candidate by examination; a written thesis is not required.

Initially, the M.A. in applied sociology will permit concentration on any of the following special topics: Social Research Technology, Urban Planning, Population Studies, Deviance and Control, Social Change in Developing Areas, and Teaching of Sociology. Details may be obtained by inquiry to the department of sociology.

SOCIOLOGY

412 Analysis in Demography and Ecology (3)
422 Analysis in Social Organization and Change (3)
432 Analysis in Social Control (3)
442 Analysis in Social Psychology (3)
452 Analysis in Social Institutions (3)
462 Analysis in Applied Sociology (3)
472 Analysis in Sociology: Theory, Methods, Statistics (3)
495 Topics in Sociology: Faculty Projects Normally Limited to 10 students (v)
496 Topics in Sociology: Student Projects (v)
620 Proseminar I: The Sociological Profession (3)
621 Proseminar II: The Field of Sociology (3)
714 Seminar in Methods of Research (3)
715 Seminar in Social Statistics (3)
716 Seminar in Theory Construction (3)
720 Seminar in Social Organization (3)
721 Seminar in Social Institutions (3)
722 Seminar in Group Relations (3)
730 Seminar in Social Disorganization (3)
731 Seminar in Social Change (3)
732 Seminar in Comparative Sociology (3)
740 Seminar in Social Psychology (3)
741 Seminar in Culture and Communication (3)
750 Seminar in Demography and Human Ecology (3)
751 Seminar in Urban and Rural Sociology (3)
799 Directed Research (v)
800 Thesis Research (v)
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; 431, if 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.

Extensive revision of the Spanish M.A. program is under way. Prospective students should be certain to contact an adviser in the field.

Intended candidates for the M.A. in speech-communication may present a bachelor's 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. The Aptitude Test of the Graduate Record
Examination is required. Applicants whose backgrounds are deficient for the successful pursuit of the M.A. degree may be required to strengthen certain areas. Plan A (thesis) and Plan B (nonthesis) are available. Both programs require the completion of SpCom 601 and 602. A minimum of 6 and a maximum of 9 credit hours of graduate work must be taken in a related field outside the department. An oral examination is required near the end of the program. Under Plan A, the thesis will count 6 semester hours. At least 12 semester hours, excluding SpCom 602, must be in courses numbered above 600. Not more than 2 semester hours may be taken in directed research, SpCom 799. Under Plan B, at least 18 semester hours must be in courses numbered above 600.

The above is under review and possible modification. For further details, please write the department chairman.

SPEECH-COMMUNICATION (SpCom)

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 (v)
601 History of Theory and Trends in Speech-Communication Research (3)
602 Methods of Scientific Research in Speech-Communication (3)
610 Organic Disorders of Speech (3)
612 Functional Disorders of Speech (3)
613 Language Development for Children with Hearing Deficiencies (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 (v)
800 Thesis Research (v)

Speech Pathology and Audiology

Graduate Faculty

M. Ansberry, Ph.D. (Chairman)—audiology
S. Batkin, M.D.—speech science
D. D. Craven, M.A.—speech pathology, audiology
D. F. McPherson, Ph.D.—speech pathology, audiology
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 30 undergraduate semester credits in the area including basic courses in speech correction, methodology, pathology of speech, audiology, testing of hearing, habilitation and rehabilitation of hearing, speech and hearing science, and practicum in both speech pathology and audiology. A minimum of 12 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. This presupposes a strong undergraduate major and preparation in the areas listed above. 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)
602 Diagnostic Procedures in Speech Pathology (3)
603 Advanced Audiology (3)
610 Organic Disorders of Speech (3)
612 Functional Disorders of Speech (3)
613 Language Development for Children with Hearing Deficiencies (3)
710 Advanced Practicum in Speech Pathology (1-3)
711 Advanced Practicum in Audiology (1-3)
712 Advanced Practicum in Speech Pathology (6)
720 Seminar in Functional Disorders of Speech (3)
721 Seminar in Audiology—Diagnostic Procedures (3)
722 Seminar in Organic Disorders of Speech (3)
723 Seminar in Audiology—Rehabilitative Procedures (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

F. I. Kamemoto, Ph.D. (Chairman)—comparative endocrinology
J. M. Arnold, Ph.D.—developmental biology
J. H. Bailey-Brock, Ph.D.—invertebrate zoology
A. H. Banner, Ph.D.—invertebrate zoology, systematics
J. E. Bardach, Ph.D.—sensory physiology, behavior, ecology
A. J. Berger, Ph.D.—ornithology, human and avian anatomy
M. G. Hadfield, Ph.D.—developmental biology of invertebrates
S. R. Haley, Ph.D.—invertebrate embryology
P. Helfrich, Ph.D.—ichthyology
R. E. Kane, Ph.D.—cell biology
A. A. Kay, Ph.D.—malacology
R. A. Kinzie III, Ph.D.—coral reef biology, marine ecology
G. S. Losey, Jr., Ph.D.—marine ecology, behavior
J. A. Maciolek, Ph.D.—limnology, fishery biology
A. N. Popper, Ph.D.—sensory processes of animal communication
S. A. Reed, Ph.D.—coral physiology
E. S. Reese, Ph.D.—behavior, ecology, invertebrate zoology
E. D. Stevens, Ph.D.—physiology
J. S. Stimson, Ph.D.—population ecology, marine ecology
A. L. Tester, Ph.D.—fishery biology, biometry
S. J. Townsley, Ph.D.—invertebrate zoology, ecology, radiobiology
P. B. van Weel, Ph.D.—physiology, physiological ecology

Affiliate Faculty

E. C. Evans III, Ph.D.—cetacean sonar systems
G. W. Harvey, Ph.D.—cetacean sound production and reception: air-sea interface analysis
F. J. Hester, Ph.D.—fishery biology
K. S. Norris, Ph.D.—marine mammals
J. E. Randall, Ph.D.—ichthyology
Z. H. Shehadeh, Ph.D.—physiology of fishes
M. Takata, M.S.—fishery biology
A. C. Ziegler, Ph.D.—vertebrate zoology

Intended candidates for the M.S. or Ph.D. degrees 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, and have completed two years of chemistry (inorganic and organic). One year of physics and courses in calculus and botany. Deficiencies in undergraduate preparation must be made up without graduate credit. An official record of the student's performance of the Graduate Record Examination (Aptitude Test and the Advanced Test in Biology) must be submitted to the chairman of the zoology program before any action will be taken on applications for admission.

Zooology courses listed below receive graduate credit if not taken to satisfy undergraduate deficiencies. One seminar or topics course 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, physics, psychology and other related areas. For the Ph.D., additional work will be stipulated by the supervising committees. Ph.D. candidates must pass a reading examination in one foreign language.

Ultimately, it is the responsibility of the student to be aware of the requirements of the program in which she or he is enrolled. This information is available in this catalog and departmental memoranda. Following familiarization with the requirements, the student should consult the faculty adviser.

ZOOLOGY (Zool)

416  Histology (3)
417  Microtechnique (3)
420  Embryology (4)
421  Developmental Biology (3)
430  Animal Physiology (4)
435  Endocrinology (2)
441  History of Zoology (2)
450  Natural History of the Hawaiian Islands (2)
460  Avian Biology (3)
465  General Ichthyology (3)
470  Limnology (3)
480  Animal Evolution (3)
564  Comparative Endocrinology (3)
565  Comparative Endocrinology Laboratory (1)
566  Principles of Animal Behavior (2)
567  Principles of Animal Behavior Laboratory (1)
568  Growth and Form (4)
569  Biology of Symbiosis (3)
570  Topics in Developmental Biology (v)
571  Seminar in Teaching (1)
572  Marine Ecology (3)
573  Isotopic Tracers in Biology (3)
574  Biometry (3)
575  Advanced Biometry (3)
576  Comparative Invertebrate Physiology (3)
577  Advanced Ichthyology (3)
578  Seminar in Zoology (1)
579  Directed Research (v)
580  Preparation of Scientific Manuscripts (1)
581  Topics in Animal Behavior (v)
582  Topics in Invertebrate Zoology (3)
583  Topics in Fish and Fisheries Biology (3)
584  Topics in Animal Physiology (3)
585  Thesis Research (v)
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CORRESPONDENCE DIRECTORY

Detailed information on specific items may be obtained by writing to the offices listed below.

Add: University of Hawaii
   Honolulu, Hawaii 96822

Undergraduate Admissions
   Director, Admissions and Records
   Bachman Hall 125
   2444 Dole Street

Graduate Student Admissions
   Admissions, Graduate Division
   Spalding Hall 354
   2540 Maile Way

Dormitories
   Student Housing Office
   Johnson Hall A
   2555 Dole Street

Scholarships and Loans
   Financial Aids Office
   1627-A Bachman Place

Curriculum Information
   Dean of Student Services
   (College or School)

Graduate Assistantships
   Chairman of (Department)

Summer Session
   Dean of Summer Sessions
   Krauss Hall 101
   2500 Dole Street

Foreign Students
   International Student Office
   Webster Hall 101
   2528 The Mall

Student Services
   Dean of Student Affairs
   Bachman Hall 124-B
   2444 Dole Street

Student Activities
   Bureau of Student Activities
   Hemenway Hall 204
   2443 Campus Road

UNIVERSITY OF HAWAII
Office Locations

Admissions and Records Office, Bachman 125
Athletics Office, Varsity Building
Business Office, Bachman 110
Campus Police, Physical Plant Bldg.
College of Arts and Sciences, Webster 204
   Student Services, Bachman Annex 10
College of Business Administration, BusAd-C 204
   Travel Industry Management, BusAd-B 203
College of Education, Wist Annex-2 128
   Student Services, Wist Annex-2 224
College of Engineering, Keller 119
College of Health Sciences and Social Welfare
   Medicine, Biomed-T 101
   Nursing, Webster 416
   Public Health, Biomed-D 208
   Social Work, Hawaii 117
College of Tropical Agriculture, Gilmore 209
Community College Office, 2327 Dole St.
Continuing Education, 2500 Dole St.
   Student Services, Rm. 105
Counseling and Testing Center, 1615 East-West Rd.
Financial Aids, Bachman Annex 2

Foreign Student Adviser (International Student Office),
   Webster 101
Graduate Division, Spalding 359
   Student Services, Spalding 354
Honors & Selected Studies Program,
   Sinclair Library 504-B
Ka Leo Office, Hemenway 140
KHET Educational TV, Wist 205
KTUH Radio, Hawaii 206
Lost and Found, Hemenway 204
New College, 2001 Vancouver Dr.
Parking and Traffic, Auxiliary Services Building
Placement and Career Planning, 1631 Correa Rd.
Selective Service Adviser, Bachman 124
Student Activities Bureau, Hemenway 204
Student Employment, Bachman Annex 2
Student Health Service, 1710 East-West Rd.
Student Housing, Johnson A
Summer Session, 2500 Dole St., Rm. 101
Tutoring and Services to Handicapped (Kokua),
   Bachman Annex 12
U.S. Post Office, Bookstore Annex